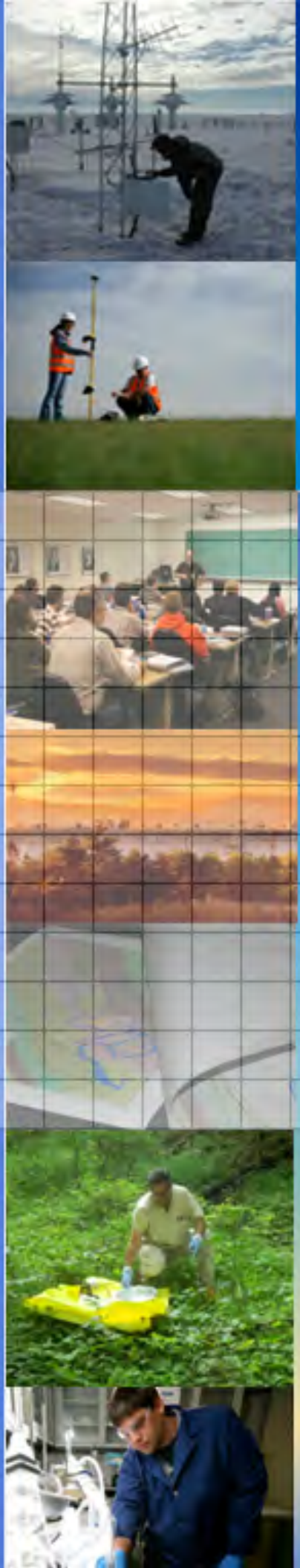

DATA SHARING REPORT CHARACTERIZATION OF ISOTOPE ROW FACILITIES OAK RIDGE NATIONAL LABORATORY OAK RIDGE, TENNESSEE

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This document is approved for public release per review by:

Christopher Poe December 6, 2013
ORNL Classification Officer Date

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OAK RIDGE NATIONAL LABORATORY
OAK RIDGE, TENNESSEE

Prepared by
Phyllis C. Weaver
Independent Environmental Assessment and Verification Program
Oak Ridge Associated Universities

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Prepared by: _____ Date: 12/19/13
P. C. Weaver, Project Manager
Independent Environmental Assessment
and Verification Program

Reviewed by: Wade P. Ivey Date: 12/19/13
W. P. Ivey, Laboratory Group Manager
Independent Environmental Assessment
and Verification Program

Reviewed by: Paige Benton Date: 12/19/2013
P. H. Benton, Quality Assurance Specialist
Independent Environmental Assessment
and Verification Program

Reviewed and approved for release by: _____ Date: 12/19/2013
T. J. Vitkus, IEAV Associate Director
Independent Environmental Assessment
and Verification Program

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ACRONYMS

ACM	asbestos-containing material
ARRA	American Recovery and Reinvestment Act
COC	contaminant of concern
cpm	counts per minute
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
dpm	disintegrations per minute
DQO	data quality objective
EM-OR	Oak Ridge Office of Environmental Management
EMWMF	Environmental Management Waste Management Facility
EPA	U.S. Environmental Protection Agency
HPGe	high-purity germanium
ISOCS	In-Situ Object Counting System
LSC	liquid scintillation counting
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
NDA	nondestructive assay
ORAU	Oak Ridge Associated Universities
ORISE	Oak Ridge Institute for Science and Education
ORNL	Oak Ridge National Laboratory
PCB	polychlorinated biphenyl
PEMS	Project Environmental Measurements System
PK	process knowledge
PSP	project-specific plan
RCRA	Resource Conservation and Recovery Act
ROC	radionuclides of concern
S&M	surveillance and maintenance
SMO	Sample Management Office
TCLP	Toxicity Characteristic Leaching Procedure
TSDR	treatment, storage, disposal, or recycling
UCOR	URS|CH2M Oak Ridge, LLC
UTB	University of Tennessee-Battelle

DATA SHARING REPORT
CHARACTERIZATION OF ISOTOPE ROW FACILITIES
OAK RIDGE NATIONAL LABORATORY
OAK RIDGE, TENNESSEE

1. BACKGROUND

The U.S. Department of Energy (DOE) Oak Ridge Office of Environmental Management (EM-OR) requested that Oak Ridge Associated Universities (ORAU), working under the Oak Ridge Institute for Science and Education (ORISE) contract, provide technical and independent waste management planning support using funds provided by the American Recovery and Reinvestment Act (ARRA). Specifically, DOE EM-OR requested ORAU to plan and implement a survey approach, focused on characterizing the Isotope Row Facilities located at the Oak Ridge National Laboratory (ORNL) for future determination of an appropriate disposition pathway for building debris and systems, should the buildings be demolished. The characterization effort was designed to identify and quantify radiological and chemical contamination associated with building structures and process systems.

The Isotope Row Facilities discussed in this report include Bldgs. 3030, 3031, 3032, 3033, 3033A, 3034, 3036, 3093, and 3118, and are located in the northeast quadrant of the main ORNL campus area, between Hillside and Central Avenues. Construction of the isotope production facilities was initiated in the late 1940s, with the exception of Bldgs. 3033A and 3118, which were enclosed in the early 1960s. The Isotope Row facilities were intended for the purpose of light industrial use for the processing, assemblage, and storage of radionuclides used for a variety of applications (ORNL 1952 and ORAU 2013).

The Isotope Row Facilities provided laboratory and support services as part of the Isotopes Production and Distribution Program until 1989 when DOE mandated their shutdown (ORNL 1990). These facilities performed diverse research and developmental experiments in support of isotopes production. As a result of the many years of operations, various projects, and final cessation of operations, production was followed by inclusion into the surveillance and maintenance (S&M) project for eventual decontamination and decommissioning (D&D). The process for D&D and final dismantlement of facilities requires that the known contaminants of concern (COCs) be evaluated

and quantified and to identify and quantify any additional contaminants in order to satisfy the waste acceptance criteria requirements for the desired disposal pathway. Known facility contaminants include, but are not limited to, asbestos-containing material (ACM), radiological contaminants, and chemical contaminants including polychlorinated biphenyls (PCBs) and metals.

2. BUILDING DESCRIPTIONS AND HISTORY

The Isotope Row facilities, excluding the 3093 Krypton cylinders enclosure, are of steel-frame construction enclosed with corrugated aluminum siding. All building structures have a flat roof of either rubber coating or tar and gravel. The exterior surfaces of Bldgs. 3033, 3033A, and 3034 have been coated with a polyurethane foam sealant and the remaining buildings have only been painted. The 3093 enclosure is an open-roofed, reinforced poured-concrete structure which houses four stainless steel cylinders.

Seven of the Isotope Row Facilities— Bldgs. 3030, 3031, 3032, 3033, 3033A, 3093, and 3118—are managed by URS|CH2M Oak Ridge, LLC (UCOR). University of Tennessee-Battelle (UTB) manages Bldgs. 3034 and 3036. The 3099 Pad was originally included with the listed Isotope Row buildings; however, 3099 is a concrete slab and slabs were not within scope for characterization sampling activities (ORISE 2011). A process knowledge (PK) document that summarizes each building's mission, process, and operational history is provided in App. A.

2.1. URS|CH2M OAK RIDGE, LLC (UCOR) FACILITIES

2.1.1 Building 3030

Buildings 3030, Isotope Production Laboratory C, was designed for limited production and processing of reactor-produced beta/gamma-emitting radioisotopes for industrial, medical, and research applications (ORNL 1997a). Building 3030 contains one manipulator-type hot cell, a laboratory work bench in the center of the building, and fume hoods for material processing. Radionuclides that were processed in Bldg. 3030 included Co-56, Co-57, Au-198, Fe-55, Np-234, Se-75, Sr-90, Sn-119m, U-237, P-33, and Ir-192. The general facility is posted as a contamination area. Fume hoods, glove boxes, and work benches are typically posted as contamination areas;

however, there are items such as sinks and the hot cell that are posted as high contamination areas. The top of the hot cell is posted as a radiation area as a result of the off-gas and ventilation ducts that have limited shielding material.

2.1.2 Building 3031

Building 3031, Isotope Production Laboratory D, was designed to processes isotopes from irradiated targets from the High Flux Isotope Reactor, the Oak Ridge Research Reactor, and the 86-in Cyclotron (ORNL 1997b). The final separation stage of Gd-153 from europium targets was conducted in the 3031 hot cell (ORNL 1997b). The general facilities are posted as contamination areas; however, fume hoods, gloveboxes, and work benches are typically posted as contamination areas. There are items such as sinks and the hot cells that are posted as high contamination areas. The top of the hot cell is posted as a radiation area because of the high dose rate from the off-gas and ventilation ducts as a result of limited shielding material.

2.1.3 Building 3032

Building 3032 is the Radioisotopes Production Laboratory E which served as a radiochemical analytical support facility for isotopes production (ORNL 1996). Building 3032 contains a series of five laboratory hoods and once housed glove boxes for operations utilizing Am-241 (ORNL 2010). The 3032 laboratory facility processed irradiated targets from the High-Flux Isotope Reactor, the Oak Ridge Research Reactor, and the 86-in Cyclotron (ORNL 1997c). Fume hoods are posted as contamination areas and the facility is posted as a controlled area.

2.1.4 Building 3033

Building 3033 served as the Krypton and Tritium Facility and contained the radioisotope processing systems for handling gaseous H-3, Kr-85, and C-14 (ORNL 1990). C-14 processing was discontinued in 1975, the last Kr-85 campaign was in 1989, and the last processing of H-3 was in 1990. Tritium and Kr-85 were separate operations which involved purification of bulk product for sale and distribution to private and government customers. Building 3033 is a controlled area; however, the H-3 Room is a posted contamination area (ORNL 1997d).

2.1.5 Building 3033A

Building 3033A was the Actinide Fabrication Facility. This building was used to distribute highly enriched actinide isotopes and for a period housed a small C-14 production area in what was later used as a storage room. Building 3033A contained gloveboxes and hoods that supported production, loading, welding, and decontamination of neutron dosimeter materials as well as the weighing and packaging of milligram to gram quantities of actinide materials for research applications (ORNL 2005). The Isotopes Facilities Deactivation Project also used Building 3033A for fabrication of weapons grade Pu-239 source standards for neutron assay system verification (ORNL 2010). 3033A is posted as a controlled area; however, the storage room is posted as a contamination area.

2.1.6 Building 3093

The 3093 Krypton Storage Cubicle, more commonly referred to as the Krypton Enclosure, is a concrete structure that contains four charcoal-filled storage tanks. This system stored the Kr-85 feed material for Krypton operations conducted in Bldg. 3033 (ORNL 1997d). The 3093 facility is posted as a controlled area.

2.1.7 Building 3118

The area between Bldgs. 3030 and 3031 is Bldg. 3118, Isotope Production Laboratory H. It was originally an open concrete storage pad that was enclosed in the 1960s. The primary purpose for Building 3118 was to provide covered access to the rear entry hot cell doors for Bldgs. 3030 and 3031. Building 3118 contained a charging station and storage area for battery-powered forklifts and served as storage for sources and temporary holding of shielding materials, casks, and wastes (ORNL 1997e). Building 3118 is posted as a controlled area.

2.2. UT-BATTELLE FACILITIES

2.2.1 Building 3034

Building 3034 is the electrical distribution center for Isotope Row facilities. This building has been used as the receiving area for materials and supplies to support the 3047B hot cell activities, Plant and Equipment Division services shop, storage, and most recently as a break room (ORNL 1997f).

The high ceiling allows for a mezzanine which is located on the west side of the building. Underneath the mezzanine are two portable-style office units used by S&M personnel.

2.2.2 Building 3036

Building 3036 initially served as ORNL's decontamination facility for equipment and transport vehicles (ORNL 1990). This operation was managed by the Waste Operations Group until the building was converted for storage in 1965 (WMI 2011). A new concrete floor was then poured and the decontamination acid bath pit beneath the north end of the building was filled in (ORNL 1990 and P2S 2007). In 1970, the building was designated as the U.S. Department of Transportation (DOT) storage and packaging facility for shipping and receiving stable isotopes. DOT operations continued until December 2011. Building 3036 also has a mezzanine used for storage, located along the north end of the building. In the center of the building is an operating 3-ton crane. The building is currently posted as having fixed contamination.

3. CONTAMINANTS OF CONCERN

A variety of diverse research and development processes were performed at Isotope Row involving both chemical and radiological constituents. Additionally, the facilities themselves may have been constructed or maintained using materials that could potentially represent a hazard if disposed. Based on historical site use, general survey and scoping data, and information from operations personnel, the probable contaminants of concern (COCs) include ACM, PCBs, various heavy metals (e.g., lead, cadmium, nickel), and radionuclides. A specific list of radionuclides is provided in Table 3.1. Short half-life radionuclides are included because these had been listed in existing PK documents. Knowledge of the chemical and radiological constituent concentrations is required to ultimately satisfy the waste acceptance criteria for a specified treatment, storage, disposal, or recycling (TSDR) facility, considering the waste populations for these facilities.

Table 3.1 Contaminants of Concern Isotope Row Facilities Oak Ridge National Laboratory			
Radionuclides of Concern			
Ac-228	Cm-245/246	Pb-212*	Tc-99
Am-241	Eu-152	Pb-214*	Th-228
Am-243	Eu-154	Pu-238	Th-229
Au-198	Eu-155	Pu-239/240	Th-230
Ba-133	Fe-55	Pu-241	Th-232
Bi-212	H-3	Pu-242	Th-234*
Bi-214	I-129	Pu-244	U-233/234
C-14	Kr-85	K-40	U-235/236
Cs-134	Ni-63	Pm-147*	U-237
Cs-137	Np-234	Ra-226	U-238
Co-56	Np-234	Ra-228	Gd-153
Co-57	P-33	Sr-90	Sn-119m
Co-60	Pa-233	Se-75	Ir-192
Chemicals of Concern			
ACM	PCB	Heavy Metals	

*Short half-life radionuclides

4. CHARACTERIZATION METHODOLOGY

A graded data quality objectives (DQOs) process was use for determining the COC constituent concentration data quantity and quality necessary for developing a building debris disposal path to an approved TSDR facility. The DQOs were developed in accordance with the U.S. Environmental Protection Agency's (EPA) *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA 2006). The EPA guidance outlines the seven steps of the DQO process which was used to define the requirements to identify target waste populations, sampling and analytical methodology, tolerance limits, decision errors, optimization for specific sampling requirements, and adjustments for biased sampling.

The Isotope Row facilities will be dismantled for disposal; however, data are insufficient to determine whether the expected waste populations will meet the waste acceptance criteria of potential TSDR facilities. Most importantly, it needs to be determined whether or not most of the debris from these facilities could be disposed at the Environmental Management Waste

Management Facility (EMWMF). The expectation of the DQO process was to identify the requirements for characterization that would address this disposal decision.

The DQO requirements included a review of historical PK, identifying available radiological measurements and analytical data, visual inspection, collection of measurements and samples, and sample analysis. The approach for meeting the DQO requirements was developed by a project team and set forth in a project-specific plan (PSP) which outlined several methodologies for collecting the necessary information (ORAU 2013). The DQO requirements bound the characterization study to the selected nine facilities above-grade structural components (with the exception of floor tile) and interior process systems. The design considered the collection of data that would meet the most restrictive of waste acceptance criteria based on radiological concentrations. The radionuclides concentrations would have to meet the sum-of fractions requirement for the EMWMF, which has the most restrictive disposal requirements of the other potential facilities. Additionally, during DQO development, it was determined that the concentration of PCBs, lead, and other metals in paint, and the historical levels of chromium identified in similar corrugated siding, had to be evaluated as part of the disposal requirement of a listed waste determination., Ultimately, the DQO process led to the number and types of samples to be collected as well as the analytical suite required to address the disposal decision data gaps for each building. These DQO outputs are summarized in Table 4.1. Data collection described in the following sections was performed in accordance with the PSP, the ORAU/ORISE Survey Procedures Manual, and specific work package addenda requirements (ORAU 2013 and ORAU/ORISE 2013a).

Table 4.1. Data Quality Objectives: Facility Sampling Requirement										
P/A[a]	**Area /System[b]**	**Bldg. 3030**	**Bldg. 3118**	**Bldg. 3031**	**Bldg. 3032**	**Bldg. 3033**	**Bldg. 3033A**	**Bldg.3034**	**Bldg.3036**	**Bldg. 3093**
P	**Interior Building Surfaces**	3 locations Rad[c] – full suite 1 location judgmental Rad – full suite	2 locations Rad – full suite	3 locations Rad – full suite 3 locations – judgmental Rad – full suite	6 locations Rad – full suite	3 locations plus 2 judgmental Rad – full suite 1 judgmental location floor– PCB	6 locations Rad – full suite 1 judgmental location – floor tile	15 gross alpha and beta smears 3 judgmental locations Paint (PCB and total metals)	10 locations Rad – full suite Total metals	3 locations Rad – full suite
A	**Interior Building Surfaces**	3 locations Rad[c] – full suite 6 judgmental location Rad – full suite	3 locations Rad – full suite 5 judgmental location Rad – full suite	3 locations Rad – full suite 5 locations – judgmental Rad – full suite	6 locations Rad – full suite 6 locations – judgmental Rad – full suite 1 judgmental sample of floor tile Rad – full suite	7 locations Rad – full suite 2 judgmental Rad – full suite 1 sample of floor tile Rad	11 locations Rad – full suite 2 judgmental locations – floor tile (PCB)and 1 internal wall Rad – full suite	15 gross alpha and beta smears 3 judgmental locations Paint (PCB and total metals) 4 judgmental locations	2 samples from ceiling 8 samples from interior wall (no metal) 1 sample from structural beam and 1 judgmental floor tile (PCB) Rad – full suite TCLP and Total metals	**3 samples collected from the interior of the concrete enclosure**
P	**Exterior Building Surfaces**							1 judgmental location TCLP and Total metals, Rad– full suite		
A	**Exterior Building Surfaces**							1 sample from corrugated siding TCLP and Total metals, Rad– full suite	3 samples from wall; includes interior and exterior component TCLP and	

Table 4.1. Data Quality Objectives: Facility Sampling Requirement										
P/A[a]	**Area /System[b]**	**Bldg. 3030**	**Bldg. 3118**	**Bldg. 3031**	**Bldg. 3032**	**Bldg. 3033**	**Bldg. 3033A**	**Bldg.3034**	**Bldg.3036**	**Bldg. 3093**
									Total metals, Rad– full suite	
P	**Piping/Duct /Filters**	11 locations Rad – full suite, TCLP metals (5)	1 location Rad – full suite	11 locations Rad – full suite, TCLP metals 2 locations judgmental Rad – full suite, TCLP metals	8 locations plus 1 judgmental Rad – full suite, TCLP metals	8 locations Rad – full suite TCLP metals	5 locations plus 2 judgmental Rad – full suite TCLP metals	1 location TCLP and total metals Rad – full suite†		
A		NDA on hot cell process duct and hot cell ventilation. 3 samples from Rooftop filters and fan TCLP metals and Rad – full suite 5 Process duct locations 1 sink drain	1 locations Sink Rad – full suite and TCLP metals	NDA on hot cell process duct, 3 samples from Rooftop filters and fan TCLP metals and Rad – full suite 7 Process duct locations Rad – full suite, TCLP metals	1 Sink. 6 process ducts, 1 judgmental drain pipe, Rad – full suite, TCLP metals	7 process duct and 1 sink locations Rad – full suite TCLP metals	4 process duct locations 1 judgmental Rad – full suite TCLP and Total metals 1 HEPA filter	Pipe sample not collected in 3034 to avoid potential building contamination. Pipe sample collected in 3033A. Rad – full suite TCLP and Total metals		
P	**Hot Cell (HC)**	1 location– judgmental Rad – full suite, TCLP metals		1 location – judgmental Rad – full suite, TCLP metals		2 locations – judgmental Rad – full suite, TCLP metals				

Table 4.1. Data Quality Objectives: Facility Sampling Requirement										
P/A[a]	**Area /System[b]**	**Bldg. 3030**	**Bldg. 3118**	**Bldg. 3031**	**Bldg. 3032**	**Bldg. 3033**	**Bldg. 3033A**	**Bldg.3034**	**Bldg.3036**	**Bldg. 3093**
A		1 Rad — full suite of residual encapsulating material. Stainless Steel lining not sampled. No TCLP metals. NDA on hot cell		Stainless steel lining not sampled No TCLP metals. No access to allow adequate clearance for equipment. NDA on hot cell		2 Carbon filters above cell – judgmental Rad – full suite,				
P	**Hood/ Equipment**	1 location – judgmental Rad – full suite, TCLP metals		1 location – judgmental Rad – full suite TCLP metals	6 locations – judgmental (includes a sink inside a fume hood) Rad – full suite, TCLP metals	4 locations – judgmental Rad – full suite, TCLP metals				
A		See glovebox entry		See glovebox entry	6 locations– judgmental Rad – full suite, TCLP metals	2 locations in Tritium room; Carbon reactor vessel and slug carrier – total of 4 judgmental Rad – full suite, TCLP metals				
P	**Glovebox**	2 locations – judgmental Rad – full suite, TCLP metals		3 locations – judgmental Rad – full suite, TCLP metals						

Table 4.1. Data Quality Objectives: Facility Sampling Requirement										
P/A[a]	**Area /System[b]**	**Bldg. 3030**	**Bldg. 3118**	**Bldg. 3031**	**Bldg. 3032**	**Bldg. 3033**	**Bldg. 3033A**	**Bldg.3034**	**Bldg.3036**	**Bldg. 3093**
A		3 fume hood/glovebox Rad – full suite, TCLP metals		3 fume hood/glovebox Rad – full suite, TCLP metals						
P	**Roof**	2 locations Rad – full suite				2 locations Rad – full suite			1 sample from roof	
A		Sample not collected; no roof sampling allowed, per facility management & DOE				Sample not collected; no roof sampling allowed, per facility management & DOE			Sample not collected; no roof sampling allowed, per facility management & DOE	
P	**Cylinder**									5 cylinder locations TCLP metals, Rad – full suite
A										No samples collected of the cylinders. Could not verify zero energy and pressure on the system. NDA measurement of cylinder collected

Table 4.1. Data Quality Objectives: Facility Sampling Requirement										
P/A[a]	**Area /System[b]**	**Bldg. 3030**	**Bldg. 3118**	**Bldg. 3031**	**Bldg. 3032**	**Bldg. 3033**	**Bldg. 3033A**	**Bldg.3034**	**Bldg.3036**	**Bldg. 3093**
P	**Crane**								Crane (included in count for number of interior samples)	
A									Sampling not allowed; crane remains operational	

[a]P/A = planned/actual
[b]Intrusive sample locations listed in Apps. B and C
PCB = polychlorinated biphenyls
RAD = radionuclides
TCLP = toxicity characteristic leaching procedure

4.1 SURFACE SCANS

Limited scans of the building interior surfaces, representing approximately 50 percent coverage, were performed during the scoping surveys in 2010. However, at the time of the scoping surveys, the random/systematic sample locations had not yet been determined. Therefore, during the characterization survey effort, additional scans for alpha and beta radiation were performed over a one-square meter area surrounding each measurement and sampling location to determine the presence of any localized elevated radiation levels. The scan density increased or decreased depending upon existing PK, identified data gaps, and the configuration of the measurement location. If localized elevated direct radiation levels were identified within the one-square meter area, then that specific location was marked for sampling. Scans were conducted using Ludlum Model 43-92 and 44-142 scintillation detectors and gamma scintillation detectors connected to Ludlum Model 2221 ratemeter-scalers with data logging capabilities.

4.2 SAMPLING AND MEASUREMENT

The survey approach used a combination of random systematic and judgmental sampling, collection of surface activity measurements, and sampling for removable radioactivity, as specified by the PSP or as identified during scan evaluation. Representative samples of the major construction material types present in each facility were collected, dependent upon accessibility. Random systematic sampling and measurement locations were generated using Visual Sampling Plan software (version 6.0 or greater) based on the statistical requirement specified in the PSP. Biased samples and measurements were collected at locations of most probable contamination (ORAU 2013). The numbers of samples required were adjusted to accommodate the inclusion of biased samples to characterize for Resource Conservation and Recovery Act (RCRA) requirements.

4.2.1 Total and Removable Surface Activity Measurements

Direct measurements for quantifying total alpha and beta surface activity levels were collected at Random systematic and judgmental locations. The random locations were generated using Visual Sample Plan (VSP) Version 6.0 or greater, software. Judgmental surface activity measurements were collected at locations exhibiting elevated direct radiation levels as identified by surface scans. Direct measurements were performed using Ludlum Model 43-92 and 44-142 scintillation detectors coupled to Ludlum model 2221 ratemeter-scalers. Smear samples and/or large area wipes were

collected primarily for determining removable gross alpha and gross beta surface activity levels and, when specified, for quantifying C-14 and H-3 concentrations. Smears were also collected when access restrictions prevented the use of sampling tools, or when any intrusive sampling could impact structural integrity or operations, or compromise the safety of the worker.

Total and removable surface activity measurement locations are provided in Appendix B.

4.2.2 Sample Collection

Volumetric building construction material and system samples were collected for laboratory analyses to quantify radiological and chemical contaminant concentrations. Sample locations were selected using both random systematic and judgmental methods. Facility structures and systems were evaluated separately. VSP was used to generate the random sample locations for structural surfaces. The combination of PK, scan results, and visual observations were used to judgmentally select process system sampling locations.

Samples included media such as paint, filters, insulation, and materials of construction (e.g., metal, drywall). Power tools were used to cut metal surfaces and hand tools were used to collect filters and insulation. Paint was scraped from the surface to obtain a sample. However, if the paint could not easily be removed, a sample coupon of the material type with the intended paint color was collected. Sampled media were size-reduced in the field based on specific container size requirements. Appendix B provides the sampling location maps and descriptions, and includes photo documentation of the sampling location or actual sample.

4.2.3 Nondestructive Assays

Nondestructive assays (NDAs) were performed using Canberra's in-situ high-purity germanium (HPGe) measurement system, and data are presented in App. F. Calibration efficiencies were generated using In-Situ Object Counting System (ISOCS) software from dimensions and material compositions measured during field activities. In-situ measurements were performed on systems where the radiation fields prevented the collection of a volumetric sample. The in-situ HPGe was positioned above both hot-cells at a location where the cell off-gas ventilation leaves the top of the cells and at the location of highest direct radiation measurement identified from the off-gas fume hood measurements. ISOCS measurements of the 3093 enclosure were selected instead of

volumetric sampling because facility management could not confirm that the system was not under pressure, and therefore a significant risk existed for a radiological material release.

4.3 CHARACTERIZATION METHODOLOGY FOR BUILDING 3034

Based on the PK for Bldg. 3034, it was determined that materials associated with this building could meet the Y-12 Landfill waste disposal requirements. The PK and available scoping survey data were used in the DQO planning for Bldg. 3034, to design a characterization survey that followed the *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)* guidance and adequately assess the building's radiological status (NRC 2000). The characterization survey included collecting random/systematic and biased radiological measurements for total and removable contamination as provided in Appendix B.

The DQO process also identified an additional data gap for PCBs, particularly in paint and metals that must meet the waste disposal requirements for the landfill. To address this gap, judgmental intrusive samples of paint and structural metal constituents was added. The sampling design considered the variations of paint color, age of the structures, and whether scoping surveys had identified any measurable radioactivity.

4.3.1 Surface Scans

Limited scans of the building surface areas, approximately 50 percent, were performed during the scoping surveys in 2010. However, at the time of the scoping surveys, the random/systematic sample locations had not yet been determined. Therefore, during the characterization survey effort, additional scans for alpha and beta radiation were performed over a one-square meter area surrounding each measurement and sampling location to determine the presence of any localized elevated radiation levels. The scan density increased or decreased depending upon existing PK, identified data gaps, and the configuration of the measurement location. If elevated direct radiation was identified, then that location was selected for sampling. Scans were conducted using Ludlum Model 43-92 and 44-142 scintillation detectors alpha and beta scintillation detectors and NaI gamma scintillation detectors connected to Ludlum Model 2221 ratemeter-scalers with data logging capabilities.

4.3.2 Surface Activity Measurements

Direct measurements for total alpha and beta surface activity levels were collected at planned random/systematic locations and at judgmental locations identified during the scoping survey. Measurements were performed using Ludlum Model 43-92 and 44-142 scintillation detectors coupled to Ludlum Model 2221 ratemeter-scalers. A smear sample, for determining removable gross alpha and gross beta surface activity, was collected from each measurement location.

4.3.3 Sample Collection

Smear samples were collected in Bldg. 3034 to identify removable gross alpha and gross beta radioactivity. Volumetric samples were collected for analytical determination of radiological and chemical concentrations, and included paint, residue, and materials of construction (e.g., metal, drywall). Volumetric samples were typically obtained with the help of power-aided hand tools that required special precautions to control potentially contaminated sample media.

5. ANALYTICAL METHODOLOGY

All media samples were returned to the ORAU/ORISE Radiological and Environmental Analytical Laboratory in Oak Ridge, Tennessee and prepared for either analyses or for shipment to another Sample Management Office (SMO)-approved laboratory. Detection and reporting levels for each analyte were to be sufficient to meet the requirements for chemical and radiological analysis were specified in the PSP and are provided in Tables 5.1 and 5.2 (ORAU 2013). Actual detection limits may be sample-specific; however, the data measurement objective was to obtain data with detection limits that were adequate to satisfy these levels. Target detection limits were intended to be at or below waste profile limits. ORAU performed analysis for all radiological samples and conducted the analysis for characteristic metals using the Toxicity Characteristic Leaching Procedure (TCLP). The concentration units for volumetric (laboratory analytical) data are picocuries per gram (pCi/g), milligrams per kilograms (mg/kg), or milligrams per liter (mg/L). Direct and removable surface activity measurement data were corrected for background and instrument efficiency and the results reported in units of disintegrations per minute per 100 cm^2 (dpm/100 cm^2). Total and removable activity results are rounded to two significant figures.

The specified analytical methods, to the extent practicable when based on sample volume, were performed to the designated parameters specified in the PSP. Deviations from the PSP were submitted, documented, and approved by the ORAU Project Manager. All laboratory analyses and QC requirements were performed in accordance with the SAP and laboratory procedures (ORAU 2013 and ORAU/ORISE 2013b).Volumetric samples designated for radiological analysis were analyzed using dissolutions and extractions and counted by alpha spectrometry, gamma spectrometry, gas proportional counting, and/or liquid scintillation counting (LSC) based on the listed COCs in Table 5.2. Stontium-90 was determined by radiochemical separation and counted using low background proportional detection, and Tc-99 was separated by extraction chromatography and analyzed using LSC. Solid samples for H-3 and C-14 were analyzed using a material oxidizer and the resulting scintillation cocktail was analyzed using LSC. Samples specified for toxicity characteristic leaching procedure (TCLP) were analyzed using EPA Method 1311 with the resulting extract digested for inductively coupled plasma mass spectrometry.

Smear samples collected for removable C-14 and H-3 determination were analyzed using the biological material oxidizer process which traps the products in specific scintillation cocktails that are then counted via LSC. Smears collected for gross removable alpha/beta activity were counted using a low background proportional counter. However, large area wipes that had to be collected because access was limited or volumetric samples could not be obtained safely, were counted using gamma spectroscopy. The activity was reported in pCi/sample.

Samples for PCB, ACM, and total metals were sent to a SMO-approved laboratory. The prescribed method for analysis is provided in Table 5.3. ACM analysis was specified by the prescribed method EPA 600R-93/116 to quantify asbestos in bulk building materials. Deviations from specified analytical methods or parameters were required to be submitted, documented, and approved by the ORAU Project Manager. All laboratory analyses and quality control requirements were performed in accordance with the PSP and ORAU/ORISE Laboratory Procedures Manual (ORAU 2013 and ORAU/ORISE 2013b).

Table 5.1. Radiological Analytical Methods, Constituents, and Detection Limits				
Isotope	**Analytical method**	**NNSS exempt**	**EMWMF ASA[c] WAC pCi/g**	**1% of EMWMF ASA WAC**
Am-241	A-Spec[b]	No	1.30E+04	1.30E+02
Cm-243/Cm-244	A-spec	No	2.00E+04	2.00E+02
Pu-238	A-Spec	No	1.50E+04	1.50E+02
Pu-239/240	A-Spec	No	1.30E+04	1.30E+02
Pu-242	A-Spec	No	1.50E+04	1.50E+02
U-233/234	A-Spec	No	1.00E+05	1.00E+03
U-235/236	A-Spec	No	1.00E+05	1.00E+03
U-238	A-Spec	No	1.00E+05	1.00E+03
Am-243 (by Np-239)	G-Spec[d]	No	1.30E+04	1.30E+02
Ba-133	G-Spec	No	NA	NA
Co-60	G-Spec	No	6.90E+06	6.90E+04
Cs-137	G-Spec	No	1.50E+06	1.50E+04
Eu-152	G-Spec	No	4.90E+06	4.90E+04
Eu-154	G-Spec	No	4.90E+06	4.90E+04
Eu-155	G-Spec	No	2.30E+07	2.30E+05
I-129	G-Spec	No	1.50E+03	1.50E+01
K-40	G-Spec	No	4.20E+06	4.20E+04
Kr-85	G-Spec	No	NA	NA
Np-237 (by Pa-233)	G-Spec	No	1.00E+04	1.00E+02
Pa-233	G-Spec	No	NA	NA
Ra-226 (by Pb-214)	G-Spec	No	3.00E+05	3.00E+03
Ra-228 (by Ac-228)	G-Spec	Yes	3.00E+05	3.00E+03
Th-228 (by Pb-212)	G-Spec	Yes	2.50E+04	2.50E+02
Th-229	G-Spec	No	2.30E+03	2.30E+01
Th-230	G-Spec	No	1.50E+04	1.50E+02
Th-232 (by Ac-228)	G-Spec	No	2.50E+03	2.50E+01
Sr-90	LBPC[e]	No	4.00E+05	4.00E+03
Ni-63	LSC[f]	No	1.30E+08	1.30E+06
C-14[a]	LSC	No	1.00E+07	1.00E+05
H-3[a]	LSC	No	4.00E+08	4.00E+06
Pu-241	LSC	No	7.90E+05	7.90E+03
Tc-99	LSC	No	4.20E+07	4.20E+05

[a]Metal samples collected for C-14 and H-3 for will be smeared and the smear analyzed.
[b]A-Spec = alpha spectroscopy
[c]ASA = auditable safety analysis
[d]G-Spec = gamma spectroscopy
[e]LBPC = low background proportional counting
[f]LSC = liquid scintillation counting

Table 5.2. Analytical Methods and Target Detection Limits for Non-radiological SRCs

Analysis type	Parameter	CAS number	Analytical method	Project reporting level (MDA or MDL) (total metals = mg/kg total organics = µg/kg TCLP = mg/L)
PCB	Arochlor-1016	12674-11-2	SW-846-8082A	33
PCB	Arochlor-1221	11104-28-2	SW-846-8082A	33
PCB	Arochlor-1232	11141-16-5	SW-846-8082A	33
PCB	Arochlor-1242	53469-21-9	SW-846-8082A	33
PCB	Arochlor-1248	12672-29-6	SW-846-8082A	33
PCB	Arochlor-1254	11097-69-1	SW-846-8082A	33
PCB	Arochlor-1260	11096-82-5	SW-846-8082A	33
PCB	Arochlor-1262	11096-82-5	SW-846-8082A	33
PCB	Arochlor-1268	11096-82-5	SW-846-8082A	33
PCB	Total PCBs	Total PCBs	SW-846-8082A TPCB	33
METAL	Aluminum	7429-90-5	SW-846-6020	4
METAL	Antimony	7440-36-0	SW-846-6020	1.5
METAL	Arsenic	7440-38-2	SW-846-6020	0.4
METAL	Barium	7440-39-3	SW-846-6020	0.2
METAL	Beryllium	7440-41-7	SW-846-6020	0.1
METAL	Boron	7440-42-8	SW-846-6020	0.1
METAL	Cadmium	7440-43-9	SW-846-6020	0.2
METAL	Calcium	7440-70-2	SW-846-6020	10
METAL	Chromium	7440-47-3	SW-846-6020	0.5
METAL	Cobalt	7440-48-4	SW-846-6020	0.2
METAL	Copper	7440-50-8	SW-846-6020	0.2
METAL	Iron	7439-89-6	SW-846-6020	2
METAL	Lead	7439-92-1	SW-846-6020	1
METAL	Lithium	7439-93-2	SW-846-6020	1
METAL	Magnesium	7439-95-4	SW-846-6020	5
METAL	Manganese	7439-96-5	SW-846-6020	0.2
METAL	Mercury	7439-97-6	SW-846-7471A	0.04
METAL	Molybdenum	7439-98-7	SW-846-6020	1
METAL	Nickel	7440-02-0	SW-846-6020	0.2
METAL	Potassium	7440-09-7	SW-846-6020	10
METAL	Selenium	7782-49-2	SW-846-6020	0.5
METAL	Silver	7440-22-4	SW-846-6020	0.4
METAL	Sodium	7440-23-5	SW-846-6020	25
METAL	Strontium	7440-24-6	SW-846-6020	1
METAL	Thallium	7440-28-0	SW-846-6020	0.5
METAL	Tin	7440-31-5	SW-846-6020	1
METAL	Vanadium	7440-62-2	SW-846-6020	1
METAL	Zinc	7440-66-6	SW-846-6020	0.5
TCLPMET	Arsenic	744-38-2	SW-846-1311/6020	See note a
TCLPMET	Barium	7440-39-3	SW-846-1311/6020	See note a
TCLPMET	Cadmium	7440-43-9	SW-846-1311/6020	See note a
TCLPMET	Chromium	7440-47-3	SW-846-1311/6020	See note a
TCLPMET	Lead	7439-92-1	SW-846-1311/6020	See note a

Table 5.2. Analytical Methods and Target Detection Limits for Non-radiological SRCs

Analysis type	Parameter	CAS number	Analytical method	Project reporting level (MDA or MDL) (total metals = mg/kg total organics = µg/kg TCLP = mg/L)
TCLPMET	Mercury	7439-97-6	SW-846-1311/7470A	See note a
TCLPMET	Selenium	7782-49-2	SW-846-1311/6020	See note a
TCLPMET	Silver	7440-22-4	SW-846-1311/6020	See note a

[a]Reporting levels for TCLP metals are one-tenth the regulatory limit where possible, and at least < the regulatory limit.
CAS = Chemical Abstracts Service registry number
MDA = minimum detectable activity
MDL = method detection limit
PCB = polychlorinated biphenyls
TCLP = toxicity characteristic leaching procedure

6. DQO DEVIATIONS

Departures from the procedures or sampling designs that were specified in the PSP were documented in the deviation log provided in Table 6.1. Deviations included any change in the methodology, requirements, or commitments that would potentially impact sample or data quality or other characterization field survey information collected. Deviations were also necessary and recorded when employee or environmental safety could have negatively or significantly impacted. Deviations from planned activities required authorization by the ORAU Project Manager or designee.

Table 6.1. Isotope Row Characterization Project Deviation Log							
No.	**Description**	**Date Reported**	**Facility**	**Priority (H/M/L)**	**Reported by**	**Resolution/Comment**	**ORAU Concurrence**
1	DOE/UTB expressed concern regarding intrusive sampling of building roofs and recommended no intrusive sampling of roof material.	11/19/12	All	H	K. Rollow	ORAU did not sample any roof material. Sampling will be deferred until such time that the buildings have been scheduled for demolition (E-mail from Rollow to Perez, "ORISE Work" 12/02/2012)	P. Weaver
2	3093 cylinders: Could not verify zero energy and pressure on the systems.	11/19/12	3093	L	P. Weaver	Functional operation not available and decision was made to do ISOCS measurements: Collected 5/14/13.	K. Rollow
3	No sampling of the process pipe performed in Bldg. 3034 due to internal contamination.	12/1/12	3034	H	P. Weaver	Because Bldg. 3034 is considered a low impact, low hazard facility, ORAU elected not to sample the pipe in Bldg. 3034 but rather to sample at its point of origin. Pipe could not be located at point of origin and had to be sampled in Bldg. 3033A (5/7/13).	K. Rollow
4	Crane rail will not be sampled due to possible future use.	12/1/12	3036	H	P. Weaver	UTB has requested that the crane not be surveyed so as to maintain the functional integrity for future use.	K. Rollow
5	The planned sampling location of vertical beam on west wall, with elevated activity, will not be sampled.	12/11/12	3036	H	E. Harpenau	UT-B structural engineer determined that the planned sampling location is a structural support and any intrusive sampling of the beam could compromise the structural integrity of the building. Sample 5114M0011 was not collected.	P. Weaver
6	Planned scanning activities identified area with elevated beta activity at top of west wall.	2/14/13	3033A	L	E. Harpenau	Added sample 5112M0013 located on the beam.	P. Weaver

Table 6.1. Isotope Row Characterization Project Deviation Log							
No.	**Description**	**Date Reported**	**Facility**	**Priority (H/M/L)**	**Reported by**	**Resolution/Comment**	**ORAU Concurrence**
7	Pipe in the former C-14 process area was not sampled as planned. The pipe leads into Bldg. 3033.	3/13/13	3033A	M	E. Harpenau	Pipe will be sampled at the point of origin. Pipe could not be located at point of origin and had to be sampled in Bldg. 3033A (5/7/13).	P. Weaver
8	Pre-sample surveys of the off-gas fume hood duct in the northeast corner of the building found contamination in excess of allowable sampling and transportation limits.	4/10/13	3030	H	E. Harpenau	In-situ measurement was collected instead of volumetric sample (5/13/13).	P. Weaver
9	Loose mercury was identified at sampling location underneath the sink.	4/17/13	3030	H	E. Harpenau	Sample 5108M0010 was not collected at the initially planned location due to worker protection purposes. The sink was closed and secured. Alternate sink trap in the southwest corner of the building sampled as 5108M0010.	P. Weaver
10	Fan blade inaccessible without completely destroying the unit's motor housing.	5/2/13	3030/3031	H	E. Harpenau	Sample collected from the stack pipe instead.	P. Weaver
11	3030/3031 Hot Cells: Samplers were not able to obtain a sample of the steel liner of either hot cell. Sample tools were unsuccessful in penetrating the stainless steel liner.	5/23/13	3030/3031	H	E. Harpenau	Alternate sample collected was of the residual material that coated the hot cell interior..	P. Weaver
12	Random (wall) sample 5108M0023 was inaccessible because it was between two adjacent fume hoods.	8/8/13	3030	M	E. Harpenau	Sample coordinates were adjusted to the closest accessible location. X and Y coordinates were adjusted from 0.1m and 1.3m to 1.3m and 3.15m.	P. Weaver

Table 6.1. Isotope Row Characterization Project Deviation Log							
No.	**Description**	**Date Reported**	**Facility**	**Priority (H/M/L)**	**Reported by**	**Resolution/Comment**	**ORAU Concurrence**
13	Random sample location 5108M0026 was located on the facility access door. Compromising the integrity of outer facility door was unacceptable.	8/8/13	3030	M	E. Harpenau	Sample coordinates were adjusted to the closest accessible wall location. X and Y coordinates were adjusted from 3.9m and 0.6m to 5.0m and 0.6m.	P. Weaver
14	Random sample location 5109M0018 was located on facility access door. Compromising the integrity of outer facility door was unacceptable.	8/12/13	3031	M	E. Harpenau	Sample coordinates were adjusted to the closest accessible wall location. X and Y coordinates were adjusted from 3.5m and 1.7m to 3.1m and 1.7m.	P. Weaver
15	Random sample location 5109M0019 obstructed due to facility utility lines..	8/12/13	3031	M	E. Harpenau	Sample coordinates were adjusted to the closest accessible wall location. X and Y coordinates were adjusted from 5.4m and 0.7m to 6.4m and 0.7m.	P. Weaver
16	Random sample location 5109M0022 was obstructed.	8/12/13	3031	M	E. Harpenau	Sample coordinates were adjusted to the closest accessible wall location. X and Y coordinates were adjusted from 7.3m and 2.7m to 6.3m and 2.7m.	P. Weaver
17	Random sample location 5110M0022 was inaccessible behind fume hood.	8/13/13	3032	M	E. Harpenau	Sample coordinates were adjusted to the closest accessible wall location. X and Y coordinates were adjusted from 0.7m and 1.5m to 1.2m and 1.5m.	P. Weaver
18	Random sample location 5110M0023 was inaccessible due to immovable casework.	8/13/13	3032	M	E. Harpenau	Sample coordinates were adjusted to the closest accessible wall location. X and Y coordinates were adjusted from 3.0m and 0.5m to 2.8m and 0.5m.	P. Weaver
19	Sample could not be collected through stainless steel at random sample location 5110M0024.	8/13/13	3032	M	E. Harpenau	Sample coordinates were adjusted to the closest accessible metal wall location. X and Y coordinates were adjusted from 7.5m and 0.9m to 6.7m and 2.1m.	P. Weaver

Table 6.1. Isotope Row Characterization Project Deviation Log							
No.	**Description**	**Date Reported**	**Facility**	**Priority (H/M/L)**	**Reported by**	**Resolution/Comment**	**ORAU Concurrence**
20	Random sample location 5110M0027 was inaccessible due to the presence of an electrical box.	8/13/13	3032	M	E. Harpenau	Sample coordinates were adjusted to the closest accessible wall location. X and Y coordinates were adjusted from 2.3m and 2.2m to 1.5m and 2.2m.	P. Weaver
21	Random sample location 5111M0024 was inaccessible due to the presence of an electrical box and associated conduit.	8/14/13	3033	M	E. Harpenau	Sample coordinates were adjusted to the closest accessible wall location. X and Y coordinates were adjusted from 3.2m and 0.8m to 2.2m and 0.6m.	P. Weaver
22	Random sample location 5110M0026 was inaccessible due to the location of carbon-14 reactor vessel and support structures.	8/14/13	3033	M	E. Harpenau	Sample coordinates were adjusted to the closest accessible wall location. X and Y coordinates were adjusted from 5.9m and 0.3m to 6.7m and 1.8m.	P. Weaver
23	Random sample location 5114M0012 was inaccessible due to its location above the metal roof over the walking path between buildings.	8/26/13	3036	M	E. Harpenau	Alternate sample location #1 was selected. Sample was collected from north wall of west internal office.	P. Weaver
24	Random sample location 5114M0016 was inaccessible due to an exterior rolling door.	8/26/13	3036	M	E. Harpenau	Alternate sample location #2 was selected. Sample was collected from east wall of west internal office.	P. Weaver

7. SUMMARY

This summary report presents analytical results, radiological survey data, and other data/information to be used in the final disposition planning for the specified Isotope Row Facilities located at Oak Ridge National Laboratory in Oak Ridge, Tennessee. Field personnel from ORAU completed data collection per the PSP (ORAU 2013). Characterization activities included the following data collection modes: visual inspection, radiological survey, direct measurement, removable activity, volumetric sampling, and NDA measurements. The following data files are provided:

- Data summary statistics for each analyte (App. C)
  - Graphical representation of the building analyte concentrations
  - Summary statistics of the building analyte concentrations
- Summary of the analytical laboratories results uploaded to the Project Environmental Measurements System (PEMS) (App. D)
  - Radiological analytical report
  - Total metals analytical report
  - TCLP metals analytical report
  - PCB analytical report
- ISOCS reporting of process systems (App. E)
- Building 3034 data (App. F):
  - Radiological analytical report, including gross alpha and beta removable measurements and sampling reporting for Bldg. 3034 MARSSIM evaluation

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APPENDIX A
PROCESS KNOWLEDGE
FOR THE OAK RIDGE NATIONAL LABORATORY
ISOTOPE ROW FACILITIES

PROCESS KNOWLEDGE
FOR THE OAK RIDGE NATIONAL LABORATORY
ISOTOPE CIRCLE FACILITIES
3030, 3031, 3032, 3033, 3033A, 3034, 3036, 3093, and 3118

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ACRONYMS

ACM	asbestos-containing material
Ci	Curie
COC	contaminants of concern
D&D	decontamination and decommissioning
DOT	U.S. Department of Transportation
FIMS	Facility Information Management System
HEPA	High Efficiency Particulate Air
ORNL	Oak Ridge National Laboratory
PACM	Presumed asbestos-containing material
PCB	polychlorinated biphenyl
PK	process knowledge
PWTC	Process Waste Treatment Center
RaLa	radioactive lanthanum
RCRA	Resource Conservation and Recovery Act
S&M	surveillance and maintenance
UCOR	URS CM2MHill, LLC
UT-B	University of Tennessee – Battelle, LLC

PROCESS KNOWLEDGE
FOR THE OAK RIDGE NATIONAL LABORATORY
ISOTOPE ROW FACILITIES
3030, 3031, 3032, 3033, 3033A, 3034, 3036, 3093, and 3118

1. INTRODUCTION

After World War II, Clinton Laboratories was forced to refocus its research and development efforts. This change in focus produced many important contributions to science and the production of radioisotopes. Isotopes produced in reactors were extracted by chemical processes and then utilized for biological, medical, and industrial research. In the late 1940s, the Isotopes Section was formed at the Clinton Laboratories. Union Carbide Corporation, the manager of the laboratories, initiated the Program H expansion to replace wartime temporary structures with more permanent buildings (ORNL 1952). A major focus of this program to provide a radioisotope complex consisting of buildings designed to process, package, and ship multiple radioisotopes. The subject radioisotope buildings constructed under Program H are grouped together with common walls and are collectively known as the Isotope Row Facilities, hereto referred as "Isotope Row". This process knowledge (PK) document includes some of the original Program H buildings, along with buildings constructed at later dates to support isotope production.

Nine facilities associated with the former Isotope Production Program at Oak Ridge National Laboratory (ORNL) are being characterized to evaluate the radiological and chemical hazards as a result of previous operational processes. Isotope Row includes 3030, 3031, 3032, 3033, 3033A, 3034, 3036, 3093, and 3118. These facilities have been designated as surplus to reduce costs associated with surveillance and maintenance and to provide access to soil for remediation under the Bethel Valley Record of Decision (BJC 2002). The nine surplus facilities are no longer used to produce isotopes and have been deactivated since the late 1980s and early 1990s.

This PK document has been prepared to support the objectives of characterization in determining a final waste disposition pathway for the current structure and associated contents. The PK document is an accumulation of available historical information that is relevant to the characterization of Isotope Row facilities. The scope of this PK focuses on facilities 3030, 3031, 3032, 3033, 3033A, 3093, and 3118, currently managed by URS CH2MHill, LLC (UCOR), and Bldgs. 3034 and 3036, managed by UT-Battelle (UT-B). Included within this PK is a living memory summary provided by persons having information and some operational knowledge pertaining to the listed buildings (ORAU 2011).

Pertinent PK for the designated facilities is collected and summarized for each building in the following sections. The summary topics are:

- Building description
- Process description
- Operational history
- Contaminants of concern

Radiological sources
Other hazardous contaminants and materials

- Current facility conditions
- Existing characterization data

- Anticipated waste volume

2. PROCESS KNOWLEDGE FOR BUILDING 3030

2.1 BUILDING DESCRIPTION

Constructed in 1949, Bldg. 3030 is a steel-framed structure on a concrete foundation with corrugated metal siding, as shown in Fig. 1. It has a tar and gravel coated flat roof on a concrete base which includes the High Efficiency Particulate Air (HEPA) unit filter bank for the hot cell and exhaust ductwork. The exterior siding has a polyurethane coating and the interior walls consist of thin metal sheeting insulated with fiberglass batting. The Facility Information Management System (FIMS) record identifies the gross square footage as 823 ft^2 with a footprint of 806 ft^2 and a wall height of 17-ft (P2S 2007a). Building 3030 contains an 8-ft ×8-ft × 4-ft hot cell located approximately center of the building along the east wall. At the south building entrance, access into the operations portion of the building is through a Plexiglas airlock.

Building 3030 has a small hot cell consisting of 2-ft thick concrete walls, a mineral-oil or zinc bromide filled lead glass viewing window, a stainless steel operating pan that covers the floor and interior walls up to viewing window, and Model-8 manipulators (ORNL 1997a). Until 2013, the exterior shell of the hot cell was lined with 4-inch thick lead brick for shielding. DOE directed that the lead shielding be removed. Access for loading materials and equipment into the hot cell is through thick lead double doors located at the rear of the hot cell, accessible only through Bldg. 3118. The smaller door on the north side of the cell was used to retrieve and add materials and equipment as needed. In the late 1990s, a fixative/sealant coating was applied to the hot cell internal surfaces and the rear cell doors sealed.

Three 4-ft × 6-ft × 4-ft hoods with glove box inserts were decontaminated in the 1990s and a coating applied to the interior surfaces to fix any potential for loose contamination. A laboratory workbench occupies the center floor area of the building. The original building transite exhaust ductwork was routed through a 24-in duct located in the southwest corner of the building to the 3039 stack. This system was abandoned in place when a local HEPA exhaust unit was mounted to the roof of the building in 1984. The process floor drains remain in service to the Process Waste Treatment Center (PWTC). Photographs of the building features and interior are provided in Attachment A.

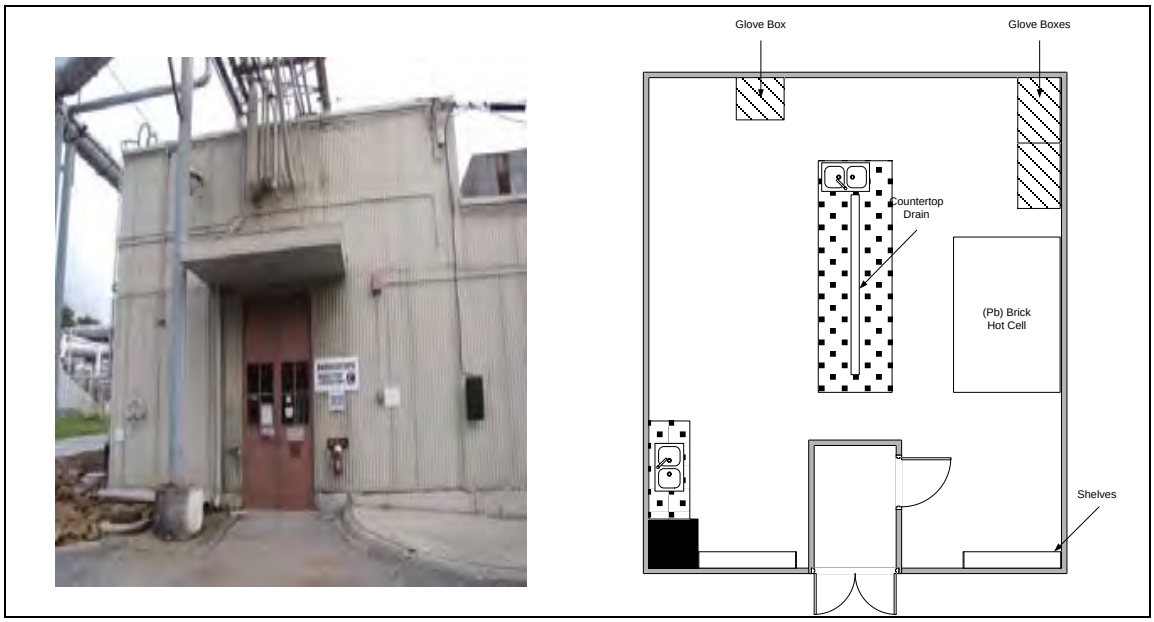

Fig. 1. Building 3030 exterior and floor plan.

2.2 PROCESS DESCRIPTION

Originally designated as the Radioisotope Production Laboratory C, Bldg. 3030 was constructed for the storage, purification, processing, and dispensing of a variety of radioisotopes. Limited production and development work, and extraction and recovery of radioisotopes from irradiated cyclotron and reactor targets and various waste streams were performed to recover and produce unique radioisotopes for a variety of customers. Processes using radioisotopes during Bldg. 3030 operations involved less than 100 Curies (Ci) (ORNL 1997a). Radioactive gaseous wastes and contaminants were collected and disposed of via both cell ventilation and process off-gas systems through a central stack.

2.3 OPERATIONAL HISTORY

Building 3030 operated for 40 years as a laboratory facility for a variety of radioisotope development work for industrial, medical, and research applications. This facility was originally designed for conducting Cs-137 purification work. A series of fume hoods were located on the west wall, equipped with special lead barriers. This work was later transferred into the Cesium Cell (hot cell) in 1953 and the special lead barriers were removed from the building. One of the remaining fume hoods was dedicated to welding capsules. The hot cell was eventually used for processing the irradiated cyclotron and reactor targets to produce unique radioisotopes (ORNL 1997a).

In 1950, a heated coil column was added within the 6-in lead barricade for separating short lived rare earths from radioactive lanthanum (RaLa) wastes. In 1954, design work for using manipulators in the Cesium cell appears on engineering drawings and in 1955, the Cesium Cell was altered for use as a manipulator cell for conducting intermediate level (100 Ci of Co-60 or equivalent) radiochemical processing (Murphy 2011).

Deactivation of processes in Bldg. 3030 included decontamination and application of a fixative/sealant coating added to the remaining hoods and hot cell. The manipulators were pulled from the hot cell and

shielding was added at the top of the cell in 1996, and final surveys of Bldg. 3030 were performed in 1996 as part of the shutdown and deactivation of the isotope facilities (ORNL 1997b).

2.4 CONTAMINANTS OF CONCERN

2.4.1 Radiological Contaminants

Table 2.1 lists the potential radiological contaminants based on historical process knowledge. Because most of the radioisotopes listed have a short half-life, the primary contaminants of concern (COCs) for Bldg. 3030 would include Cs-137, Co-60, Sr-90, Eu-152, Ni-63, and Am-241. The hot cell, fume hoods, and process drains are contaminated and the hot drain system has been determined to be highly contaminated (ORNL 1997a). Small quantities of Ni-63 and Pd-103 were found in the radiological inventory (ORNL 1997b).

Table 2.1. Radiological contaminants of concern for Bldg. 3030

COC	Half-life	COC	Half-life	COC	Half-life
Am-241*	432.2 y	Co-57	270.9 d	Au-198	2.7 d
Ni-63*	96 y	Np-234	6.4 d	Se-75	119.8 d
Sr-90*	29.12 y	Cd-109	462.6d	U-237	6.75 d
Fe-55	2.7 y	Ir-192	73.8 d	Sn-110	4.11 h
Pm-147	2.62 y	P-33	25.4 d	Pd-103	17 d
Cs-137*	30 y	Gd-153	242 d	Na-33	8.2 msec
Eu-152*	13.3 y	Co-56	78.8 d	Pu-233	21 m
Co-60*	5.27 y	Sn-119m	293.1 d		

*Primary contaminants of concern
Radiological inventory obtained from ORNL 1996 and ORAU 2006

2.4.2 Other Hazardous Contaminants and Materials

Small quantities of chemicals, acids, and hydraulic fluids were used in laboratory processes and for equipment operations. Polychlorinated biphenyls (PCBs) were identified in electrical capacitors. The original exhaust ductwork and floor tiles are primarily comprised of asbestos-containing material (ACM). Lead-based paint was applied and remains on interior building surfaces. The hot cell walls and viewing window also have lead shielding (ORNL 1996).

2.5 CURRENT FACILITY CONDITIONS

Power and utility services have been disconnected. Steam and potable water systems have been isolated, drained and abandoned in place. The natural gas line and plant air lines have been isolated, vented, and valved off. The central ventilation system remains in operation to provide negative pressure for the hot cell. The hot cell manipulator boots have been removed and the isolation bags have been replaced. The process drains remain connected to the PWTC and the fire protection (dry system) remains active in the building (ORNL 1997a).

No significant combustibles remain in Bldg. 3030. All furniture and miscellaneous items were removed as part of the deactivation process. Paint is peeling from the ceiling and wall surfaces covering the building floor. Current facility conditions are shown in the photographs provided in Attachment A.

2.6 EXISTING CHARACTERIZATION DATA

Loose materials were removed from the hot cell and fume hoods. The interior surfaces were decontaminated to remove transferable contamination from access-required spaces and then the fixative applied. Post-radiological survey data as reported in the final deactivation report for Bldg. 3030, Attachment 7, is provided in Table 2.2 (ORNL 1997a). Routine surveillance and maintenance survey data, as reported in the 2007 facility walkdown checklist, indicate that the highest activity in access-required space for total alpha measurement was 92 dpm alpha and beta/gamma was 1066 dpm (P2S 2007a).

Table 2.2. Post-deactivation contamination levels (ORNL 1997a)

Identification	Contamination description	Radioactive levels (/100 cm^2)	Radiation levels (mRem/hr)
Hot cell	Alpha smear—transferable Beta/gamma smear—transferable	Less than 500 dpm 1.0 to 100,000 dpm	22
Hood #1	Alpha smear—transferable Beta/gamma smear—transferable	Less than 500 dpm Not detectable	0.2
Hood #2	Alpha smear—transferable Beta/gamma smear—transferable	Less than 500 dpm Not detectable	0.3
Hood #3	Alpha smear—transferable Beta/gamma smear—transferable	Less than 500 dpm Not detectable	5.0
General area	Alpha smear—transferable Beta/gamma smear—transferable	Less than 500 dpm Not detectable	0.1

2.7 ANTICIPATED WASTE VOLUME

The estimated waste volume forecast for Bldg. 3030 is 3456 ft^3 (128 yd^3), plus systems and equipment volume estimate of 1007 ft^3 (37 yd^3), for a total waste volume of 4463 ft^3 (165 yd^3). Approximately 570 linear ft. of pipes covered by 226 ft^3 (8.4 yd^3) of insulation, approximately 800 ft^2 with an approximate volume of 1 yd^3 of floor tile, and potentially 265 ft^3 (9.5 yd^3) of roofing material are considered as ACM (P2S 2007b). PCBs associated with electrical devices are present in ballasts, electrical equipment, and potentially in paint. Lead is present in the hot cell window glass, roof flashing, and approximately 5400 lbs as shielding associated with the hot cell ductwork (1-in thick lining for 8-in × 8-in duct). Zinc bromide or mineral oil is contained in the hot cell viewing window. Universal wastes and circuit boards are also anticipated to be present.

3. PROCESS KNOWLEDGE FOR BUILDING 3031

3.1 BUILDING DESCRIPTION

Building 3031 was originally designated as the Radioisotope Production Laboratory D. Constructed in 1949, Bldg. 3031 is a steel-framed structure on a concrete foundation clad in corrugated metal siding, as shown in Fig. 2. The exterior siding has a polyurethane coating and the interior walls consist of thin metal sheeting insulated with fiberglass batting. Building 3031 has a tar and gravel coated flat roof on a concrete base which includes the HEPA filter unit for the hot cell and fume hood off-gas. The FIMS record identifies the gross square footage as 823 ft^2 with a footprint of 806 ft^2 and a wall height of 17-ft (P2S 2007b). Building 3031 contains an 8-ft × 8-ft × 4-ft hot cell located approximately center of the building along the west wall. Access into the operations portion of the building is through a Plexiglas airlock located on the south side of the building. Photographs of building interior and features are provided in Attachment B.

The Building 3031 hot cell consists of 1-ft thick concrete walls, a mineral-oil or zinc bromide- filled lead glass viewing window, a stainless steel operating pan that covers the floor and interior walls up to the viewing window, and was once outfitted with Model-8 manipulators (ORNL 1997c). Inside the hot cell is a 5-in steel armor plate that covers the east wall of the cell, starting at 2-ft 10-in above the floor, and it has

a stainless steel operating pan that covers the floor and interior walls up to the level of viewing window (ORNL 1997b). Also in Bldg. 3031 are three 4-ft × 6-ft × 4-ft fume hoods with glovebox inserts similar to the ones in Bldg. 3030.

Large equipment and materials were loaded through thick lead double doors located at the rear of the hot cell, accessible only through Bldg. 3118. The smaller doors on either side of the cell were used to retrieve and add materials and equipment as needed. In the late 1990s, a fixative/sealant coating was applied to the hot cell internal surfaces and the rear cell doors sealed.

The fume hoods were decontaminated in the 1990s and a coating applied to the interior surfaces to fix any potential for loose contamination (ORNL 1997c). A laboratory workbench occupies the center floor area of the building. The original building transite exhaust ductwork was routed through a 24-in duct located in the southwest corner of the building to the 3039 stack. This system was abandoned in place when a local HEPA exhaust unit was mounted to the roof of the building in 1984. The process floor drains remain in service to the PWTC. Photographs of the building interior and features are provided in Attachment B.

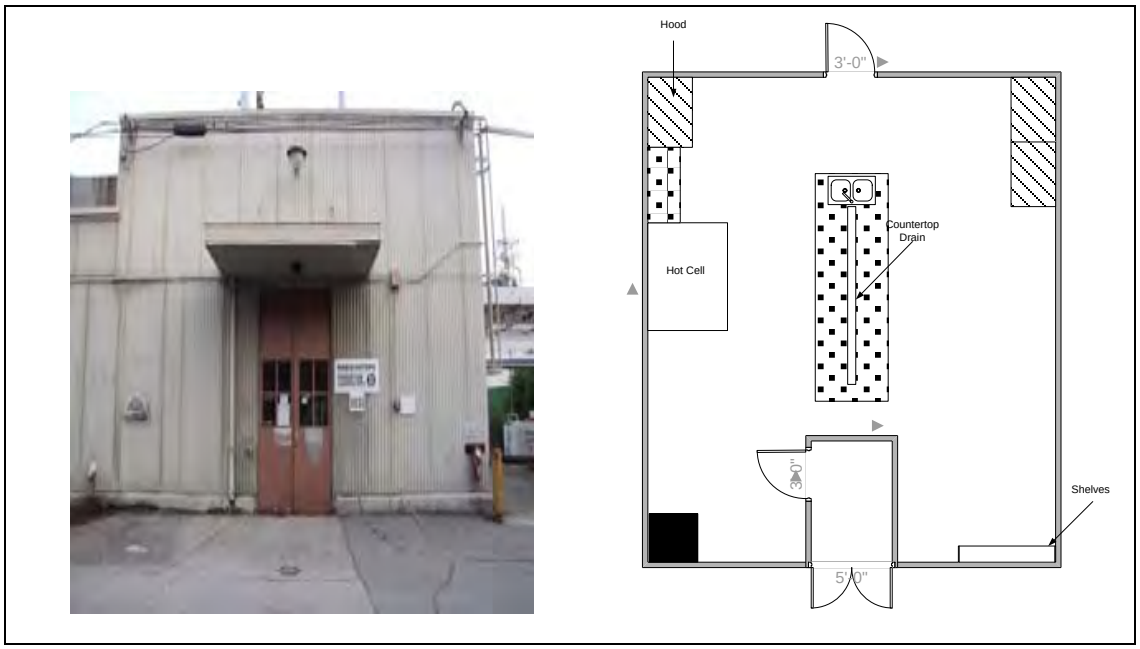

Fig. 2. Building 3031 exterior and floor plan.

3.2 PROCESS DESCRIPION

Bldg. 3031 was constructed to perform limited production and development work with radioisotopes needed for industrial, medical, and research applications (ORNL 1997c). Operations included purifying, processing, and dispensing of a variety of radioisotopes such as Co-56, Co-57, Sr-90, Ir-192, and U-237. These isotopes were processed from irradiated targets from the High-Flux Isotope Reactor and the 86-in Cyclotron. Operations were conducted in the hot cell, lab hoods, and gloveboxes. The hot cell was used to perform the final separation of Gd-153 from europium targets (ORNL 1996).

3.3 OPERATIONAL HISTORY

In 1949, a purification process apparatus was installed for the extraction of Sr-90 from RaLa waste and rare earths, Na, K, Mg, and other cations (ORNL 1997c). High-vacuum processing and packaging equipment was installed to extract and collect the rare gases (Xe-133, Kr-85, Ar-37).

In 1961, the manipulator hot cell was constructed in Bldg. 3031 and by the late 1960s; a glovebox was added specifically to process Am-241 materials. In the early 1970s, Gd-153 production began. The process required extracting the Gd-153 chemically from exhausted europium control plates from the High Flux Isotope Reactor. This operation was conducted inside the hot cell. Preparation for processing Y-90 began in 1989, but operations were shut down in 1990 and deactivated before processing began. The Building 3031 hoods were decontaminated and a fixative/sealant coat applied in 1994, the floor was painted to fix contamination after decontamination in 1996, and a final survey was conducted in 1997 as part of shutdown and deactivation.

3.4 CONTAMINANTS OF CONCERN

3.4.1 Radiological Contaminants

The COCs identified from historical documentation and living memory interviews are included in Table 3.1. The radioactive half-life for each contaminant is provided. Prior to final deactivation the hot cell dose rate was measured at 900 mrem/hr and a total beta/gamma measurement in the hot cell is 1.6E+08 dpm (P2S 2007b).

Table 3.1. Radiological contaminants of concern for Bldg. 3031

COC	Half-life	COC	Half-life	COC	Half-life
Am-241*	432.2 y	Ba-139	83.0 m	Cd-109	462.6 d
Ce-139	137.6 d	Co-60*	5.27 y	Cs-137*	30 y
Eu-152*	13.3 y	Sb-122	2.72 d	Th-232*	1.4E+10 y
Y-90	64.05 h	Gd-153	242 d	Pu-233	21 m
Ni-63*	96 y	Eu-154*	8.8 y		

*Primary contaminants of concern
Radiological inventory obtained from ORNL 1996, 1997c, and ORAU 2006

3.4.2 Other Hazardous Contaminants and Materials

Hazardous materials identified during facility walkdowns include lead-based paint and asbestos, which is found in the floor tile and on the pipe lagging throughout the building. Lead used in shielding materials for the hot cell and cell viewing window remains in place. Mineral oil can be found in the hot cell window and PCBs are likely in the remaining electrical devices.

3.5 CURRENT FACILITY CONDITIONS

Miscellaneous items abandoned in the building following facility shutdown have been removed. Loose combustibles have been removed and access-required spaces were decontaminated to reduce the possibility of transferable contamination during routine access. The floors were painted with an epoxy type coating which has begun to disintegrate and peel as a result of water damage. Areas of radiological contamination have been posted appropriately.

The hot cell and central ventilation systems remain under a slight negative pressure; however, the local ventilation has been removed from service (ORNL 1997c). The manipulator arms were removed from the hot cell and all fume hoods and the hot cell interiors were coated with a fixative. Current facility conditions can be found in the photographs provided in Attachment B.

3.6 EXISTING CHARACTERIZATION DATA

Deactivation of Bldg. 3031 included the removal of loose materials from the surfaces of the hot cell and fume hoods, particularly from access-required spaces, prior to the fixative being applied. Post--radiological survey data, as reported in Attachment 8 of the final deactivation report for Bldg. 3031, is provided in Table 3.2 (ORNL 1997c). Routine surveillance and maintenance survey data, as reported in the 2007 facility walkdown checklist, indicate that the highest activity in access-required space was 0 dpm for total alpha measurements and beta/gamma was 3320 dpm for the internal surface area (P2S 2007b).

Table 3.2. Post-deactivation contamination levels (ORNL 1997c)

Identification	Contamination description	Radioactive levels (/100 cm^2)	Radiation levels (mRem/hr)
Hot Cell	Alpha smear—transferable	Less than 500 dpm	30
	Beta/gamma smear—transferable	1.0–100,000 dpm	
Hood #1	Alpha smear—transferable	Less than 500 dpm	0.7
	Beta/gamma smear—transferable	Not detectable	
Hood #2	Alpha smear—transferable	Less than 500 dpm	0.4
	Beta/gamma smear—transferable	Not detectable	
Hood #3	Alpha smear—transferable	Less than 500 dpm	<0.1
	Beta/gamma smear—transferable	Not detectable	
General area	Alpha smear—transferable	Less than 500 dpm	0.1
	Beta/gamma smear—transferable	350–1057 dpm	

3.7 ANTICIPATED WASTE VOLUME

The waste volume forecast for Bldg. 3031 is 3456 ft^3 (128 yd^3), plus systems and equipment volume estimated at 789 ft^3 (29 yd^3), for a total estimated waste volume of 4245 ft^3 (157 yd^3). There is approximately 825 ft^2 of floor tiles with a an estimated volume of less than 1 yd^3 considered to be ACM, approximately 570 liner ft of pipes are covered by 6.4 yd^3 of ACM insulation, and an estimated 200 ft^3 (7.5 yd^3) of roofing material that is potentially ACM (P2S 2007a). PCBs are expected in electrical light ballasts, electrical equipment, and potentially in paint. Lead is present in roof flashing, the hot cell window glass, and approximately 5400 lbs as shielding associated with the hot cell ductwork (1-in thick lining for 8-in × 8-in duct). Zinc bromide or mineral oil is contained in the hot cell viewing window. Universal wastes and circuit boards are expected to be part of the waste stream.

4. PROCESS KNOWLEDGE FOR BUILDING 3032

4.1 BUILDING DESCRIPTION

Building 3032 was originally designated as Radioisotope Production Laboratory E. The building has a steel-framed structure on a concrete foundation clad in a corrugated metal siding (ORNL 1997d). The roof is flat with a tar and gravel coating covering a concrete base. A bank of HEPA units and exhaust ductwork are mounted on the roof. The FIMS record of gross square footage is 833 ft^2 with a footprint of 825 ft^2. Inside the building are five 6-ft × 6-ft × 3-ft hoods that were decontaminated in the 1990s with a final layer of strip coat left on the interior surface (P2S 2007d).

There are two separate areas in Bldg. 3032. The northern portion of the building was used as laboratory space. Located in this portion of the building are five laboratory-type hoods and two workbenches with sinks (Figure 3). The remainder of the building was used for office space. Photographs of the interior of Bldg. 3032 are provided in Attachment C.

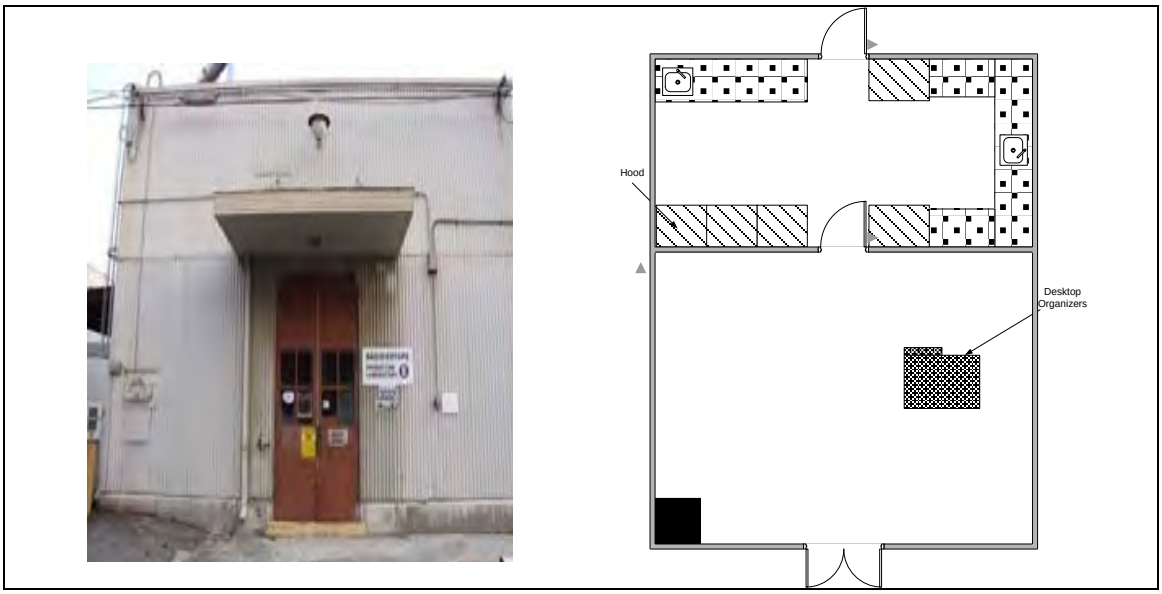

Fig. 3. Building 3032 exterior and floor plan.

4.2 PROCESS DESCRIPTION

Building 3032 was constructed in 1949 to perform limited production and development work with radioisotopes consisting of irradiated targets from the High-Flux Isotope Reactor, the Oak Ridge Research Reactor, and the 86-in Cyclotron. It housed the analytical facility for radiochemical support for the isotopes production activities.

4.3 OPERATIONAL HISTORY

In 1949, sulfur extraction equipment for phosphorous development work was installed. By 1950 routine operations were being conducted for P-32 production. The Production of P-32 was transferred from Bldg. 3032 to the Oak Ridge Research Reactor in 1959, and in 1964, most of the lab work being performed in Bldg. 3032 was transferred to the Radioactive Materials Analytical Laboratory in Bldg.

2026 (Murphy 2011). By 1997, the hoods and cabinets were decontaminated and the front portion of the building was also decontaminated to serve as the health physics office (ORNL 1997d).

4.4 CONTAMINANTS OF CONCERN

4.4.1 Radiological Contaminants

The COCs identified for Bldg. 3032 are provided in Table 4.1. The radioactive half-life for each contaminant is provided.

Table 4.1. Radiological contaminants of concern for Bldg. 3032

COC	Half-life	COC	Half-life	COC	Half-life
Am-241*	432.2 y	Pu-233	21 m	U-235*	7.3E+08 y
Eu-152*	13.3 y	Eu-154*	8.8 y	Gd-153	240 d
Co-56	78.8 d	Co-57	270.9 d	Au-198	2.7 d
Ba-133*	10.51 y	Cd-109	462.6 d	Co-60*	5.27 y
Fe-55	2.7 y	Np-234	6.4 d	Se-75	119.8 d
Sr-90*	29.12 y	Sn-119m	293.1 d	U-237	6.75 d
P-33	25.4 d	Ir-192	73.8d	Cm-244*	18.1 y
Xe-131	11.9 d	I-131	8 d	Mo-99	66 h
Th-232*	1.4E+10 y	Cs-137*	30 y	P-32	14.3 d
Pm-147	2.6 y				

*Primary contaminants of concern
Radiological inventory obtained from ORNL 1996, 1997, and ORAU 2006.

4.4.2 Other Hazardous Contaminants and Materials

Interior surfaces were painted using lead-based paint. ACM is present in the floor tile and original exhaust duct pipe lagging. PCBs are expected in light ballasts, electrical devices, and potentially in paint. Universal wastes and circuit boards are also anticipated to be present (P2S 2007c.

4.5 CURRENT FACILITY CONDITIONS

All process operations have been shut down, all discrete items of radioactive material inventory have been removed, and the facility is in deactivation mode. There exist discrete residual locations of fixed hot spots and transferable contamination, primarily in or on surfaces that are not readily accessible (i.e., hoods and sink drains). The floor drains are operable but abandoned and connect to the PWTC (P2S 2007c). Electrical services have been disconnected or de-energized except for lighting. The fire protection (dry system) remains active. Steam, natural gas, plant air, and potable water systems are isolated, drained, and abandoned in place. There is a slight negative pressure flow in the ventilation system (ORNL 1997d).
The building has significant mold on the walls and ceilings as a result of water infiltration from the roof. The paint is peeling from the interior surfaces. Photographs of the current facility conditions are provided in Attachment C.

4.6 EXISTING CHARACTERIZATION DATA

Deactivation of Bldg. 3032 included the removal of discrete radioactive material inventory and decontamination to reduce transferable contamination levels. The 1997 deactivation report for Bldg. 3032

indicates that the hoods were sealed to prevent access after being cleaned. The post-deactivation levels for the laboratory area surface are provided in Table 4.2. Radiological surveys for pre- and post-deactivation are available in the Final Deactivation Report for Building 3032 (ORNL 1997d).

Table 4.2. Post-deactivation contamination levels (ORNL 1997d)

Identification	Contamination description	Radioactive levels (/100 cm^2)	Radiation levels
Hood #1	Alpha smear—transferable	Less than 20 dpm	60,000 dpm
	Beta/gamma smear—transferable	Less than 200 dpm	
Hood #2	Alpha smear—transferable	Less than 20 dpm	50,000 dpm
	Beta/gamma smear—transferable	Less than 200 dpm	
Hood #3	Alpha smear—transferable	Less than 20 dpm	25 mr/hr
	Beta/gamma smear—transferable	Up to 75,000 dpm	
Hood #4	Alpha smear—transferable	Up to 235 dpm	59,400 dpm
	Beta/gamma smear—transferable	Up to 408 dpm	
Hood #5	Alpha smear—transferable	Up to 178 dpm	25 mr/hr
	Beta/gamma smear—transferable	Up to 293 dpm	
General area	Alpha smear—transferable	Less than 20 dpm	0.1 mrem/hr
	Beta/gamma smear—transferable	Less than 200 dpm	
Attic	Alpha smear—transferable	Up to 2626 dpm	
	Beta/gamma smear—transferable	Up to 707 dpm	

4.7 ANTICIPATED WASTE VOLUME

The waste volume forecast for Bldg. 3032 is 3537 ft^3 (131 yd^3), plus systems and equipment volume estimate of 551 ft^3 (20 yd^3), for a total estimated waste volume of 4088 ft^3 (151 yd^3). There is approximately 825 ft^2 of floor tiles with an estimated volume of less than 1 yd^3 considered to be ACM, approximately 375 liner ft of pipes covered by approximately 5.6 yd^3 of ACM insulation, and approximately 7.5 yd^3 of roofing material that is potentially ACM (P2S 2007c).

5. PROCESS KNOWLEDGE FOR BUILDING 3033

5.1 BUILDING DESCRIPTION

Building 3033 was originally designated as Radioisotope Production Laboratory F. The building is a steel-framed structure on a concrete foundation with corrugated metal siding and a flat tar and gravel roof on a concrete base. The FIMS record of gross square footage is 832 ft^2 with a footprint of 837 ft^2 (Fig. 4) Inside the building is a 9-ft × 7.5-ft × 4-ft Krypton Process Enclosure (hot cell) and two smaller enclosures (ORNL 1997e): the Krypton-xenon Separations Column and the Carbon Reactor Enclosure (Fig. 4). In the northeast corner of the building is a small room measuring 10-ft × 12-ft which housed the H-3 processes. Inside the room are two process hoods and two loading hoods, one each on the north and south walls. The exterior entrances are sealed with gaskets and a cocooning process makes the building airtight. The cell ventilation system maintains a slight negative pressure on building systems (ORNL 1997e). Current facility conditions are shown in the photographs in Attachment D.

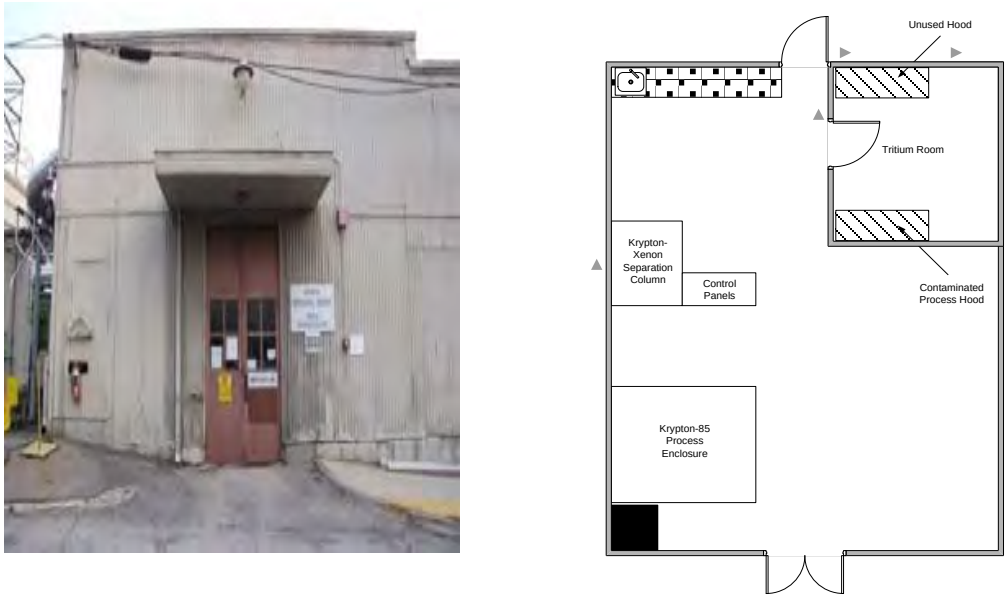

Fig. 4. Building 3033 exterior and floor plan.

5.2 PROCESS DESCRIPTION

Building 3033 was arranged to house two separate radioisotope processing operations. Krypton processing was performed in the main operating area of the building. The Krypton Process Enclosure/hot cell consisted of a composite shielded enclosure made of 2.25-in thick steel plate overlaid with 1-in of lead and supported by 8-in thick × 2-ft high concrete wall at the bottom. Part of the enclosure housed the in-process storage tanks and was made of stacked 4-in thick lead bricks. Both the Carbon Reactor and Separation Columns are housed in steel framed structures, covered with 4-in lead bricks. The tritium process equipment was highly contaminated, and tritium contamination was occasionally detected outside the hoods (BJC 2005).

Krypton operations included purification of Kr-85 that was received from Idaho National Engineering Laboratory in preparation for direct sale or as feed to the thermal diffusion columns in Bldg. 3026C.
The tritium process operations were performed in the small room located in the northeast corner of the building. Tritium operations involved receiving bulk tritium shipments from Savannah River Plant, followed by purification, loading shipping containers, and shipping (BJC 2005).

5.3 OPERATIONAL HISTORY

In 1949, equipment was installed in Bldg. 3033 to study organic C-14 fractions and to produce C-14 as $BaCO_3$. This equipment included a furnace hood, a pellet crusher, and a lead storage vault. Carbon development work to separate C-14 from Be_3N_2 graphite reactor slugs began in 1950; however, processing ended in 1975 (BJC 2005).
The Krypton Process Enclosure/hot cell and process equipment for purification of Kr-85 was placed into operation at Bldg. 3033 in 1955 and the krypton column for fractionation was placed in the building in 1956. Utilization of the equipment began in 1957 to recover krypton and other inert gases from spent uranium fuel. The hot cell was used as the K-85 process cell until the last operational campaign ended in 1989 (ORNL 1997e).

All building operations ended in 1990; however, the H-3 traps were not deactivated and inerted in the south hood until 1996. The final survey for deactivation was performed in 1997; at that time a fixative coating and sealant were applied to the internal surfaces and access points of both krypton processing units in 2004 (BJC 2005).

5.4 CONTAMINANTS OF CONCERN

5.4.1 Radiological Contaminants

. The radioactive half-life for each primary contaminant during the facility us is provided in Table 5.1.

Table 5.1: Radiological contaminants of concern for Bldg. 3033

COC	Half-life	COC	Half-life	COC	Half-life
Kr-85	10.75 y	H-3	12.35 y	C-14	5730 y
Am-241	32.2	Cs-137	30 y	Co-60	5.27 y
Sr-90	29 y	Eu-152	13.3 y	Eu-154	8.8 y
Pu-239	2.4E4 y				

Source document ORNL 1997e and BJC 2005.

Building 3033 known COCs at the close of operations are presented in Table 5.2. The nuclear inventory in the facility consists primarily of surface contamination (BJC 2005).

- Radioactive surface contamination in the Tritium Processing Laboratory
- Radioactive surface contamination on the inside of the Krypton Processing Enclosure and Krypton-Xenon Separation Column which is now fixed in place
- Radioactive surface contamination on the surfaces of the balance of the structure

Table 5.2. Inventory calculations summary for radiological contaminants of concern Bldg. 3033

Facility	Nuclide	Ci
Tritium Processing Laboratory	Tritium	1.50E-01[a]
Tritium-Krypton Processing Enclosure and Krypton-Xenon Separation Column	Americium-241	1.55E-07
	Cesium-137	2.76E-07
Balance of the facility	Americium-241	2.93E-06
	Cesium-137	2.66E-05
	Cobalt-60	1.50E-06
	Europium-152	2.07E-05
	Europium-154	7.14E-06

[a]This value is based on calculations from facility contamination surveys that include conservative assumptions. While the tritium system is reported purged, insufficient data to document the residual tritium inventory is available. As a matter of conservatism, the value reported in the table is increased by 100 (i.e., 1.50E+01) to bound the tritium inventory (BJC 2005).

5.4.2 Other Hazardous Contaminants and Materials

Lead-based paint was used throughout the building on internal surfaces. Lead bricks and sheets have been used for bio-shielding around the krypton and krypton-xenon enclosures, slug carrier, and carbon reactor.

ACM is present in the floor tile and original exhaust duct pipe lagging. PCBs are present in light ballasts, electrical devices, and could potentially be in paint. Universal wastes and circuit boards are also present (P2S 2007d).

5.5 CURRENT FACILITY CONDITIONS

The facility has been deactivated from plant service and radioactive inventory removed from the enclosures (ORNL 1997e). Electrical services have been disconnected or de-energized except for lighting. The fire protection (dry system) remains active. The off-gas and cell ventilation systems are at a slight negative pressure.

The tritium processing equipment remains in Bldg. 3033; however, the uranium traps have been inerted. The Krypton Processing Enclosure was pumped down and the system purged and disconnected from the Kr Storage tanks in the 3093 enclosure (BJC 2005). Current facility conditions are shown in the photographs provided in Attachment D.

5.6 EXISTING CHARACTERIZATION DATA

Table 5.3 lists the surface activity contamination levels at the time of post-deactivation. Post-deactivation radiation levels are provided in Table 5.4 activities (ORNL 1997e).

Table 5.3. Post-deactivation radioactive contamination levels

Location	Description	Quantity
3033 entire building	Alpha smear—transferable contamination	None detected
3033 general area	Beta/gamma smear—transferable contamination	<1,000 dpm/l00 cm^2 (H-3)
3033 tritium room	Beta/gamma smear—transferable contamination	1,217 dpm to 25,982 dpm/l00 cm^2 (H-3)

Table 5.4. Post-deactivation radiation levels

Location	Description	Quantity
3033	General area	<0.1 mr/hr
3033	Tritium room	<0.1 mr/hr

5.7 ANTICIPATED WASTE VOLUME

The waste volume forecast for Bldg. 3033 is 3591 ft^3 (133 yd^3), plus systems and equipment volume estimate of 874 ft^3 (32 yd^3), for a total estimated waste volume of 4465 ft^3 (165 yd^3). Approximately 720 ft^2, having a volume of less than 1 yd^3, of floor and ceiling tiles are ACM; 640 liner ft of pipes are covered by 5.6 yd^3 of ACM insulation; and 7.5 yd^3 of potentially ACM contaminated roofing material. PCBs are expected in light ballasts and electrical equipment (P2S 2007d). Lead is present in the roof flashing and 70,580-lbs, or a minimum volume of 100 yd^3 (not taking into account void space of the waste), used as shielding on the krypton enclosure, column, and associated ductwork. Universal wastes and circuit boards are also anticipated to be present.

6. PROCESS KNOWLEDGE FOR BUILDING 3033A

6.1 BUILDING DESCRIPTION

Building 3033A was added between Bldgs. 3033 and 3034 in 1960. It was originally designated as the Radioisotope Production Laboratory Annex. The building is a steel-framed structure on a concrete foundation with corrugated metal siding, a flat roof with tar and gravel coating on a concrete base. The building ventilation is maintained under a slight negative pressure (ORNL 1997e). The record of gross square footage is 790 ft^2 (P2S2007e). Photographs of Bldg. 3033A interior are provided in Attachment E.

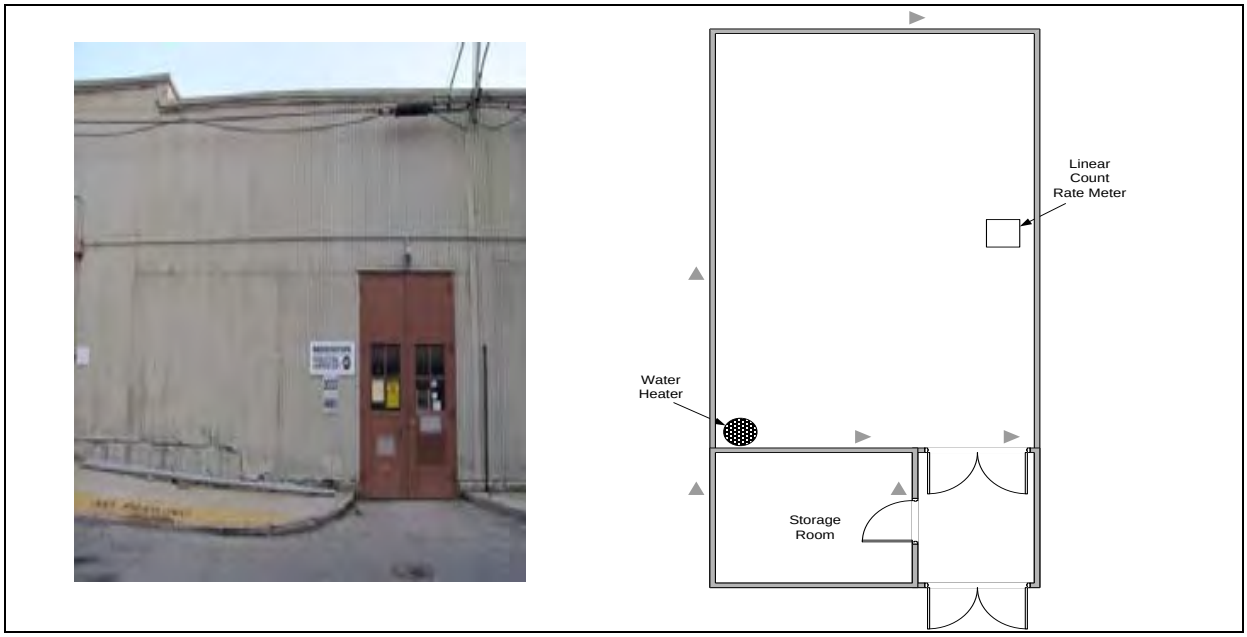

Fig. 5. Building 3033A exterior and floor plan.

6.2 PROCESS DESCRIPTION

Building 3033A was used almost exclusively to prepare and distribute highly enriched actinide isotopes with the exception of a small C-14 production area located at the south end of the building. C-14 production stopped in the 1980s. The room was decontaminated which included the removal of an underground tank (BJC 2005). The room was then used for storage.

The main building area was used to handle actinide materials for research applications. This included fabrication of ceramic oxide wires for loading and welding capsules for use as in-core reactor neutron dosimeters. Processes included fabrication of gamma sources, preparation of materials (actinide isotopes) for packaging and distribution, or counting. Decontamination of material shipping containers was also a process performed in Bldg. 3033A (BJC 2005).

6.3 OPERATIONAL HISTORY

Building 3033A was used for the production, loading, welding, and decontamination of neutron dosimeter materials as well as weighing and packaging milligram to gram quantities of actinide materials for research applications. Operations were performed in three portable glove boxes and a radiochemical

hood. The glove boxes were equipped to operate under an argon atmosphere. Glove box exhaust travelled through high efficiency particulate air filters in the attic before discharge to the Isotope Area cell ventilation system.

Operations involved fabrication of ceramic oxide wires, loading of ceramic oxide wires oxide powder, or metal into small metal capsules. Additional operations included weighing and packaging milligram to gram quantities of actinide materials for research applications, preparation of neutron dosimeters, decontamination of nuclear material shipping containers, and storage of radioactive materials for disposal or shipment.

In 1980 the C-14 equipment was removed, including an underground dissolver tank, and the area was decontaminated and converted to a storage area. All Bldg. 3033A operations were discontinued in 1990 (ORNL 1997e). All equipment, welding and weighing boxes, fume hood, work benches, etc has been removed from the building with the exception of the HEPA filters that serviced the fume hood and boxes.

6.4 CONTAMINANTS OF CONCERN

Building 3033A COCs are listed in Table 6.1 and also include highly enriched actinide isotopes. COCs from the living memory interviews PK effort identified I-131, C-14, and U-233 which was released from a glove box being removed from the building. The radioactive half-life for each contaminant is provided.

Table 6.1. COCs for Bldg. 3033A

COC	Half-life	COC	Half-life	COC	Half-life
Am-241	432.2 y	C-14	5,730 y	Np-237	2.1E+06 y
Pu-238	87.7 y	Cm-244	18.1 y	Pu-239	2.4E+04 y
U-235	7.3E+08 y	Cf-252	2.6 y	U-233	1.62E+05 y
I-131	8d				

Lead based paint is applied to internal surfaces of the building. Approximately 565 ft^2 or nearly 1 yd^3 of floor tiles are ACM, 380 liner ft or approximately 2 yd^3 of pipe lagging is ACM and approximately 7.5 yd^3 roofing material are suspect (P2S 2007e). PCBs are expected to be present in light ballasts and electrical equipment. Lead is present in the roof flashing. Universal wastes and circuit boards are also anticipated to be present.

6.5 CURRENT FACILITY CONDITIONS

There is no potential for significant radiation exposure to personnel working in Bldg. 3033A; radiation concentrations in the building are 1.1 mCi of alpha, 2.2 mCi of beta/gamma, and 72 µCi of C-14 (P2S 2007e). Reported alpha radioactivity ranged from 1,570 to 60,000 dpm/100 cm^2 and beta activity up to 60,000 dpm/100 cm^2. Electrical services have been disconnected or de-energized except for lighting. The fire protection (dry system) remains active. Steam, natural gas, plant air and potable water systems are isolated, drained, and abandoned in place. The floor in Bldg. 3033A has been painted to fix any remaining radioactive contamination in place. Hot drains are plugged and the floor drain is in service to the PWTC (ORNL 1997e).

6.6 EXISTING CHARACTERIZATION DATA

Existing and relevant PK documentation suggest there is no potential for significant radiation exposure; however, there are several locations of elevated radiological activity. While the levels are not significant enough to raise concern of radiation exposure, they are high enough to eliminate this building from Y-12 Landfill consideration. A summary of the inventory for Bldg. 3033A is provided Table 6.2.

Table 6.2. Inventory calculations summary for Bldg. 3033A (BJC 2005)

Facility	Nuclide	Ci
Balance of facility	Plutonium-239	1.06E-03
	Strontium-90	1.06E-02
	Carbon-14	2.56E-03

6.7 ANTICIPATED WASTE VOLUME

The waste volume forecast for Bldg. 3033A is 3024 ft^3 (112 yd^3) plus systems and equipment volume estimate of 374 ft^3 (14 yd^3) for a total estimated waste volume of 3398 ft^3 (126 yd^3). The estimated equipment waste volume is 1280 ft^3 (P2S 2007e). Estimates indicate that there is about 756 linear feet of piping and conduit, 563 ft^2 (<1yd^3) of ACM floor tile and 378 linear feet of ACM pipe insulation.

7. PROCESS KNOWLEDGE FOR BLDG. 3034

7.1 BUILDING DESCRIPTION

Building 3034 is a single story steel-framed structure clad in corrugated metal siding having a poured concrete foundation. The roof is a built-up flat top on a concrete base. The building contains a partial mezzanine, as shown in Fig. 6, and two portable office units. The ORNL FIMS record shows a gross square footage of 1092 ft^2 (P2S 2007f). Prior inspections have reported Bldg. 3034 to be in generally good structural condition. The research shows no process-related equipment existed in Bldg. 3034.

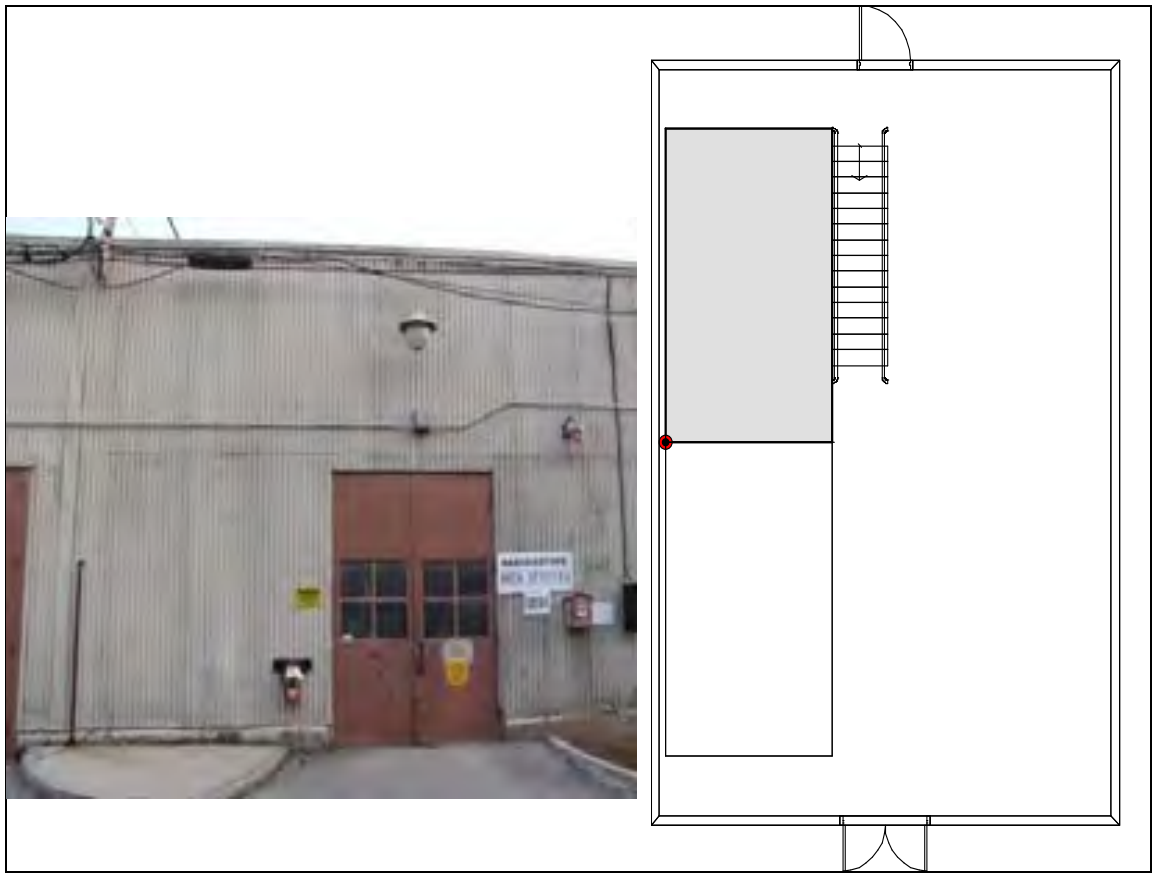

Fig. 6. Bldg. 3034 exterior and floor plan.

7.2 PROCESS DESCRIPTION

Because no radioactive process activities were performed in Bldg. 3034, the facility did not warrant a formal safety hazard analysis document. The primary function for this facility was to house the isotope complex electrical distribution system.

7.3 OPERATIONAL HISTORY

Building 3034 houses the electrical distribution facility for the ORNL isotope complex and had been previously used as a field shop for the Plant and Equipment Division. After 40 years of operations, it was surplused and included in the isotope facilities deactivation. During operation, Bldg. 3034 served as a storage area, a stores drop point for supplies for the isotope complex, and as general office space (ORNL 1997f). The objective of the deactivation process was to place the facility in a passively safe and environmentally stable configuration that can be efficiently and cost effectively maintained for an indefinite period of time. No radioactive operations were known to have been performed in this building (ORNL 1997g).

7.4 CONTAMINANTS OF CONCERN

7.4.1 Radiological Contaminants

Operational history did not use or store radiological materials or sources; however, fixed, non-transferrable contamination was identified (ORNL 1997f). General area fixed and transferable radiation levels were noted up to 33,000 dpm, with the one identified pipe, on the west side of the building going into 3033A, measuring 231,000 dpm (ORNL 1997g). Efforts were made to remove or reduce the fixed contamination as part of the deactivation process and the pipe was not removed but was posted as having internal contamination. No isotopic information was provided. Table 4 of the Final Deactivation Report states that transferrable beta/gamma contamination was limited to two small locations of 250 dpm/100 cm^2 and 300 dpm/100 cm^2 and Table 5 lists the expected dose rate from fixed and transferable radiation levels to be < 0.1 mRem/hr (ORNL 1997f). The approximate total activity inventory for the fixed surface radiological contamination was determined to be 1.7 mCi beta/gamma (P2S 2007f).

In 2010, ORAU performed an additional scoping survey and identified several additional locations with measurable radioactivity levels on surfaces greater than 3 meters from the floor. These isolated spots of radioactivity may be a result of its proximity to other process buildings or may be a result of radioactivity that could have been inadvertently introduced when the building was used as the service shop.

Visual inspection of this facility identified some process-related piping that traverses through Bldg. 3034 and into the adjacent Bldg. 3033A. The piping penetrates the floor adjacent to the shared wall between Bldgs. 3034 and 3033A, behind the portable office units. No operational knowledge of any spills or leaks from this process-related piping has been documented, although this piping could likely be the source of the isolated, fixed contamination observed during surveys. The building surfaces have been painted as part of regular maintenance and upkeep during its operational period.

7.4.2 Other Hazardous Contaminants and Materials

The exterior of Bldg. 3034 is composed of painted corrugated metal siding. These types of materials, along with protective coatings, have been known to fail for Resource Conservation and Recovery Act (RCRA) heavy metals (e.g., chromium) concentration limits for characteristic wastes. Based on this knowledge, intrusive samples of this material are required to confirm its chemical characteristics and compliance with RCRA characteristic regulations. In addition, lead and PCB concentrations in painted structural materials required quantification prior to disposal.

Miscellaneous items abandoned when the facility was no longer in use have been removed from the general area. Lead-based paint exists throughout the building as wall covering. The areas that were peeling and flaking were repaired, noting that approximately three-fourths of the building was repainted (ORNL 1997f).

Based on historical reports, no listed waste processes occurred in Bldg. 3034. A visual inspection of the building verified the absence of hazardous waste residuals and/or stains on the floor/concrete slab, walls, or ceiling. A separate listed waste determination has been prepared for all of the Isotope Row facilities—including Bldg. 3034—and concluded that no listed waste processes had occurred.

Due to the age of the building, some of the light ballasts may have been manufactured prior to 1979. Lighting system ballasts installed prior to 1979 are known to contain PCBs. Four of the hydraulic door-closer mechanisms installed at this building were manufactured prior to 1980. Historically, ORNL has determined the presence of PCBs in hydraulic fluid samples collected from door-closers that were of similar age and manufacture. Samples from the hydraulic fluids of door-closers in Bldg. 3034 have not been collected. Transformers observed in Bldg. 3034 appear to be the dry type. The ORNL PCB Items

Report does not indicate the use or storage of any PCB-regulated equipment at this location. The Hazardous Materials Information System Data maintained by ORNL, has identified 23 items that exist in the building, that are associated with structure or building operational features as of September 21, 2005 (P2S 2007f).

The following hazardous materials were reported or suspected in Bldg. 3034 based on a walkdown performed by P2S in 2007:

- Approximately 600 ft^2 or < 1 yd^3 of floor tiles and 570 liner ft or 2 yd^3 of pipe lagging are presumed ACM (PACM) along with roofing material that is suspect ACM
- Underground abandoned diesel fuel tanks (out of scope) and above ground diesel storage tank
- PCBs expected in light ballasts, transformers, electrical equipment, and potentially in dry applied paint
- Regulated items such as circuit boards and lead items (e.g., fuses), as well as universal waste such as lamps, thermostats (e.g., mercury-contaminated equipment), and batteries
- Asbestos, refrigerants, free liquids (oil, contaminated water, etc.) may be present in intact electrical, mechanical, and ventilation system components (ORNL 1997f and P2S 2007f)

P2S included in the walkdown report that beryllium is suspect in the building (P2S 2007f). This statement was primarily due to the proximity of Bldg. 3034 to larger production and processing facilities and the general age of the structure. Traces of beryllium, if present, are likely from the settling atmospheric dusts.

7.5 CURRENT FACILITY CONDITIONS

Building 3034 has been used by UT-Battelle (UT-B) as a break room, offices, and storage area. The main fire alarm and power distribution system panels for the Isotope Row facilities are located in Bldg. 3034 (P2S 2007f). Non-essential piping and alarms have been deactivated; however, the fire protection (dry system) remains active. Steam, natural gas, plant air, and potable water systems are isolated, drained, and abandoned in place. All electrical services that were not essential to basic surveillance and maintenance (S&M) operations were disconnected at the main breaker box, although the power distribution system remains in service. The process floor drains (e.g., gravity drain system) remain in operation to direct any roof leakage to the ORNL process waste system. No decontamination of the process drain system has been performed (ORNL 1997h).

7.6 EXISTING SURVEY DATA

ORAU performed a radiological scoping survey of the building surfaces in December 2010. The survey included surface scans and direct measurements for alpha, beta, and gamma radioactivity. Although historical PK documents state that no radioactive materials were handled in this building, a few locations of isolated elevated beta surface readings were identified as provided in Table 7.1 and Fig. 7. Direct measurement Location 10 had the highest measured alpha activity. It was collected inside an I-beam along the east side of the building. Additionally, measurement Location 11 had the highest beta activity and was found on a conduit located on the east side of the building.

Table 7.1. Bldg. 3034 ORAU static measurement results December 2010

		Alpha		Beta	
Measurement #	**Surface**	**Counts (cpm)**	**Activity (dpm/100 cm^2)**	**Counts (cpm)**	**Activity (dpm/100 cm^2)**

1	Floor	37	300	840	1200
2	Wall	6	42	1500	3200
3	Beam	1	0	1300	2600
4	Floor	6	42	1300	2600
5	Floor	6	42	1000	1600
6	Floor	1	0	1500	3300
7	Beam	6	42	4500	13,000
8	Wall	3	17	2600	6700
9	Beam	7	50	5400	15,000
10	Beam	96	800	740	900
11	Conduit	56	460	59,000	180,000

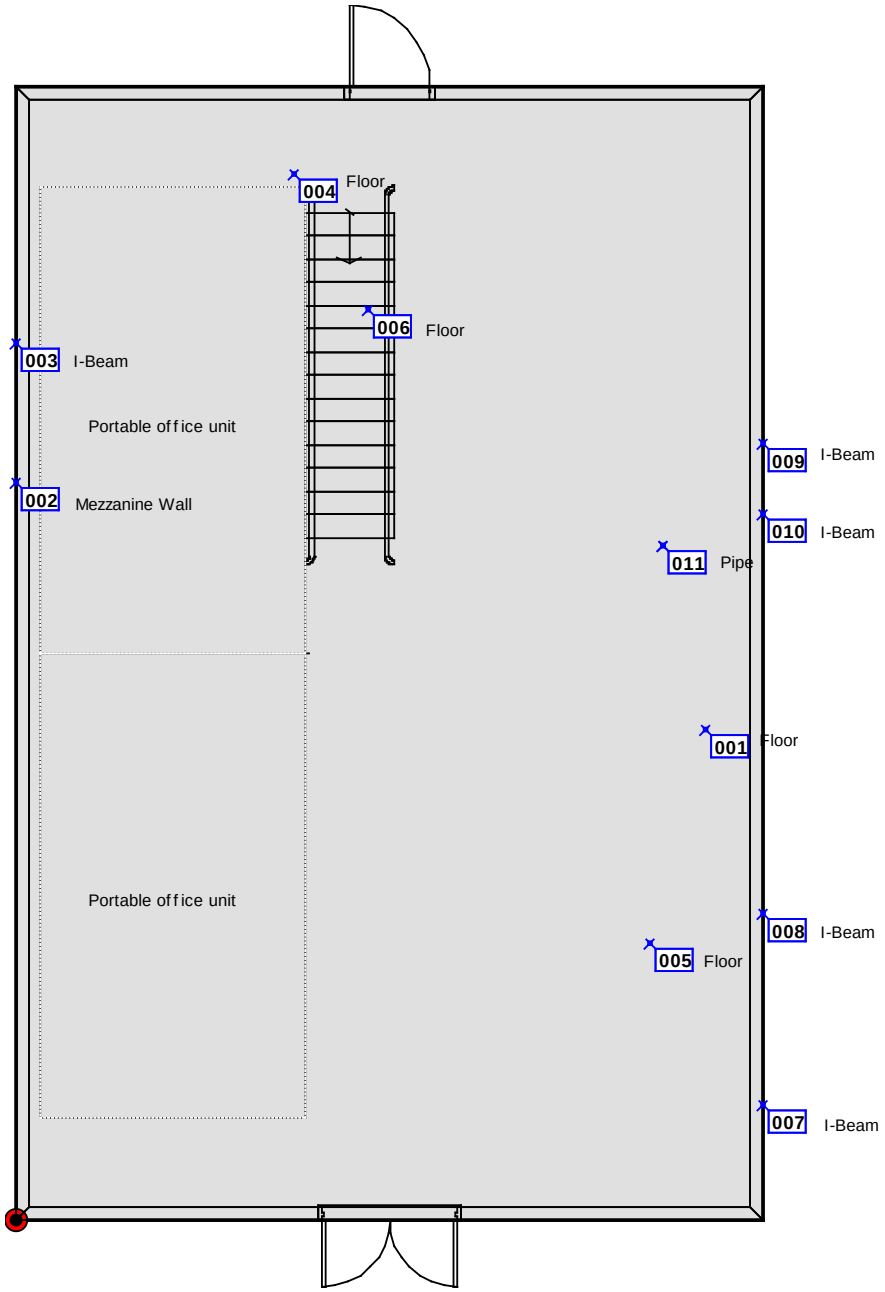

Fig. 7. Bldg. 3034 Scoping Static Measurement Locations.

7.7 ANTICIPATED WASTE VOLUME

The total waste volume forecast for Bldg. 3034 is 5130 ft^3 (190 yd^3); no process systems or equipment are expected to be present. Hazard abatement activities will generate small quantities of suspect or regulated materials which will require segregation, characterization, and treatment prior to disposal at an approved disposal facility.

8. PROCESS KNOWLEDGE FOR BLDG. 3036

8.1 BUILDING DESCRIPTION

Building 3036 is a steel-framed structure clad in corrugated metal siding on a concrete foundation. The building features a built-up flat roof on a concrete base, a second level mezzanine with metal floor, a roll-up door, and a 3000 lb capacity crane that protrudes from the front of the building (Fig. 8). The FIMS record of gross square footage is 2048 ft^2. Prior inspections have reported Bldg. 3036 to be in generally good structural condition.

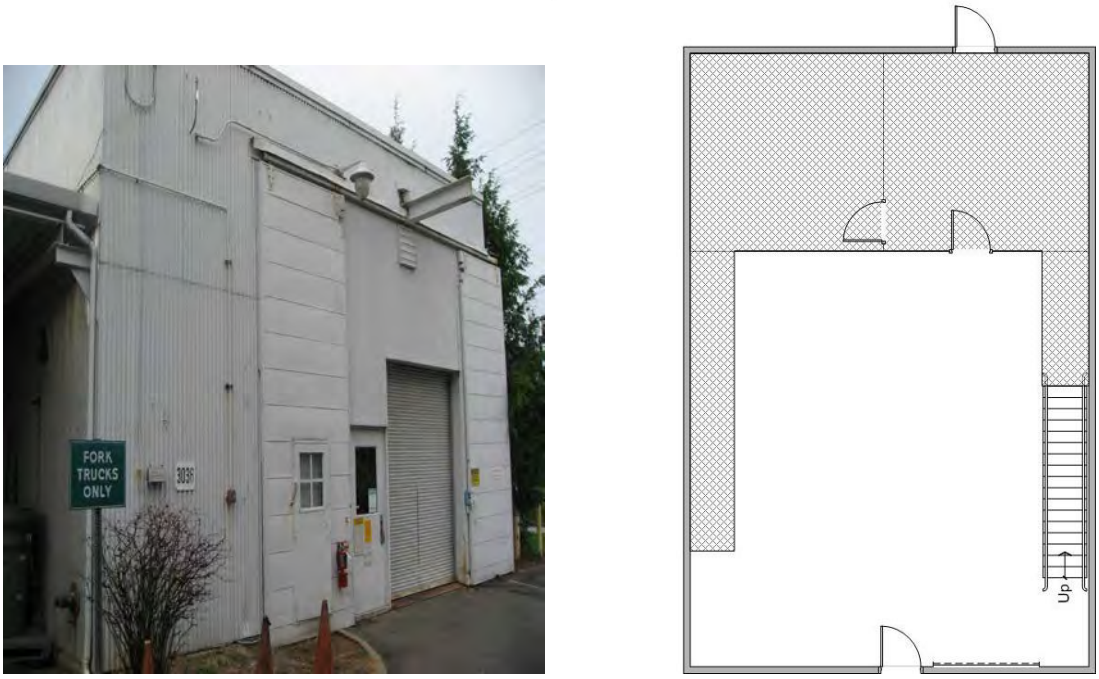

Fig. 8. Bldg. 3036 exterior façade and floor plan.

8.2 PROCESS DESCRIPTION

Bldg. 3036 was never used for radioisotope processing; therefore, the facility did not warrant a hazard or safety analysis document or a deactivation report. One of the historical tasks performed in this building involved the decontamination of lead bricks which were subsequently sent to the lead shop (Bldg. 7005). Lead bricks were decontaminated by dipping them into a nitric acid solution. There has been no operational knowledge of spills or leaks from prior operational activities.

8.3 OPERATIONAL HISTORY

Building 3036, also referenced as the Isotopes Area Storage and Servicing Building, was constructed in 1950 as the decontamination facility for equipment and trucks at ORNL but has primarily been used as a general storage facility in support of the isotopes program (ORNL 1990a). Operations involved decontaminating equipment, used by the Isotopes program, in an acid bath treatment located in an underground tank/pit (ORAU 2011). Additionally, transport vehicles were also cleaned inside the high

bay area. Contaminated liquid from the decontamination activities was collected into a waste drain and underground tank beneath the building. During operations, this liquid was periodically pumped and disposed of at an on-site waste area. Decontamination operations were discontinued in 1960 and moved into the Bldg. 7819 Decontamination Facility Building. Surfaces were painted to fix remaining contamination. In 1965, concrete was poured to cover the original floor that had been contaminated by the decontamination operations and the building was permanently converted for storage (ORNL 1990b, ORAU 2011, and P2S 2007g). In 1970, the building was designated as the U.S. Department of Transportation (DOT) storage and packaging facility for shipping and receiving stable isotopes. Storage and shipping operations were moved from the facility in December 2011.

8.4 CONTAMINANTS OF CONCERN

8.4.1 Radiological Contaminants

Building 3036 is posted as "Radioactive Materials, Fixed Contamination." The source of this contamination is believed to be associated with prior decontamination activities. Radiological contamination is reported to be fixed behind layers of paint and a new concrete floor. No removable radiological contamination has been reported. All of the interior surfaces have been painted as part of general surveillance and maintenance. This facility was painted in 1965 to fix any potential removable contamination that might have resulted when equipment decontamination activities were carried out in Building 3036.

Periodic radiological surveys of the facility determined that the general area dose rate measured throughout the facility was <0.1 mR/hr whole body. The dose rate in front of the underground storage tank measured 0.8 mR/hr on contact. Removable contamination on large area smears were <100 dpm alpha and <1000 dpm beta/gamma. Removable activity for gross alpha and beta on disc smears were <20 dpm/100 cm^2 alpha, <200 dpm/100 cm^2 beta/gamma (P2S 2007g).

8.4.2 Other Hazardous Contaminants and Materials

As previously stated, the exterior of Bldg. 3036 is composed of corrugated metal siding. These types of materials along with protective coatings have been known to fail leachable concentration limits for RCRA heavy metals (e.g., chromium). PCBs are expected to be present in light ballasts, paint and electrical devices such as switchgear, transformers, etc. Positive lead paint sampling results are reported (P2S 2007g). Universal waste such as lamps, batteries, and mercury-containing equipment may also be present.

8.5 CURRENT FACILITY CONDITIONS

Plant utilities, ventilation fan, and high-efficiency particulate air filters remain active. The process floor drain is operational and the fire protection, which is a dry system, remains active.

8.6 EXISTING SURVEY DATA

ORAU performed a scoping survey of the interior surfaces of Bldg. 3036 in December 2010. This included surface scans and direct measurements for alpha, beta, and gamma radioactivity. Direct measurement Location 4, collected on the floor near the west side of the building, had the highest beta activity (see Table 8.1 and Fig. 9.). Measurement Locations 6 and 7 had the highest reported alpha activity. Both were located on the horizontal structural support on the west side of the building.

Table 8.1. Bldg. 3036 ORAU static measurement results December 2010

		Alpha		Beta	
Measurement #	**Surface**	**Counts (cpm)**	**Activity (dpm/100 cm^2)**	**Counts (cpm)**	**Activity (dpm/100 cm^2)**
1	Floor	4	25	3000	7200
2	Floor	2	8	1900	3800
3	Floor	1	0	1300	1900
4	Floor	4	25	14,000	41,000
5	Wall	4	25	4200	11,000
6	Wall	8	58	2900	7000
7	Wall	8	58	5500	15,000
8	Floor	3	17	8800	26,000
9	Crane rail	7	50	2100	4500

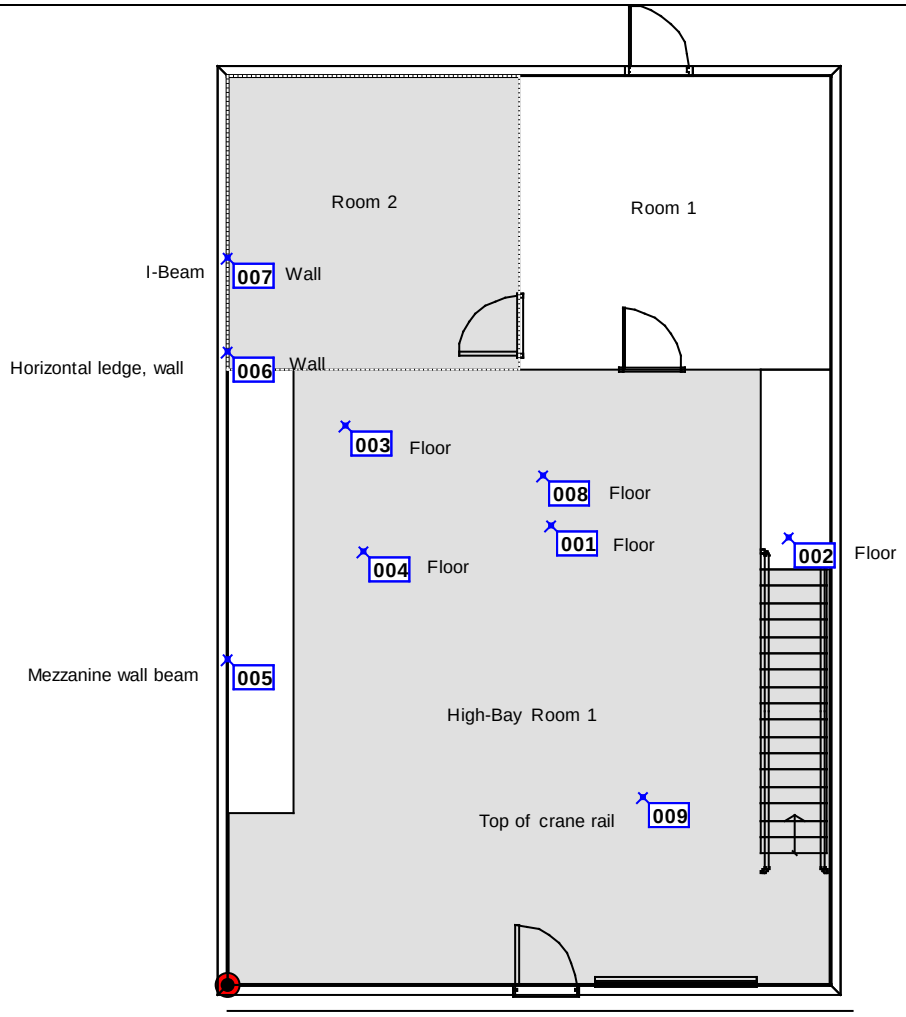

Fig. 9. Bldg. 3036 Scoping Static Measurement Locations.

8.7 ANTICIPATED WASTE VOLUME

The total waste volume forecast for Bldg. 3036 structure is 5130 ft^3 (190 yd^3); no systems and equipment volume is projected for this facility. Hazard abatement activities will generate small quantities of suspect or regulated material which will require segregation, characterization, and treatment prior to disposal at an approved disposal facility. An estimated 1100 ft^2 or 2.5 yd^3 of floor and ceiling tile with mastic, 570 liner ft or 2 yd^3 of pipe insulation, and roofing material is present as PACM (P2S 2007g).

9. PROCESS KNOWLEDGE FOR BUILDING 3093

9.1 BUILDING DESCRIPTION

Building 3093 is a 2-ft thick reinforced concrete enclosure, without a cover, that contains four cylinders used to store krypton gas for the processes conducted in Bldg. 3033. It is located on the northwest corner outside of Bldg. 3033. Building 3093 is located northwest and adjacent to Bldg. 3033. The facility is approximately 8-ft × 4-ft with a gross square footage of 150 ft^2 and a footprint of 126 ft^2, according to the FIMS record. Inside the enclosure are four 9-ft long and 18-in diameter charcoal filled storage cylinders (ORNL 1997e). Additional photographs are provided in Attachment F.

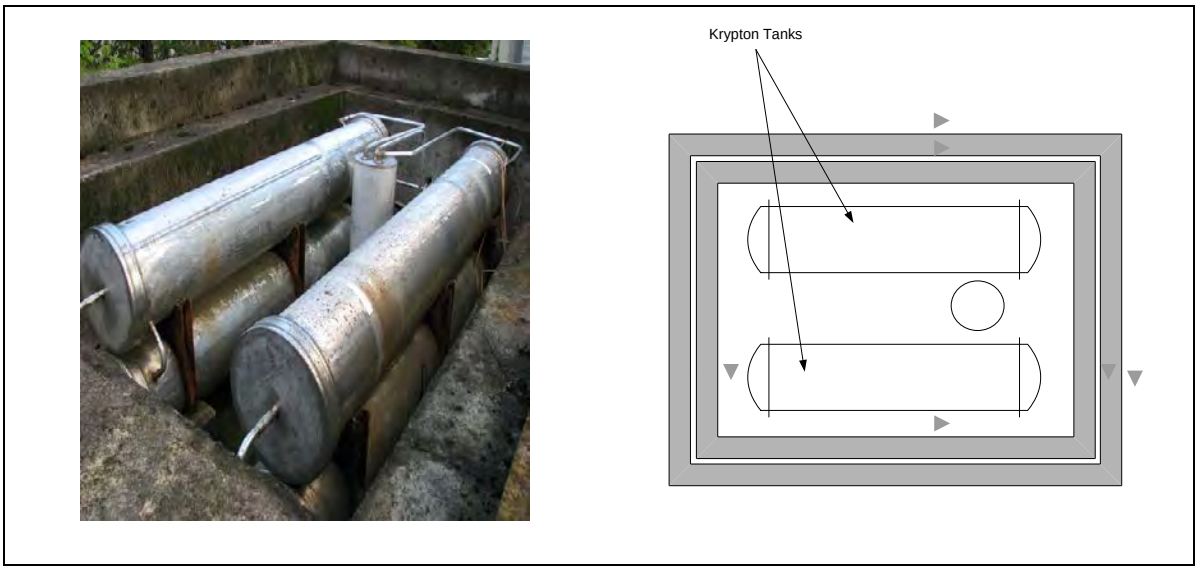

Fig. 10. Building 3093 Exterior.

9.2 PROCESS DESCRIPTION

Building 3093 was built as a permanent storage facility to support processing operations in Bldg. 3033. It contains four charcoal-filled cylinders for storage of Kr-85 gas associated with krypton purification. The krypton feed gas from the permanent facility was pumped to a 1-in thick steel plate enclosure adjacent to Bldg. 3033 which feed the Krypton Process Enclosure through copper lines (ORNL 1997e).

9.3 OPERATIONAL HISTORY

The krypton storage cylinders were first used in the late 1950s and the last Kr-85 campaign was conducted in September 1989.

9.4 CONTAMINANTS OF CONCERN

9.4.1 Radiological Contaminants

Irretrievable amounts of Kr-85 remain on the interior of the cylinders absorbed in the charcoal inside the storage cylinders:

9.4.2 Other Hazardous Contaminants and Materials

There are no known hazardous materials associated with the 3093 enclosure.

9.5 CURRENT FACILITY CONDITIONS

The krypton handling equipment contained in the concrete enclosure has been disconnected from the isotopes area cell ventilation system and the process off-gas system.

9.6 EXISTING CHARACTERIZATION DATA

The inventory calculation summary for Bldg. 3093 is 2.60E-04 Ci for Krypton-85 (BJC 2005). Much less than 1 Ci of krypton remains in the storage cylinders. There is some residual krypton absorbed in the charcoal, but the gas cannot be removed from the charcoal even by extended heat treatment (ORNL 1997c).

9.7 ANTICIPATED WASTE VOLUME

With the activated carbon removed from the four storage cylinders and both the metal cylinders and the activated carbon disposed of separately, the estimated volume is approximately 5 yd^3.

10. PROCESS KNOWLEDGE FOR BUILDING 3118

10.1 BUILDING DESCRIPTION

Building 3118 is a steel-framed structure on a concrete foundation with corrugated metal siding and a built-up flat roof on a metal base. In 1965, the building was erected by roofing and enclosing the space between Bldgs. 3030 and 3031 (ORNL 1997g). The FIMS record of gross square footage is 899 ft^2 and a footprint of 900 ft^2 (P2S 2007h) All ductwork on the south end of Bldg. 3118 is part of the air conditioning system for Bldgs. 3030 and 3031. The supply units for the air conditioning are mounted on the roof of Bldg. 3118.

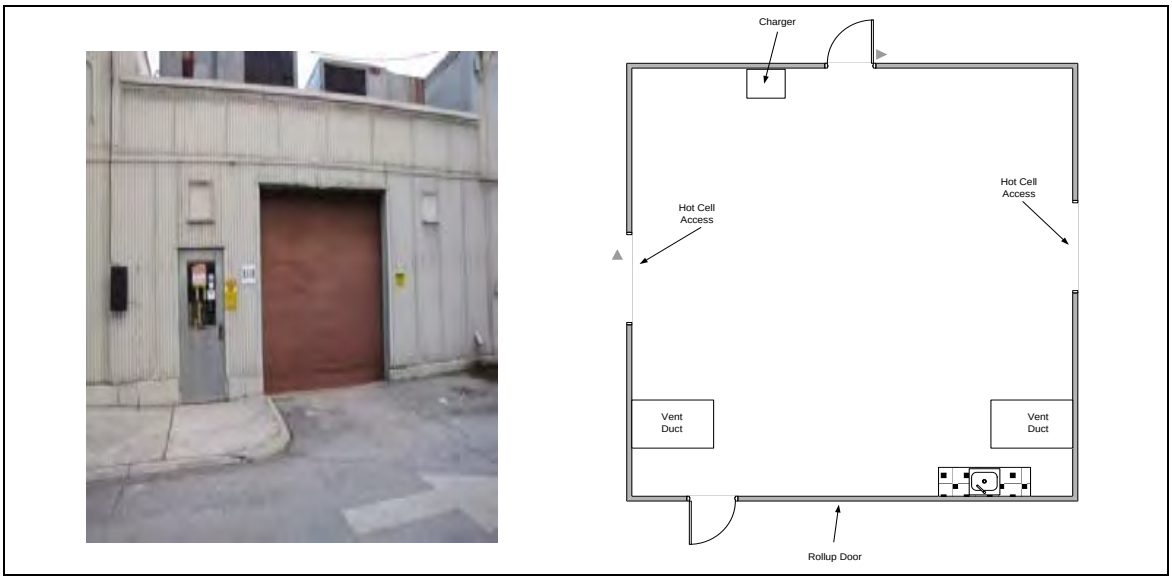

Fig. 11. Building 3118 exterior and floor plan.

10.2 PROCESS DESCRIPTION

Building 3118 provided access to the rear entry doors for hot cells to perform maintenance, decontamination, and process activities.

10.3 OPERATIONAL HISTORY

Originally designated as the Radioisotope Production Lab-H, Bldg. 3118 was built primarily to enclose the hot cell access doors for Bldgs. 3030 and 3031. The building functioned as a charging station and storage location for battery-powered forklifts. Building 3118 also served as temporary storage for drums and other containers of hazardous and radiological wastes, radioactive shielding materials, and shipping casks.

10.4 CONTAMINANTS OF CONCERN

The radiological COCs identified for Bldg. 3118 are provided in Table 10.1. The radioactive half-life for each contaminant is provided.

10.4.1 Radiological Contaminants

Table 10.1. COCs for Bldg. 3118

COC	Half-life	COC	Half-life	COC	Half-life
Am-241*	432.2 y	Ba-139	83.0 m	Cd-109	462.6 d
Ce-139	137.6 d	Co-60*	5.27 y	Cs-137*	30 y
Eu-152*	13.3 y	Sb-122	2.72 d	Th-232*	1.4E+10 y
Y-90	64.05 h	Gd-153	240 d	Pu-233	21 m
Ni-63*	96 y	Eu-154*	8.8 y		

10.4.2 Other Hazardous Contaminants and Materials

Lead based paint was applied and remains on interior building surfaces. Pipes covered by approximately 1.8 yd^3 of ACM insulation. Material and wastes anticipated to be present in Bldg. 3118 include PCBs associated with electrical devices and universal wastes.

10.5 CURRENT FACILITY CONDITIONS

Miscellaneous items abandoned in place have been removed from the general area and no significant combustibles remain there (ORNL 1997g). The general area of Bldg. 3118 was decontaminated to remove transferable contamination from access-required spaces. The hot drain system is highly contaminated. The process drain systems are contaminated and have been abandoned in place. The battery charging station has been de-energized and abandoned in place. The hot cell access doors to both the Bldg. 3030 and the Bldg. 3031 hot cells are closed, locked, and sealed. Photographs of Bldg. 3118 interior are provided in Attachment G.

Electrical services have been disconnected or de-energized except for lighting. The fire protection (dry system) remains active. Steam, natural gas, plant air and potable water systems are isolated, drained, and abandoned in place (ORNL 1997g).

10.6 EXISTING CHARACTERIZATION DATA

The survey results in Bldg. 3118 show that the walls next to the hot cell access are radiologically contaminated. While only three survey locations were recorded, the scoping survey package shows elevated readings throughout the building. Location 3 had the highest beta activity and is a wall location on the north side of the building. Location 1 had the highest alpha activity and is a wall location on the east side of the building.

Table 10.2. Post-deactivation radioactive contamination levels (ORNL 1997g)

Identification	Contamination description	Radioactive quantity (/100 cm^2)	Radiation quantity (mRem/hr)
General area	Alpha smear—transferable	Less than 20 dpm	0.5
	Beta/gamma smear—transferable	Less than 200 dpm	
Bldg. 3030 hot cell door area	Alpha smear—transferable	Less than 20 dpm	3.0
	Beta/gamma smear—transferable	Less than 200 dpm	
Bldg. 3031 hot cell door area	Alpha smear—transferable	Less than 20 dpm	1.0
	Beta/gamma smear—transferable	Less than 200 dpm	

Radiological survey data are available in the final deactivation report for Bldg. 3118 (ORNL 1997g).

10.7 ANTICIPATED WASTE VOLUME

The waste volume forecast for Bldg. 3118 is 3861 ft^3 (143 yd^3) plus systems and equipment volume estimate of 1000 ft^3 (37 yd^3) which includes approximately 130 linear feet of piping and conduit (P2S 2007h).

11. LIVING MEMORY

The living memory information presented in Att. 1 is derived from interviews of individuals thought to have personal knowledge pertaining to the Isotope Row Facilities. This information was collected as part of a process to capture historical insights, often years after the relevant events occurred. The opinions and comments from interview participants have not been verified, and these statements may contain erroneous or incomplete information.

Sixteen people with personal knowledge of Isotope Row production activities were interviewed and their responses summarized and recorded (WMI 2011). Included in the interviews were three Division Directors; a person with an office in Bldg. 3036 for years; 10 technicians, chemical operators, chemists, researchers and technologists involved in isotope production; and 2 people who were responsible for facility and maintenance oversight.

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P2S 2007d. Facility Walkdown Checklist – 3033, Pro2Serve, October 25, 2007

P2S 2007e. Facility Walkdown Checklist – 3033A, Pro2Serve, October 25, 2007

P2S 2007f. Facility Walkdown Checklist – 3034. Pro2Serve. October 25, 2007

P2S 2007g. Facility Walkdown Checklist – 3036. Pro2Serve. October 25, 2007

P2S 2007h. Facility Walkdown Checklist – 3118, Pro2Serve, October 25, 2007

WMI 2011. ORNL Isotope Row Facilities Characterization Project Living Memory Summary. Waste Management Innovations, Inc. Rockwood, TN

Attachment 1

Living Memory Summary

DOE/OR/

LIVING MEMORY SUMMARY

April 2011

Linda A. Coffey

Waste Management Innovations, Inc.
323 Kirkham Drive
Rockwood, TN 37854
865-776-5041

1. INTRODUCTION

The Isotope Row Facilities Characterization Project includes Buildings 3030, 3031, 3032, 3033, 3033A, 3034, 3036, 3093, 3099, and 3118 at the Oak Ridge National Laboratory (ORNL) in Oak Ridge, Tennessee. The purpose of the Living Memory Summary for this project is to capture the historical process knowledge of former employees to help identify likely locations and types of contamination generated from normal process operations and anomalous events.

Information was collected from sixteen (16) individuals with personal knowledge of production activities at the Isotope Row Facilities. The individuals subject to interviews represented a combined work history ranging from 1946 through 1999 with varied responsibilities including division oversight, hand-on-production work in the manipulator cells, and facility maintenance and support. In many cases the interviewees were able to provide contact information for additional individuals with working knowledge of the Isotope Row Facilities. A number of historical documents containing useful process knowledge were also identified during the interviews.

2. LIVING MEMORY INTERVIEWS

Three (3) of the interviews were conducted with former Division Directors for the Chemical Technology Division (CTD), the Isotopes Division, and the Analytical Chemistry Division. These individuals were never housed in the subject facilities or specifically involved in hands-on operations, but did provide general information that served to supplement previously published documents.

One (1) person interviewed maintained an office for many years in Building 3036 and was familiar with the history of the building and various alterations made during the facility's life cycle.

Ten (10) people interviewed were directly involved with the day-to-day isotope production as target group technicians, chemical operators, chemists, researchers, and technologists.

The remaining two (2) people interviewed, a mechanical engineer and a facility engineer, provided facility oversight and maintenance supervision support.

The opinions and comments collected may contain erroneous or incomplete information due to the inherent difficulty of accurately recalling details of activities in the decades prior to the 1980s.

General Facility Information

Several of the interviewees, especially those without direct involvement in isotope production activities, recalled general information related to the timeline of operations, management changes, etc. Much of the information they provided was found to closely match facts available in published reports.

- In 1960 the Radioisotopes Target Fabrication Group was managed by the Isotopes Division. The Solid State Physics Division assumed operation of the Target Fabrication Group from 1975 until 1981. The Isotopes Division was absorbed by the Operations Division in the early 1980s, and in 1988 radioisotopes production at ORNL became the responsibility of the Chemical Technology Division (CTD).

- The isotopes handled in the Central Facilities were obtained primarily from the Oak Ridge Research Reactor (ORRR) and the Savanna River plant.

- Isotopes production in the 3000 area was phased out during the 1980s, and the condition of the buildings began to degrade as a result of reduced resources for building maintenance.

- The original ventilation system for these facilities was underground and vented to a central stack. The system was upgraded to an above ground system in the mid 1980s.

- The Divisions responsible for isotope production had written procedures in the form of Central Files (CF) reports. The reports were numbered; however, they were not abstracted or available through library distribution.

- Division quarterly and annual reports were prepared for the program sponsor (Atomic Energy Commission which became the Department Of Energy). These documents had restricted distribution.

- Lee Wan Associates prepared a draft white paper addressing the Isotopes Program in 1987. Lee Wan Associates revised the report in 1988 at the request of the CTD director; however, the report was never officially issued. The report concluded the radioisotopes facilities (3000 area) were too degraded to support isotope production and recommended new facilities be constructed in the High Flux Isotopes Reactor (HFIR) area. DOE began shutdown of the 3000 area facilities in 1990.

Former employees having direct involvement with isotope production recalled more specific information about typical chemical usage, routine waste management, and decontamination activities.

- Each building was set up as a stand-alone facility according to explosive industry standards, so that in the event of a major release the contaminated facility could be isolated for decontamination without affecting operations in the non-affected buildings.

- The production work in buildings 3030, 3031, and 3033 was limited due to the small cells and limited shielding at those facilities. The bulk of the high level work was conducted at 3028, 3029, and 3047. All alpha powder work was limited to Building 3038.

- Releases of contamination (from glove boxes into the general work area) were usually small, well contained, and easily cleaned up.

- Oxalic acid, Turco 4501 (potassium hydroxide, hydroxyl-diamine), and commercially available household cleaners (Fantastic and Formula 409) were utilized for decontamination of equipment and tools.

- Organic materials were used for solvent extraction processes on a very small scale (100 cubic centimeters maximum) and were never used or stored in bulk quantities in any of these facilities.

Vented storage cabinets were located outside for storage of flammable liquids and solvents.

- Solid low-level wastes from routine isotopes production and decontamination operations (PPE, glassware, absorbent pads, rags, etc.) from isotope production and decontamination activities were packaged in plastic bags and placed in yellow dumpsters located at the facility. The filled dumpsters were transported to the ORNL burial grounds for disposal. Routine waste deliveries to burial ground did not require special paperwork or tracking.

- Chemists and technicians kept a daily work log. Blank logbooks were issued by laboratory records. When the employee retired or was reassigned the logs were returned to laboratory records and archived.

Facility Specific Information

The existing published information was somewhat lacking in detail of the day-to-day operations. Some former employees having direct involvement with the isotope production processes were able to provide the following facility specific information.

Building 3030: Radioisotope Production Lab-C

- The west wall initially contained a bank of hot hoods with special shielding barricades for handling reactor produced isotopes.

- The building contained a hot cell for processing irradiated cyclotron and reactor targets.

- One hood was dedicated to welding capsules containing sources of iridium, strontium, and promethium.

- Cobalt-56 and 57, gold-198, neptunium-234, uranium-237, tin-110, and nickel-63 were processed in this facility. Stronium-90, iron-55, iridium-192, and sulfur-33 were stored in the facility as a nitrate solutions. During the purification process aliquots of the nitrate solutions were measured out and retained as liquid for distribution to customers.

- Small selenium and gadolinium sources were produced at this facility.

- In conjunction with a commercial company, ORNL produced palladium-103 seeds to be used for prostate cancer treatment.

Building 3031: Radioisotope Production Lab-D

- The original glove boxes along the west wall were taken out, and a hot cell was built in the space they occupied.

- Yttrium-90 and gadolinium-153 were processed in the hot cell.

- A glove box was dedicated to processing operations for americium-241 during the late 1960s and early 1970s.

- A small amount of plutonium was processed in this facility.

Building 3032: Radioisotope Production Lab-E

- Glove boxes similar to those in Building 3031were used to prepare neutron sources (including beryllium nitrate sources).

- A large number of isotopes were analyzed in this facility, including phosphorous-32, americium-241, plutonium-233, and small quantities of gold-198. Some work was done with gadolinium-153 before switching to gadolinium-147.

- This facility had four or five hoods used for physical testing of welded source capsules using x-raying bubble, dye, and vacuum testing.

- The majority of chemical and physical testing operations for isotope production were relocated in 1964 to Radioactive Materials Analytical Laboratory (Building 2026).

- This facility operated at atmospheric pressure, and no high-level work was done in this building.

Building 3033: Radioisotope Production Lab-F

- This facility was a krypton-85, carbon-14, and tritium load out station.

- Tritium was absorbed into traps then released into containers for shipment to customers.

- The tritium process equipment was highly contaminated. Occasionally, tritium contamination was detected outside the hoods.

Building 3033A: Radioisotope Production Lab Annex (Actinide Fabrication Facility)

- Samples of materials needed for studies were received from researchers all over the world. The material sample was coated with the specified radioactive isotope and returned to the originator.

- Iodine-131 was processed in one of the hoods.

- There was an alcove in the front left of the building that once contained a dissolver in an underground concrete enclosure which was used for carbon-14 production. In the early 1980s the dissolver was removed from the enclosure and disposed of by IRML personnel. The underground enclosure was filled in with concrete and the surrounding area was decontaminated and converted into a storage area. The underground concrete enclosure did not undergo decontamination prior to being filled with concrete.

- Source materials were received from the ORRR and the HFIR.

- All operations involving radioactive material were conducted in sealed, vacuum filtered glove boxes. There was a dedicated glove box for each different isotope. Each glove box was equipped with a local exhaust filter. Glove box exhaust travelled through additional high efficiency particulate air (HEPA) filters in the attic before discharge to the Isotope Area cell ventilation system and 3039 stack.

- The HEPA filters were changed on a routine schedule, two to three times per year.

- Contamination controls included weekly surveys of the work area by the radiation protection group; an air monitoring system inside the building to detect airborne releases from glove boxes; and self monitoring prior to exit. Evidence of contamination outside of the glove boxes resulted in immediate decontamination.

- The hood and a stainless steel sink were equipped with drains. The technician that made this statement could not recall any operations that generated liquid waste.

- The largest project in this facility was a dosimeter project where ceramic oxide powders of various actinides were loaded into small metal capsules which were sealed by welding. The capsules were for use in reactors as in-core neutron radiography dosimeters to map the flux.

- Most training was "on-the-job" with an experienced co-worker prior to 1986. After 1986 a formalized training program specific for isotope facility and glove box work was developed.

- Standard work attire was company issued clothing (khakis). Coveralls, gloves, shoe covers, and full face masks were required for all decontamination activities.

- Any releases of contamination from the glove boxes were easily contained inside the building. Clean up usually included scrubbing the affected area with alcohol-190 and/or a mild, non-organic, all-purpose household cleaner (Comet) and dampened cloths/rags. Radiological protection surveys were used to verify cleanup efforts. Occasionally, floor tile replacement was necessary to completely remove contamination.

- Safety Analysis Reports (SARS) specific to the 3033A facility were issued in 1983 or 1984.

- Decontamination debris and other radioactive waste were collected in plastic bags and placed in the radioactive waste dumpster dedicated to the facility. Dumpster contents were taken to the ORNL burial ground for disposal.

- The process of bagging materials in/out of the glove boxes was the easiest way for contamination to migrate into normally uncontaminated work areas of the facility. These releases were usually not significant enough to trigger and alarm from the air monitors. Most of this type of contamination was detected during the self-monitoring process.

- One technician witnessed a contamination incident in the 1980s involving a release of U-233 from a glove box on loan from the Oak Ridge Gaseous Diffusion Plant (ORGDP) Complex for a special project. Upon completion of the project it was to be removed from the building. The glove box needed to be laid on its side to fit through the door. The Plexiglas enclosure developed a crack while it was being repositioned, and the glove box broke apart. U-233 dust went "everywhere" and "on everything" from the ceiling to the floor. Walls, floors, equipment, and cabinets were scrubbed down until decontamination was confirmed by radiological surveys.

- Several of the interviewees recalled a contamination incident that occurred around the late 1960s to early 1970s when a storage container/box containing carbon-14 was opened at the direction of a supervisor. Some of the material escaped into the facility. The material was contained inside the building. The incident was investigated and a report was filed.

- One technician recalled stories about a contamination incident in 1960 when a "hot trailer" was decontaminated outdoors with a sand blaster near Building 3033A.

Building 3034: Radioisotope Area Services

- This facility housed the electrical distribution system for the isotopes area.

- This facility was a plant and equipment building with a small machine shop. This facility also served as a storage area and drop off point for supplies. The back part (north end) was at one time an area shop with crafts people stationed for work. Eventually, the building was converted into office space.

- Radiological materials were not handled in this facility.

- One person recalled that a couple of hoods were torn out before making in into a machine shop.

Building 3036: Isotope Area Storage and Servicing Building

- This building initially served as a decontamination facility for the entire ORNL plant and was managed by the Waste Operations Group. Later the facility was converted into a storage and dispensing area for stable isotopes.

- The decontamination facility had a below floor level pit for acid baths. The pit was filled in when the decontamination process stopped in 1956 or 1957.

- Decontamination activities were conducted inside the building and outside on a concrete pad equipped with a hot drain.

- The employee housed in Building 3036 stated that when the building was converted to a storage facility, all of the interior surfaces were painted with magenta colored paint to cover legacy contamination. The magenta paint was then covered with white paint which is still in place. He pointed to areas on the floor where the white paint was chipped or worn through and the magenta underneath was clearly visible. He stated that occupants of the building were instructed to never

do any drilling or cutting on the interior surfaces that could disturb contamination under the paint.

Building 3093: Storage cubicle for Krypton

- This area was a storage facility (approximately 10 ft x 6 ft x 4.5 ft tall) for cylinders of krypton. The 3099 pad and this storage facility were all considered as part of Building 3033.

- Krypton-85 cylinders were hooked up in this facility then piped into the process facility.

Building 3099: Storage Pad 3031/3032 (NA)

- This facility was referred to as “the pad” and was used for staging shipping containers for truck pick up.

- The containers typically sat on this pad for a couple of days before being picked up.

- Part of the pad between 3032 and 3033 was used for storing krypton-85 and tritium. Cylinders were connected to a system on the pad that was hard piped into the process facility. Gases in Building 3033 were absorbed on charcoal in the process equipment and released into cylinders on the pad in preparation for shipment.

Building 3118: Radioisotope Production Lab

- This facility provided an enclosed space between Buildings 3030 and 3031 for personnel to access the rear doors of the hot cells in those facilities. Prior to construction of the enclosure the back of the hot cells opened to the outside.

ATTACHMENT A

Building 3030
Current Facility Condition

Building Feature Photographs	Description
	Glass wash sink on west wall View of southwest corner
	Hot sink hood on north wall
	Fume hoods with glove box port inserts
	South view of manipulator hot cell southeast corner Frontal view of manipulator hot cell

Center laboratory work bench

Sink on north end of work bench

Roof-mounted exhaust

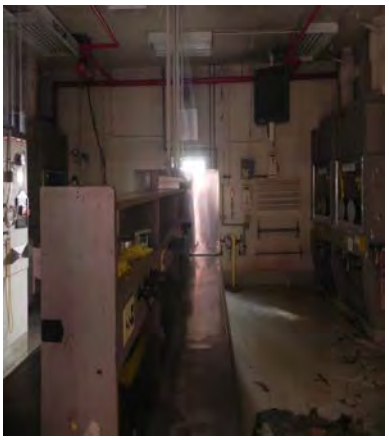
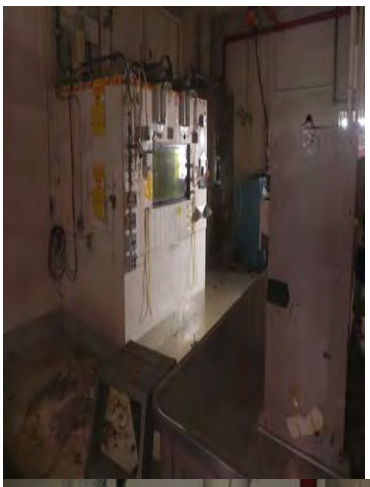
Filter bank

Off gas filter (FH-105)

Filter bank, hot cell exhaust

ATTACHMENT B

Building 3031
Current Facility Condition

Building Feature Photographs	Description
	North view of Bldg. 3031 process area and center work bench
	Northwest corner of process area Hot cell
	Fume hood with glove box insert

Double fume hoods set with glove box inserts

Cold sink

Hot cell off gas exhaust

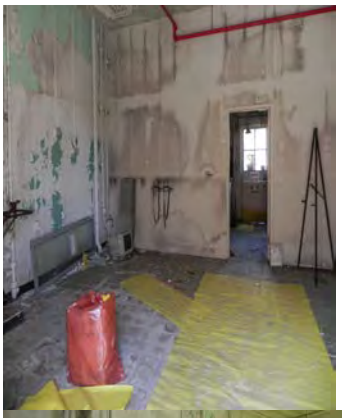
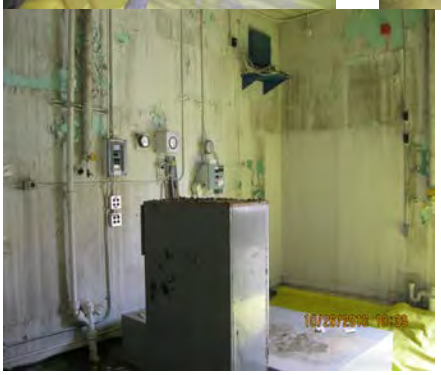
Filter bank (FH-111)

Roof mounted filters

Local exhaust

ATTACHMENT C

Building 3032
Current Facility Condition

Building Feature Photographs	Description
	Northwest office area Northeast office area
	Southeast corner view of office area
	Laboratory room Single hood on south wall
	Work bench and sink on east wall and single hood on north wall

Laboratory work bench on north wall opposite set of three hoods

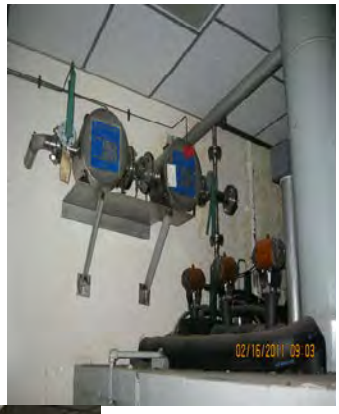
Set of three hoods on the south wall

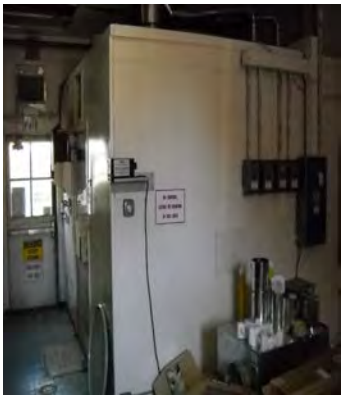
Roof mounted filters

Local exhaust

ATTACHMENT D

Building 3033
Current Facility Condition

Building Feature Photographs	Description
	Kr process (hot) cell and off gas filters
	Kr process cell tank area shielding
	Kr-Xe Separation Column and Carbon Reactor Kr-Xe column operations side
	Workbench and sink area on north wall



View of the H-3 room

H-3 room entrance

North process and loading hood inside the H-3 room

Lower portion of the north and south process and loading hood

Control panel and upper section of the south process and loading hoods

South process hood
duct work

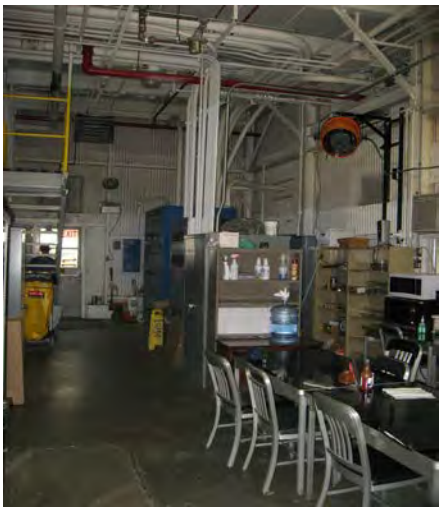
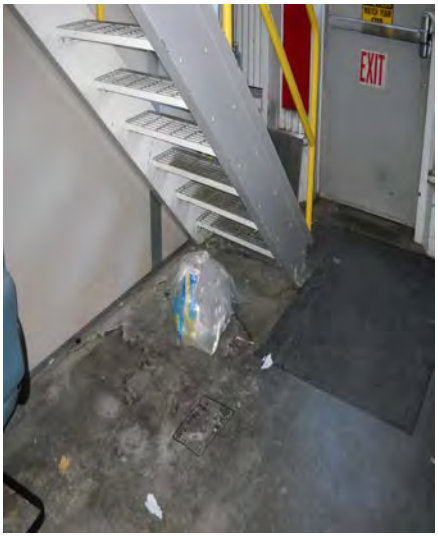
ATTACHMENT E

Building 3033A
Current Facility Condition

Building Feature Photographs	Description
	Interior area of Bldg. 3033A, north view
	Cell vent ductwork
	Filter housing
	FH-106 cell vent

ATTACHMENT F

Building 3034
Current Facility Condition

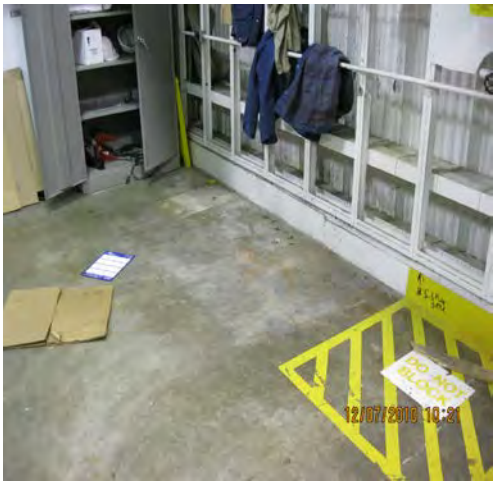
 **View facing north**	 **View from top of mezzanine stairs**
 **North exit and mezzanine stairs**	 **View of mezzanine top of stairs**

Electrical distribution panels	**Southeast side of high bay**

ATTACHMENT G

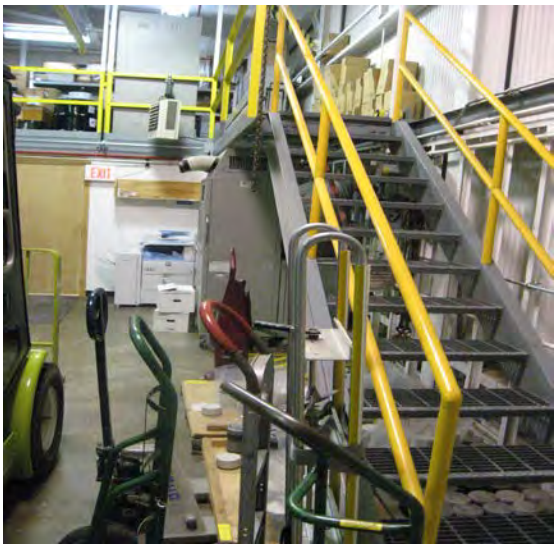
Building 3036
Current Facility Condition

Door to office area



West side of high bay

Mezzanine



Stairs to mezzanine

 Office	 **Mezzanine above office**

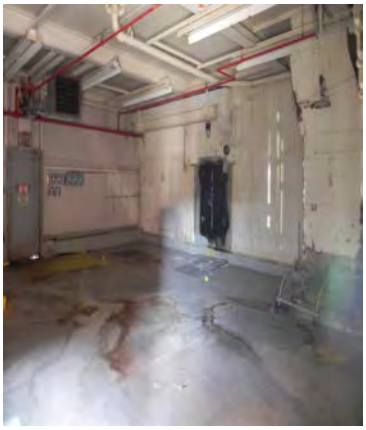
ATTACHMENT H

Building 3093
Current Facility Condition

Building Feature Photographs	Description
	Krypton gas storage cylinders
	Krypton gas storage enclosure

ATTACHMENT G

Building 3118
Current Facility Condition

Building Feature Photographs	Description
	Northeast corner of building with view of rear entry into the 3031 hot cell View of southeast corner work bench and sink
	3030 hot cell access with exhaust duct
	3031 hot cell access Exhaust duct

APPENDIX B
ISOTOPE ROW FACILITY
MAPS, SAMPLE LOCATIONS, AND DESCRIPTIONS

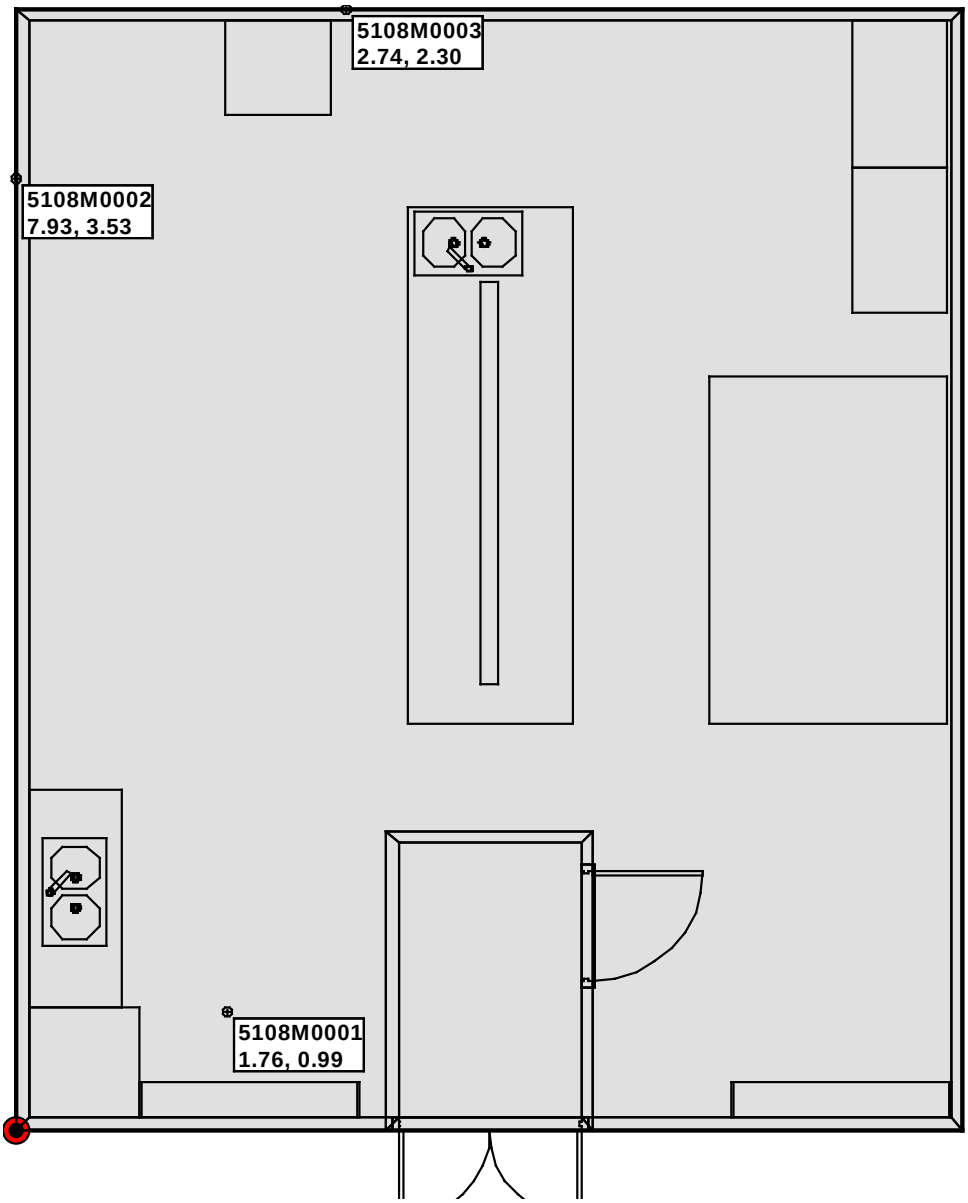
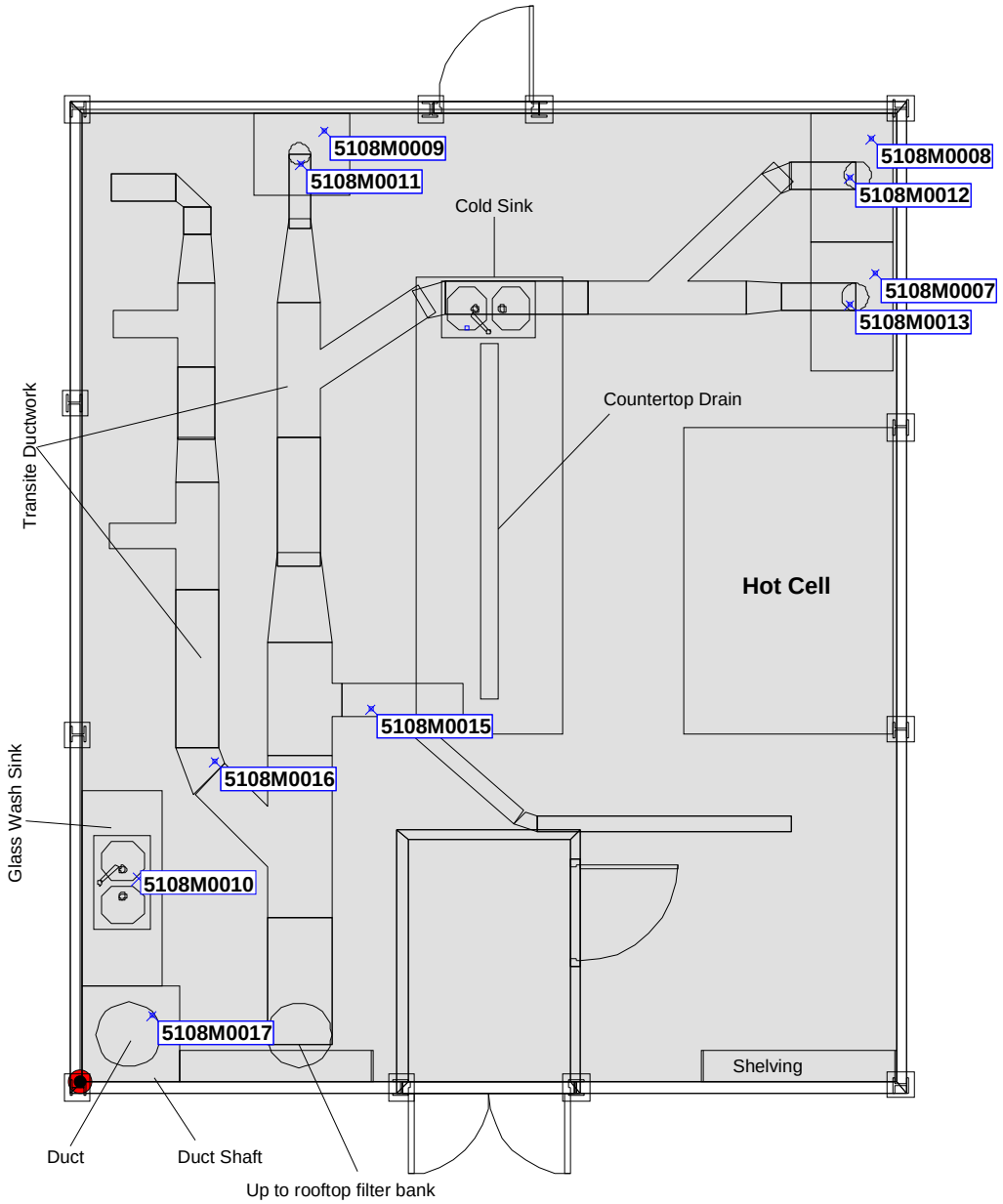


Fig. 1 Wall and Ceiling Sample Locations for Building 3030



5108M0018 and 5108M0019: Rooftop Filters

5108M0020: Rooftop Stack

Fig. 2 Process Systems Sample Locations for Building 3030

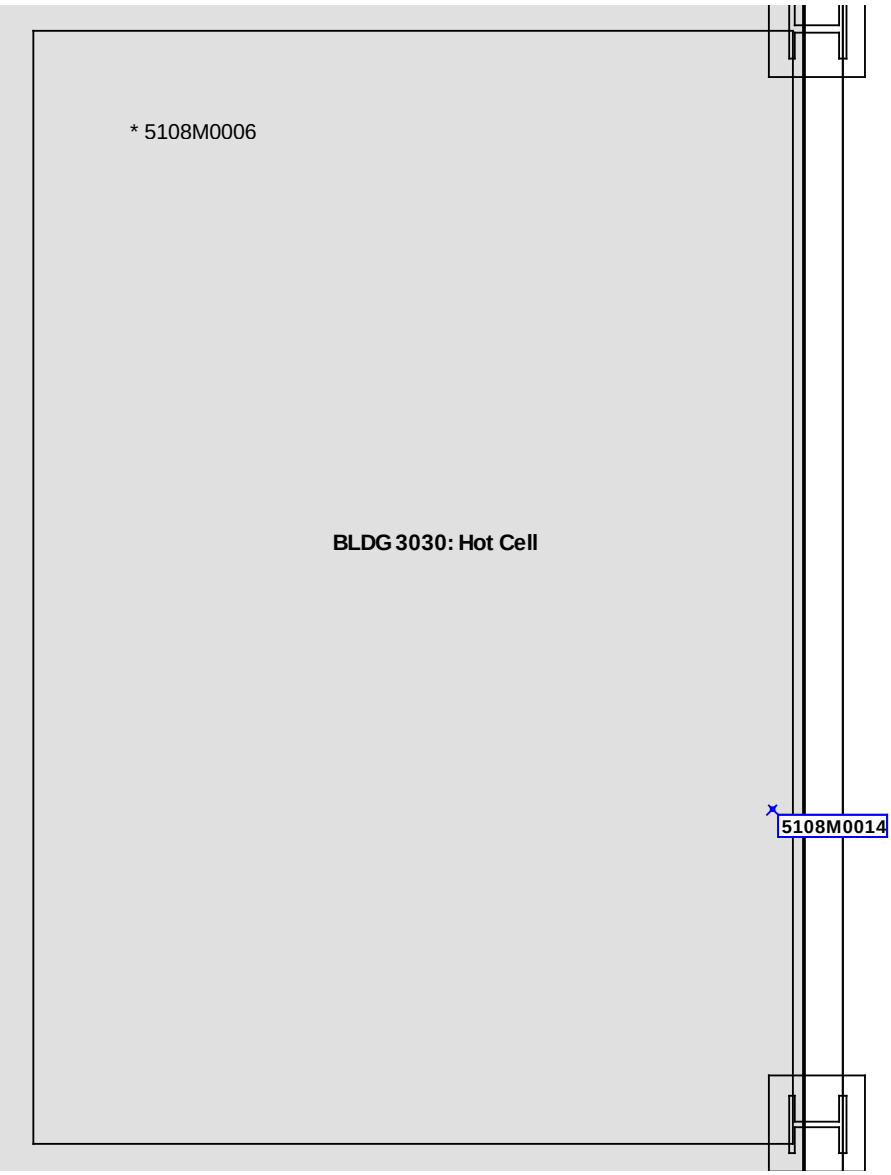


Fig. 3 Hot Cell and Cell Off-gas/Ventilation Sample Locations for Building 3030

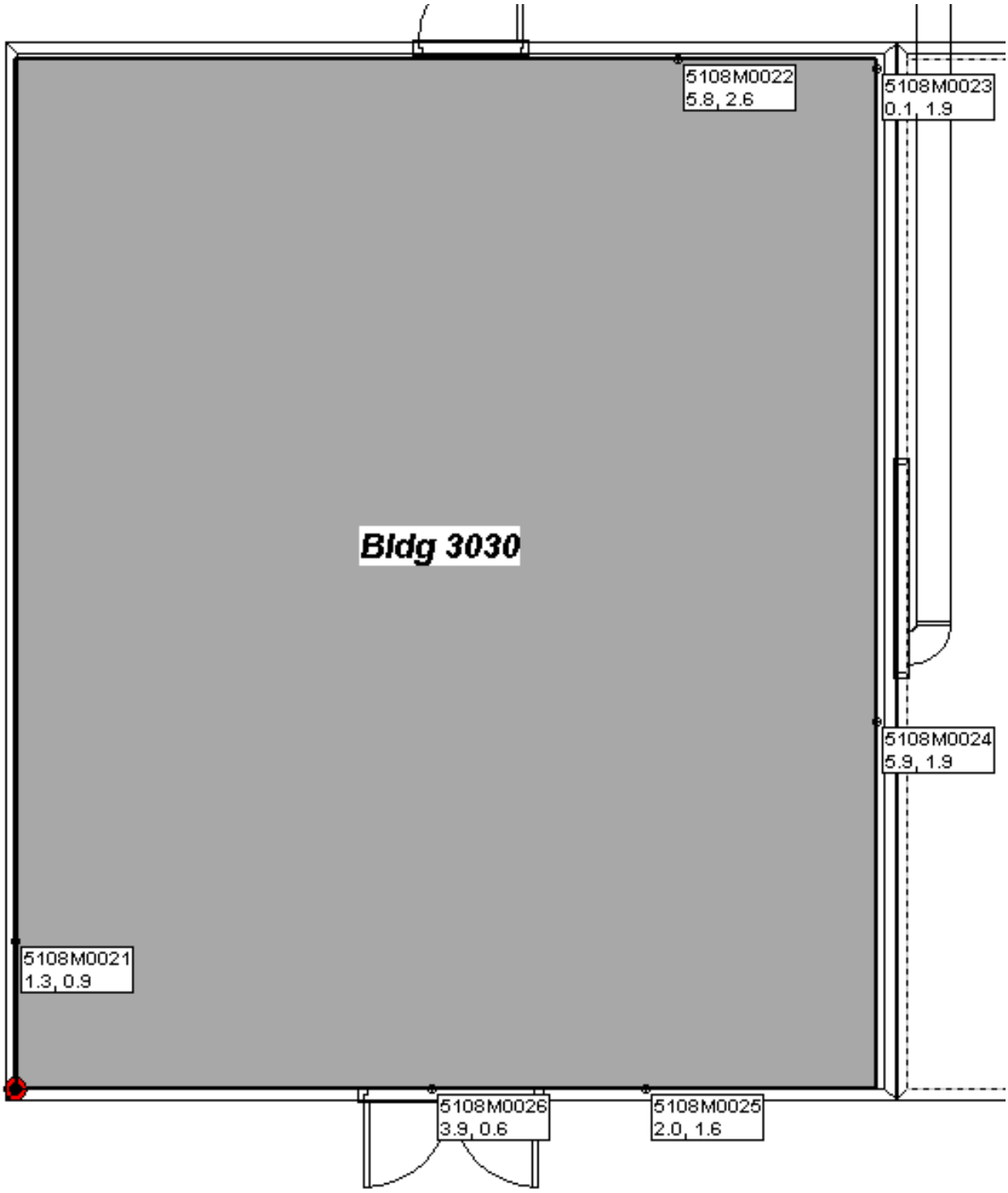
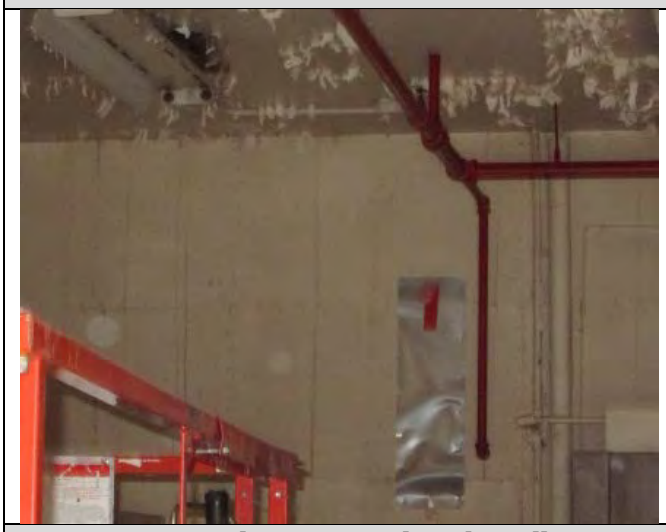


Fig. 4 Wall Sample Locations for Building 3030

Table 1: Building 3030 Sample Location Descriptions		
Sample ID	Surface	Remarks/Deviations
5108M0001	Ceiling	Metal ceiling.
5108M0002	Wall 1	Metal wall.
5108M0003	Wall 2	Metal wall. X coordinate changed to 2.5 because process hood is blocking access to 2.74m and exterior glass door is on the right (east) side of the hood.
5108M0004	Roof	Not collected. Originally intended as a Roof sample. Building owners mandated that no sampling of the roofs would be allowed.
5108M0005	Roof	Not collected. Originally intended as a Roof sample. Building owners mandated that no sampling of the roofs would be allowed.
5108M0006	Hot Cell	Volumetric sample of steel liner was not possible with available access. Collected sample from material used to seal pass-through, as well as a direct measurement and smear of the internal horizontal surface.
5108M0007	FH/GB	
5108M0008	FH/GB	
5108M0009	FH/GB	
5108M0010	Sink Drain	Sample was not collected at original location due to the presence of mercury around the sink drain, all sampling activities for this sample suspended on 4/17/13. Sample location moved and collected from SW sink drain.
5108M0011	Process Duct	
5108M0012	Process Duct	Activity on the outside of ducting exceeded the NaI instruments capacity, 30 sec count was still >1,000,000, cpm and a 12 sec count was 650,000 cpm. NDA measurement collected in place of sampling.
5108M0013	Process Duct	
5108M0014	Cell Vent	NDA measurement collected due to contamination levels documented in PK.
5108M0015	Process Duct	
5108M0016	Process Duct	
5108M0017	Process Duct	
5108M0018	Rooftop Filters	
5108M0019	Rooftop Filters	
5108M0020	Rooftop Fan	Fan blade was not collected it was determined to be too difficult to access the fan, sample location moved to plug located on the vent stack instead
5108M0021	West wall	Random internal sample on sink backsplash
5108M0022	North Wall	Random sample collected from internal wall.
5108M0023	Northeast Wall	Sample coordinates adjusted from behind fume hood to closest accessible location. X and Y coordinates were adjusted from 0.1m and 1.3m to 1.3m and

		3.15m.
5108M0024	East Wall	Random sample collected from internal wall.
5108M0025	Southeast Wall	Random sample collected from internal wall.
5108M0026	South Wall	Sample coordinates adjusted from door to closest accessible wall location. X and Y coordinates were adjusted from 3.9m and 0.6m to 5.0m and 0.6m.

TABLE : Sample Photographs and Location Descriptions for Building 3030	
5108M0001-Ceiling	**5108M0002-Upper West Wall**
5108M0003-North Wall	**5108M0006-Hot Cell pass through**
	
5108M0007- North Fume Hood Back Wall	**5108M0008-South Fume Hood Back Wall**

5108M0009- Fume hood sink and hose port	**5108M0010-Clean-out drain plug.**
5108M0011-Fume hood process off-gas/ventilation duct.	**5108M0012- NDA location Fume hood process off-gas/ventilation duct.**
5108M0013-Fume hood process off-gas/ventilation duct.	**5108M0014 Hot-Cell process off-gas/ventilation duct.**

5108M0015-Fume hood process off-gas/ventilation duct.	5108M0016-Fume hood process off-gas/ventilation duct.
5108M0017-Process off-gas/ventilation duct SW corner.	**5108M0018 -SW side of rooftop filter bank.**
5108M0019-NW side of rooftop filter bank.	**5108M0020- Threaded plug from exhaust stack.**

5108M0021- West wall/backsplash.	5108M0022- North wall.
5108M0023 Northeast wall.	**5108M0024-East wall.**
5108M0025-Southeast wall.	**5108M0026 -South wall.**

BLDG 3031
SAMPLE LOCATION
MAP AND DESCRIPTIONS

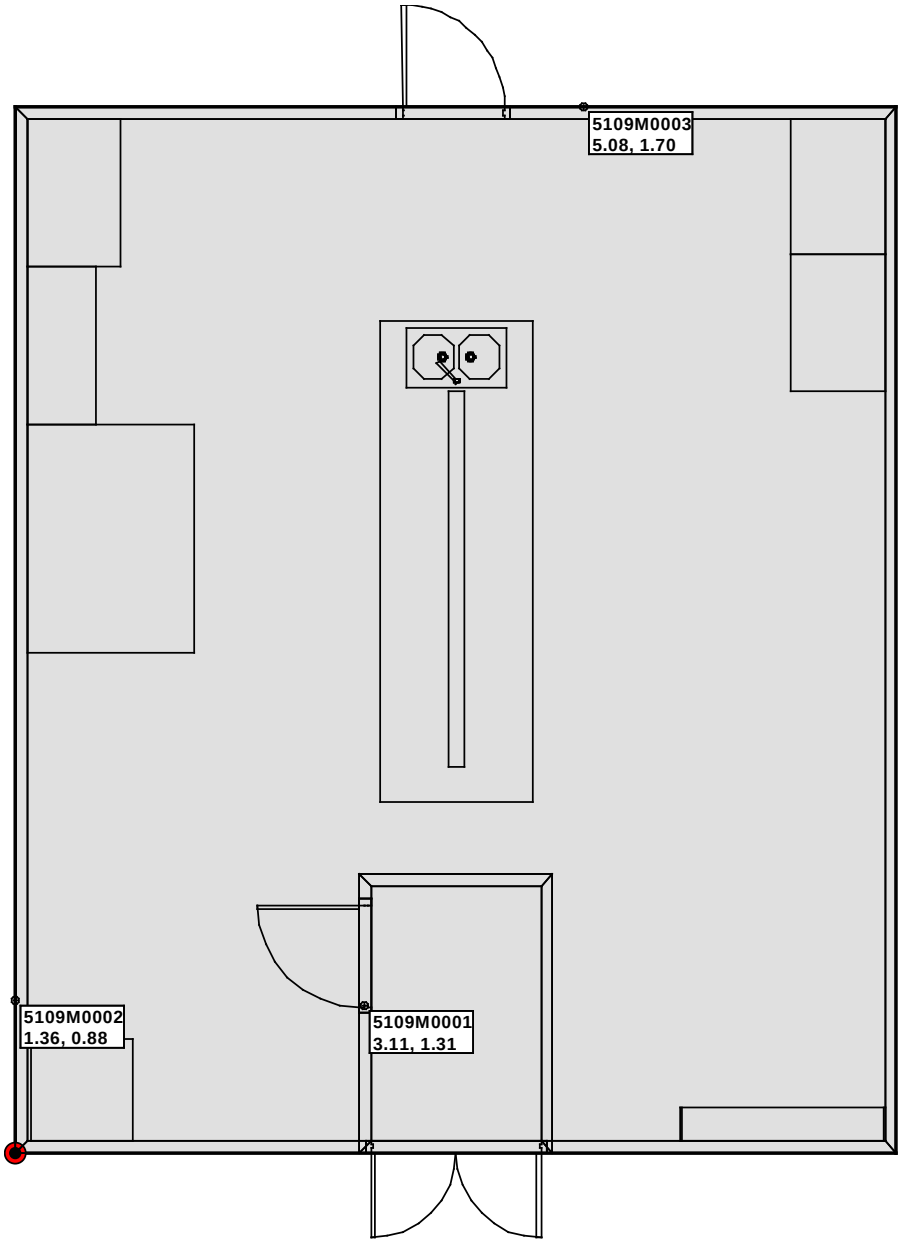


Fig. 1 Wall and Ceiling Sample Locations for Building 3031

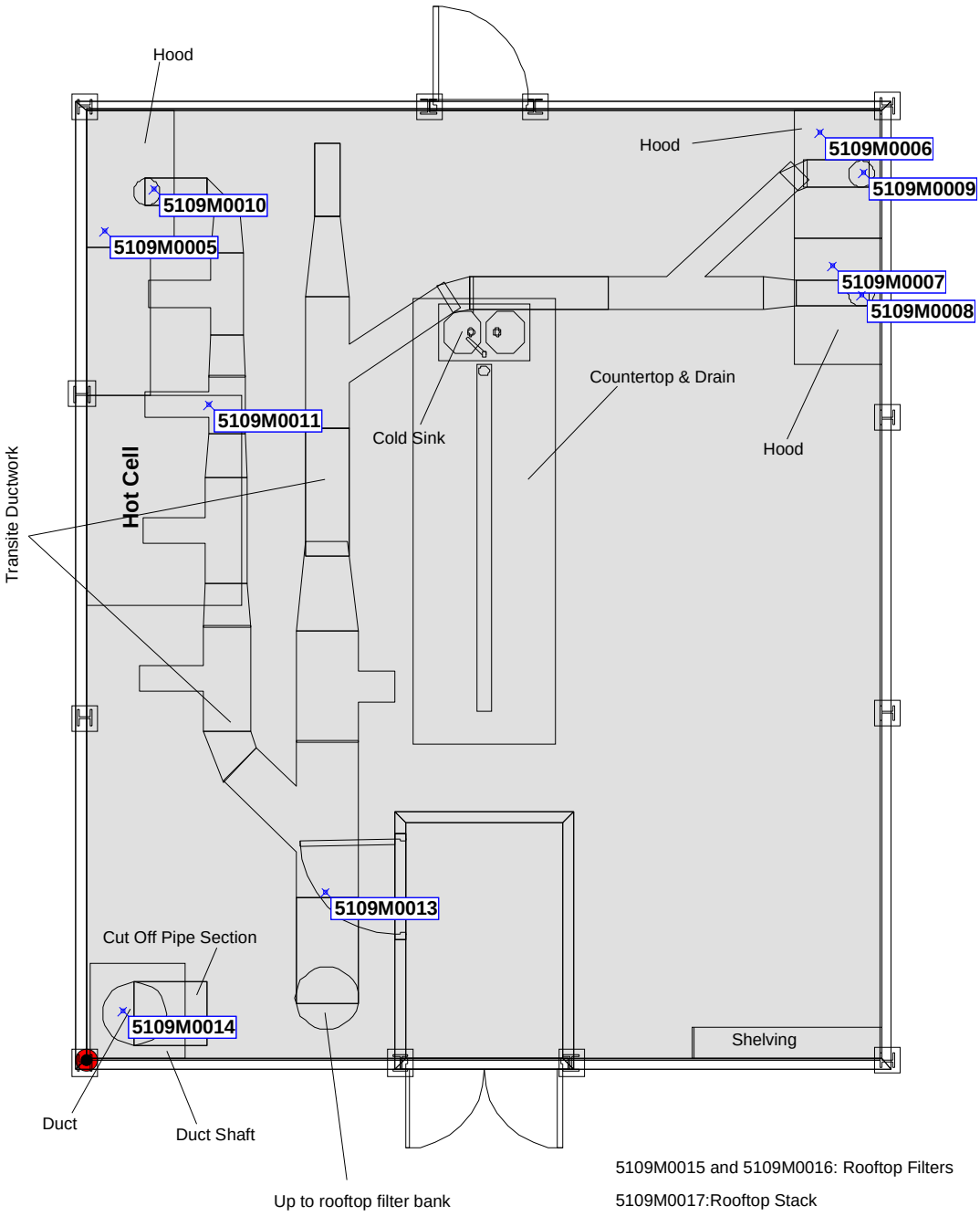


Fig. 2 Process Systems Sample Locations for Building 3031

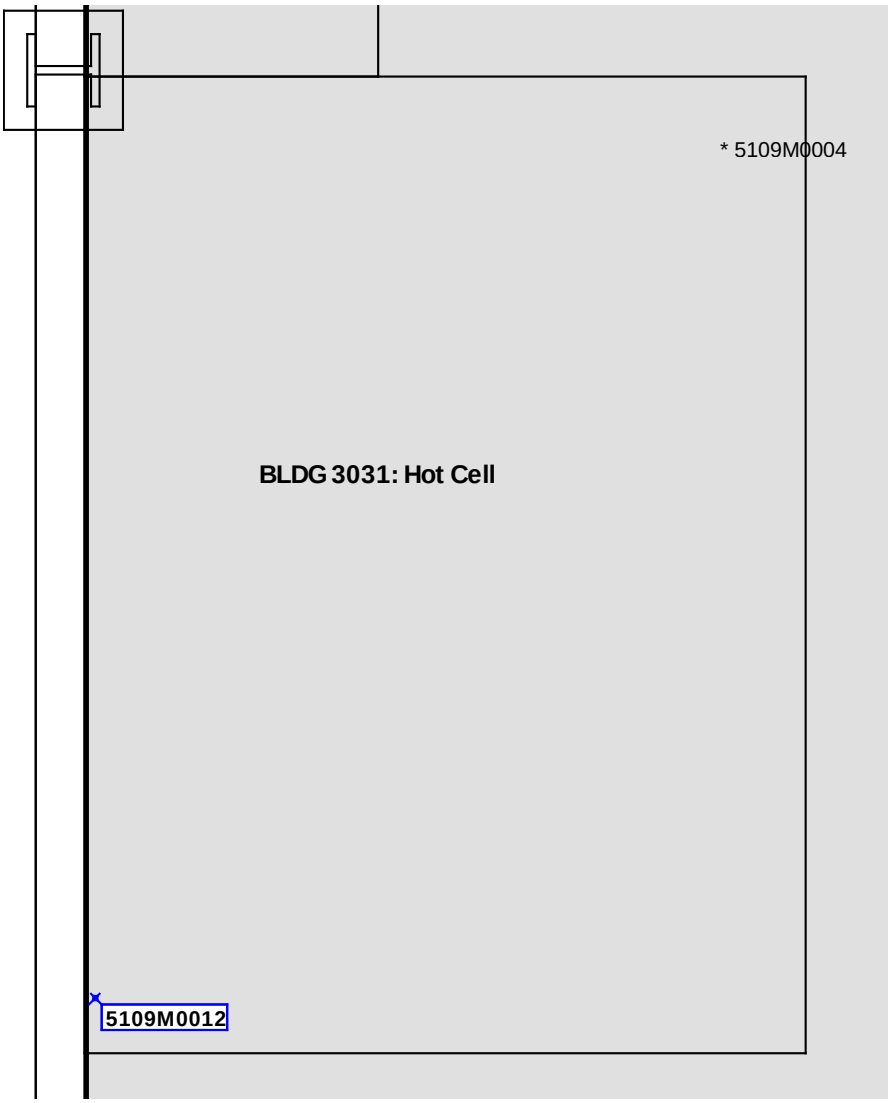


Fig. 3 Hot Cell and Cell Off-gas/Ventilation Sample Locations for Building 3031

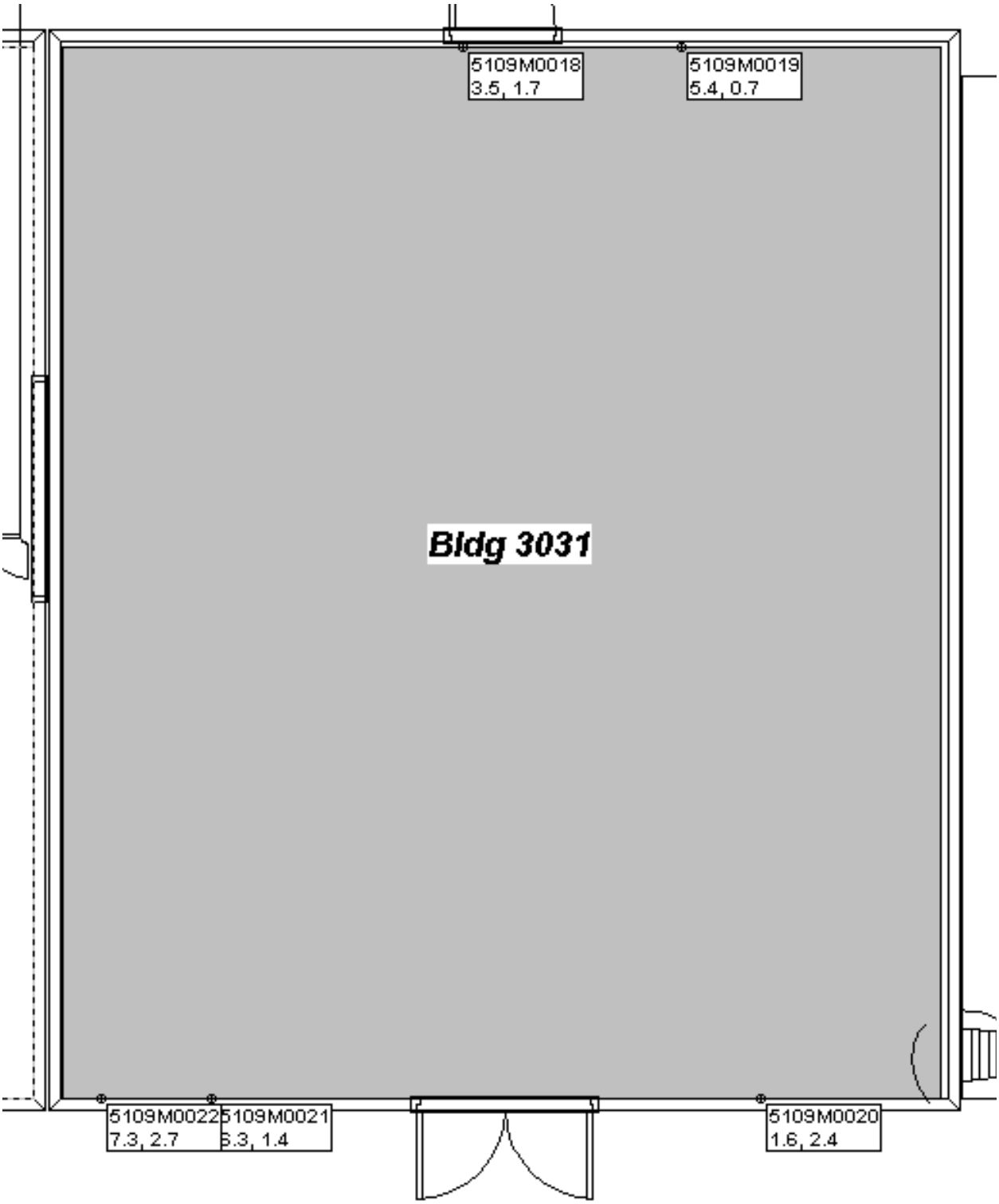
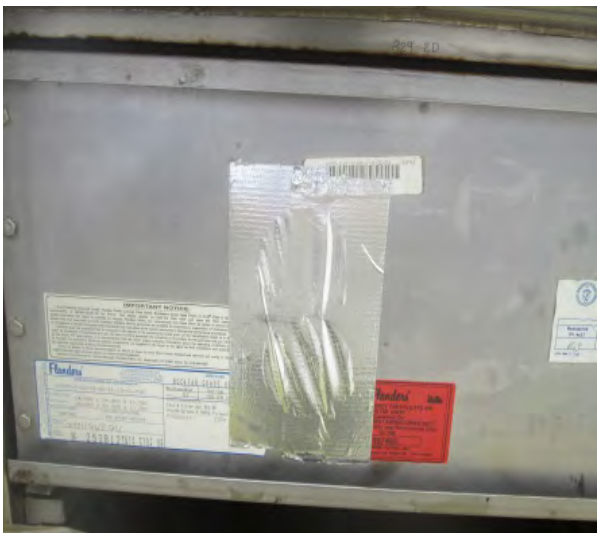


Fig. 4 Wall Sample Locations for Building 3031

Table 1: Building 3031 Sample Location Descriptions		
Sample ID	Surface	Remarks/Deviations
5109M0001	Ceiling	Sample matrix is metal. Sample weight: 476 grams.
5109M0002	Wall 1	Wall matrix is metal. Sample weight: 354 grams.
5109M0003	Wall 2	Wall matrix is metal. Sample weight: 406 grams
5109M0004	Hot Cell	Volumetric sample of steel liner was not possible with available access. Collected sample from material used to seal pass-through, as well as a direct measurement and smear of the internal horizontal surface.
5109M0005	FH/GB	Highest Activity in hood was located on internal lead lining.
5109M0006	FH/GB	Sample contains transite, paint, metal
5109M0007	FH/GB	Sample contains metal and transite
5109M0008	Process Duct	Sample contains transite
5109M0009	Process Duct	Contains transite
5109M0010	Process Duct	Sample contains transite
5109M0011	Process Duct	Contains transite
5109M0012	Process Duct	NDA measurement collected due to contamination levels documented in PK.
5109M0013	Process Duct	Contains transite
5109M0014	Process Duct	Sample contains transite
5109M0015	Rooftop Filters	
5109M0016	Rooftop Filters	
5109M0017	Rooftop Fan	Fan blades were not collected it was determined to be too difficult to collect sample there, sample moved to plug on the fan stack.
5109M0018	North Wall	Sample was moved from the original location at the door from 3.5m, 1.7m to 3.1m to 1.7m next to the door.
5109M0019	Northeast Wall	Sample was moved from 5.4m, 0.7m to 6.4m, 0.7m due to utilities.
5109M0020	Southeast Wall	Random sample collected from internal wall.
5109M0021	Southwest Wall	Random sample collected from internal wall.
5109M0022	Southwest Wall	Sample was moved from 7.3m, 2.7m to 6.3m, 2.7m due to pipe located in the southwest corner of the facility.

TABLE 2: Sample Photographs and Location Descriptions for Building 3031	
5109M0001-Ceiling.	**5109M0002-Lower west wall.**
5109M0003-Lower north wall.	**5109M0004-Pass through for hot cell work area.**
5109M0005 -Walls of NW fume hood	**5109M0006-Walls of NE fume hood**

5109M0007-Fume hood walls SE	5109M0008- Fume hood process off-gas duct.
5109M0009-North Fume hood process off-gas/ventilation duct.	**5109M0010-West Fume process off-gas/ventilation duct.**
5109M0011-Process off-gas/ventilation duct.	**5109M0012-NDA of metal process off-gas/ventilation duct.**

5109M0013-Process off-gas/ventilation duct	**5109M0014-Process off-gas/ventilation duct.**
5109M0015-SW side of rooftop filter bank.	**5109M0016- NW side of rooftop filter bank.**
	
5109M0017-Threaded plug from exhaust stack.	**5109M0018-North wall next to the door.**

5109M0019-Northeast wall	5109M0020-Southeast wall
5109M0021-Lower southwest wall	**5109M0022-Upper southwest wall**

BLDG 3032 SAMPLE LOCATION MAP AND DESCRIPTIONS

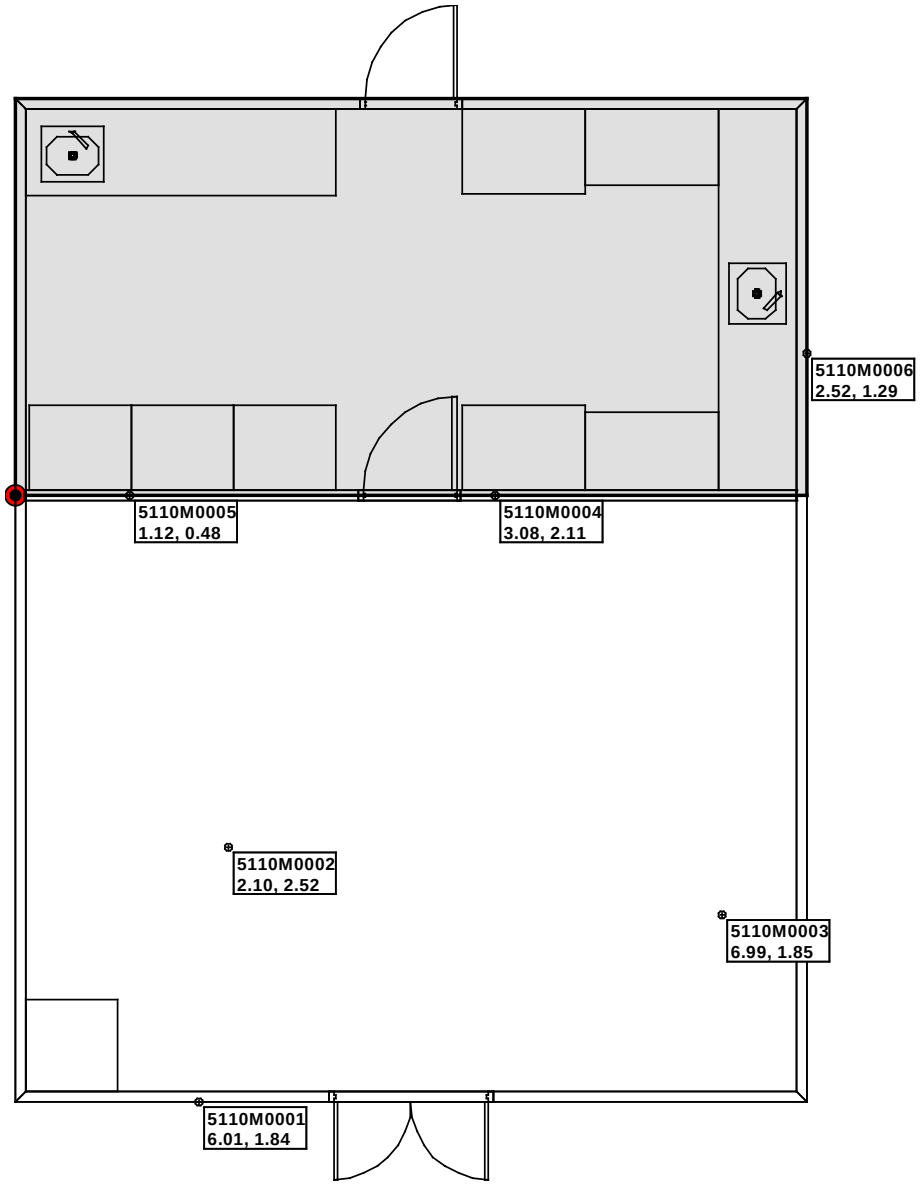


Fig. 1 Wall and Ceiling Sample Locations for Building 3032

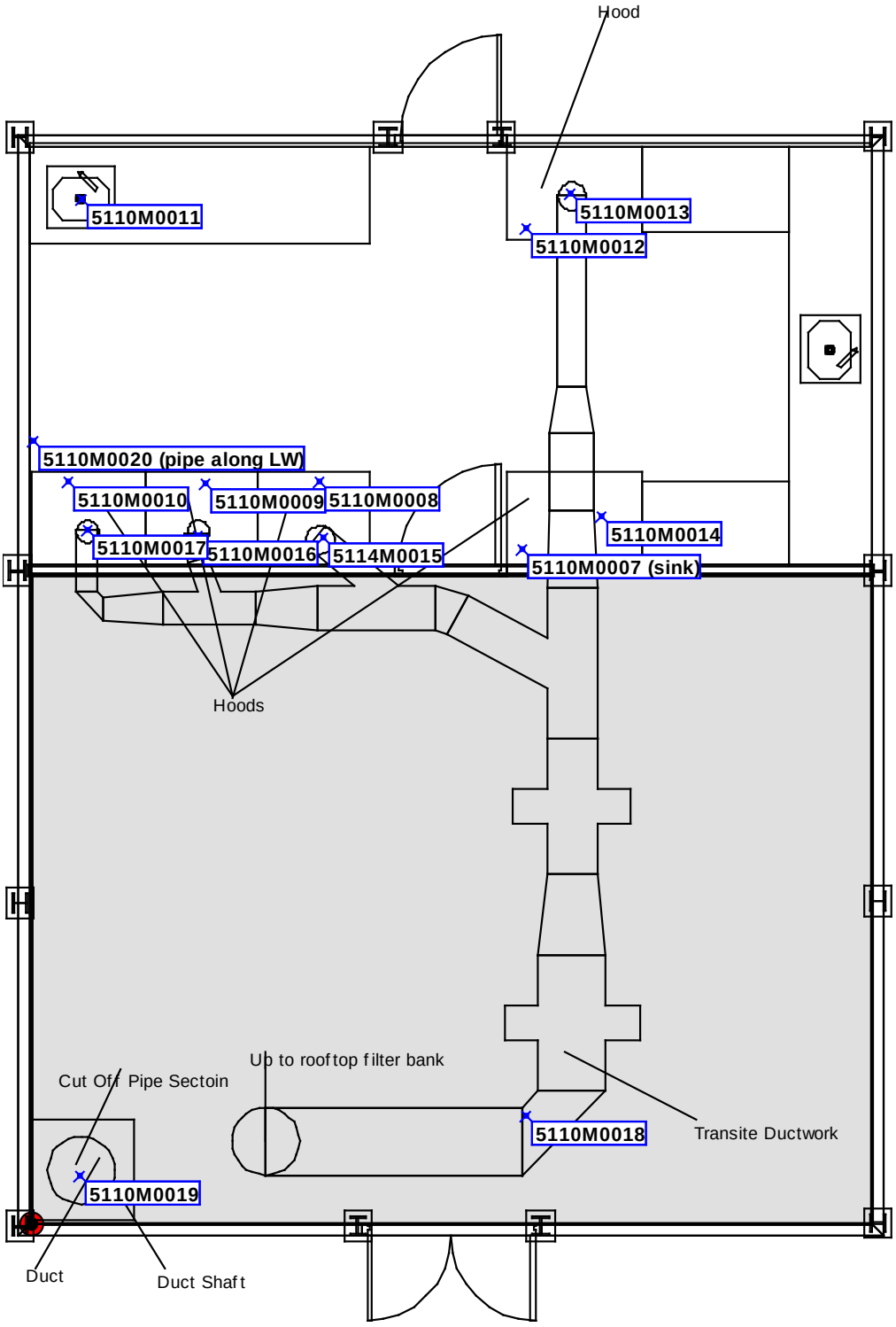


Fig. 2 Process Systems Sample Locations for Building 3032

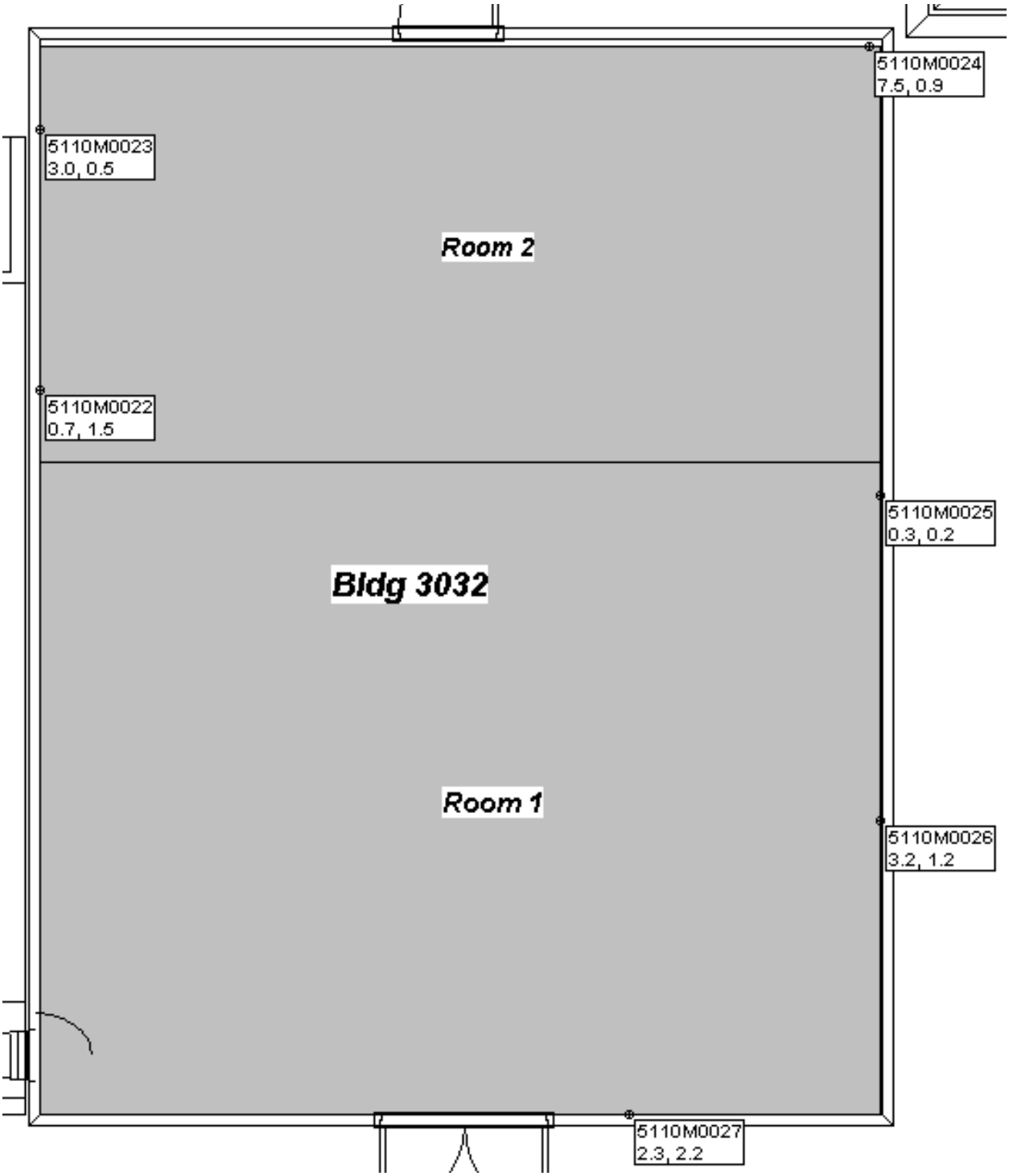


Fig. 3 Wall Sample Locations for Building 3032

Table 1: Building 3032 Sample Location Descriptions		
Sample ID	Surface	Remarks/Deviations
5110M0001	Wall 4	Sample is metal.
5110M0002	Ceiling	Sample material is metal.
5110M0003	Ceiling	Sample is metal.
5110M0004	Wall 4	Sample material is sheet rock.
5110M0005	Wall 2	Sample material is sheet rock.
5110M0006	Wall 3	Sample is stainless steel.
5110M0007	Sink in FH/GB	No sink present. Process is a grinding stone and supporting air hose
5110M0008	FH/GB	Sample matrix is metal and transite
5110M0009	FH/GB	Sample matrix is metal and transite
5110M0010	FH/GB	Sample matrix is metal and transite. Activity exceeded beta instrument output: beta presample measurement is 30 second reading.
5110M0011	Sink	Collected sample from the drain line below the sink.
5110M0012	FH/GB	Sample matrix is metal and transite
5110M0013	Process Duct	Sample matrix is transite
5110M0014	FH/GB	Sample matrix is transite
5110M0015	Process Duct	Sample matrix is transite
5110M0016	Process Duct	Sample matrix is transite
5110M0017	Process Duct	Sample matrix is transite
5110M0018	Process Duct	Transite Duct
5110M0019	Process Duct	Transite duct
5110M0020	Pipe along LW	Sample matrix is metal drain pipe with rad labeling
5110M0021	Floor Tile	ACM floor tile. Scoping survey identified as contaminated. Sample weight: 640 grams
5110M0022	West Wall	Random internal sample @ Room #2, Sample was moved from original coordinates 0.7m, 1.5m to 1.2m, 1.5m due to cabinet.
5110M0023	West Wall	Random internal sample @ Room #2, sample was moved from original coordinates 3.0m, 0.5m to 2.8m, 1.5m due to sink cabinet.
5110M0024	Northeast Wall	Random internal sample @ Room #2, sample was moved from original location due to a Stainless Steel wall from 7.5m, 0.9m to 6.7m, 2.1m. Sample was collected above S.S. wall.
5110M0025	Northeast wall	In Room #1.
5110M0026	Northeast Wall	In Room #1.
5110M0027	Southeast Wall	Random internal wall @ Room #1. Sample was moved from original location due to electrical box from 2.3m, 2.2m to 1.5m and 2.2m.

TABLE 2: Sample Photographs and Location Descriptions for Building 3032	
5110M0001-Upper South wall	**5110M0002-Ceiling**
5110M0003-Ceiling near Southeast corner	**5110M0004-North wall right of doorway.**
5110M0005-Lower north wall left of doorway.	**5110M0006-East wall left of sink**

5110M0007 -Walls of fume hood with sink on South wall.	**5110M0008-Series fume hood walls.**
5110M0009-Series fume hood walls.	**5110M0010-Series fume hood walls.**
5110M0011-Drain line from sink in northwest corner.	**5110M0012-Walls of fume hood on north wall**

5110M0013-North hood off-gas/ventilation duct.	5110M0014-South hood off-gas/ventilation duct.
5110M0015-Series hood off-gas/ventilation duct.	**5110M0016-Series hood off-gas/ventilation duct.**
5110M0017-Series hood off-gas/ventilation duct.	**5110M0018-Main process off-gas/ventilation duct**

5110M0019-SW corner process off-gas /ventilation duct	5110M0020-Threaded cap from line lower west wall
5110M0021-ACM floor tile	**5110M0022-West Wall Room #2**
5110M0023 West Wall Room #2 near lab bench	**5110M0024-North east wall in Room #2.**

5110M0025-East wall north corner in Room#1.	5110M0026-East wall in Room #1.
5110M0027-South east wall in Room# 1.	

BLDG 3033 SAMPLE LOCATION MAP AND DESCRIPTIONS

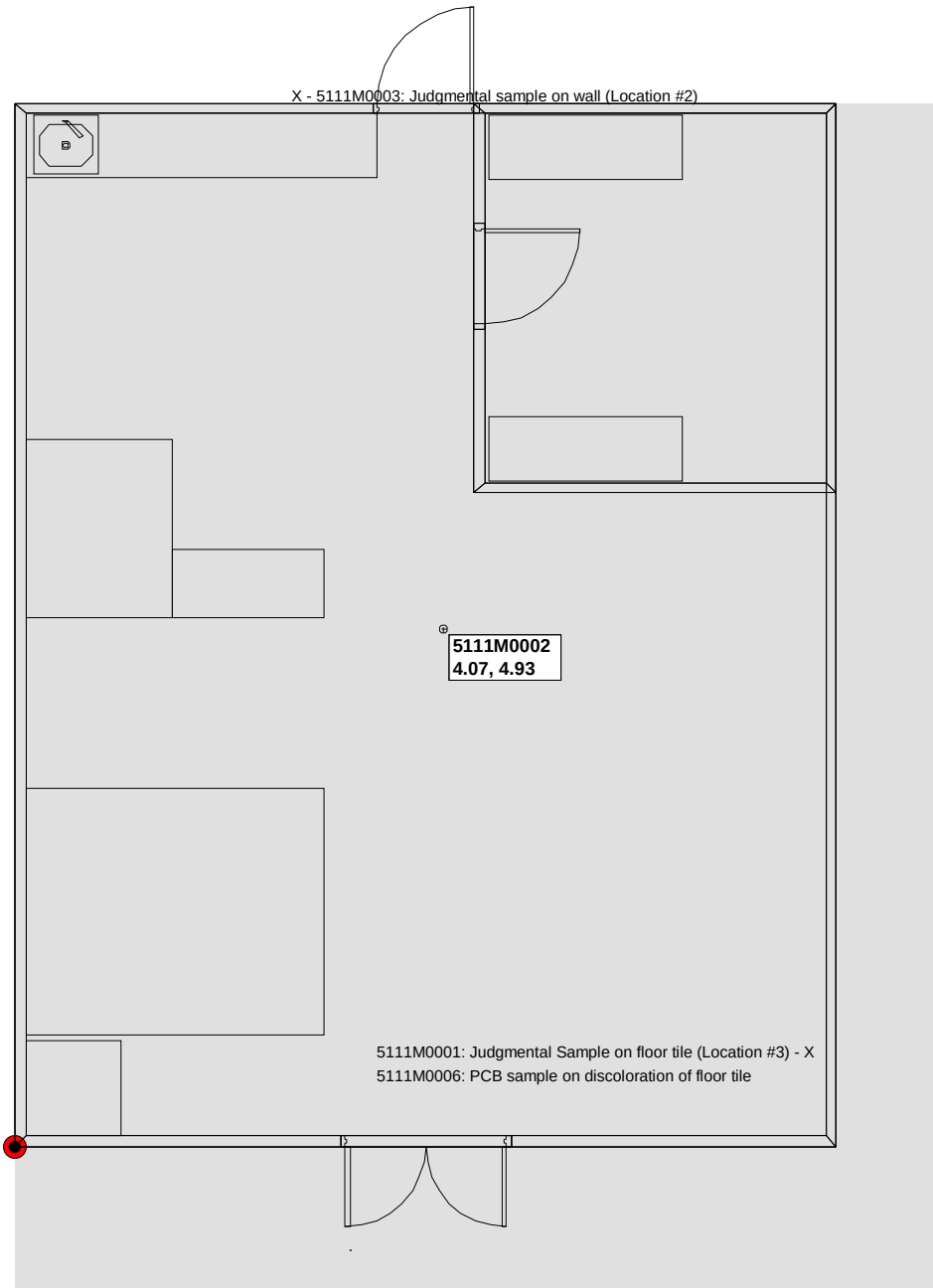


Fig. 1 Wall and Ceiling Sample Locations for Building 3033

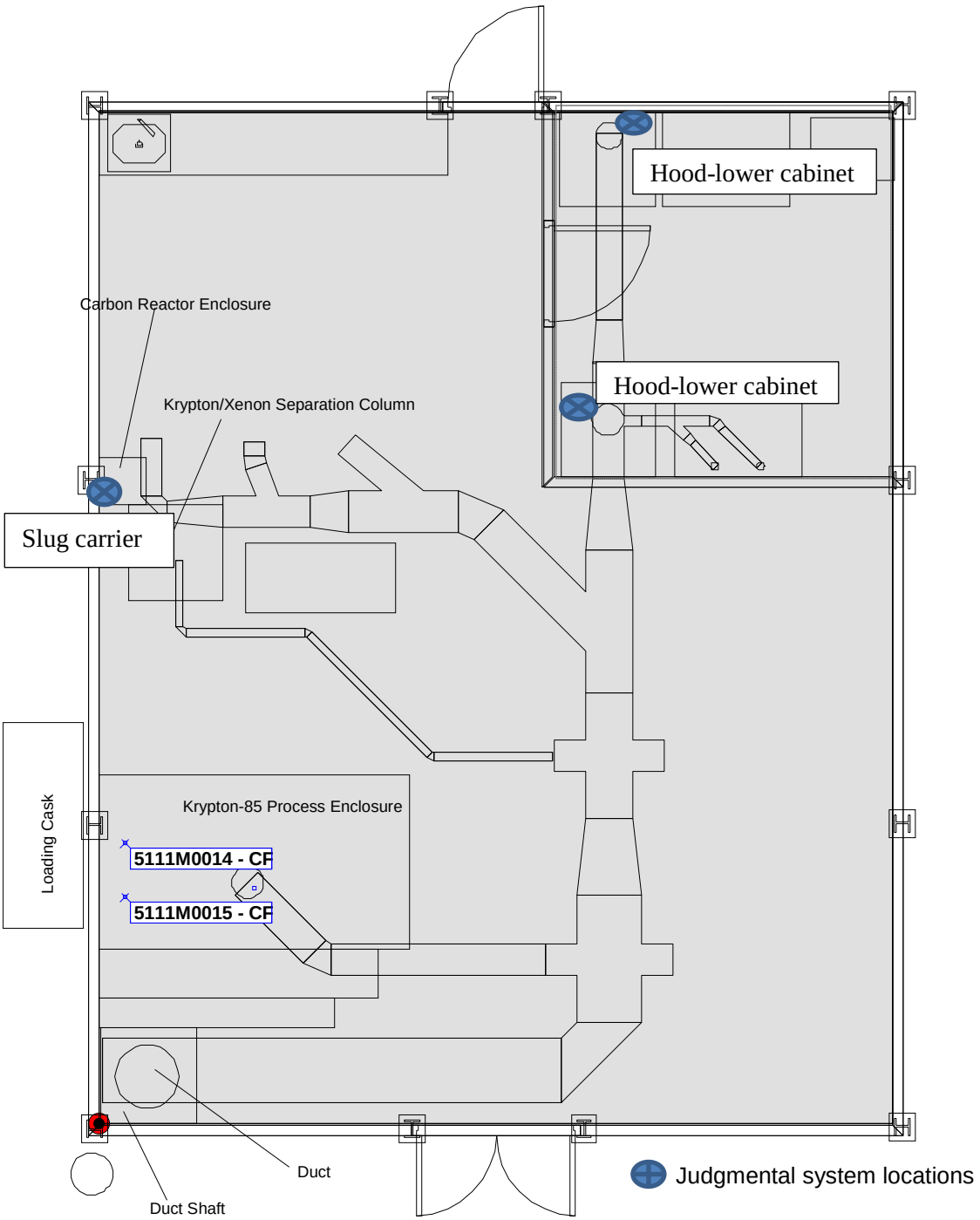


Fig. 2 Process Systems Sample Locations for Building 3033

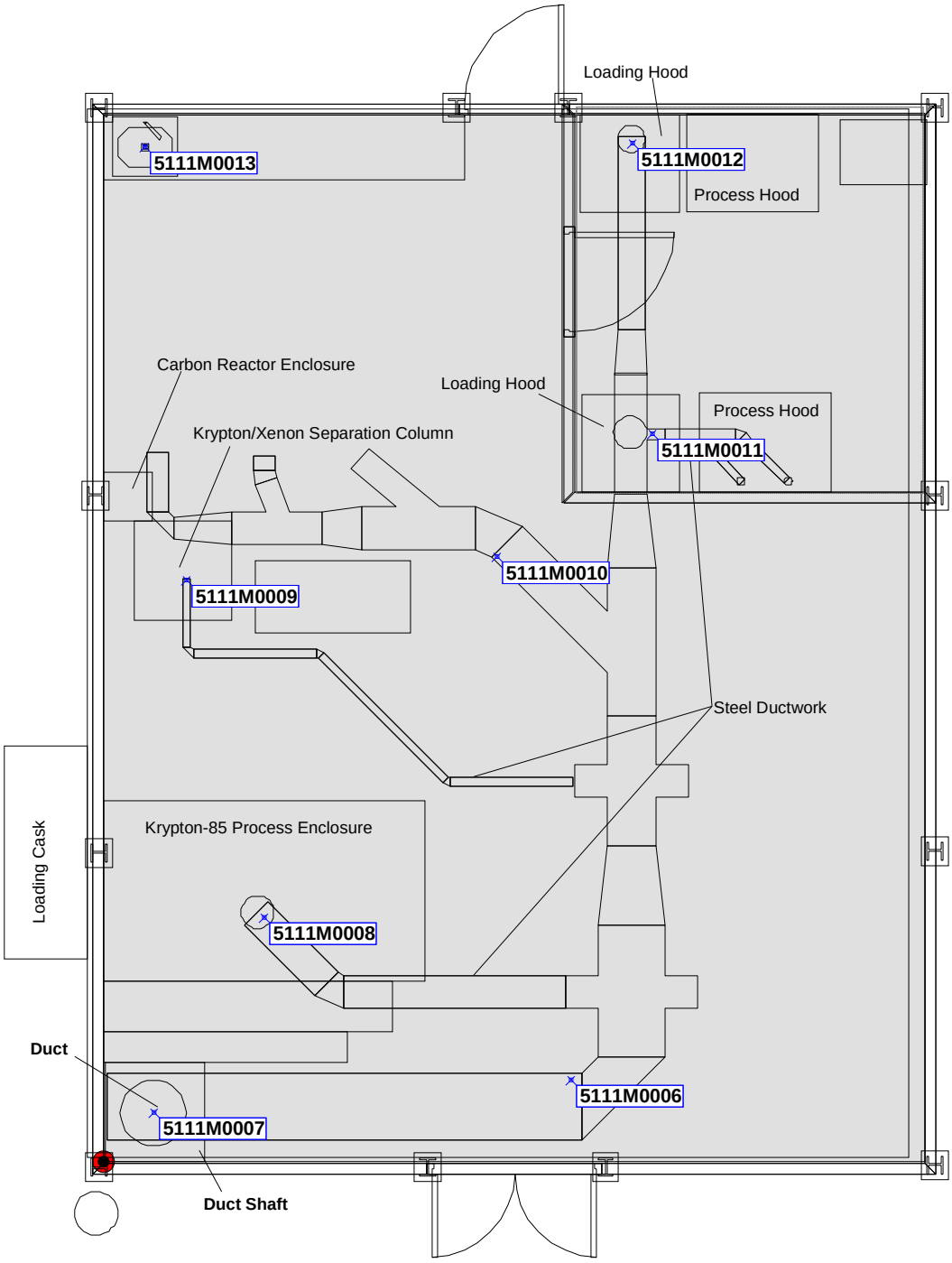


Fig. 3 Process Off-gas and Cell Ventilation Sample Locations for Building 3033

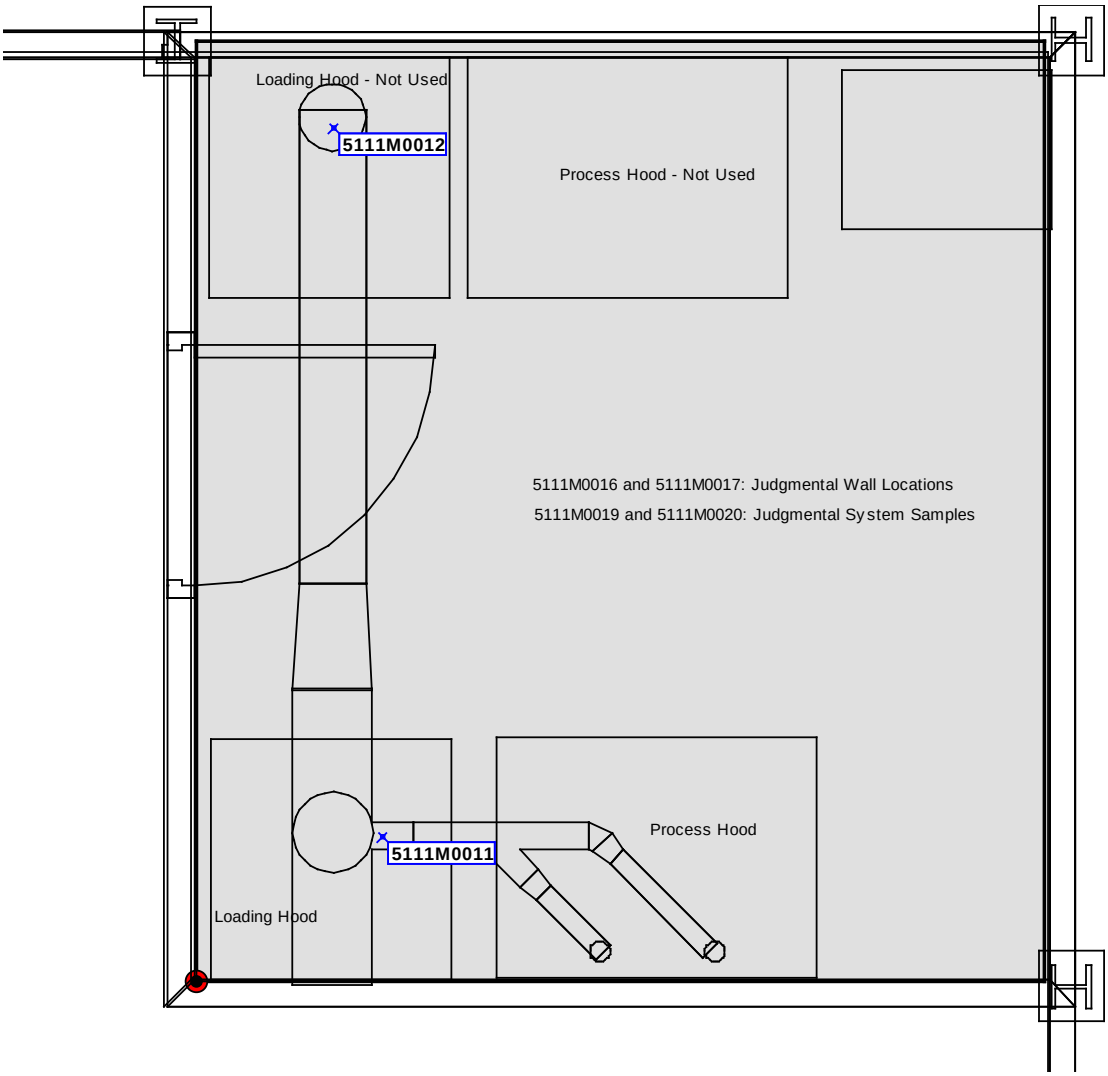


Fig. 4 Tritium Room Sample Locations for Building 3033

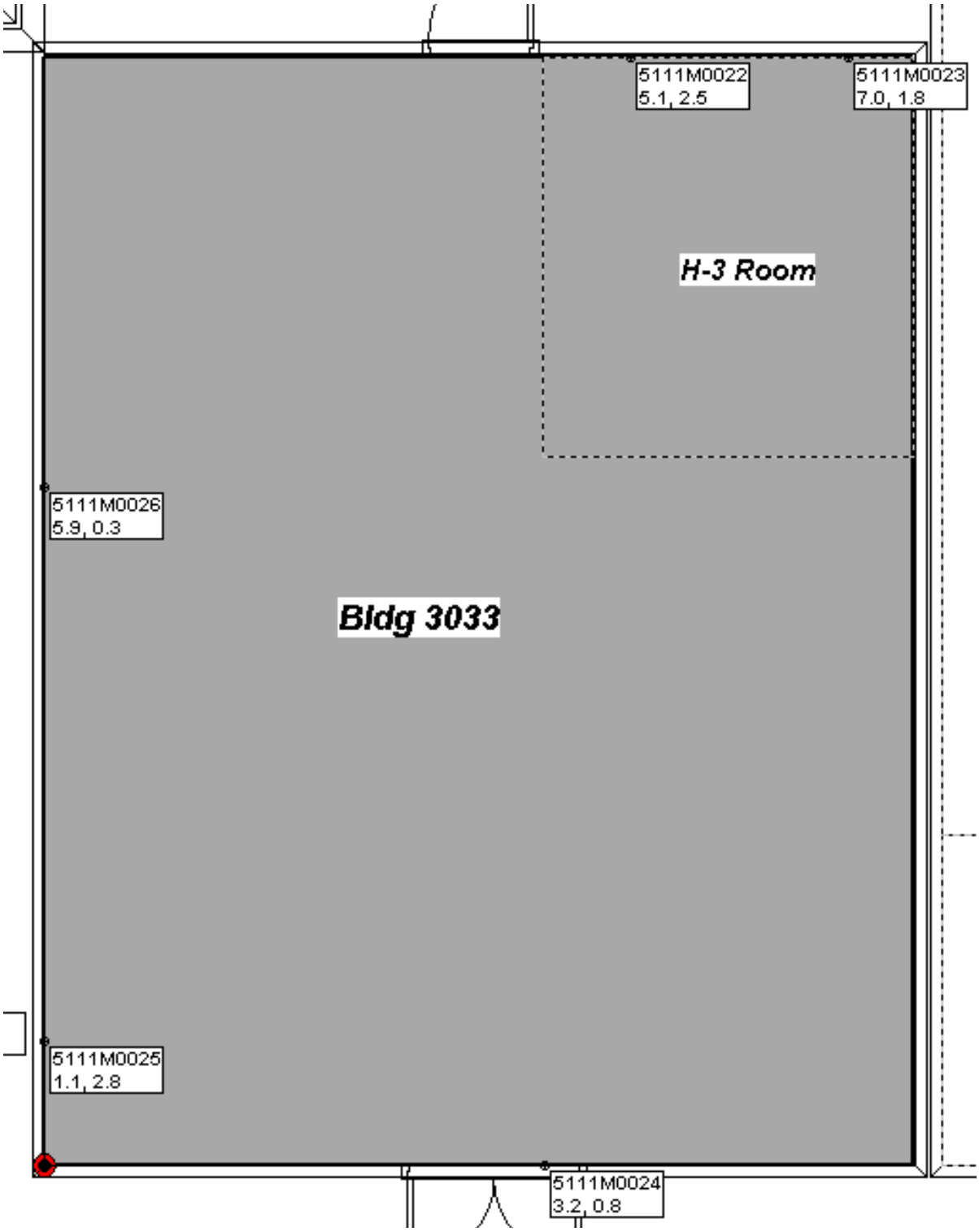
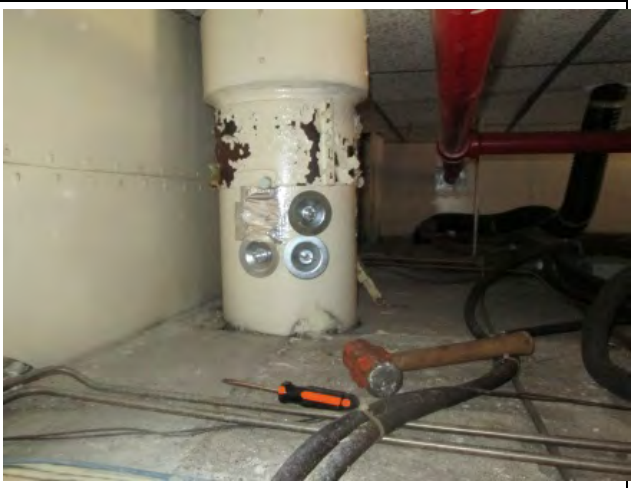


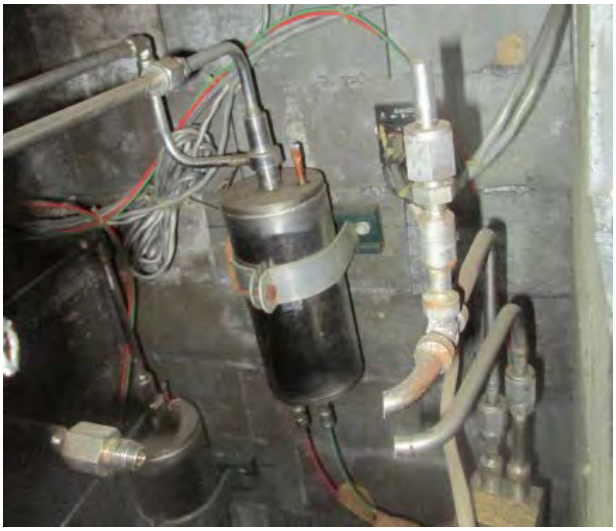
Fig. 5 Wall Sample Locations for Building 3033

Table 1: Building 3033 Sample Location Descriptions		
Sample ID	Surface	Remarks/Deviations
5111M0001	Floor Tile	Location #3 from Scoping Survey. Activity seems to be coming from concrete underneath.
5111M0002	Ceiling	Sample Matrix was metal with several layers of paint.
5111M0003	Wall2	Location #2 from Scoping Survey. Activity observed with beta detector is on sampled material. Sample matrix is metal.
5111M0004	Roof	Not collected. Originally intended as a Roof sample. Building owners mandated that no sampling of the roofs would be allowed.
5111M0005	Roof	Not collected. Originally intended as a Roof sample. Building owners mandated that no sampling of the roofs would be allowed.
5111M0006	Process Duct	
5111M0007	Process Duct	
5111M0008	Process Duct	
5111M0009	Process Duct	
5111M0010	Process Duct	
5111M0011	Process Duct	
5111M0012	Process Duct	
5111M0013	Sink	
5111M0014	Carbon Filter	
5111M0015	Carbon Filter	
5111M0016	Judgmental Ceiling Location in Tritium Room	
5111M0017	Judgmental Wall Location in Tritium Room	
5111M0018	Judgmental System (Tritium Room)	Lower wall of south hood.
5111M0019	Judgmental System (Tritium Room)	Lower wall of north hood.
5111M0020	Slug Carrier	Judgmental sample collected from slug carrier. Contains lead and small metal pipe
5111M0021	Carbon Reactor Vessel	Judgmental sample collected from piping within the reactor vessel.
5111M0022	Northeast Wall	Sample weight less than 200 g
5111M0023	Northeast Wall	Random internal sample.
5111M0024	Southeast Wall	Sample was moved from original coordinates 3.2m, 0.8. to 2.2m, 0.6m due to electrical box and conduits.
5111M0025	West Wall	Random internal sample.
5111M0026	West Wall	Sample was moved from 5.9m, 0.3m moved to 6.7m, 1.8m due to location of small hot cell.

TABLE 2: Sample Photographs and Location Descriptions for Building 3033	
5111M0001 Floor adjacent to east wall	**5111M0002- Ceiling**
5111M0003-North wall	**5111M0006-Process duct in attic space.**
5111M0007-Process duct in SW corner of room	**5111M0008-Kr-85 cell off-gas/ventilation duct.**

5111M0009-Kr-85 enclosure off-gas/ventilation duct.	**5111M0010-Capped end of off-gas ventilation system in attic**
5111M0011 H-3 Room off-gas/ventilation duct south hood	**5111M0012** H-3 Room off-gas/ventilation duct north hood
	
5111M0013 Sink drain plastic pipe north wall	**5111M0014** 1 of 2 carbon filters

5111M0015 2 of 2 carbon filters	**5111M0016** Ceiling inside H-3 Room.
5111M0017 East wall inside H-3 Room	**5111M0018 Lower wall of south hood in H-3 Room.**
5111M0019 Lower wall of north hood in H-3 Room.	**5111M0020 Slug carrier**

5111M0021 Piping inside the C-14 reactor vessel.	**5110M0022** Upper North wall
	
5111M0023 Northeast wall	**5111M0024 Upper** south east wall.
5111M0025 East south wall.	**5111M0026 Lower w**est wall.

BLDG 3033A SAMPLE LOCATION MAP AND DESCRIPTIONS

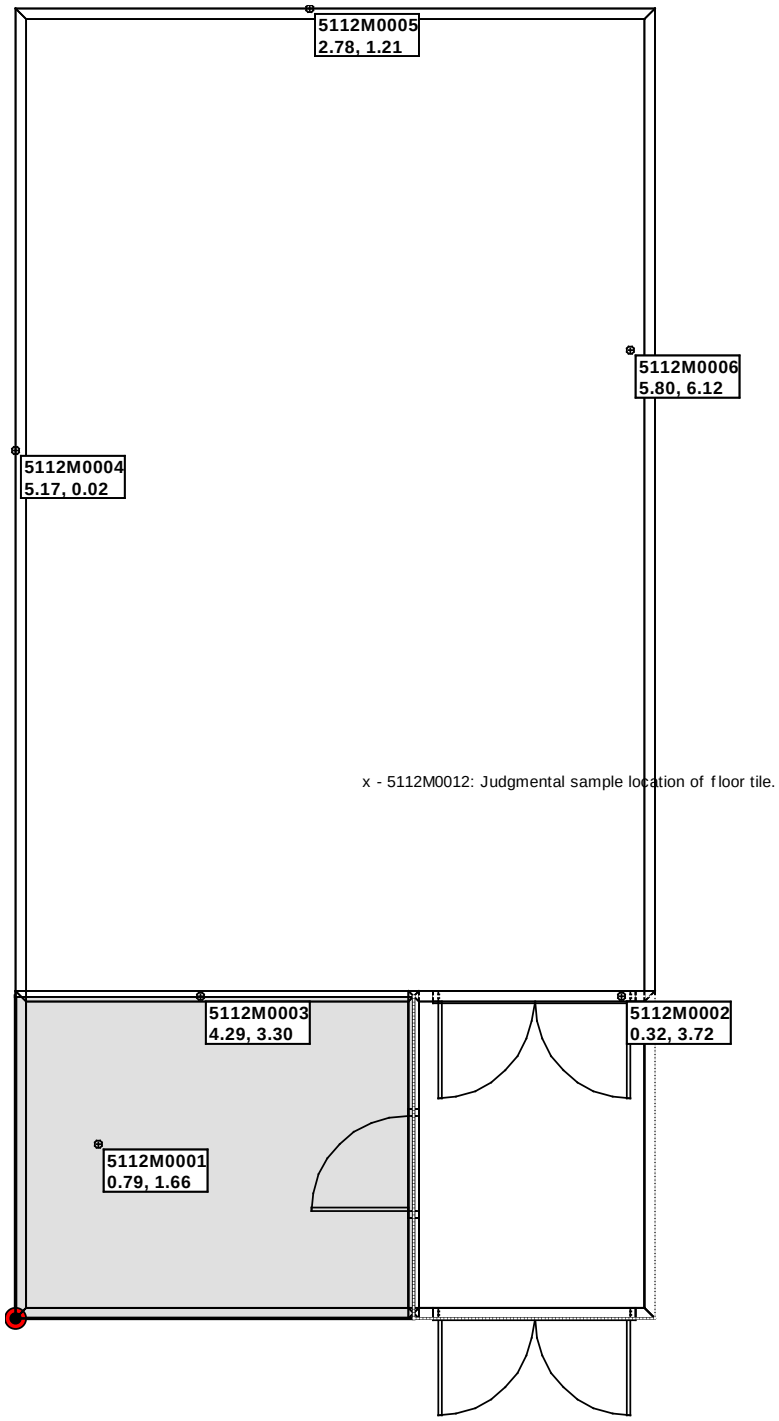


Fig. 1 Wall and Ceiling Sample Locations for Building 3033A

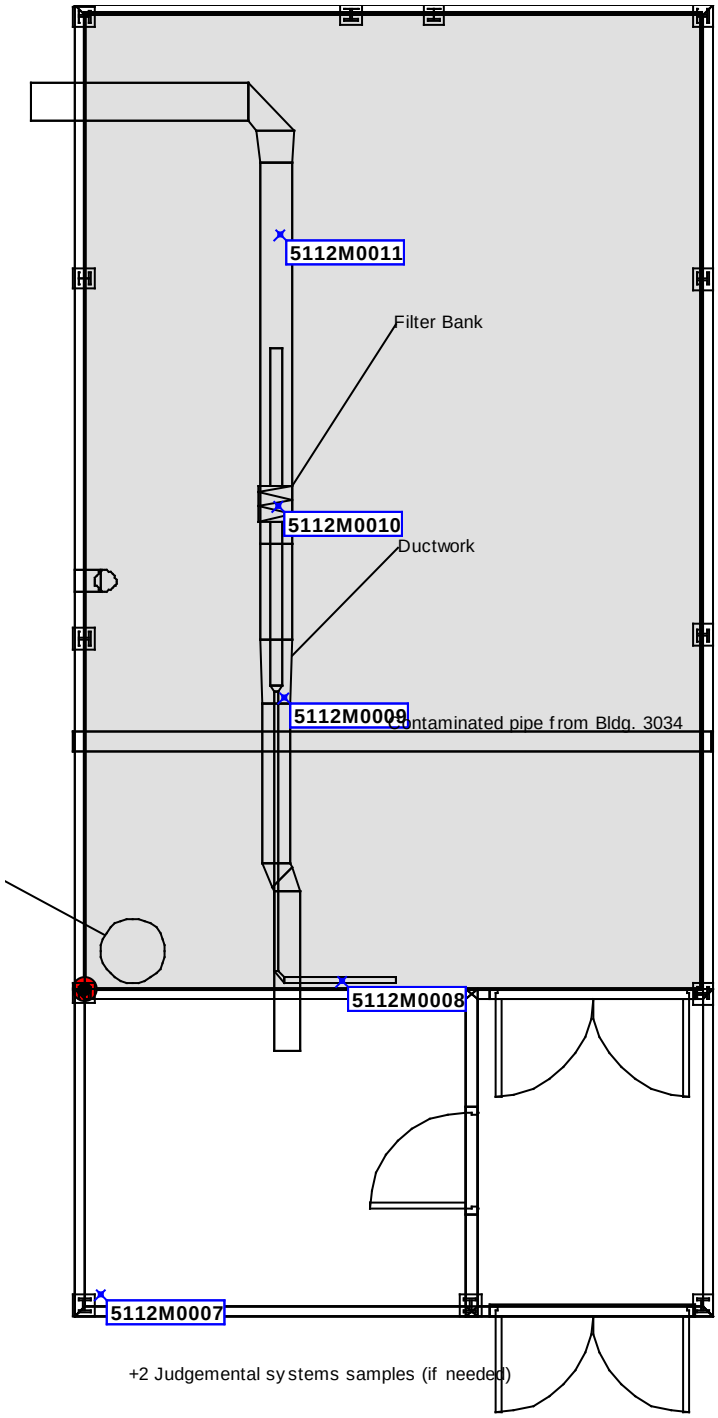


Fig. 2 Process Systems Sample Locations for Building 3033A

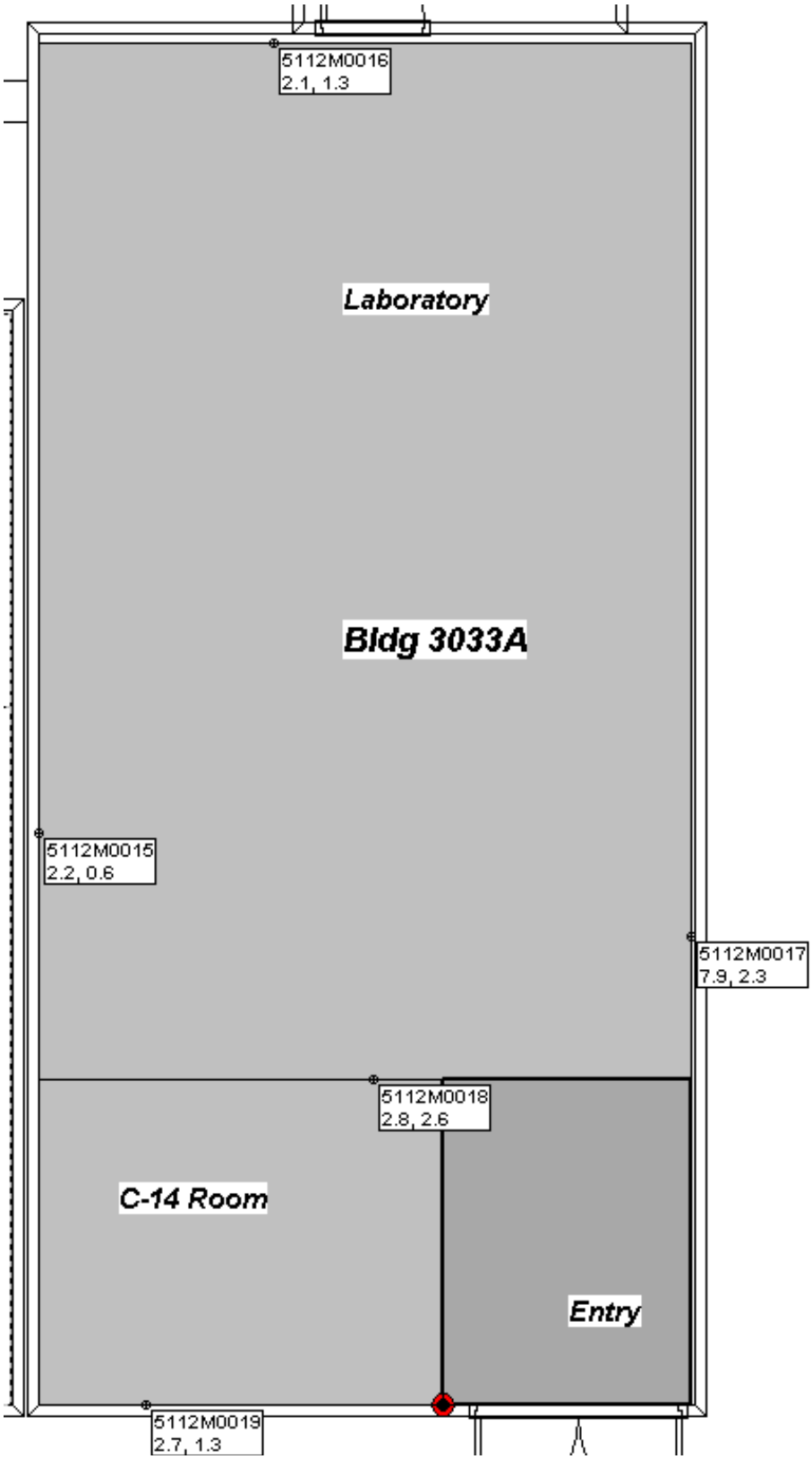
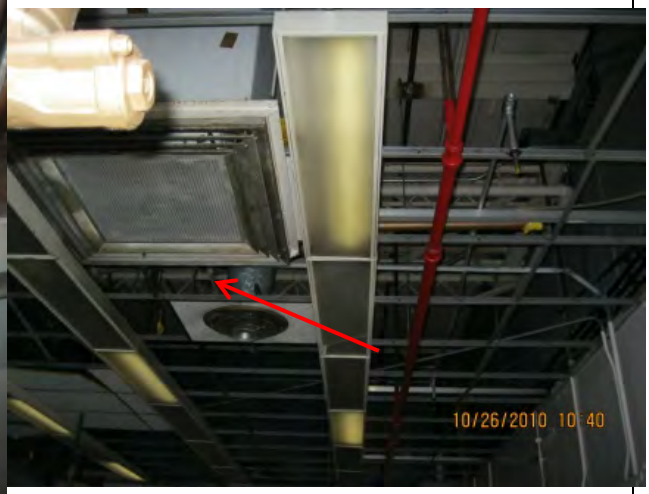
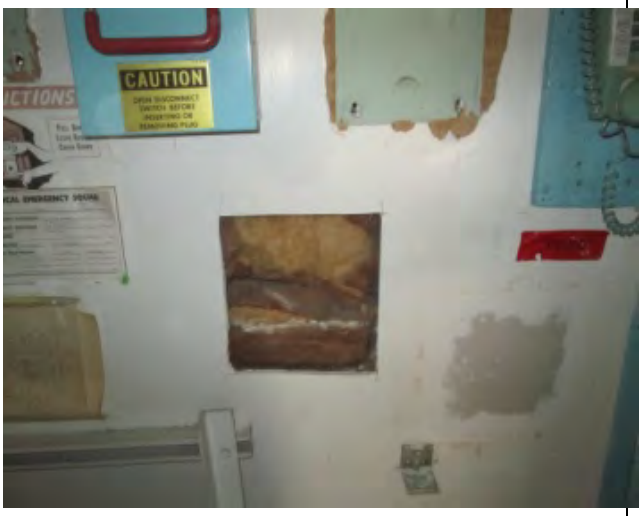


Fig. 3 Wall Sample Locations for Building 3033A

Table 1: Building 3033A Sample Location Descriptions		
Sample ID	Surface	Remarks/Deviations
5112M0001	Ceiling	Ceiling metal was very light. Larger area along Y-axis sampled to obtain desired sample weight.
5112M0002	Wall 4	Wall height only at 3.07 meters, collect texted sample at top of wall height. 595 grams
5112M0003	Wall 4	619.6 grams
5112M0004	Wall 1	The pre measurement beta count was elevated due to being located close to the floor. The post beta count was also elevated and was performed on the wall 3033 portion of the shared wall. 522 grams
5112M0005	Wall 2	563.8 grams
5112M0006	Ceiling	
5112M0007	Pipe	Process pipe in Carbon Room
5112M0008	Process Duct	None
5112M0009	Process Duct	Metal duct
5112M0010	Filter	Sample had a dose rate of 1.3 mR on contact using M-5 #236202. Sample contained too much activity to transport as limited quantity. Two small pieces of HEPA filter removed from sample (0.3 mR), taken to ORISE lab on gamma spec. Am-241 identified.
5112M0011	Process Duct	Stainless steel ventilation duct downstream of where vacuum line ties into system.
5112M0012	Judgmental Systems if needed	23.9 grams, oily location, floor tile
5112M0013	Judgmental Systems if needed	Elevated activity observed on top of internal wall in NW part of main laboratory room. Changed from hole saw to reciprocating saw
5112M0014	Process Duct	Pipe from 3034 was planned as 5113M0002. Rad tape applied to pipe for identification.
5112M0015	West Wall	Random internal sample (sheet rock) in main laboratory.
5112M0016	North Wall	Random internal sample (sheet rock) in main laboratory.
5112M0017	East Wall	Random internal sample (sheet rock) in main laboratory.
5112M0018	Internal South Wall	Random internal sample (Sheet rock) in main laboratory.
5112M0019	South West Wall	Random Internal sample (metal) in Carbon-14 room.

TABLE 2: Sample Photographs and Location Descriptions for Building 3033A	
5112M0001 Ceiling of Carbon Room.	**5112M0002** Upper wall in main laboratory.
5112M0003-Upper wall in main laboratory.	**5112M0004** Lower wall in main laboratory.
5112M0005 –Lower wall in main laboratory.	**5112M0006** Ceiling in main laboratory

5112M0007 Pipe in Carbon Room	**5112M0008 South wall process valve and port**
5112M0009 Process off-gas/ventilation duct.	**5112M0010** HEPA filter
5112M0011 Process off-gas/ventilation duct.	**5112M0012** Oil stained floor tile

5112M0013-Upper internal wall on NW side	**5112M0014 P**rocess pipe from Building 3034
	
5112M0015 Lower west wall	**5112M0016 Lower wall**
	
5112M0017 Upper wall	**5112M0018 Upper wall**

5112M0019 Lower south wall in Carbon-14 room	

BLDG 3034 SAMPLE LOCATION MAP AND DESCRIPTIONS

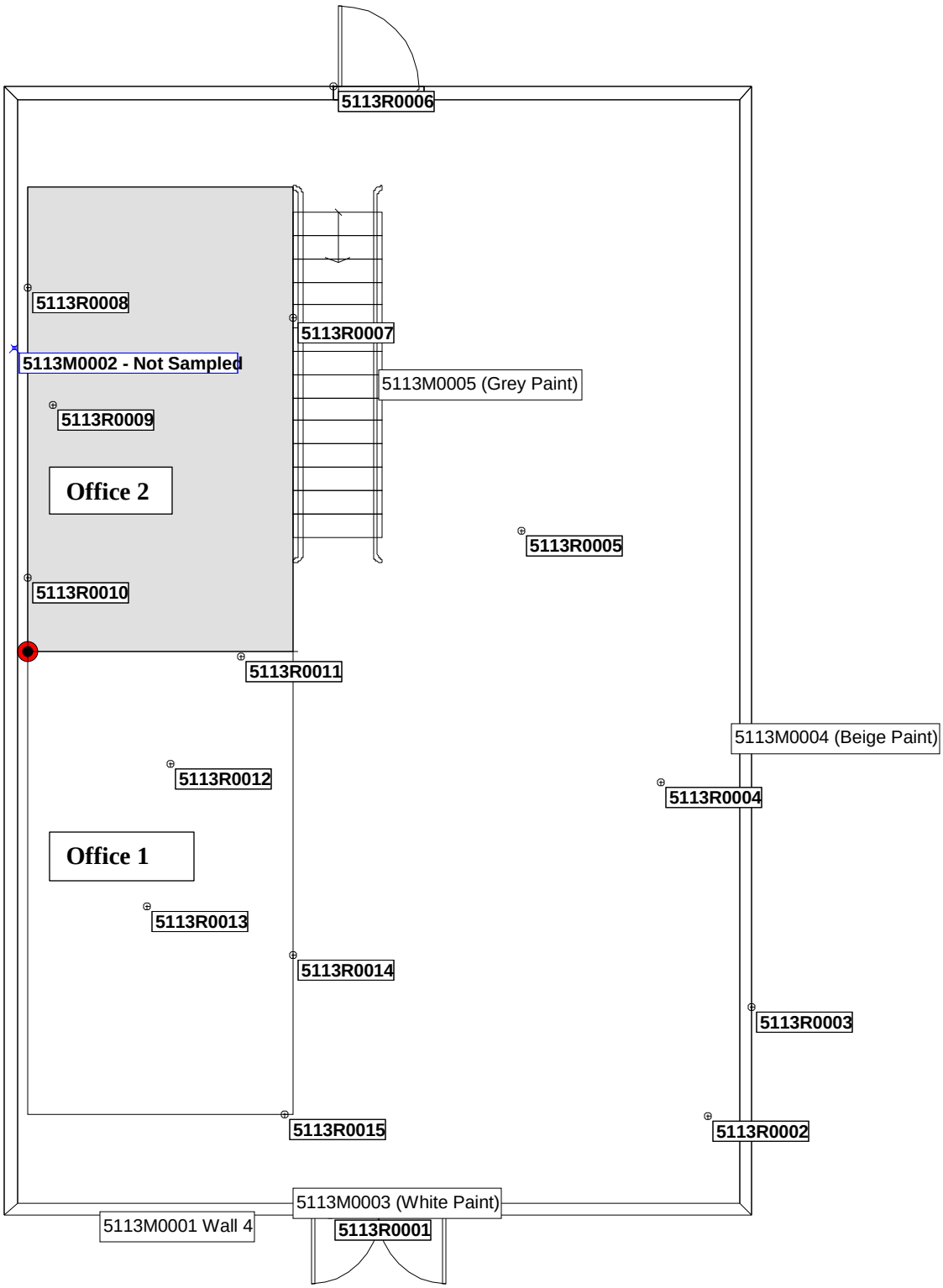


Fig. 1 Characterization Sample Locations for Building 3034

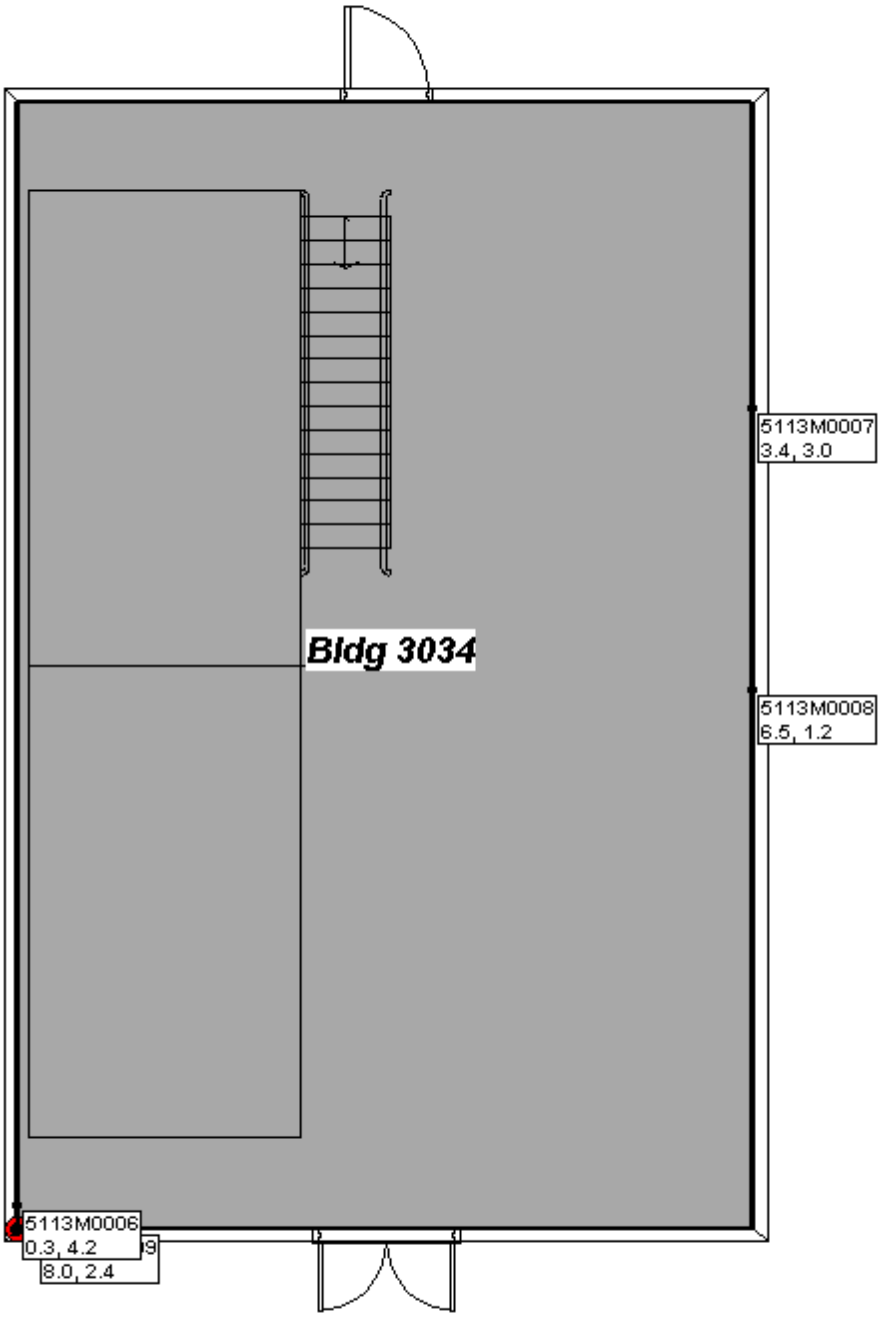


Fig. 2 Characterization Sample Locations for Building 3034

Table 1: Building 3034 Sample Location Descriptions		
Sample ID	Surface	Remarks/Deviations
5113M0001	Lower Wall	South wall (judgmental sample location) west of junction box.
5113M0002	Pipe	Contaminated pipe. Not collected in this building
5113M0003	Paint	White (Structural member) (judgmental sample location)
5113M0004	Paint	Beige (Structural member) (judgmental sample location)
5113M0005	Paint	Grey (mezzanine floor area) (judgmental sample location)
5113R0001	Room 1, Wall 4	
5113M0006	Upper Wall, Mezzanine	Random internal sample collected from corner of southwest wall.
5113M0007	Upper Wall	Random internal sample.
5113M0008	Lower Wall	Random internal sample.
5113M0009	Upper Wall	Random internal sample.
5113R0002	Room 1, Ceiling	
5113R0003	Room 1, Wall 3	
5113R0004	Room 1, Ceiling	
5113R0005	Room 1, Ceiling	
5113R0006	Room 1, Wall 2	
5113R0007	Room 3, Wall 3	
5113R0008	Room 3, Wall 1	
5113R0009	Room 1, Ceiling	
5113R0010	Room 3, Wall 1	
5113R0011	Room 1, Ceiling	
5113R0012	Room 2, Ceiling	
5113R0013	Room 1, Ceiling	
5113R0014	Room 2, Wall 3	
5113R0015	Room 2, Wall 4	
5113R0016	Room 3, Floor	
5113R0017	Room 3, Wall 1, Mezzanine	
5113R0018	Mezzanine	
5113R0019	East end of Room 2, Floor	
5113R0020	Room 3, Floor	
5113R0021	Upper Stairwell, Floor	
5113R0022	Room 3, Upper Wall 3	
5113R0023	Room 3, Upper Wall 3	
5113R0024	Room 3, Upper Wall 3	
5113R0025	Room 3, Upper Wall 3	
5113R0026	Room 3, Top of Pipe Conduit	

TABLE 2: Sample Photographs and Location Descriptions for Building 3034	
5113M0001-Lower south wall	**5113M0003-Paint from entry door frame**
5113M0004-Paint from East wall	**5113M0005-Paint from stairs to mezzanine**
5113M0006-Upper southwest corner.	**5113M0007- Lower East wall**

5113M0008- East wall.	**5113M0009-South wall**

BLDG 3036
SAMPLE LOCATION
MAP AND DESCRIPTIONS

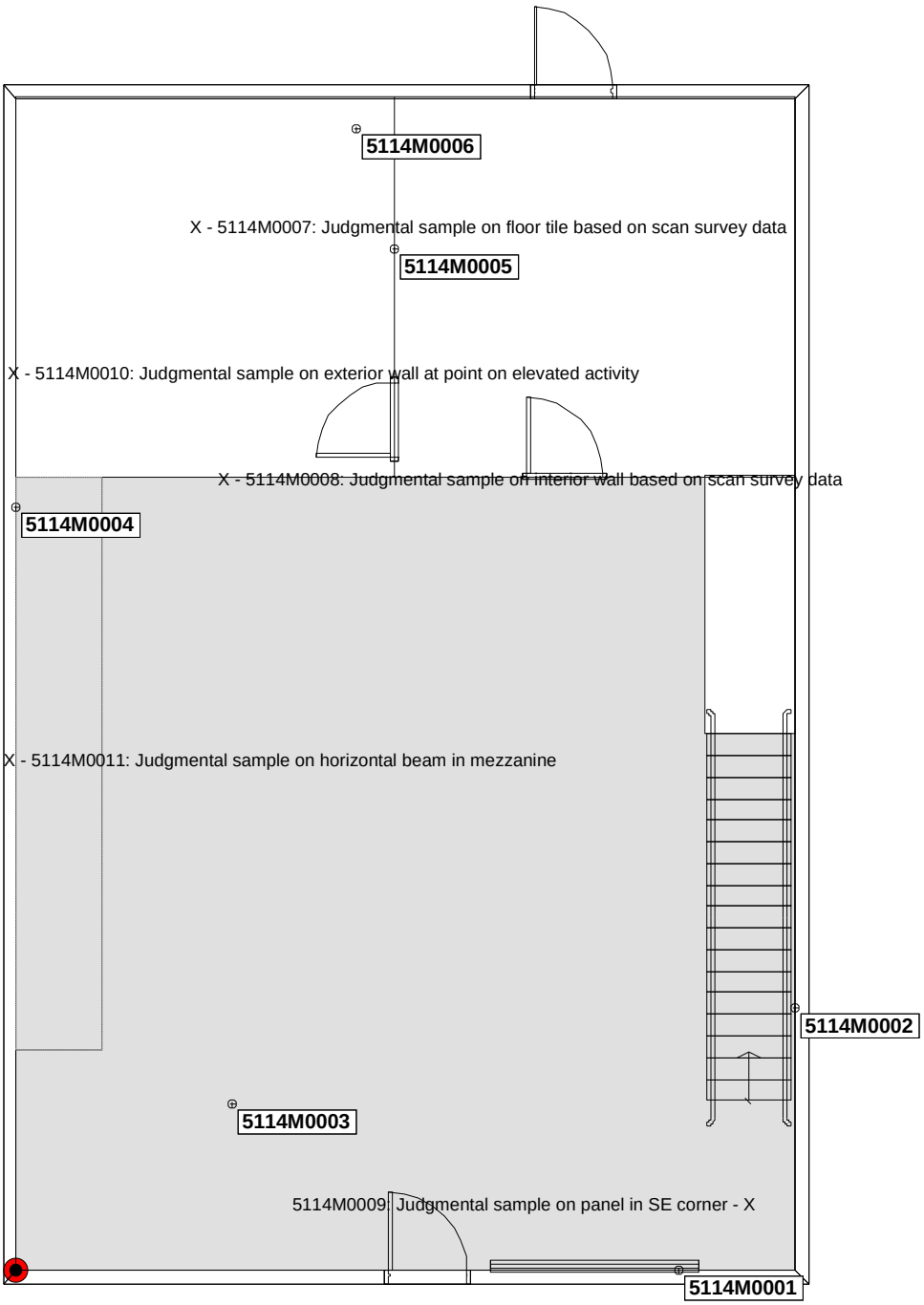


Fig. 1 Characterization Sample Locations for Building 3036

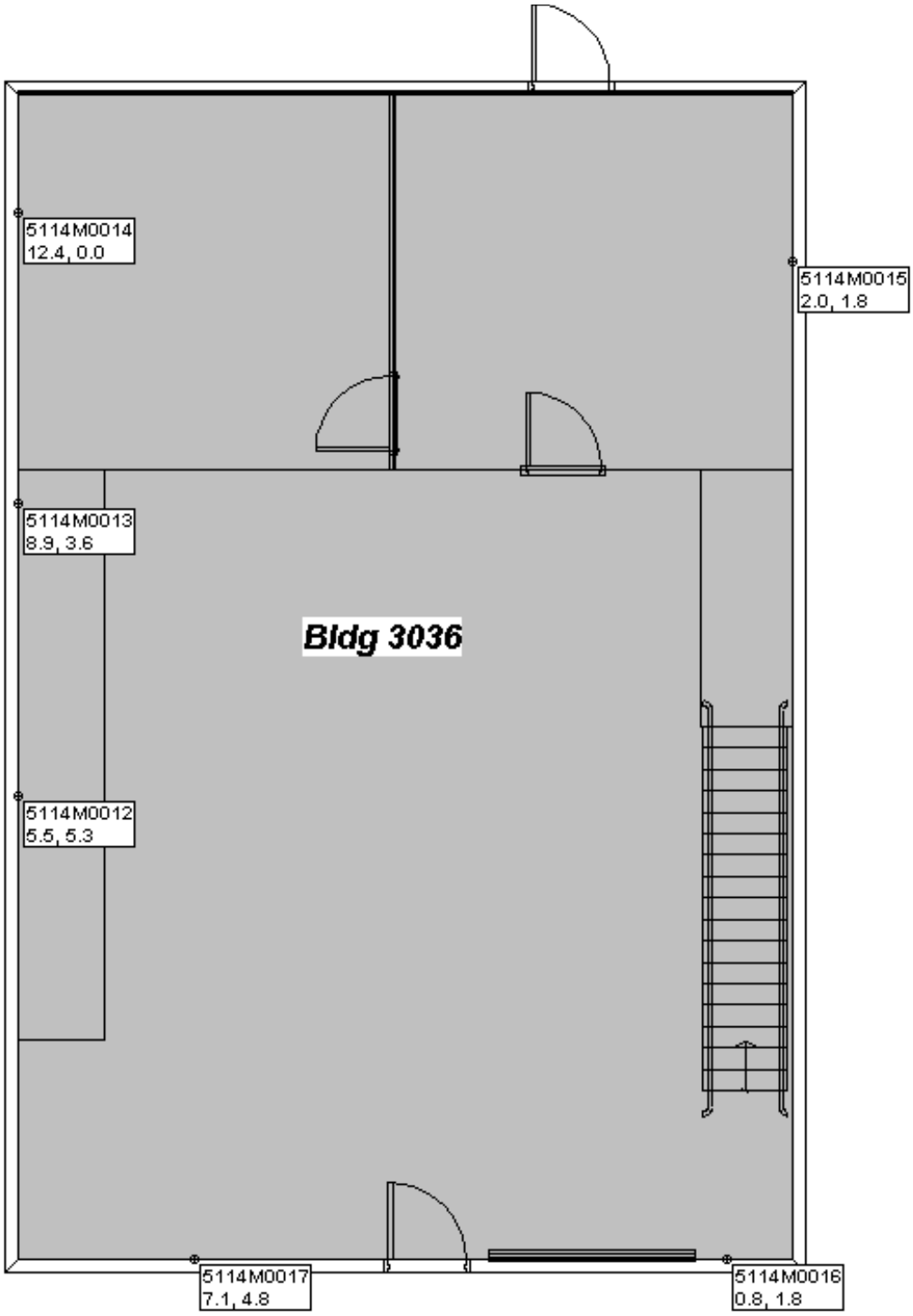


Fig. 2 Characterization Sample Locations for Building 3036

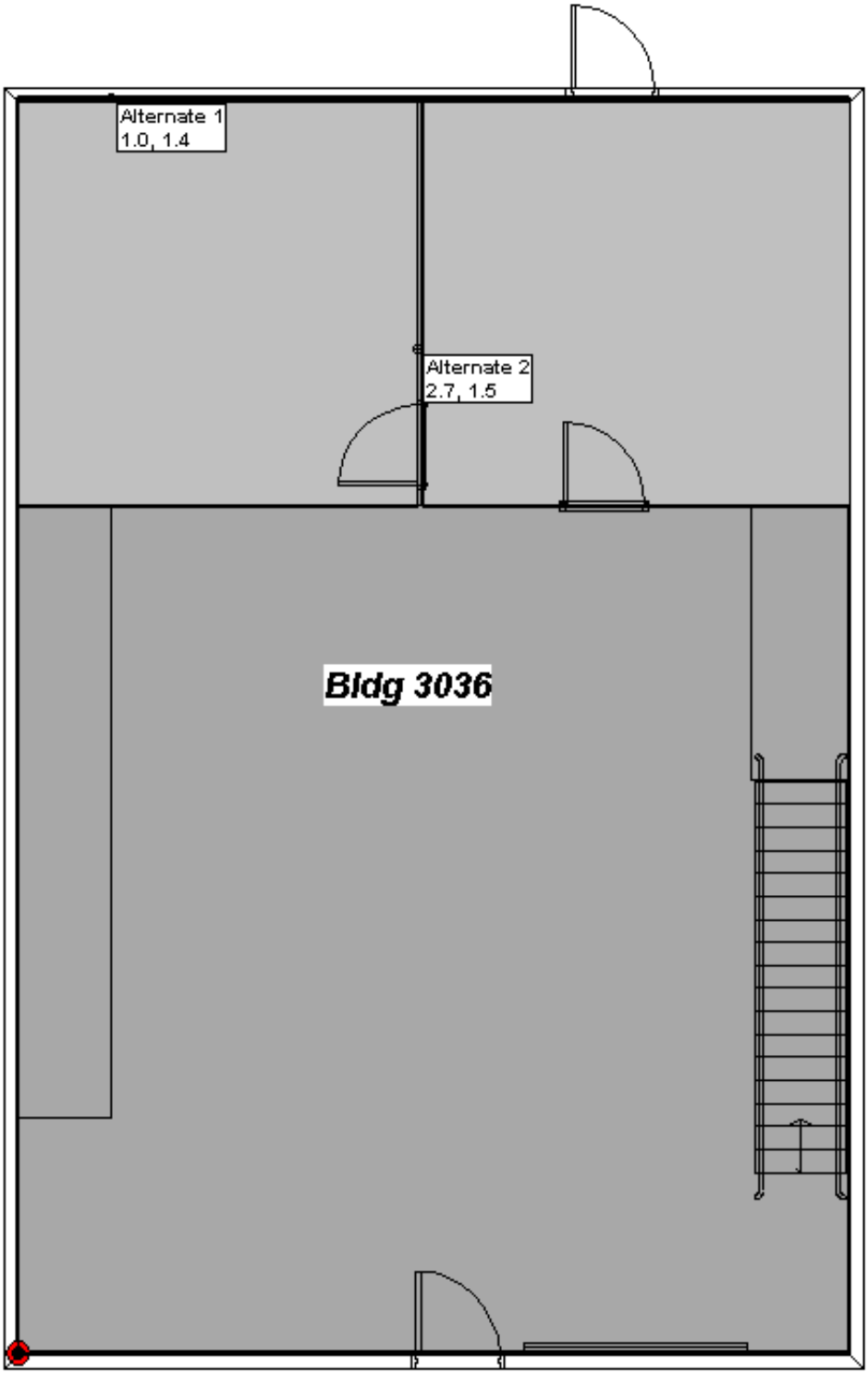
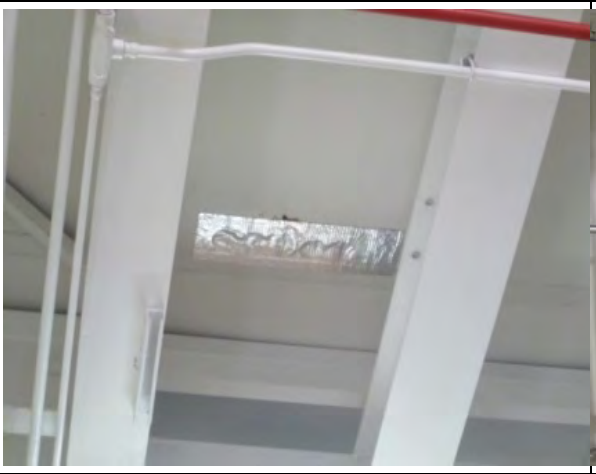
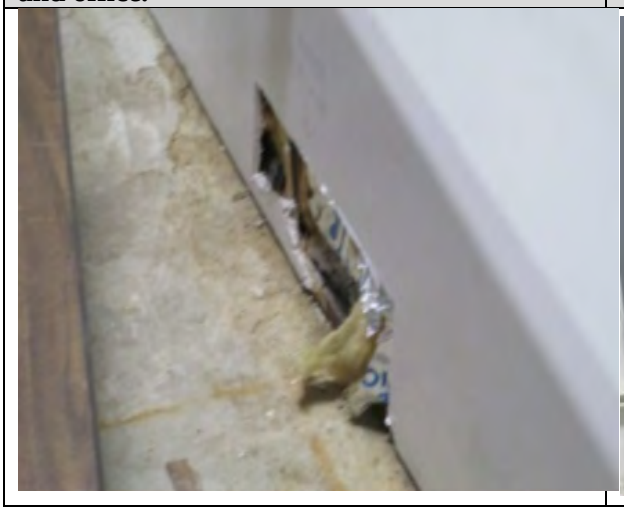


Fig. 3 Alternate Characterization Sample Locations for Building 3036

Table 1: Building 3036 Sample Location Descriptions		
Sample ID	Surface	Remarks/Deviations
5114M0001	Wall 4	Metal
5114M0002	Wall 3	Metal
5114M0003	Ceiling	***NOTE: This is a deviation. Originally intended as a Roof sample. Building owners mandated that no sampling of the roofs would be allowed.*** Sample location was shifted east within a one meter range of original location. A light fixture obstructed the original randomly selected location (coordinates listed on the figure is for the original location)
5114M0004	Wall 1	Metal
5114M0005	Wall 3	Sheet rock
5114M0006	Ceiling	Ceiling
5114M0007	Floor Tile	Floor tile
5114M0008	Interior Wall	Sheet rock was sampled. Elevated activity possibly due to floor contamination. Floor is out of scope.
5114M0009	Metal Panel in SE corner	Metal sample in S.E. corner
5114M0010	Wall 1	Metal-horizontal beam
5114M0011	Metal Beam	***NOTE: This is a deviation. Sample location not collected. ORNL structural engineer indicated that the integrity of the building could affected if an additional sample collected from the horizontal beam.***
5114M0012	Wall 2	Original sample location was inaccessible. Alternate location collected from interior north wall. (Alternate 1)
5114M0013	Wall 1	Random external sample.
5114M0014	Wall 1	Random internal sample.
5114M0015	Wall 3	Random external sample.
5114M0016	Wall 3	Original sample location was inaccessible. Alternate location collected from interior east wall. (Alternate 2)
5114M0017	Wall 4	Random external sample.

TABLE 2: Sample Photographs and Location Descriptions for Building 3036	
5114M0001-Above the roll-up door south side of building.	**5114M0002-East side of the building above stairs to the mezzanine**
5114M0003-Ceiling	**5114M0004 Lower East wall.-**
	
5114M0004- Lower East wall.	**5114M0005-Lower wall between offices.**

5114M0006-Ceiling tile below Mezzanine floor.	5114M0007-Floor tile
5114M0008-Lower wall between high bay and office.	**5114M0009-Panel in SE corner**
	

5114M0010-Horizontal beam on West wall	5114M00012-Internal Office North wall
5114M0013-Exterior West wall	**5114M0014 Lower West wall in office**
5114M0015-Exterior East Wall	**5114M0016-Internal Office East wall**

5114M0017-Lower SW wall	

BLDG 3093 SAMPLE LOCATION MAP AND DESCRIPTIONS

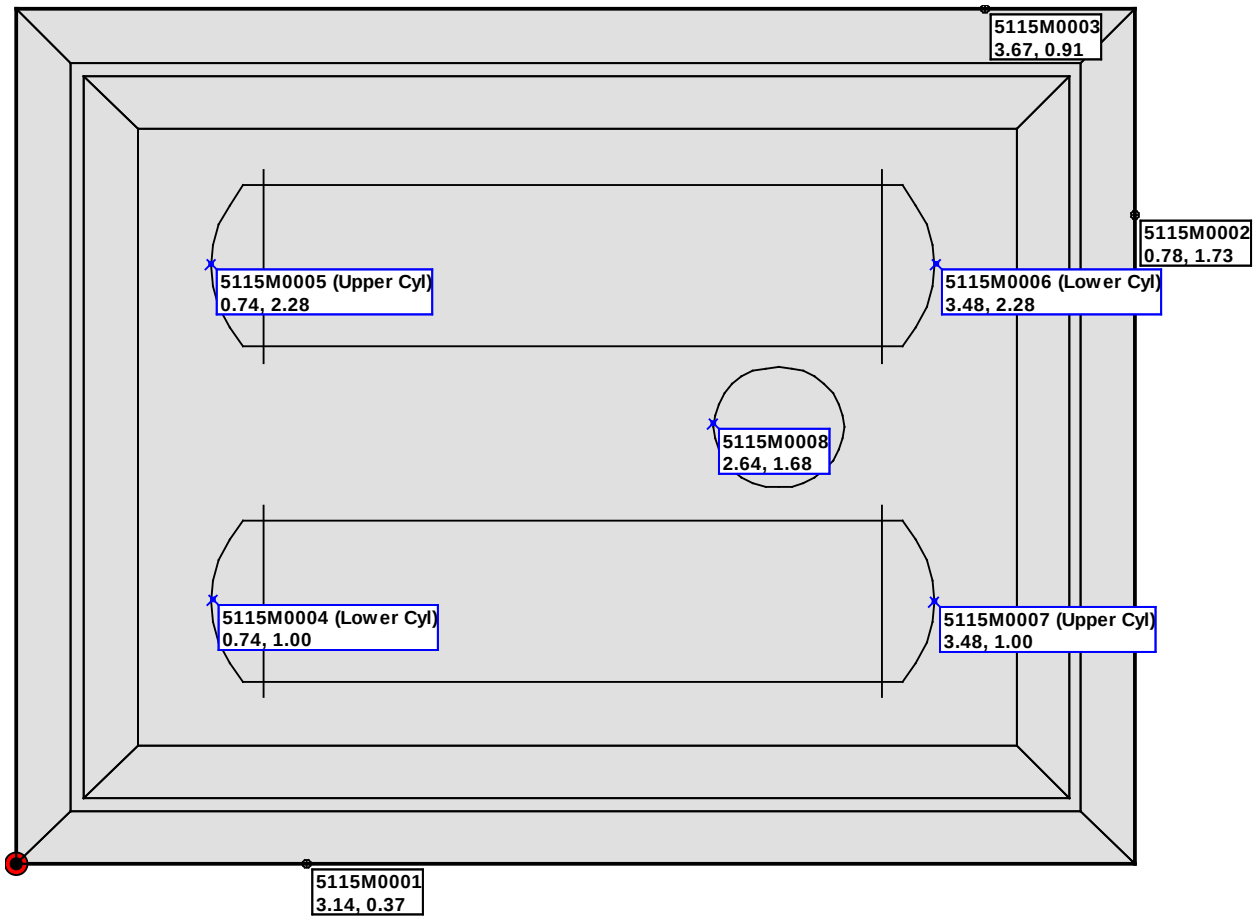


Fig. 1 Wall and System Sample Locations for Building 3093

Table 1: Building 3093 Sample Location Descriptions		
Sample ID	Surface	Remarks/Deviations
5115M0001	Wall 4	Sample of concrete containment wall.
5115M0002	Wall 3	Sample from upper concrete containment wall.
5115M0003	Wall 2	Sample from concrete containment wall
5115M0004	Lower Cylinder	Volumetric sample not collected because zero energy/pressure has not been verified. In-situ measurement collected from location exhibiting highest level of radioactivity.
5115M0005	Upper Cylinder	Sample not collected because zero energy/pressure has not been verified.
5115M0006	Lower Cylinder	Sample not collected because zero energy/pressure has not been verified.
5115M0007	Upper Cylinder	Sample not collected because zero energy/pressure has not been verified.
5115M0008	Cylinder	Sample not collected because zero energy/pressure has not been verified.

TABLE 2: Sample Photographs and Location Descriptions for Building 3032	
5115M0001-South wall	**5115M0002- East wall**
5115M0003-North wall.	**5115M0004-NDA (in-situ) measurement of cylinder**

BLDG 3118 SAMPLE LOCATION MAP AND DESCRIPTIONS

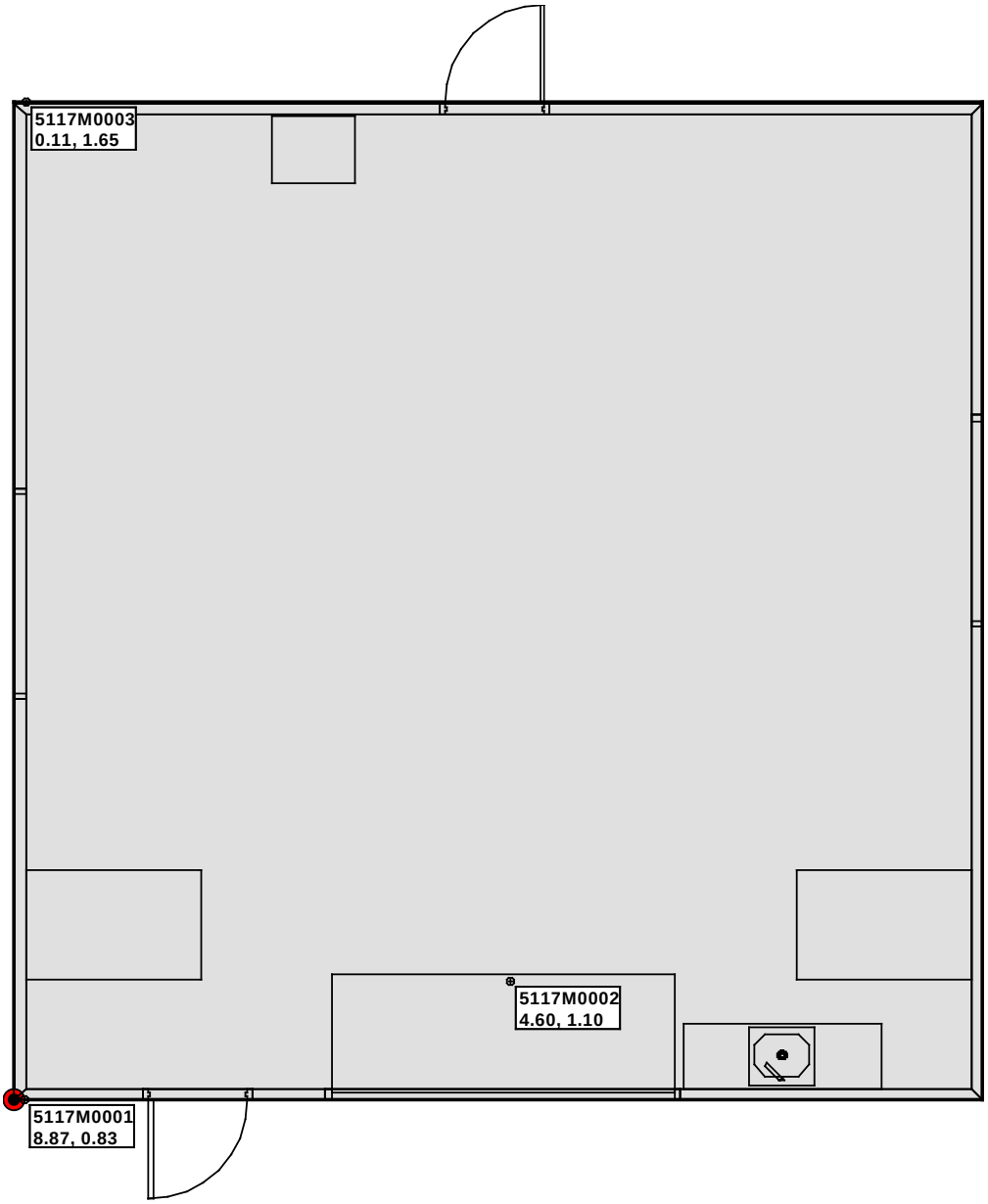


Fig. 1 Wall and Ceiling Sample Locations for Building 3118

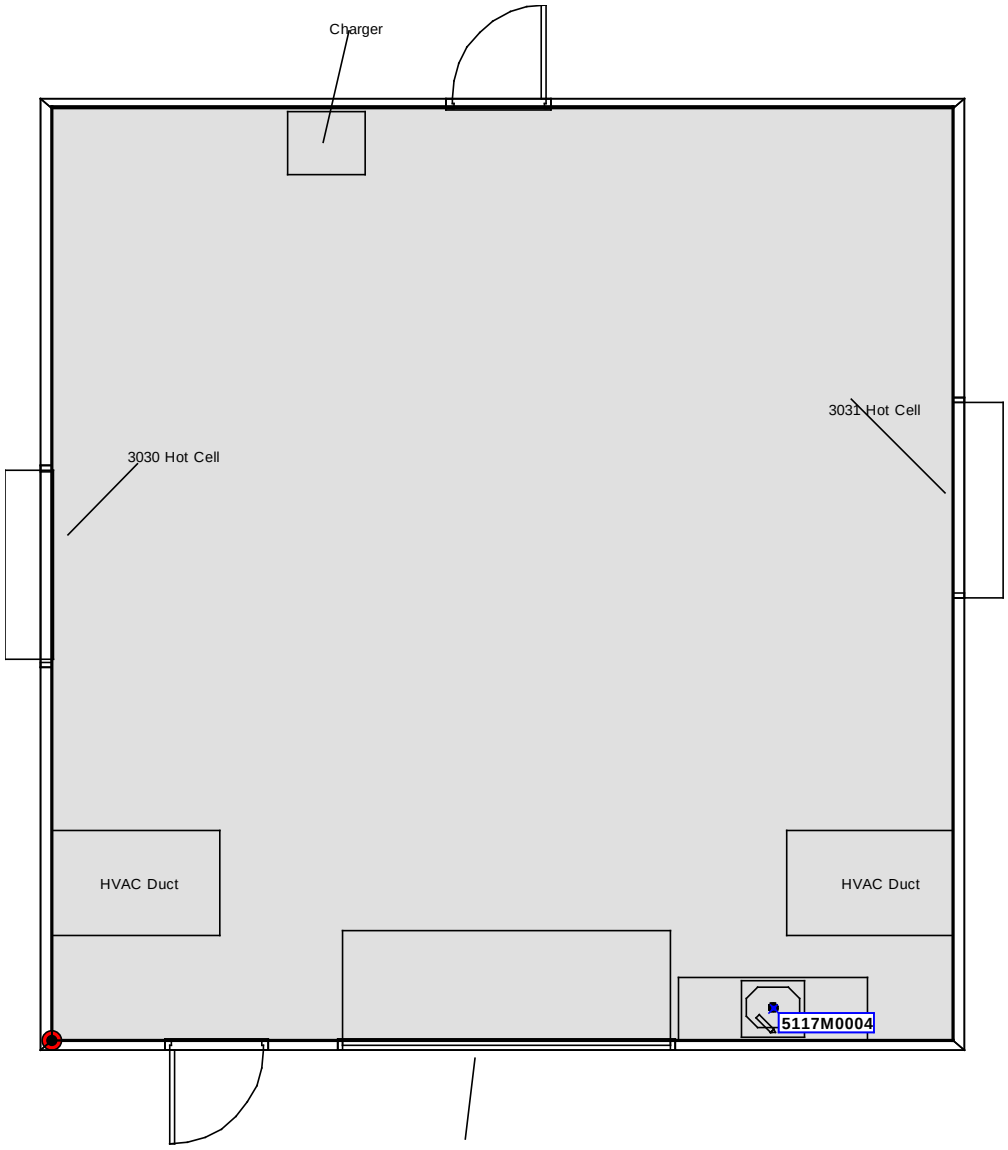


Fig. 2 Process Systems Sample Locations for Building 3118

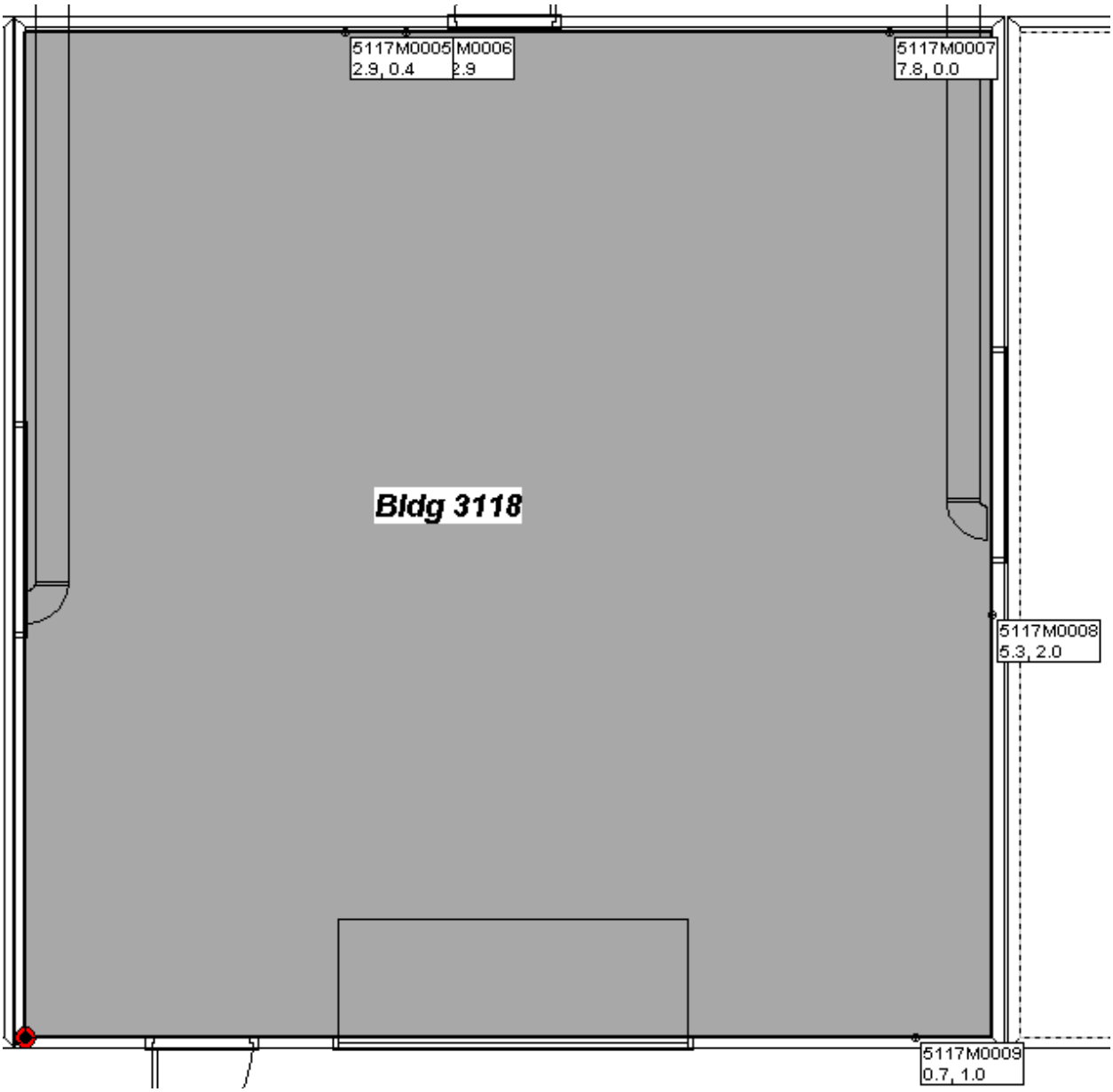
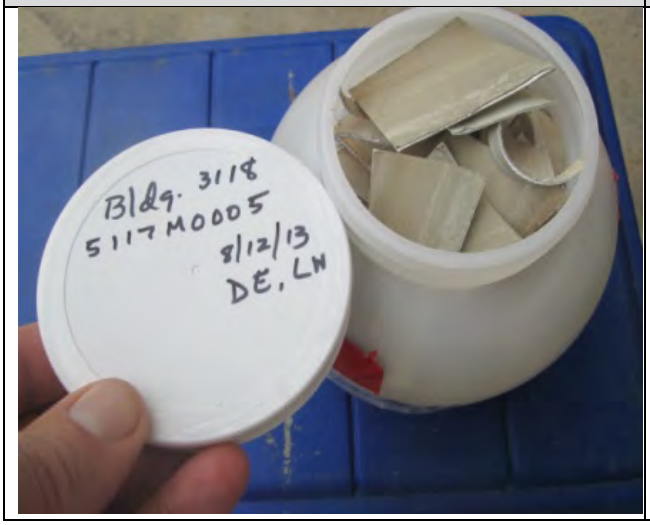


Fig. 3 Wall Sample Locations for Building 3118

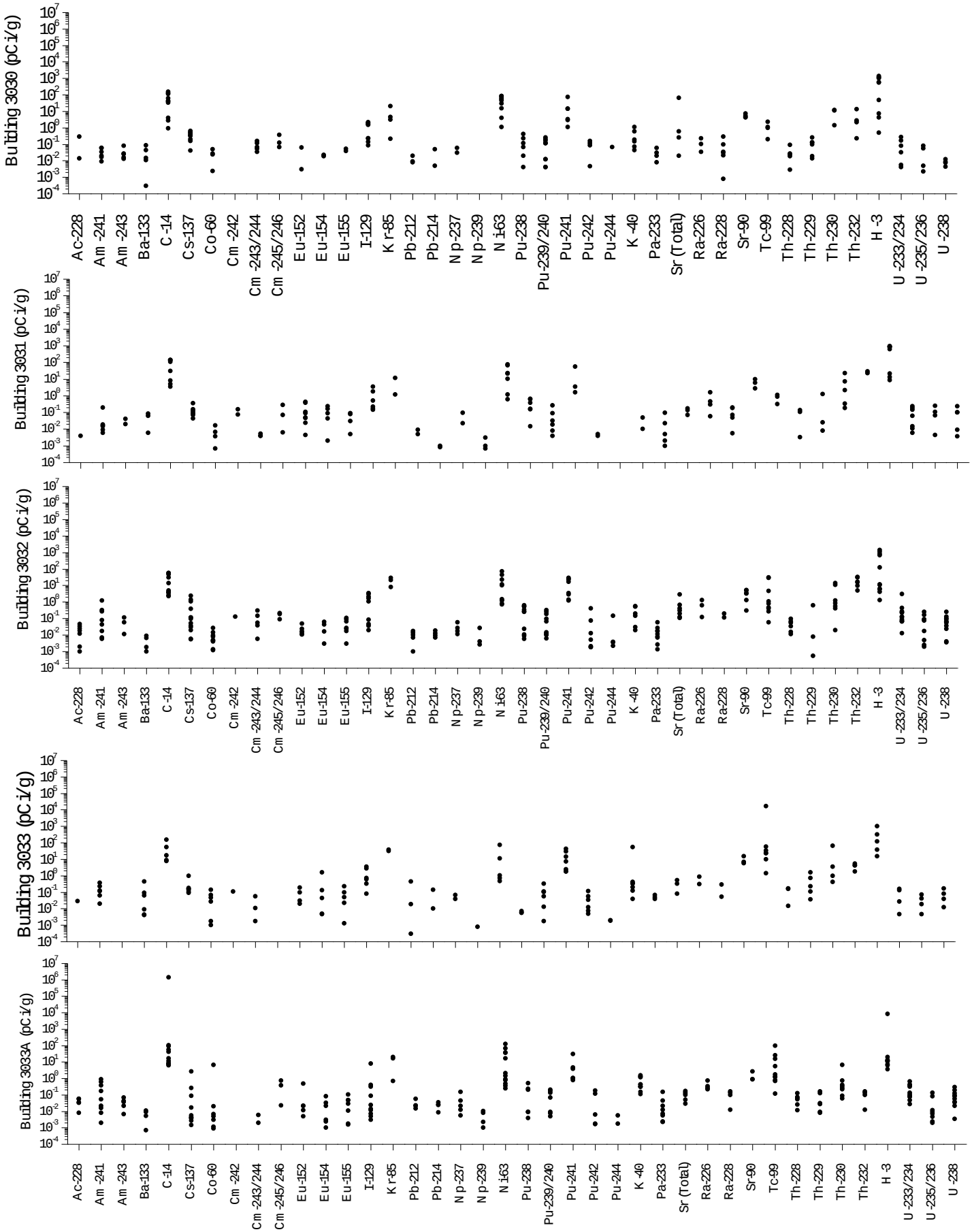
Table 1: Building 3118 Sample Location Descriptions		
Sample ID	Surface	Remarks/Deviations
5117M0001	Wall 4	X-coordinate was moved ~0.5m because random location was blocked by building obstructions. New x-coordinate: 8.4m. Sample weighed 400 grams.
5117M0002	Ceiling	Sample matrix: metal. Sample weighed: 412 grams
5117M0003	Wall 2	There was a large metal plate on back side of wall metal. Did not sample through metal plate, because it did not seem to be part of the building
5117M0004	Sink	Matrix: stainless steel pipe. Weight: 402 grams. Samplers: A. Kirthlink and E. Montalvo
5117M0005	North Wall	Random internal sample.
5117M0006	North Wall	Random internal sample.
5117M0007	North east Wall	Random internal sample.
5117M0008	East Wall	Random internal sample.
5117M0009	South East Wall	Random internal sample.

TABLE 2: Sample Photographs and Location Descriptions for Building 3118	
5117M0001- south wall	**5117M0002-Ceiling**
5117M0003-Lower north wall in NW corner	**5117M0004- Sink drain pipe.**
5117M0005-From North wall	**5117M0006- From North Wall**
	

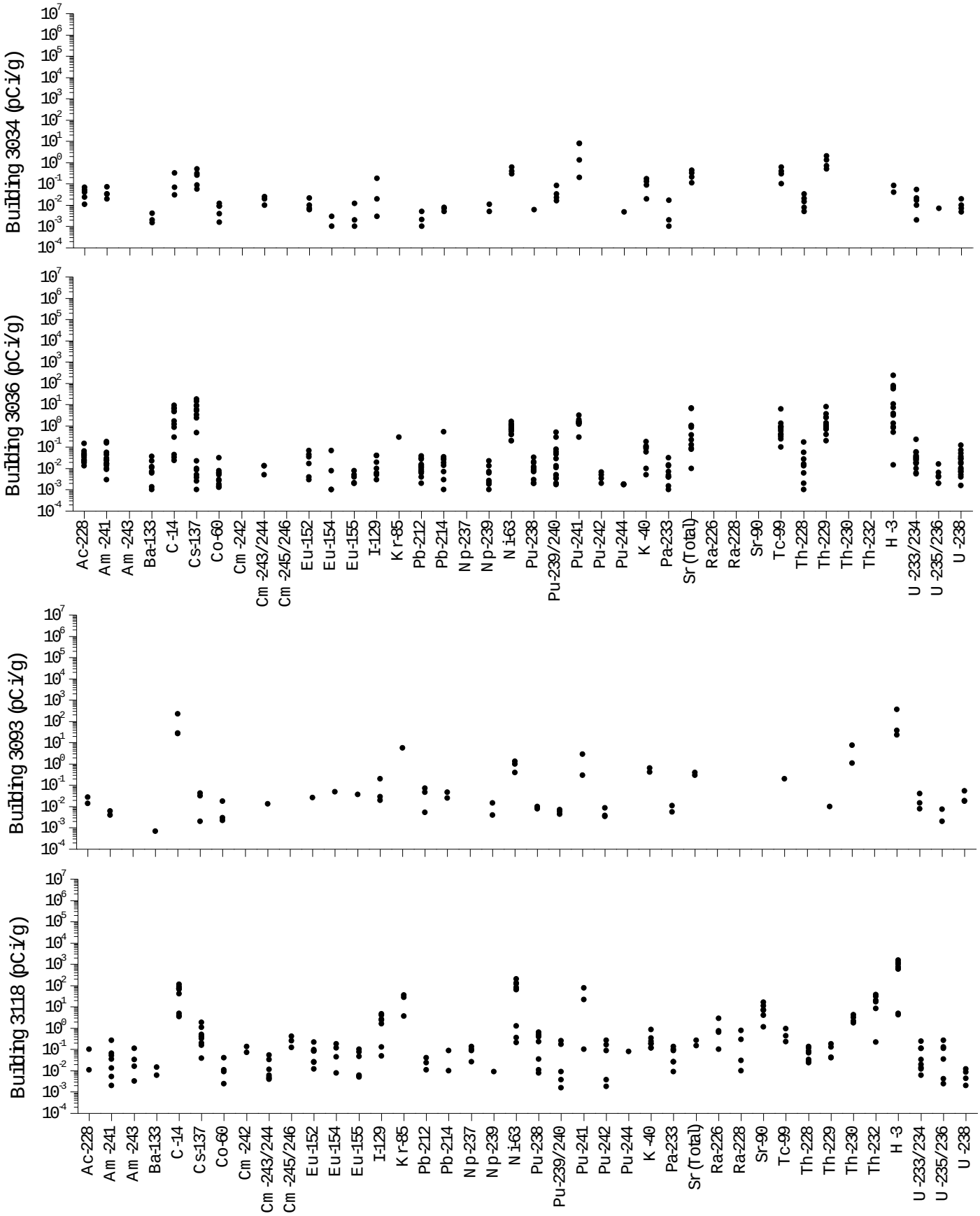
5117M0007-From NE wall.	5117M0008- From East wall.

APPENDIX C
ISOTOPE ROW FACILITIES
DATA SUMMARY STATISTICS

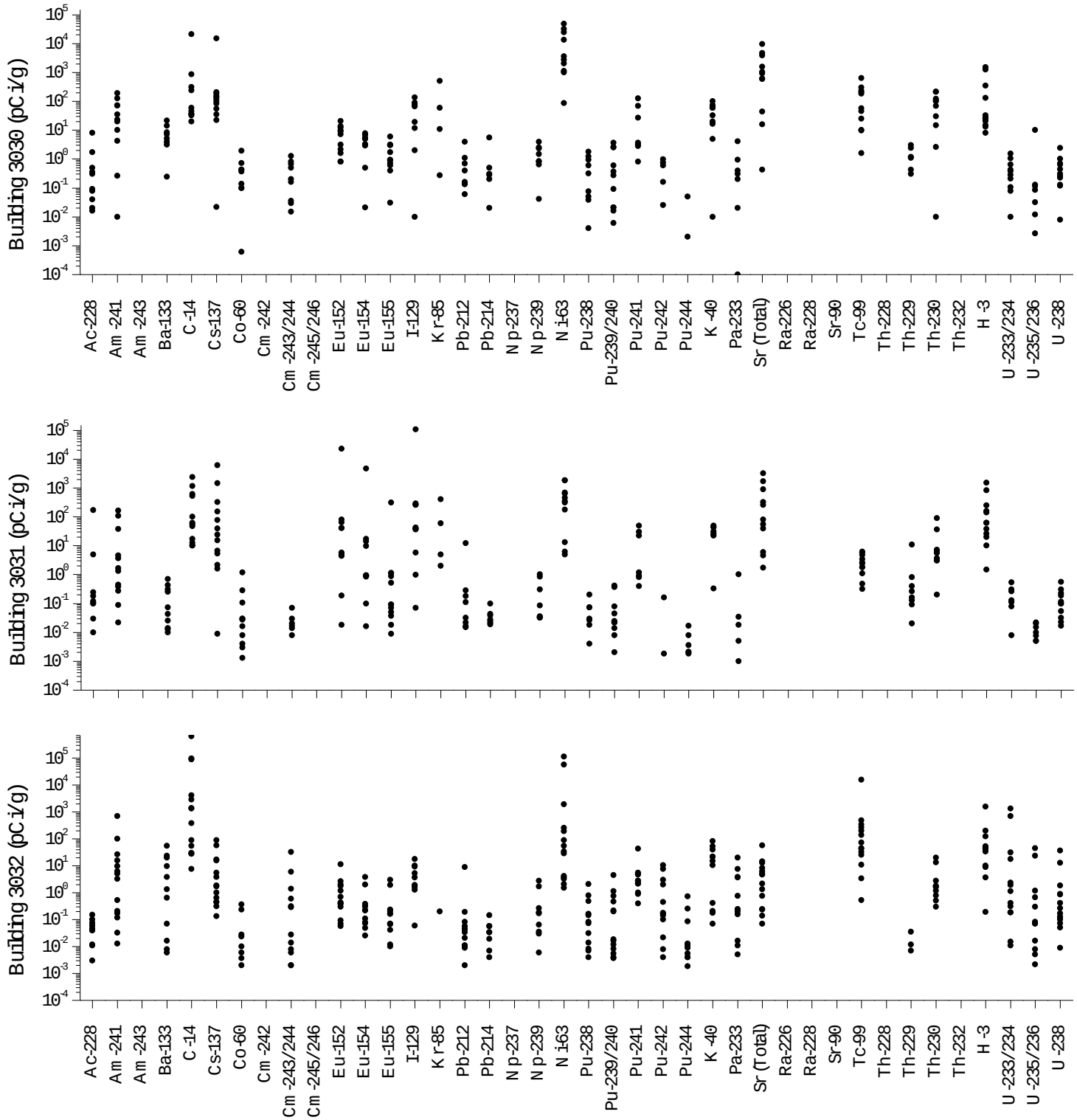
Radiological Analysis for Building Structures



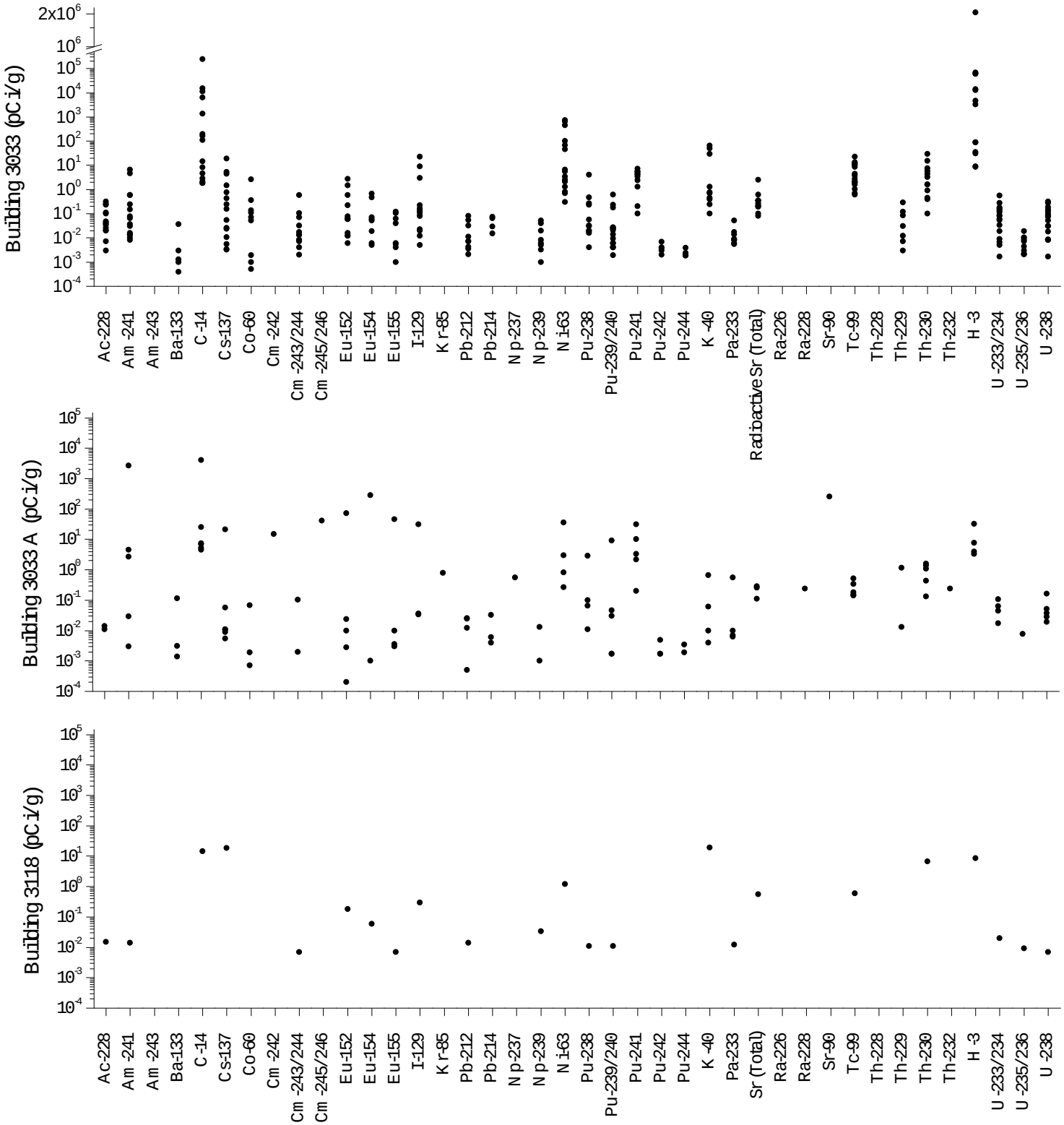
Radiological Analysis for Building Structures



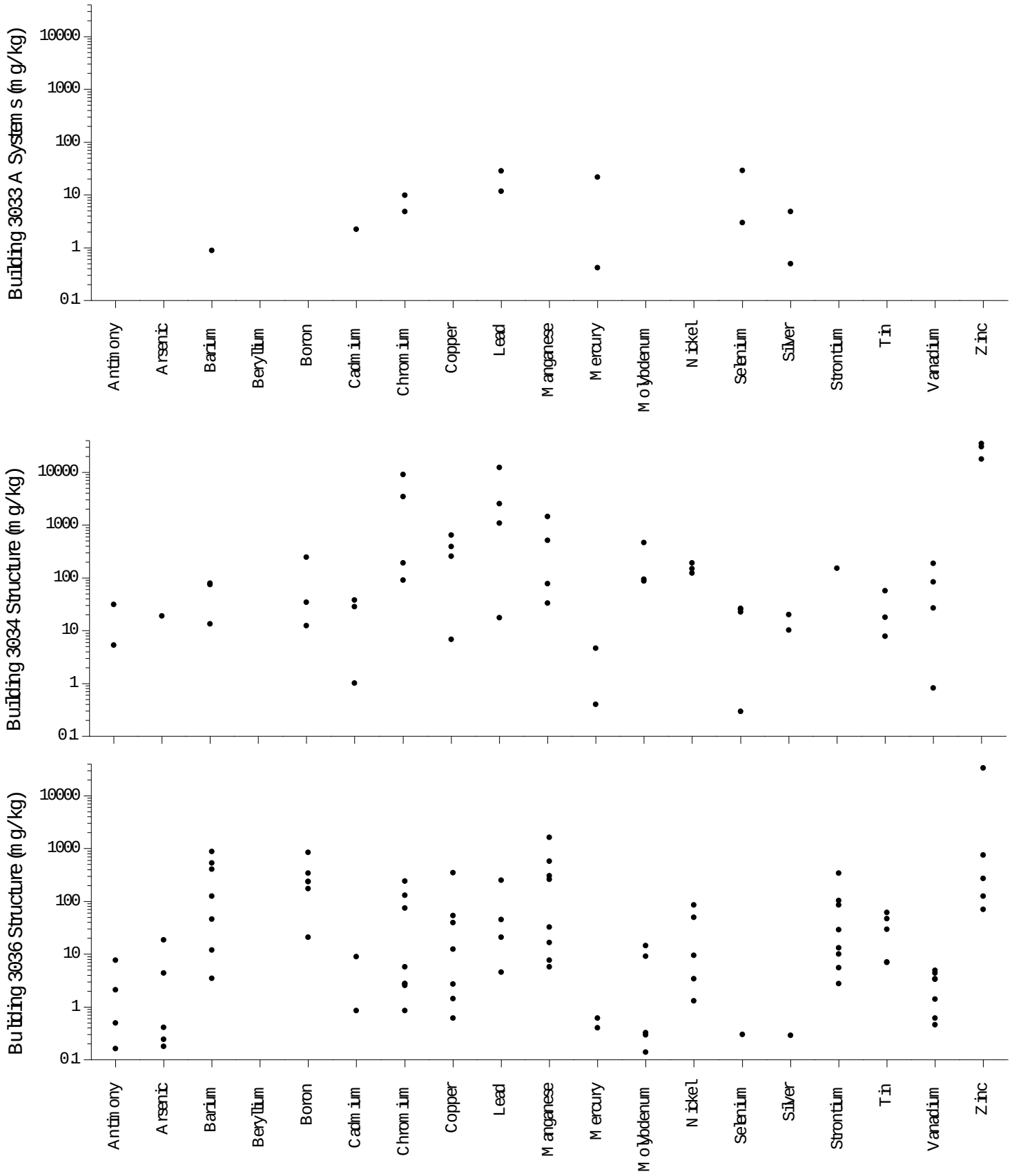
Radiological Analysis for Building Systems



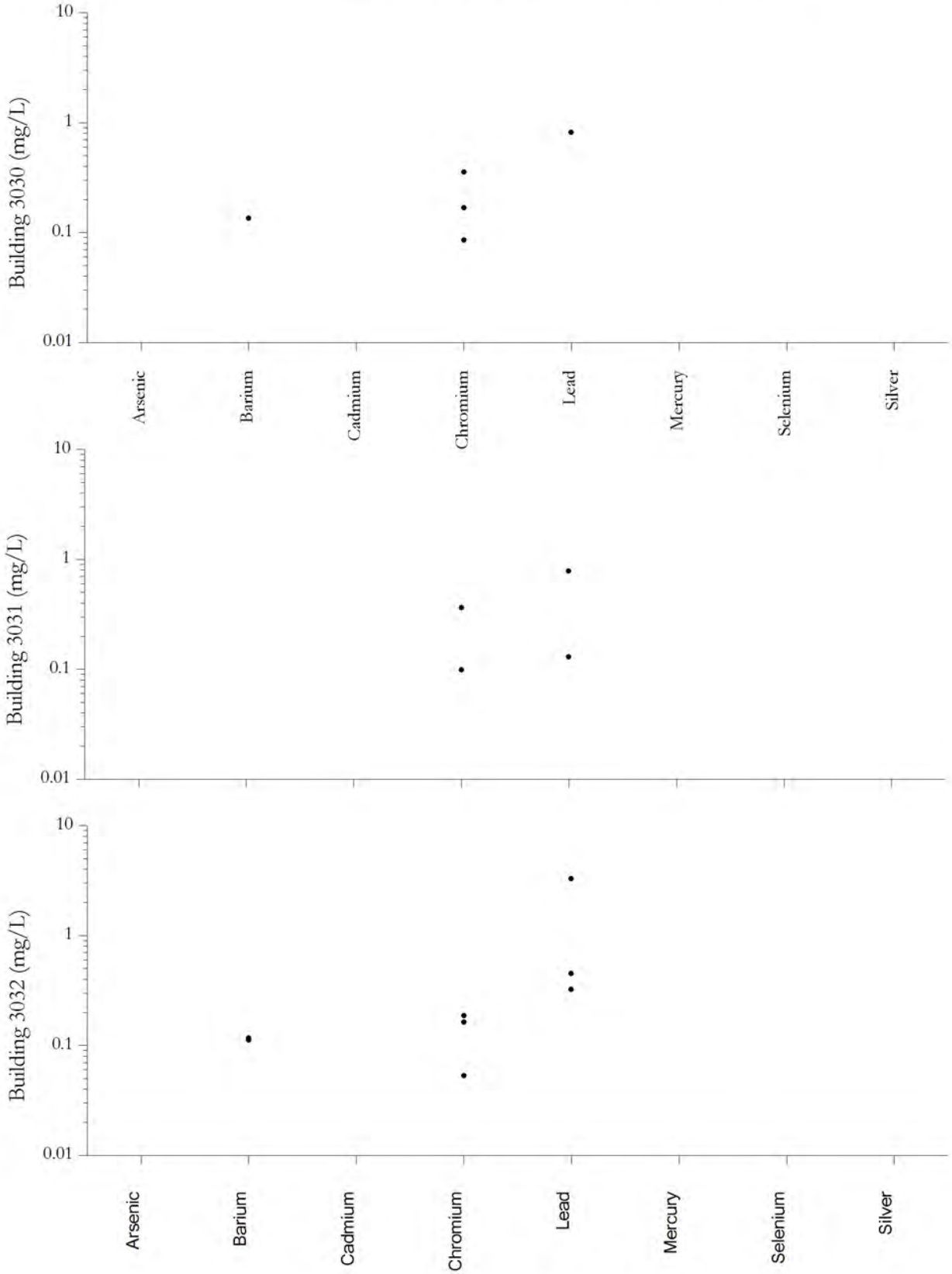
Radiological Analysis for Building Systems



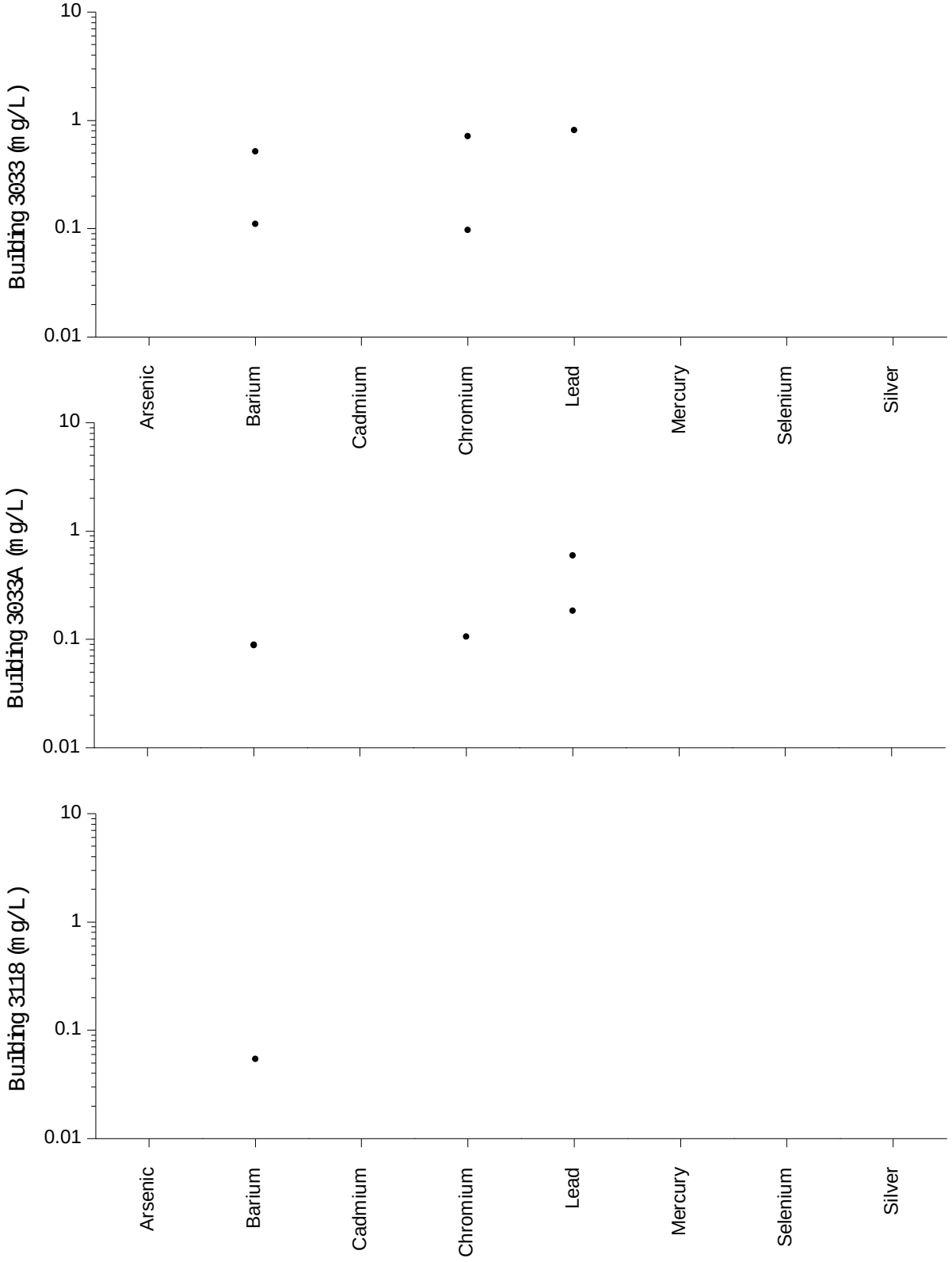
Total Metals



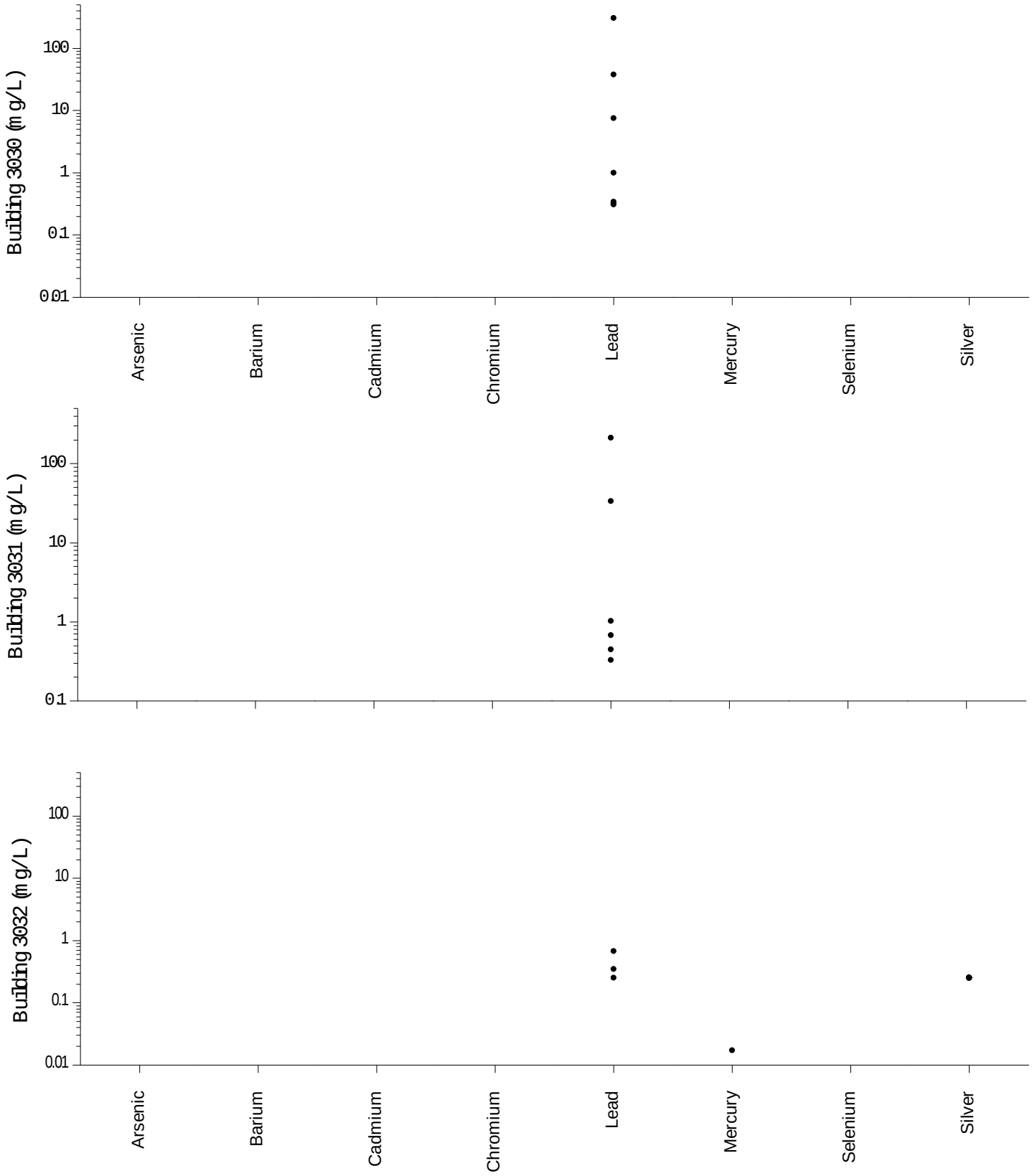
TCLP Metals for Building Structures



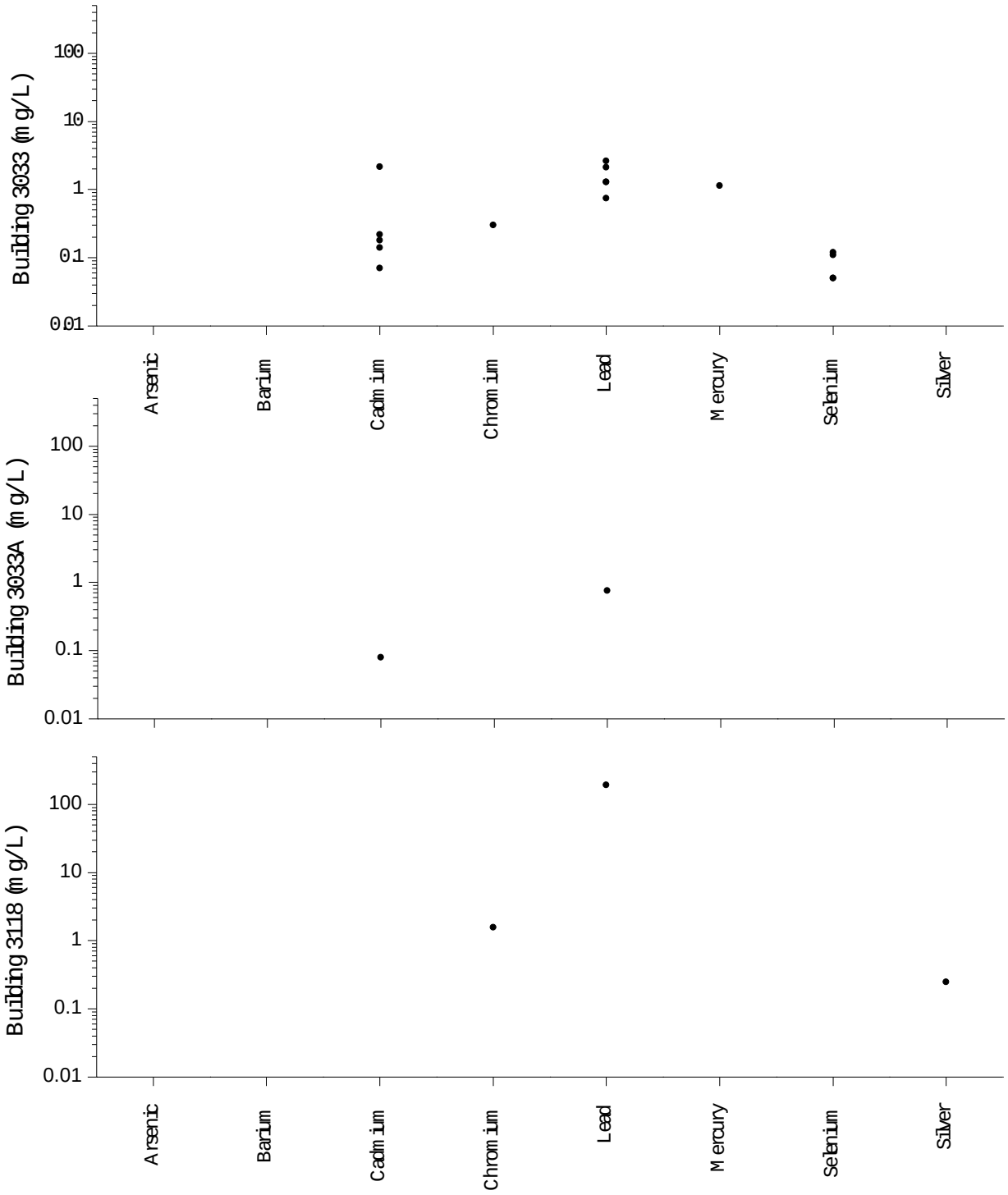
TCLP Metals for Building Structures



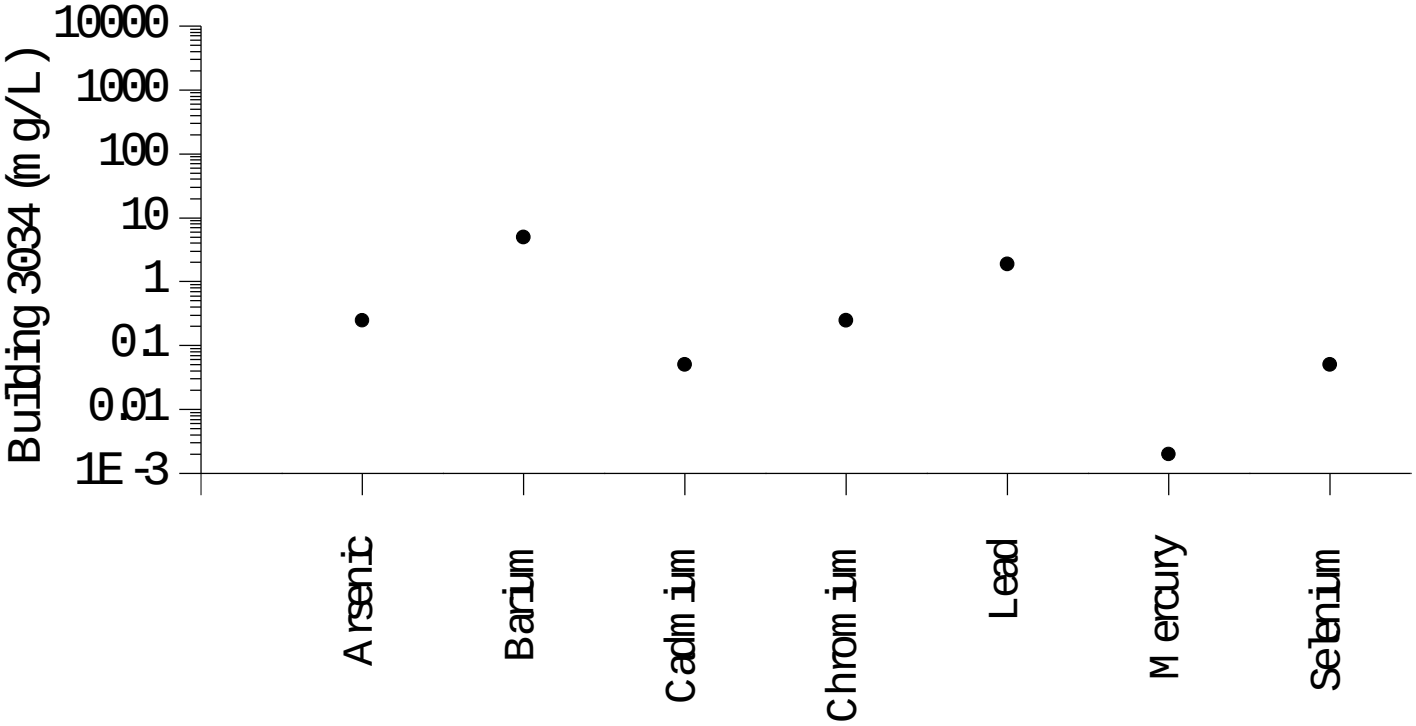
TCLP Metals for Building Systems

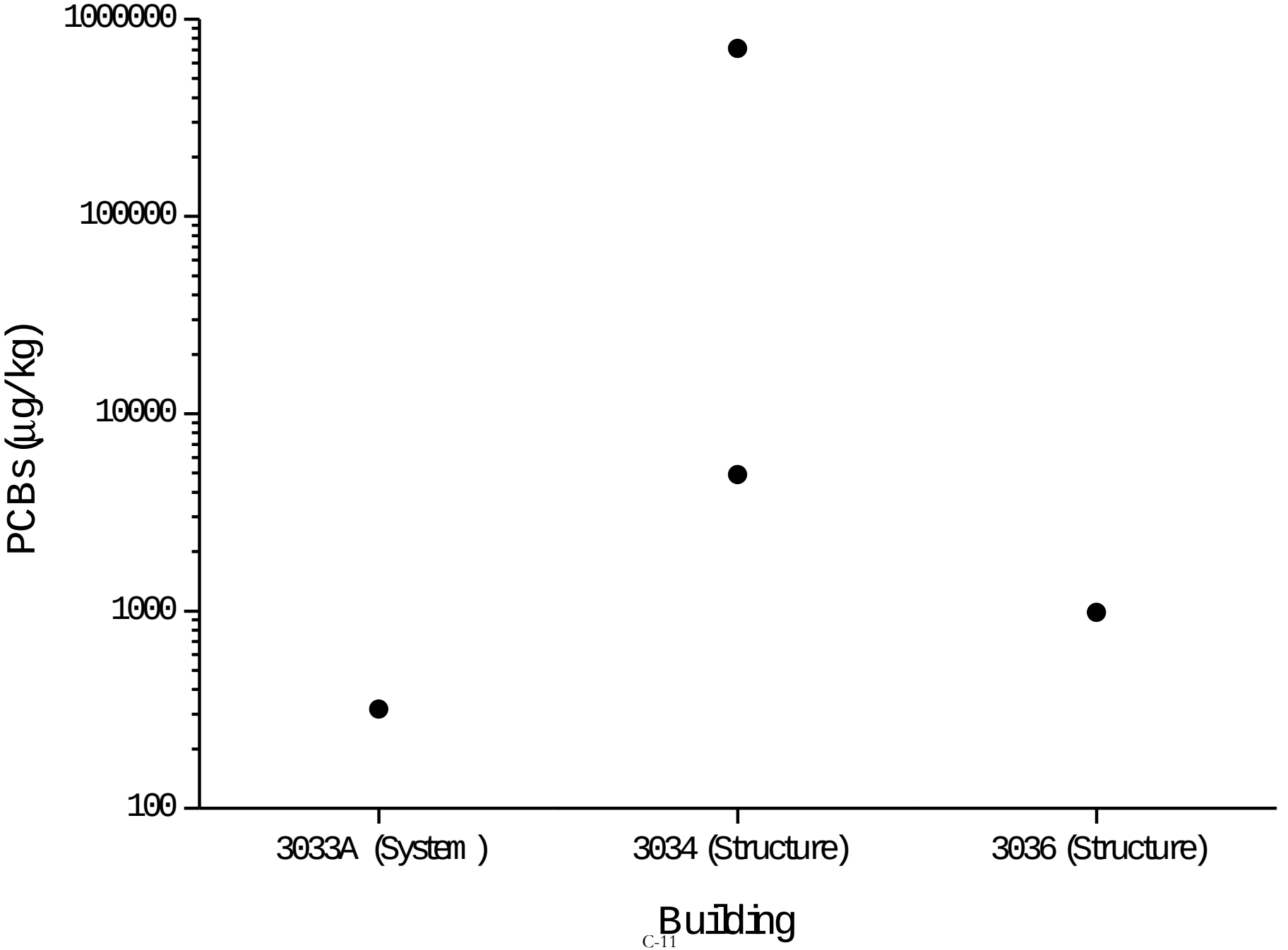


TCLP Metals for Building Systems



TCLP Metals for Building Structures




1000000
100000
10000
1000
100
PCBs (µg/kg)
3033A (System)
3034 (Structure)
3036 (Structure)
Building

Summary Statistics for Isotope Row

Location ID	Analysis Type	Chemical Name	Units	Average	Minimum	Maximum	Number of Samples
ORNL 3030	METAL	Arsenic	mg/L	0.26	0.25	0.3	12
		Barium	mg/L	3.77	0.05	5	12
		Cadmium	mg/L	0.05	0.05	0.05	12
		Chromium	mg/L	0.24	0.0857	0.353	12
		Lead	mg/L	29.58	0.1	306.03	12
		Mercury	mg/L	0.00	0.0002	0.002	12
		Selenium	mg/L	0.11	0.05	0.3	12
		Silver	mg/L	0.20	0.05	0.25	12
	RADS	Actinium-228	pCi/g	0.30	-5	8	16
		Americium-241	pCi/g	26.20	-0.249	192	21
		Americium-243	pCi/g	0.03	-0.00954	0.0827	6
		Barium-133	pCi/g	2.86	-1	21.8	22
		Carbon-14	pCi/g	1649.52	20	21470	14
		Carbon-14	pCi/sample	85.06	-1.7	311	7
		Cesium-137	pCi/g	727.40	0	14900	22
		Cobalt-60	pCi/g	0.16	-0.38	1.9	22
		Curium-242	pCi/g	-0.01	-0.0423	0	6
		Curium-243/244	pCi/g	0.19	-0.11	1.28	21
		Curium-245/246	pCi/g	0.08	-0.0416	0.372	6
		Europium-152	pCi/g	3.68	-0.15	20.7	22
		Europium-154	pCi/g	1.35	-10	7.9	22
		Europium-155	pCi/g	0.92	-0.109	6	22
		Iodine-129	pCi/g	17.32	-16	135	22
		Krypton-85	pCi/g	15.96	-100	500	22
		Lead-212	pCi/g	0.21	-3.3	4	16
		Lead-214	pCi/g	-1.89	-22.1	5.5	16
		Neptunium-237	pCi/g	0.00	-0.0648	0.0601	6
		Neptunium-239	pCi/g	0.60	-2	4	16

Location ID	Analysis Type	Chemical Name	Units	Average	Minimum	Maximum	Number of Samples
ORNL 3030	RADS	Nickel-63	pCi/g	6145.89	-1.6	48000	21
		Plutonium-238	pCi/g	0.28	-0.0663	1.77	21
		Plutonium-239/240	pCi/g	0.53	0.004	3.67	21
		Plutonium-241	pCi/g	7.85	-43.4	128	21
		Plutonium-242	pCi/g	0.12	-0.12	0.97	21
		Plutonium-244	pCi/g	-0.02	-0.33	0.0693	21
		Potassium-40	pCi/g	22.52	-0.96	99	22
		Protactinium-233	pCi/g	0.12	-2	4.1	22
		Radioactive Strontium (Total)	pCi/g	1527.10	0.02	9440	15
		Radium-226	pCi/g	-0.05	-0.309	0.234	6
		Radium-228	pCi/g	0.08	0.000789	0.294	6
		Strontium-90	pCi/g	1.74	-9.89	7.31	6
		Technetium-99	pCi/g	70.45	-64.1	638	21
		Thorium-228	pCi/g	0.02	-0.03	0.0921	6
		Thorium-229	pCi/g	-2.27	-55	3	22
		Thorium-230	pCi/g	39.12	-7.36	210	22
		Thorium-232	pCi/g	-4.38	-22.4	13.1	6
		Tritium	pCi/g	462.43	13	1420	14
		Tritium	pCi/sample	400.46	0.5	1488	7
		Uranium-233/234	pCi/g	0.24	-0.1	1.56	21
		Uranium-235/236	pCi/g	0.50	-0.0772	10.2	21
		Uranium-238	pCi/g	0.29	-0.0486	2.44	21
ORNL 3031	METAL	Arsenic	mg/L	0.26	0.25	0.3	12
		Barium	mg/L	4.18	0.05	5	12
		Cadmium	mg/L	0.05	0.05	0.05	12
		Chromium	mg/L	0.25	0.0992	0.363	12
		Lead	mg/L	20.91	0.129	212.75	12
		Mercury	mg/L	0.00	0.0002	0.002	12
		Selenium	mg/L	0.09	0.05	0.3	12
		Silver	mg/L	0.22	0.05	0.25	12
	RADS	Actinium-228	pCi/g	10.96	-0.29	170	16

Location ID	Analysis Type	Chemical Name	Units	Average	Minimum	Maximum	Number of Samples
ORNL 3031	RADS	Americium-241	pCi/g	16.07	-0.0384	163	20
		Americium-243	pCi/g	0.01	-0.0186	0.0419	5
		Barium-133	pCi/g	-0.91	-18	0.7	21
		Carbon-14	pCi/g	395.41	12.7	2400	14
		Carbon-14	pCi/sample	9.02	3.5	17.4	6
		Cesium-137	pCi/g	395.26	0.009	6190	21
		Cobalt-60	pCi/g	-3.03	-65	1.2	21
		Curium-242	pCi/g	0.03	-0.0719	0.152	5
		Curium-243/244	pCi/g	-0.03	-0.6	0.07	20
		Curium-245/246	pCi/g	0.07	-0.0306	0.277	5
		Europium-152	pCi/g	1097.71	-0.084	22800	21
		Europium-154	pCi/g	228.23	-3.3	4750	21
		Europium-155	pCi/g	14.72	-5	310	21
		Iodine-129	pCi/g	5155.68	-2.9	107300	21
		Krypton-85	pCi/g	-410.55	-9000	400	21
		Lead-212	pCi/g	-3.62	-70	12	16
		Lead-214	pCi/g	-0.76	-10	0.1	16
		Neptunium-237	pCi/g	0.01	-0.0399	0.0967	5
		Neptunium-239	pCi/g	-12.17	-176	1	16
		Nickel-63	pCi/g	323.02	-0.8	1815	20
		Plutonium-238	pCi/g	0.12	-0.03	0.667	20
		Plutonium-239/240	pCi/g	0.06	-0.122	0.406	20
		Plutonium-241	pCi/g	-2.22	-85.8	57.2	20
		Plutonium-242	pCi/g	-0.02	-0.138	0.16	20
		Plutonium-244	pCi/g	-0.02	-0.23	0.017	20
		Potassium-40	pCi/g	-2.94	-300	49	21
		Protactinium-233	pCi/g	-4.90	-100	1	21
		Radioactive Strontium (Total)	pCi/g	440.33	-0.25	3250	15
		Radium-226	pCi/g	0.42	-0.316	1.59	5
		Radium-228	pCi/g	0.10	0.00575	0.194	5
		Strontium-90	pCi/g	0.64	-9.06	9.57	5

Location ID	Analysis Type	Chemical Name	Units	Average	Minimum	Maximum	Number of Samples
ORNL 3031	RADS	Technetium-99	pCi/g	-13.27	-98.1	6.1	20
		Thorium-228	pCi/g	0.04	-0.0642	0.139	5
		Thorium-229	pCi/g	-2.24	-60	11	21
		Thorium-230	pCi/g	-106.51	-2200	90	21
		Thorium-232	pCi/g	3.38	-27	28.9	5
		Tritium	pCi/g	496.23	10.2	1500	14
		Tritium	pCi/sample	44.60	1.5	161	6
		Uranium-233/234	pCi/g	0.11	-0.0603	0.542	20
		Uranium-235/236	pCi/g	0.02	-0.03	0.242	20
		Uranium-238	pCi/g	0.11	-0.004	0.55	20
ORNL 3032	METAL	Arsenic	mg/L	0.26	0.25	0.3	17
		Barium	mg/L	4.13	0.05	5	17
		Cadmium	mg/L	0.05	0.05	0.05	17
		Chromium	mg/L	0.23	0.053	0.25	17
		Lead	mg/L	0.48	0.25	3.29	17
		Mercury	mg/L	0.00	0.002	0.0173	17
		Selenium	mg/L	0.09	0.05	0.3	17
		Silver	mg/L	0.21	0.05	0.25	17
	RADS	Actinium-228	pCi/g	0.03	-0.03	0.15	21
		Americium-241	pCi/g	32.43	-0.154	704	27
		Americium-243	pCi/g	0.01	-0.0727	0.112	6
		Barium-133	pCi/g	4.21	-0.052	54.2	27
		Carbon-14	pCi/g	48790.13	-0.8	633000	17
		Carbon-14	pCi/sample	151.25	2.2	1314	10
		Cesium-137	pCi/g	7.39	0.0054	89	27
		Cobalt-60	pCi/g	0.02	-0.0171	0.364	27
		Curium-242	pCi/g	0.02	-0.0367	0.131	6
		Curium-243/244	pCi/g	1.54	-0.121	32.8	27
		Curium-245/246	pCi/g	0.07	-0.0387	0.213	6
		Europium-152	pCi/g	0.78	-0.157	11.27	27
		Europium-154	pCi/g	0.27	-0.0992	3.82	27

Location ID	Analysis Type	Chemical Name	Units	Average	Minimum	Maximum	Number of Samples
ORNL 3032	RADS	Europium-155	pCi/g	0.23	-0.0863	3.03	27
		Iodine-129	pCi/g	2.18	-2.64	17.6	27
		Krypton-85	pCi/g	-2.77	-27.2	28.7	27
		Lead-212	pCi/g	0.44	-0.09	8.76	21
		Lead-214	pCi/g	-0.04	-0.85	0.143	21
		Neptunium-237	pCi/g	0.01	-0.029	0.058	6
		Neptunium-239	pCi/g	0.24	-0.121	2.7	21
		Nickel-63	pCi/g	6427.89	-23.6	112600	27
		Plutonium-238	pCi/g	0.24	-0.031	2.09	27
		Plutonium-239/240	pCi/g	0.30	-0.0922	4.41	27
		Plutonium-241	pCi/g	3.60	-42.2	42.3	27
		Plutonium-242	pCi/g	0.90	-0.123	10.49	27
		Plutonium-244	pCi/g	0.04	-0.0424	0.728	27
		Potassium-40	pCi/g	9.09	-0.58	81.6	27
		Protactinium-233	pCi/g	1.37	-0.029	20.2	27
		Radioactive Strontium (Total)	pCi/g	5.65	0.07	57.9	21
		Radium-226	pCi/g	0.19	-0.516	1.29	6
		Radium-228	pCi/g	0.00	-0.127	0.196	6
		Strontium-90	pCi/g	3.09	0.304	5.32	6
		Technetium-99	pCi/g	636.69	-82.5	15640	27
		Thorium-228	pCi/g	0.05	0.0117	0.0938	6
		Thorium-229	pCi/g	-0.04	-0.547	0.629	27
		Thorium-230	pCi/g	-0.04	-24	20.1	27
		Thorium-232	pCi/g	18.21	5.08	31.8	6
		Tritium	pCi/g	255.68	-268	1440	16
		Tritium	pCi/sample	192.89	4.2	1586	10
		Uranium-233/234	pCi/g	77.75	-0.0825	1340	27
		Uranium-235/236	pCi/g	2.65	-0.0827	45.4	27
		Uranium-238	pCi/g	2.03	0	36.4	27
ORNL 3033	METAL	Arsenic	mg/L	0.26	0.25	0.3	16
		Barium	mg/L	4.41	0.111	5	16

Location ID	Analysis Type	Chemical Name	Units	Average	Minimum	Maximum	Number of Samples
ORNL 3033	METAL	Cadmium	mg/L	0.21	0.05	2.14	16
		Chromium	mg/L	0.27	0.0971	0.713	16
		Lead	mg/L	0.71	0.1	2.64	16
		Mercury	mg/L	0.07	0.002	1.14	16
		Selenium	mg/L	0.09	0.05	0.3	16
		Silver	mg/L	0.23	0.05	0.25	16
	RADS	Actinium-228	pCi/g	0.03	-0.7	0.32	19
		Americium-241	pCi/g	0.57	-0.0653	6.45	24
		Americium-243	pCi/g	-0.04	-0.0808	-0.00754	5
		Barium-133	pCi/g	0.01	-0.099	0.45	24
		Carbon-14	pCi/g	26751.99	-50.7	240000	10
		Carbon-14	pCi/sample	491.94	-2	6324	14
		Cesium-137	pCi/g	1.40	-0.00634	19.1	24
		Cobalt-60	pCi/g	0.15	-0.0417	2.58	24
		Curium-242	pCi/g	0.01	-0.0408	0.113	5
		Curium-243/244	pCi/g	0.03	-0.0703	0.575	24
		Curium-245/246	pCi/g	-0.02	-0.0456	0	5
		Europium-152	pCi/g	0.20	-0.31	2.7	24
		Europium-154	pCi/g	0.10	-0.4	1.6	24
		Europium-155	pCi/g	0.01	-0.202	0.225	24
		Iodine-129	pCi/g	1.76	-1.22	22.3	24
		Krypton-85	pCi/g	-7.66	-95.9	38	24
		Lead-212	pCi/g	0.03	-0.026	0.45	19
		Lead-214	pCi/g	0.01	-0.05	0.14	19
		Neptunium-237	pCi/g	0.01	-0.0447	0.069	5
		Neptunium-239	pCi/g	-0.01	-0.18	0.052	19
		Nickel-63	pCi/g	83.89	-105	721	24
		Plutonium-238	pCi/g	0.21	-0.0736	4.04	24
		Plutonium-239/240	pCi/g	0.07	-0.0298	0.609	24
		Plutonium-241	pCi/g	5.32	-4.67	42.6	24
		Plutonium-242	pCi/g	0.00	-0.2	0.116	24

Location ID	Analysis Type	Chemical Name	Units	Average	Minimum	Maximum	Number of Samples
ORNL 3033	RADS	Plutonium-244	pCi/g	0.00	-0.0368	0.0038	24
		Potassium-40	pCi/g	8.51	-0.245	65.9	24
		Protactinium-233	pCi/g	0.00	-0.08	0.069	24
		Radioactive Strontium (Total)	pCi/g	0.30	-0.12	2.45	19
		Radium-226	pCi/g	-0.12	-1.56	0.88	5
		Radium-228	pCi/g	0.01	-0.187	0.289	5
		Strontium-90	pCi/g	1.89	-13.2	15.7	5
		Technetium-99	pCi/g	696.99	-29.6	16510	24
		Thorium-228	pCi/g	0.03	-0.121	0.166	5
		Thorium-229	pCi/g	0.09	-0.885	1.6	24
		Thorium-230	pCi/g	5.07	-7.52	66	24
		Thorium-232	pCi/g	3.18	0	5.43	5
		Tritium	pCi/g	93721.28	-520	804000	10
		Tritium	pCi/sample	154528.13	-4.1	2072100	14
		Uranium-233/234	pCi/g	0.05	-0.419	0.549	24
		Uranium-235/236	pCi/g	0.00	-0.131	0.0697	24
		Uranium-238	pCi/g	0.07	-0.0871	0.314	24
ORNL 3033A	METAL	Arsenic	mg/kg	15.88	2.96	28.8	2
		Arsenic	mg/L	0.29	0.25	0.3	4
		Barium	mg/kg	2.85	0.885	4.81	2
		Barium	mg/L	1.31	0.05	5	4
		Cadmium	mg/kg	3.52	2.22	4.81	2
		Cadmium	mg/L	0.06	0.05	0.08	4
		Chromium	mg/kg	7.36	4.81	9.91	2
		Chromium	mg/L	0.12	0.05	0.25	4
		Lead	mg/kg	19.95	11.7	28.2	2
		Lead	mg/L	0.41	0.1	0.76	4
		Mercury	mg/kg	11.11	0.413	21.8	2
		Mercury	mg/L	0.00	0.002	0.002	4
		Selenium	mg/kg	15.88	2.96	28.8	2
		Selenium	mg/L	0.24	0.05	0.3	4

Location ID	Analysis Type	Chemical Name	Units	Average	Minimum	Maximum	Number of Samples
ORNL 3033A	METAL	Silver	mg/kg	2.65	0.494	4.81	2
		Silver	mg/L	0.10	0.05	0.25	4
	PPCB	PCB-1016	ug/kg	84.40	84.4	84.4	1
		PCB-1221	ug/kg	84.40	84.4	84.4	1
		PCB-1232	ug/kg	84.40	84.4	84.4	1
		PCB-1242	ug/kg	84.40	84.4	84.4	1
		PCB-1248	ug/kg	84.40	84.4	84.4	1
		PCB-1254	ug/kg	317.00	317	317	1
		PCB-1260	ug/kg	84.40	84.4	84.4	1
		PCB-1262	ug/kg	84.40	84.4	84.4	1
		PCB-1268	ug/kg	84.40	84.4	84.4	1
		Polychlorinated biphenyl	ug/kg	317.00	317	317	1
	RADS	Actinium-228	pCi/g	0.01	-0.037	0.058	11
		Americium-241	pCi/g	148.85	-0.202	2670	18
		Americium-243	pCi/g	0.02	-0.0644	0.0703	7
		Barium-133	pCi/g	0.00	-0.0435	0.115	18
		Carbon-14	pCi/g	133117	-82	1460000	11
		Carbon-14	pCi/sample	9.63	4.6	25.2	7
		Cesium-137	pCi/g	1.37	-0.033	21.5	18
		Cobalt-60	pCi/g	0.36	-0.0289	6.5	18
		Curium-242	pCi/g	2.10	-0.00494	14.7	7
		Curium-243/244	pCi/g	-0.02	-0.15	0.104	18
		Curium-245/246	pCi/g	6.04	-0.0578	41.2	7
		Europium-152	pCi/g	4.00	-0.07	71.7	18
		Europium-154	pCi/g	15.89	-0.0529	286	18
		Europium-155	pCi/g	2.56	-0.0599	45.9	18
		Iodine-129	pCi/g	2.20	-0.49	31.1	18
		Krypton-85	pCi/g	-0.05	-19.7	20	18
		Lead-212	pCi/g	0.02	-0.004	0.056	11
		Lead-214	pCi/g	0.01	-0.018	0.0347	11
		Neptunium-237	pCi/g	0.10	-0.0945	0.548	7

Location ID	Analysis Type	Chemical Name	Units	Average	Minimum	Maximum	Number of Samples
ORNL 3033A	RADS	Neptunium-239	pCi/g	0.00	-0.014	0.013	11
		Nickel-63	pCi/g	18.28	-0.12	125	18
		Plutonium-238	pCi/g	0.21	-0.0583	2.85	18
		Plutonium-239/240	pCi/g	0.54	-0.0428	9.09	18
		Plutonium-241	pCi/g	-32.55	-532	31.1	18
		Plutonium-242	pCi/g	-0.14	-2.55	0.178	18
		Plutonium-244	pCi/g	-0.06	-0.852	0.0055	18
		Potassium-40	pCi/g	0.43	-0.208	1.52	18
		Protactinium-233	pCi/g	0.04	-0.0945	0.548	18
		Radioactive Strontium (Total)	pCi/g	0.11	-0.05	0.28	11
		Radium-226	pCi/g	0.16	-0.351	0.726	7
		Radium-228	pCi/g	0.04	-0.198	0.236	7
		Strontium-90	pCi/g	35.28	-13.7	259	7
		Technetium-99	pCi/g	8.00	-5.16	97.3	18
		Thorium-228	pCi/g	0.04	-0.0768	0.128	7
		Thorium-229	pCi/g	0.05	-0.504	1.15	18
		Thorium-230	pCi/g	0.65	-1.1	6.53	18
		Thorium-232	pCi/g	-2.14	-15.4	0.236	7
		Tritium	pCi/g	626.36	-1190	8500	11
		Tritium	pCi/sample	8.77	-0.4	32	7
		Uranium-233/234	pCi/g	-0.08	-3.92	0.672	18
		Uranium-235/236	pCi/g	-0.16	-2.95	0.135	18
		Uranium-238	pCi/g	0.06	-0.109	0.298	18
ORNL 3034	METAL	Antimony	mg/kg	11.46	5.2675	31.2079	8
		Arsenic	mg/kg	5.30	0.122	18.8847	8
		Arsenic	mg/L	0.25	0.25	0.25	1
		Barium	mg/kg	32.84	0.84	78.287	8
		Barium	mg/L	5.00	5	5	1
		Beryllium	mg/kg	1.70	0.0523	4.6816	8
		Boron	mg/kg	74.73	5	247	4
		Cadmium	mg/kg	13.46	1.0152	38.2507	8

Location ID	Analysis Type	Chemical Name	Units	Average	Minimum	Maximum	Number of Samples
ORNL 3034	METAL	Cadmium	mg/L	0.05	0.05	0.05	1
		Chromium	mg/kg	1659.04	8.47	9127.823	8
		Chromium	mg/L	0.25	0.25	0.25	1
		Cobalt	mg/kg	4.19	1.69	9.95	4
		Copper	mg/kg	168.75	6.8297	641.8609	8
		Lead	mg/kg	1992.71	2.6	12242.86	8
		Lead	mg/L	1.89	1.89	1.89	1
		Manganese	mg/kg	319.31	33.4166	1453.357	8
		Mercury	mg/kg	1.45	0.4	4.61	4
		Mercury	mg/L	0.00	0.002	0.002	1
		Molybdenum	mg/kg	81.18	0.0872	465.6301	8
		Nickel	mg/kg	64.02	0.95	192.1888	8
		Selenium	mg/kg	9.59	0.2964	26.5293	8
		Selenium	mg/L	0.05	0.05	0.05	1
		Silver	mg/kg	4.48	0.0523	19.8938	8
		Silver	mg/L	0.25	0.25	0.25	1
		Strontium	mg/kg	113.30	1	403.4	8
		Thallium	mg/kg	0.50	0.5	0.5	4
		Tin	mg/kg	32.84	7.74	56.4	4
		Vanadium	mg/kg	38.98	0.8227	187.2643	8
		Zinc	mg/kg	11151.93	7.2	35188.43	8
	PPCB	PCB-1016	ug/kg	23506.00	455	69600	3
		PCB-1221	ug/kg	23506.00	455	69600	3
		PCB-1232	ug/kg	23506.00	455	69600	3
		PCB-1242	ug/kg	23506.00	455	69600	3
		PCB-1248	ug/kg	24153.33	1210	69600	3
		PCB-1254	ug/kg	238110.00	2150	710000	3
		PCB-1260	ug/kg	23986.67	1110	69600	3
		PCB-1262	ug/kg	23506.00	455	69600	3
		PCB-1268	ug/kg	23506.00	455	69600	3
		Polychlorinated biphenyl	ug/kg	239850.00	4650	710000	3

Location ID	Analysis Type	Chemical Name	Units	Average	Minimum	Maximum	Number of Samples
ORNL 3034	RADS	Actinium-228	pCi/g	0.04	0.011	0.07	5
		Americium-241	pCi/g	0.03	-0.01	0.071	5
		Barium-133	pCi/g	-0.01	-0.029	0.0041	5
		Carbon-14	pCi/g	0.11	0	0.318	4
		Carbon-14	pCi/sample	6.00	6	6	1
		Cesium-137	pCi/g	0.24	0.056	0.502	5
		Cobalt-60	pCi/g	0.01	0.0016	0.0123	5
		Curium-243/244	pCi/g	0.01	-0.013	0.025	5
		Europium-152	pCi/g	0.01	-0.015	0.022	5
		Europium-154	pCi/g	-0.03	-0.047	0.003	5
		Europium-155	pCi/g	-0.01	-0.029	0.012	5
		Iodine-129	pCi/g	0.02	-0.081	0.18	5
		Krypton-85	pCi/g	-8.87	-13.7	-1.15	5
		Lead-212	pCi/g	0.00	-0.001	0.005	5
		Lead-214	pCi/g	0.00	-0.011	0.008	5
		Neptunium-239	pCi/g	-0.01	-0.037	0.011	5
		Nickel-63	pCi/g	0.18	-0.4	0.6	5
		Plutonium-238	pCi/g	0.00	-0.015	0.006	5
		Plutonium-239/240	pCi/g	0.03	-0.0019	0.085	5
		Plutonium-241	pCi/g	3.34	-0.8	8.1	5
		Plutonium-242	pCi/g	0.00	-0.0056	0	5
		Plutonium-244	pCi/g	0.00	-0.0075	0.0049	5
		Potassium-40	pCi/g	0.08	0	0.17	5
		Protactinium-233	pCi/g	0.00	-0.024	0.017	5
		Radioactive Strontium (Total)	pCi/g	0.20	-0.09	0.44	5
		Technetium-99	pCi/g	0.27	-0.05	0.6	5
		Thorium-229	pCi/g	0.01	0.005	0.034	5
		Thorium-230	pCi/g	0.83	-0.4	2.06	5
		Tritium	pCi/g	0.02	-0.021	0.085	4
		Tritium	pCi/sample	-1.10	-1.1	-1.1	1
		Uranium-233/234	pCi/g	0.02	0.002	0.054	5

Location ID	Analysis Type	Chemical Name	Units	Average	Minimum	Maximum	Number of Samples
ORNL 3034	RADS	Uranium-235/236	pCi/g	0.00	-0.011	0.0072	5
		Uranium-238	pCi/g	0.01	-0.003	0.02	5
ORNL 3036	METAL	Antimony	mg/kg	1.41	0.0621	7.6491	14
		Arsenic	mg/kg	2.00	0.1768	18.4849	14
		Barium	mg/kg	180.90	2.2752	879.3942	14
		Beryllium	mg/kg	0.13	0.0465	0.4118	14
		Boron	mg/kg	266.83	5	849	7
		Cadmium	mg/kg	0.98	0.1706	8.9467	14
		Chromium	mg/kg	34.60	0.5	242.9378	14
		Cobalt	mg/kg	0.49	0.2	1.61	6
		Copper	mg/kg	36.72	0.6139	349.2354	14
		Lead	mg/kg	31.86	1	248.8106	14
		Manganese	mg/kg	242.73	5.7798	1643.539	14
		Mercury	mg/kg	0.43	0.4	0.607	7
		Molybdenum	mg/kg	2.24	0.1122	14.5255	14
		Nickel	mg/kg	11.93	0.68	84.6445	14
		Selenium	mg/kg	0.71	0.2663	2.3334	14
		Silver	mg/kg	0.27	0.0465	0.4118	14
		Strontium	mg/kg	110.88	2.7651	434.1	14
		Thallium	mg/kg	0.50	0.5	0.5	6
		Tin	mg/kg	55.21	6.94	189	7
		Vanadium	mg/kg	1.97	0.4573	4.9064	14
		Zinc	mg/kg	2746.56	2.3	33305.09	14
	PPCB	PCB-1016	ug/kg	980.00	980	980	2
		PCB-1221	ug/kg	980.00	980	980	2
		PCB-1232	ug/kg	980.00	980	980	2
		PCB-1242	ug/kg	980.00	980	980	2
		PCB-1248	ug/kg	980.00	980	980	2
		PCB-1254	ug/kg	980.00	980	980	2
		PCB-1260	ug/kg	980.00	980	980	2
		PCB-1262	ug/kg	980.00	980	980	2

Location ID	Analysis Type	Chemical Name	Units	Average	Minimum	Maximum	Number of Samples
ORNL 3036	PPCB	PCB-1268	ug/kg	980.00	980	980	2
		Polychlorinated biphenyl	ug/kg	980.00	980	980	2
	RADS	Actinium-228	pCi/g	0.02	-0.05	0.15	16
		Americium-241	pCi/g	0.04	-0.013	0.184	16
		Barium-133	pCi/g	0.00	-0.044	0.037	16
		Carbon-14	pCi/g	0.06	-2.3	1.7	11
		Carbon-14	pCi/sample	6.34	4.6	9	5
		Cesium-137	pCi/g	4.24	0.001	18.2	16
		Cobalt-60	pCi/g	0.00	-0.0028	0.032	16
		Curium-243/244	pCi/g	-0.01	-0.041	0.013	16
		Europium-152	pCi/g	0.00	-0.047	0.07	16
		Europium-154	pCi/g	-0.02	-0.1	0.07	16
		Europium-155	pCi/g	-0.01	-0.038	0.008	16
		Iodine-129	pCi/g	-0.13	-0.8	0.041	16
		Krypton-85	pCi/g	-4.69	-15.8	0.3	16
		Lead-212	pCi/g	0.01	-0.045	0.038	16
		Lead-214	pCi/g	0.04	-0.012	0.522	16
		Neptunium-239	pCi/g	0.00	-0.054	0.023	16
		Nickel-63	pCi/g	0.54	-0.8	1.62	16
		Plutonium-238	pCi/g	0.01	-0.013	0.034	16
		Plutonium-239/240	pCi/g	0.07	-0.002	0.497	16
		Plutonium-241	pCi/g	0.61	-1.4	3.2	16
		Plutonium-242	pCi/g	0.00	-0.0053	0.0067	16
		Plutonium-244	pCi/g	0.00	-0.013	0.0018	16
		Potassium-40	pCi/g	-0.06	-0.73	0.18	16
		Protactinium-233	pCi/g	0.00	-0.065	0.032	16
		Radioactive Strontium (Total)	pCi/g	1.07	-0.09	6.88	16
		Technetium-99	pCi/g	0.75	-0.6	6.1	16
		Thorium-229	pCi/g	0.01	-0.07	0.17	16
		Thorium-230	pCi/g	1.02	-5.3	7.9	16
		Tritium	pCi/g	41.08	-0.11	237.5	11

Location ID	Analysis Type	Chemical Name	Units	Average	Minimum	Maximum	Number of Samples
ORNL 3036	RADS	Tritium	pCi/sample	3.12	0.5	7.3	5
		Uranium-233/234	pCi/g	0.04	0.0055	0.231	16
		Uranium-235/236	pCi/g	0.00	-0.0087	0.016	16
		Uranium-238	pCi/g	0.03	-0.002	0.123	16
ORNL 3093		Actinium-228	pCi/g	0.01	-0.02	0.028	3
		Americium-241	pCi/g	0.00	-0.011	0.006	3
		Barium-133	pCi/g	0.00	-0.006	0.0007	3
		Carbon-14	pCi/g	92.67	27	223	3
		Cesium-137	pCi/g	0.02	0.002	0.0432	3
		Cobalt-60	pCi/g	0.01	0.0022	0.018	3
		Curium-243/244	pCi/g	-0.01	-0.023	0.013	3
		Europium-152	pCi/g	0.01	-0.009	0.026	3
		Europium-154	pCi/g	-0.03	-0.126	0.05	3
		Europium-155	pCi/g	0.01	-0.009	0.037	3
		Iodine-129	pCi/g	0.08	0.02	0.2	3
		Krypton-85	pCi/g	0.66	-2.6	5.7	3
		Lead-212	pCi/g	0.04	0.0053	0.072	3
		Lead-214	pCi/g	0.03	-0.004	0.047	3
		Neptunium-239	pCi/g	0.00	-0.004	0.015	3
		Nickel-63	pCi/g	0.90	0.4	1.3	3
		Plutonium-238	pCi/g	0.01	0.008	0.01	3
		Plutonium-239/240	pCi/g	0.01	0.0044	0.007	3
		Plutonium-241	pCi/g	0.40	-2	2.9	3
		Plutonium-242	pCi/g	0.00	0.0035	0.0087	3
		Plutonium-244	pCi/g	0.00	-0.0038	0	3
		Potassium-40	pCi/g	0.21	-0.44	0.64	3
		Protactinium-233	pCi/g	0.00	-0.008	0.011	3
		Radioactive Strontium (Total)	pCi/g	0.15	-0.22	0.39	3
		Technetium-99	pCi/g	-0.23	-0.5	0.2	3
		Thorium-229	pCi/g	-0.02	-0.06	0.01	3
		Thorium-230	pCi/g	2.63	-0.6	7.4	3

Location ID	Analysis Type	Chemical Name	Units	Average	Minimum	Maximum	Number of Samples
ORNL 3093	RADS	Tritium	pCi/g	143.33	23	369	3
		Uranium-233/234	pCi/g	0.02	0.008	0.041	3
		Uranium-235/236	pCi/g	0.00	0	0.0075	3
		Uranium-238	pCi/g	0.03	0.018	0.055	3
ORNL 3118	METAL	Arsenic	mg/L	0.29	0.25	0.3	4
		Barium	mg/L	1.29	0.05	5	4
		Cadmium	mg/L	0.05	0.05	0.05	4
		Chromium	mg/L	0.43	0.05	1.58	4
		Lead	mg/L	48.04	0.1	191.86	4
		Mercury	mg/L	0.00	0.002	0.002	4
		Selenium	mg/L	0.24	0.05	0.3	4
		Silver	mg/L	0.10	0.05	0.25	4
	RADS	Actinium-228	pCi/g	0.03	-0.022	0.101	4
		Americium-241	pCi/g	0.04	-0.026	0.273	9
		Americium-243	pCi/g	-0.02	-0.143	0.11	5
		Barium-133	pCi/g	-0.02	-0.0847	0.006	9
		Carbon-14	pCi/g	75.42	67.2	91.6	5
		Carbon-14	pCi/sample	6.73	3.5	14.5	4
		Cesium-137	pCi/g	2.57	0	18.47	9
		Cobalt-60	pCi/g	0.00	-0.0275	0.0398	9
		Curium-242	pCi/g	0.04	-0.0312	0.139	5
		Curium-243/244	pCi/g	-0.01	-0.0588	0.0116	9
		Curium-245/246	pCi/g	0.15	-0.0275	0.409	5
		Europium-152	pCi/g	0.07	-0.109	0.221	9
		Europium-154	pCi/g	0.00	-0.3	0.181	9
		Europium-155	pCi/g	0.02	-0.0279	0.0996	9
		Iodine-129	pCi/g	1.45	-0.968	4.57	9
		Krypton-85	pCi/g	-1.36	-46.3	36	9
		Lead-212	pCi/g	0.02	0.011	0.04	4
		Lead-214	pCi/g	0.02	-0.013	0.088	4
		Neptunium-237	pCi/g	0.05	-0.11	0.133	5

Location ID	Analysis Type	Chemical Name	Units	Average	Minimum	Maximum	Number of Samples
ORNL 3118	RADS	Neptunium-239	pCi/g	0.00	-0.02	0.033	4
		Nickel-63	pCi/g	58.08	0	202	9
		Plutonium-238	pCi/g	0.18	-0.0361	0.651	9
		Plutonium-239/240	pCi/g	-0.03	-0.137	0.011	9
		Plutonium-241	pCi/g	-6.38	-63.6	22	9
		Plutonium-242	pCi/g	-0.03	-0.22	0.265	9
		Plutonium-244	pCi/g	-0.02	-0.137	0.0783	9
		Potassium-40	pCi/g	2.20	-0.913	19.09	9
		Protactinium-233	pCi/g	0.03	-0.11	0.133	9
		Radioactive Strontium (Total)	pCi/g	0.23	-0.07	0.55	4
		Radium-226	pCi/g	0.60	-1.05	2.86	5
		Radium-228	pCi/g	0.08	-0.265	0.766	5
		Strontium-90	pCi/g	5.41	-8.97	16.7	5
		Technetium-99	pCi/g	-48.70	-114	0.93	9
		Thorium-228	pCi/g	0.09	0.0329	0.134	5
		Thorium-229	pCi/g	-0.32	-0.99	0.181	9
		Thorium-230	pCi/g	-1.39	-20.2	6.6	9
		Thorium-232	pCi/g	22.67	8.44	37.3	5
		Tritium	pCi/g	749.60	-383	1550	5
		Tritium	pCi/sample	4.25	-0.6	8.6	4
		Uranium-233/234	pCi/g	0.06	0.00604	0.239	9
		Uranium-235/236	pCi/g	0.05	-0.0712	0.266	9
		Uranium-238	pCi/g	-0.01	-0.09	0.012	9

APPENDIX D

ISOTOPE ROW FACILITIES

RADIOLOGICAL AND CHEMICAL ANALYTICAL RESULTS

TCLP metals data for Bldg. 3030

Sample ID	Chemical name	Result	Units	Validation qualifier
5108M0007	Arsenic	0.25	mg/L	U
5108M0007	Barium	5	mg/L	U
5108M0007	Cadmium	0.05	mg/L	U
5108M0007	Chromium	0.25	mg/L	U
5108M0007	Lead	306.03	mg/L	=
5108M0007	Selenium	0.05	mg/L	U
5108M0007	Silver	0.25	mg/L	U
5108M0007A	Mercury	0.002	mg/L	U
5108M0008	Arsenic	0.25	mg/L	U
5108M0008	Barium	5	mg/L	U
5108M0008	Cadmium	0.05	mg/L	U
5108M0008	Chromium	0.25	mg/L	U
5108M0008	Lead	0.99	mg/L	=
5108M0008	Selenium	0.05	mg/L	U
5108M0008	Silver	0.25	mg/L	U
5108M0008A	Mercury	0.0002	mg/L	U
5108M0009	Arsenic	0.25	mg/L	U
5108M0009	Barium	5	mg/L	U
5108M0009	Cadmium	0.05	mg/L	U
5108M0009	Chromium	0.25	mg/L	U
5108M0009	Lead	7.53	mg/L	=
5108M0009	Selenium	0.05	mg/L	U
5108M0009	Silver	0.25	mg/L	U
5108M0009A	Mercury	0.002	mg/L	U
5108M0011	Arsenic	0.25	mg/L	U
5108M0011	Barium	5	mg/L	U
5108M0011	Cadmium	0.05	mg/L	U
5108M0011	Chromium	0.25	mg/L	U
5108M0011	Lead	0.32	mg/L	=
5108M0011	Selenium	0.05	mg/L	U
5108M0011	Silver	0.25	mg/L	U
5108M0011A	Mercury	0.002	mg/L	U
5108M0013	Arsenic	0.25	mg/L	U
5108M0013	Barium	5	mg/L	U
5108M0013	Cadmium	0.05	mg/L	U
5108M0013	Chromium	0.25	mg/L	U
5108M0013	Lead	0.34	mg/L	=
5108M0013	Selenium	0.05	mg/L	U
5108M0013	Silver	0.25	mg/L	U

TCLP and total metals data for Bldg. 3030 (cont.)

Sample ID	Chemical name	Result	Units	Validation qualifier
5108M0013A	Mercury	0.0002	mg/L	U
5108M0015	Arsenic	0.25	mg/L	U
5108M0015	Barium	5	mg/L	U
5108M0015	Cadmium	0.05	mg/L	U
5108M0015	Chromium	0.25	mg/L	U
5108M0015	Lead	0.25	mg/L	U
5108M0015	Selenium	0.05	mg/L	U
5108M0015	Silver	0.25	mg/L	U
5108M0015A	Mercury	0.002	mg/L	U
5108M0016	Arsenic	0.25	mg/L	U
5108M0016	Barium	5	mg/L	U
5108M0016	Cadmium	0.05	mg/L	U
5108M0016	Chromium	0.25	mg/L	U
5108M0016	Lead	0.31	mg/L	=
5108M0016	Selenium	0.05	mg/L	U
5108M0016	Silver	0.25	mg/L	U
5108M0016A	Mercury	0.002	mg/L	U
5108M0017	Arsenic	0.25	mg/L	U
5108M0017	Barium	5	mg/L	U
5108M0017	Cadmium	0.05	mg/L	U
5108M0017	Chromium	0.25	mg/L	U
5108M0017	Lead	0.25	mg/L	U
5108M0017	Selenium	0.05	mg/L	U
5108M0017	Silver	0.25	mg/L	U
5108M0017A	Mercury	0.002	mg/L	U
5108M0020	Arsenic	0.25	mg/L	U
5108M0020	Barium	5	mg/L	U
5108M0020	Cadmium	0.05	mg/L	U
5108M0020	Chromium	0.25	mg/L	U
5108M0020	Lead	37.95	mg/L	=
5108M0020	Selenium	0.05	mg/L	U
5108M0020	Silver	0.25	mg/L	U
5108M0020A	Mercury	0.002	mg/L	U
5108M0021	Arsenic	0.3	mg/L	U
5108M0021	Barium	0.05	mg/L	U
5108M0021	Cadmium	0.05	mg/L	U
5108M0021	Chromium	0.168	mg/L	=
5108M0021	Lead	0.1	mg/L	U
5108M0021	Mercury	0.002	mg/L	UJ

TCLP and total metals data for Bldg. 3030 (cont.)

Sample ID	Chemical name	Result	Units	Validation qualifier
5108M0021	Selenium	0.3	mg/L	U
5108M0021	Silver	0.05	mg/L	U
5108M0023	Arsenic	0.3	mg/L	U
5108M0023	Barium	0.135	mg/L	=
5108M0023	Cadmium	0.05	mg/L	U
5108M0023	Chromium	0.353	mg/L	=
5108M0023	Lead	0.814	mg/L	=
5108M0023	Mercury	0.002	mg/L	UJ
5108M0023	Selenium	0.3	mg/L	U
5108M0023	Silver	0.05	mg/L	U
5108M0025	Arsenic	0.3	mg/L	U
5108M0025	Barium	0.05	mg/L	U
5108M0025	Cadmium	0.05	mg/L	U
5108M0025	Chromium	0.0857	mg/L	=
5108M0025	Lead	0.1	mg/L	U
5108M0025	Mercury	0.002	mg/L	UJ
5108M0025	Selenium	0.3	mg/L	U
5108M0025	Silver	0.05	mg/L	U

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit
UJ = Analyte, compound or nuclide not detected above the reported detection limit, and the reported detection limit is approximated due to quality deficiency
= = Validated result, which is detected and unqualified

Radiological data for Bldg. 3030

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5108M0001	Actinium-228	0.3	0.35	pCi/g	U
5108M0001	Americium-241	0.058	0.023	pCi/g	=
5108M0001	Barium-133	0.087	0.091	pCi/g	U
5108M0001	Carbon-14	42.5	7.5	pCi/sample	=
5108M0001	Cesium-137	0.466	0.094	pCi/g	=
5108M0001	Cobalt-60	0.024	0.097	pCi/g	U
5108M0001	Curium-243/244	-0.013	0.013	pCi/g	U
5108M0001	Europium-152	-0.09	0.23	pCi/g	U
5108M0001	Europium-154	-0.02	0.43	pCi/g	U
5108M0001	Europium-155	-0.1	0.24	pCi/g	U
5108M0001	Iodine-129	0.23	0.63	pCi/g	U
5108M0001	Krypton-85	-21	12	pCi/g	UJ
5108M0001	Lead-212	0.02	0.16	pCi/g	U
5108M0001	Lead-214	0.05	0.17	pCi/g	U
5108M0001	Neptunium-239	-0.13	0.21	pCi/g	U
5108M0001	Nickel-63	15.3	2.5	pCi/g	=
5108M0001	Plutonium-238	0.02	0.015	pCi/g	U
5108M0001	Plutonium-239/240	0.012	0.01	pCi/g	U
5108M0001	Plutonium-241	2.9	4.1	pCi/g	U
5108M0001	Plutonium-242	-0.0033	0.0032	pCi/g	U
5108M0001	Plutonium-244	-0.0033	0.0046	pCi/g	U
5108M0001	Potassium-40	-0.96	0.53	pCi/g	UJ
5108M0001	Protactinium-233	0.02	0.18	pCi/g	U
5108M0001	Radioactive Strontium (Total)	65.8	1.4	pCi/g	=
5108M0001	Technetium-99	2.35	0.86	pCi/g	=
5108M0001	Thorium-229	0.13	0.49	pCi/g	U
5108M0001	Thorium-230	-0.1	9.5	pCi/g	U
5108M0001	Tritium	48	12	pCi/sample	=
5108M0001	Uranium-233/234	0.033	0.015	pCi/g	=
5108M0001	Uranium-235/236	0.0022	0.0073	pCi/g	U
5108M0001	Uranium-238	0.0087	0.0083	pCi/g	U
5108M0002	Actinium-228	-0.004	0.038	pCi/g	U
5108M0002	Americium-241	0.017	0.016	pCi/g	U
5108M0002	Barium-133	0.0003	0.0091	pCi/g	U
5108M0002	Carbon-14	3.9	3.6	pCi/sample	U
5108M0002	Cesium-137	0.397	0.018	pCi/g	=
5108M0002	Cobalt-60	-0.0057	0.008	pCi/g	U
5108M0002	Curium-243/244	-0.004	0.01	pCi/g	U
5108M0002	Europium-152	0.003	0.022	pCi/g	U

Radiological data for Bldg. 3030 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5108M0002	Europium-154	0.022	0.03	pCi/g	U
5108M0002	Europium-155	-0.001	0.016	pCi/g	U
5108M0002	Iodine-129	0.136	0.066	pCi/g	U
5108M0002	Krypton-85	0.22	0.24	pCi/g	U
5108M0002	Lead-212	0.009	0.013	pCi/g	U
5108M0002	Lead-214	-0.008	0.016	pCi/g	U
5108M0002	Neptunium-239	-0.005	0.015	pCi/g	U
5108M0002	Nickel-63	-0.4	1.5	pCi/g	U
5108M0002	Plutonium-238	-0.002	0.008	pCi/g	U
5108M0002	Plutonium-239/240	0.0124	0.0092	pCi/g	=
5108M0002	Plutonium-241	3.4	4	pCi/g	U
5108M0002	Plutonium-242	0	0.0034	pCi/g	U
5108M0002	Plutonium-244	0	0.0035	pCi/g	U
5108M0002	Potassium-40	0.07	0.15	pCi/g	U
5108M0002	Protactinium-233	-0.006	0.015	pCi/g	U
5108M0002	Radioactive Strontium (Total)	0.6	0.24	pCi/g	=
5108M0002	Technetium-99	1.1	0.8	pCi/g	U
5108M0002	Thorium-229	0.014	0.047	pCi/g	U
5108M0002	Thorium-230	1.4	1.3	pCi/g	U
5108M0002	Tritium	7.4	7	pCi/sample	U
5108M0002	Uranium-233/234	0.0055	0.0072	pCi/g	U
5108M0002	Uranium-235/236	0	0.008	pCi/g	U
5108M0002	Uranium-238	0.0074	0.0081	pCi/g	U
5108M0003	Actinium-228	0.014	0.034	pCi/g	U
5108M0003	Americium-241	0.009	0.018	pCi/g	U
5108M0003	Barium-133	-0.013	0.01	pCi/g	U
5108M0003	Carbon-14	2.8	3.4	pCi/sample	U
5108M0003	Cesium-137	0.333	0.025	pCi/g	=
5108M0003	Cobalt-60	-0.0044	0.0086	pCi/g	U
5108M0003	Curium-243/244	-0.025	0.01	pCi/g	UJ
5108M0003	Europium-152	-0.012	0.021	pCi/g	U
5108M0003	Europium-154	-0.005	0.027	pCi/g	U
5108M0003	Europium-155	-0.005	0.02	pCi/g	U
5108M0003	Iodine-129	0.088	0.05	pCi/g	U
5108M0003	Krypton-85	-1.35	0.95	pCi/g	UJ
5108M0003	Lead-212	0.008	0.015	pCi/g	U
5108M0003	Lead-214	0.005	0.012	pCi/g	U
5108M0003	Neptunium-239	-0.003	0.018	pCi/g	U
5108M0003	Nickel-63	1.1	1.7	pCi/g	U

Radiological data for Bldg. 3030 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5108M0003	Plutonium-238	0	0.013	pCi/g	U
5108M0003	Plutonium-239/240	0.004	0.011	pCi/g	U
5108M0003	Plutonium-241	1.1	4.2	pCi/g	U
5108M0003	Plutonium-242	0	0.0056	pCi/g	U
5108M0003	Plutonium-244	-0.0041	0.004	pCi/g	U
5108M0003	Potassium-40	-0.01	0.16	pCi/g	U
5108M0003	Protactinium-233	0.008	0.016	pCi/g	U
5108M0003	Radioactive Strontium (Total)	0.26	0.23	pCi/g	U
5108M0003	Technetium-99	1	0.8	pCi/g	U
5108M0003	Thorium-229	0.019	0.024	pCi/g	U
5108M0003	Thorium-230	-1	1.1	pCi/g	U
5108M0003	Tritium	4.3	6.4	pCi/sample	U
5108M0003	Uranium-233/234	0	0.008	pCi/g	U
5108M0003	Uranium-235/236	0	0.008	pCi/g	U
5108M0003	Uranium-238	-0.0019	0.0065	pCi/g	U
5108M0006	Actinium-228	8	13	pCi/g	U
5108M0006	Barium-133	-1	3.6	pCi/g	U
5108M0006	Cesium-137	121	18	pCi/g	=
5108M0006	Cobalt-60	1.9	1.8	pCi/g	U
5108M0006	Europium-152	2.2	8.5	pCi/g	U
5108M0006	Europium-154	-10	22	pCi/g	U
5108M0006	Europium-155	3	6.3	pCi/g	U
5108M0006	Iodine-129	0	38	pCi/g	U
5108M0006	Krypton-85	-100	710	pCi/g	U
5108M0006	Lead-212	-3.3	5.1	pCi/g	U
5108M0006	Lead-214	5.5	5.1	pCi/g	U
5108M0006	Neptunium-239	-2	5.9	pCi/g	U
5108M0006	Potassium-40	5	11	pCi/g	U
5108M0006	Protactinium-233	4.1	5.7	pCi/g	U
5108M0006	Thorium-229	3	20	pCi/g	U
5108M0006	Thorium-230	0	540	pCi/g	U
5108M0007	Actinium-228	-1.5	1.7	pCi/g	U
5108M0007	Americium-241	70.5	2.6	pCi/g	=
5108M0007	Barium-133	5.2	1.1	pCi/g	=
5108M0007	Carbon-14	20	20	pCi/g	U
5108M0007	Cesium-137	147	11	pCi/g	=
5108M0007	Cobalt-60	-0.2	0.35	pCi/g	U
5108M0007	Curium-243/244	0.82	0.38	pCi/g	U
5108M0007	Europium-152	20.7	2.9	pCi/g	=

Radiological data for Bldg. 3030 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5108M0007	Europium-154	5.4	2	pCi/g	=
5108M0007	Europium-155	3.2	2.2	pCi/g	U
5108M0007	Iodine-129	135	11	pCi/g	=
5108M0007	Krypton-85	0	160	pCi/g	U
5108M0007	Lead-212	0.7	1	pCi/g	U
5108M0007	Lead-214	0.5	1.2	pCi/g	U
5108M0007	Neptunium-239	2.3	1.9	pCi/g	U
5108M0007	Nickel-63	3620	20	pCi/g	=
5108M0007	Plutonium-238	0.32	0.31	pCi/g	U
5108M0007	Plutonium-239/240	0.09	0.15	pCi/g	U
5108M0007	Plutonium-241	69	68	pCi/g	U
5108M0007	Plutonium-242	-0.12	0.06	pCi/g	U
5108M0007	Plutonium-244	-0.059	0.082	pCi/g	U
5108M0007	Potassium-40	20	5.5	pCi/g	=
5108M0007	Protactinium-233	-0.9	1.5	pCi/g	U
5108M0007	Radioactive Strontium (Total)	620	8	pCi/g	=
5108M0007	Technetium-99	56.3	3.5	pCi/g	=
5108M0007	Thorium-229	1.1	4.1	pCi/g	U
5108M0007	Thorium-230	70	110	pCi/g	U
5108M0007	Tritium	25	24	pCi/g	U
5108M0007	Uranium-233/234	0.28	0.19	pCi/g	U
5108M0007	Uranium-235/236	0	0.062	pCi/g	U
5108M0007	Uranium-238	0.13	0.13	pCi/g	U
5108M0008	Actinium-228	0.36	0.72	pCi/g	U
5108M0008	Americium-241	192	8	pCi/g	=
5108M0008	Barium-133	3.17	0.41	pCi/g	=
5108M0008	Carbon-14	46	19	pCi/g	=
5108M0008	Cesium-137	149.3	9.4	pCi/g	=
5108M0008	Cobalt-60	0.43	0.18	pCi/g	=
5108M0008	Curium-243/244	0.2	0.7	pCi/g	U
5108M0008	Europium-152	9.77	0.97	pCi/g	=
5108M0008	Europium-154	7.9	1.3	pCi/g	=
5108M0008	Europium-155	1.7	1.1	pCi/g	U
5108M0008	Iodine-129	67	7.7	pCi/g	=
5108M0008	Krypton-85	-14	33	pCi/g	U
5108M0008	Lead-212	-0.04	0.46	pCi/g	U
5108M0008	Lead-214	0	0.53	pCi/g	U
5108M0008	Neptunium-239	1.51	0.96	pCi/g	U
5108M0008	Nickel-63	2720	20	pCi/g	=

Radiological data for Bldg. 3030 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5108M0008	Plutonium-238	1.77	0.79	pCi/g	=
5108M0008	Plutonium-239/240	0.37	0.35	pCi/g	U
5108M0008	Plutonium-241	-40	170	pCi/g	U
5108M0008	Plutonium-242	0	0.14	pCi/g	UJ
5108M0008	Plutonium-244	0	0.14	pCi/g	U
5108M0008	Potassium-40	58.8	3.7	pCi/g	=
5108M0008	Protactinium-233	0.4	0.47	pCi/g	U
5108M0008	Radioactive Strontium (Total)	1024	8	pCi/g	=
5108M0008	Technetium-99	181	4.4	pCi/g	=
5108M0008	Thorium-229	0.3	1.9	pCi/g	U
5108M0008	Thorium-230	30	88	pCi/g	U
5108M0008	Tritium	15	21	pCi/g	U
5108M0008	Uranium-233/234	0.08	0.43	pCi/g	U
5108M0008	Uranium-235/236	0	0.28	pCi/g	U
5108M0008	Uranium-238	0.25	0.33	pCi/g	U
5108M0009	Actinium-228	0.08	0.46	pCi/g	U
5108M0009	Americium-241	23.6	0.8	pCi/g	=
5108M0009	Barium-133	-0.03	0.68	pCi/g	U
5108M0009	Carbon-14	855	35	pCi/g	J
5108M0009	Cesium-137	205	20	pCi/g	=
5108M0009	Cobalt-60	0.1	0.19	pCi/g	U
5108M0009	Curium-243/244	-0.11	0.06	pCi/g	UJ
5108M0009	Europium-152	1.6	1.3	pCi/g	U
5108M0009	Europium-154	6.8	1.4	pCi/g	=
5108M0009	Europium-155	0.4	1.1	pCi/g	U
5108M0009	Iodine-129	-5.9	5.6	pCi/g	UJ
5108M0009	Krypton-85	-1	74	pCi/g	U
5108M0009	Lead-212	0.14	0.78	pCi/g	U
5108M0009	Lead-214	0.3	1.1	pCi/g	U
5108M0009	Neptunium-239	-0.59	0.99	pCi/g	U
5108M0009	Nickel-63	48000	100	pCi/g	=
5108M0009	Plutonium-238	0.6	0.16	pCi/g	=
5108M0009	Plutonium-239/240	0.61	0.14	pCi/g	=
5108M0009	Plutonium-241	27	19	pCi/g	U
5108M0009	Plutonium-242	0.59	0.14	pCi/g	=
5108M0009	Plutonium-244	0.05	0.04	pCi/g	=
5108M0009	Potassium-40	16.7	3.5	pCi/g	=
5108M0009	Protactinium-233	0.93	0.88	pCi/g	U
5108M0009	Radioactive Strontium (Total)	15.9	1.4	pCi/g	=

Radiological data for Bldg. 3030 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5108M0009	Technetium-99	45.9	3.2	pCi/g	=
5108M0009	Thorium-229	1.2	3	pCi/g	U
5108M0009	Thorium-230	-4	68	pCi/g	U
5108M0009	Tritium	132	24	pCi/g	=
5108M0009	Uranium-233/234	1.56	0.22	pCi/g	=
5108M0009	Uranium-235/236	10.2	0.6	pCi/g	=
5108M0009	Uranium-238	2.44	0.27	pCi/g	=
5108M0010	Actinium-228	0.016	0.016	pCi/g	U
5108M0010	Americium-241	0.01	0.019	pCi/g	U
5108M0010	Barium-133	-0.0033	0.0046	pCi/g	U
5108M0010	Carbon-14	-1.7	4.6	pCi/sample	U
5108M0010	Cesium-137	0.0221	0.005	pCi/g	=
5108M0010	Cobalt-60	0.0006	0.002	pCi/g	U
5108M0010	Curium-243/244	0.015	0.019	pCi/g	U
5108M0010	Europium-152	-0.004	0.011	pCi/g	U
5108M0010	Europium-154	0.021	0.02	pCi/g	U
5108M0010	Europium-155	0	0.0081	pCi/g	U
5108M0010	Iodine-129	0.01	0.035	pCi/g	U
5108M0010	Krypton-85	0.27	0.38	pCi/g	U
5108M0010	Lead-212	-0.0009	0.0065	pCi/g	U
5108M0010	Lead-214	-0.0046	0.0098	pCi/g	U
5108M0010	Neptunium-239	-0.0009	0.0074	pCi/g	U
5108M0010	Nickel-63	-1.6	1.2	pCi/g	UJ
5108M0010	Plutonium-238	-0.002	0.017	pCi/g	U
5108M0010	Plutonium-239/240	0.006	0.011	pCi/g	U
5108M0010	Plutonium-241	2.8	4.3	pCi/g	U
5108M0010	Plutonium-242	-0.0019	0.0037	pCi/g	U
5108M0010	Plutonium-244	-0.0019	0.0037	pCi/g	U
5108M0010	Potassium-40	-0.088	0.082	pCi/g	UJ
5108M0010	Protactinium-233	0.0001	0.0075	pCi/g	U
5108M0010	Radioactive Strontium (Total)	0.43	0.58	pCi/g	UJ
5108M0010	Technetium-99	1.6	1.2	pCi/g	U
5108M0010	Thorium-229	-0.007	0.023	pCi/g	U
5108M0010	Thorium-230	0.01	0.69	pCi/g	U
5108M0010	Tritium	8	9.3	pCi/sample	U
5108M0010	Uranium-233/234	0.01	0.012	pCi/g	U
5108M0010	Uranium-235/236	0.0026		pCi/g	U
5108M0010	Uranium-238	0.008	0.009	pCi/g	U
5108M0011	Actinium-228	0.5	1.7	pCi/g	U

Radiological data for Bldg. 3030 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5108M0011	Americium-241	0.262	0.047	pCi/g	=
5108M0011	Barium-133	-0.3	1	pCi/g	U
5108M0011	Carbon-14	60	21	pCi/g	=
5108M0011	Cesium-137	182	12	pCi/g	=
5108M0011	Cobalt-60	-0.38	0.63	pCi/g	U
5108M0011	Curium-243/244	0.035	0.023	pCi/g	U
5108M0011	Europium-152	0.8	2.7	pCi/g	U
5108M0011	Europium-154	0	2.3	pCi/g	U
5108M0011	Europium-155	0.6	2.2	pCi/g	U
5108M0011	Iodine-129	2	17	pCi/g	U
5108M0011	Krypton-85	-40	150	pCi/g	U
5108M0011	Lead-212	0.4	1.4	pCi/g	U
5108M0011	Lead-214	0.28	0.63	pCi/g	U
5108M0011	Neptunium-239	-0.4	2	pCi/g	U
5108M0011	Nickel-63	87.3	3.4	pCi/g	=
5108M0011	Plutonium-238	0.004	0.02	pCi/g	U
5108M0011	Plutonium-239/240	0.021	0.017	pCi/g	U
5108M0011	Plutonium-241	3.2	4.3	pCi/g	U
5108M0011	Plutonium-242	-0.0042	0.0041	pCi/g	U
5108M0011	Plutonium-244	-0.008	0.006	pCi/g	U
5108M0011	Potassium-40	59	11	pCi/g	=
5108M0011	Protactinium-233	0.2	1.7	pCi/g	U
5108M0011	Radioactive Strontium (Total)	1570	13	pCi/g	=
5108M0011	Technetium-99	24.9	2.5	pCi/g	=
5108M0011	Thorium-229	2.4	5.6	pCi/g	U
5108M0011	Thorium-230	210	200	pCi/g	U
5108M0011	Tritium	33	24	pCi/g	U
5108M0011	Uranium-233/234	0.108	0.03	pCi/g	=
5108M0011	Uranium-235/236	0.012	0.013	pCi/g	U
5108M0011	Uranium-238	0.12	0.031	pCi/g	=
5108M0013	Actinium-228	0.09	0.43	pCi/g	U
5108M0013	Americium-241	19.9	0.8	pCi/g	=
5108M0013	Barium-133	14.37	0.85	pCi/g	=
5108M0013	Carbon-14	32	19	pCi/g	=
5108M0013	Cesium-137	35.3	2.6	pCi/g	=
5108M0013	Cobalt-60	0.43	0.13	pCi/g	=
5108M0013	Curium-243/244	0.5	0.13	pCi/g	=
5108M0013	Europium-152	13.87	0.95	pCi/g	=
5108M0013	Europium-154	2.94	0.44	pCi/g	=

Radiological data for Bldg. 3030 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5108M0013	Europium-155	0.72	0.53	pCi/g	U
5108M0013	Iodine-129	90	5.2	pCi/g	=
5108M0013	Krypton-85	11	14	pCi/g	U
5108M0013	Lead-212	0.16	0.18	pCi/g	U
5108M0013	Lead-214	-0.59	0.29	pCi/g	UJ
5108M0013	Neptunium-239	0.65	0.48	pCi/g	U
5108M0013	Nickel-63	2020	20	pCi/g	=
5108M0013	Plutonium-238	-0.02	0.07	pCi/g	U
5108M0013	Plutonium-239/240	0.016	0.048	pCi/g	U
5108M0013	Plutonium-241	-5	17	pCi/g	U
5108M0013	Plutonium-242	-0.049	0.016	pCi/g	UJ
5108M0013	Plutonium-244	-0.008	0.016	pCi/g	U
5108M0013	Potassium-40	32.9	2.7	pCi/g	=
5108M0013	Protactinium-233	-0.3	0.31	pCi/g	U
5108M0013	Radioactive Strontium (Total)	4690	20	pCi/g	=
5108M0013	Technetium-99	208.6	4.7	pCi/g	=
5108M0013	Thorium-229	-0.97	0.98	pCi/g	U
5108M0013	Thorium-230	15	38	pCi/g	U
5108M0013	Tritium	27	22	pCi/g	U
5108M0013	Uranium-233/234	0.43	0.11	pCi/g	=
5108M0013	Uranium-235/236	0.032	0.031	pCi/g	U
5108M0013	Uranium-238	0.304	0.091	pCi/g	=
5108M0015	Actinium-228	0.04	0.049	pCi/g	U
5108M0015	Americium-241	10	0.36	pCi/g	=
5108M0015	Barium-133	0.244	0.041	pCi/g	=
5108M0015	Carbon-14	36	21	pCi/g	=
5108M0015	Cesium-137	22.1	1.6	pCi/g	=
5108M0015	Cobalt-60	-0.019	0.019	pCi/g	UJ
5108M0015	Curium-243/244	0.163	0.054	pCi/g	=
5108M0015	Europium-152	0.8	0.1	pCi/g	=
5108M0015	Europium-154	0.5	0.1	pCi/g	=
5108M0015	Europium-155	0.031	0.082	pCi/g	U
5108M0015	Iodine-129	11.8	0.74	pCi/g	=
5108M0015	Krypton-85	-6	3.6	pCi/g	UJ
5108M0015	Lead-212	0	0.04	pCi/g	U
5108M0015	Lead-214	-0.201	0.067	pCi/g	UJ
5108M0015	Neptunium-239	0.042	0.074	pCi/g	U
5108M0015	Nickel-63	1107	11	pCi/g	=
5108M0015	Plutonium-238	0.039	0.037	pCi/g	U

Radiological data for Bldg. 3030 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5108M0015	Plutonium-241	3.6	7.1	pCi/g	U
5108M0015	Plutonium-242	0	0.01	pCi/g	U
5108M0015	Plutonium-244	0	0.007	pCi/g	U
5108M0015	Potassium-40	0.01	0.22	pCi/g	U
5108M0015	Protactinium-233	-0.02	0.062	pCi/g	U
5108M0015	Radioactive Strontium (Total)	44.5	2.2	pCi/g	=
5108M0015	Technetium-99	9.8	1.7	pCi/g	=
5108M0015	Thorium-229	-0.04	0.18	pCi/g	U
5108M0015	Thorium-230	2.6	4.1	pCi/g	U
5108M0015	Tritium	13	23	pCi/g	U
5108M0015	Uranium-233/234	0.206	0.053	pCi/g	=
5108M0015	Uranium-235/236	0.116	0.045	pCi/g	=
5108M0015	Uranium-238	0.223	0.055	pCi/g	=
5108M0016	Actinium-228	-5	10	pCi/g	U
5108M0016	Americium-241	4.28	0.17	pCi/g	=
5108M0016	Barium-133	4	18	pCi/g	U
5108M0016	Carbon-14	37	20	pCi/g	=
5108M0016	Cesium-137	14900	940	pCi/g	J
5108M0016	Cobalt-60	0.1	2.1	pCi/g	U
5108M0016	Curium-243/244	0	0.019	pCi/g	U
5108M0016	Europium-152	9	38	pCi/g	U
5108M0016	Europium-154	5	10	pCi/g	U
5108M0016	Europium-155	6	22	pCi/g	U
5108M0016	Iodine-129	-16	99	pCi/g	U
5108M0016	Krypton-85	500	2600	pCi/g	U
5108M0016	Lead-212	4	19	pCi/g	U
5108M0016	Lead-214	-14	28	pCi/g	U
5108M0016	Neptunium-239	4	20	pCi/g	U
5108M0016	Nickel-63	989	11	pCi/g	=
5108M0016	Plutonium-238	0.076	0.03	pCi/g	=
5108M0016	Plutonium-239/240	3.67	0.17	pCi/g	=
5108M0016	Plutonium-241	0.8	3.9	pCi/g	U
5108M0016	Plutonium-242	0.025	0.014	pCi/g	=
5108M0016	Plutonium-244	0.002	0.008	pCi/g	U
5108M0016	Potassium-40	99	33	pCi/g	J
5108M0016	Protactinium-233	-2	24	pCi/g	U
5108M0016	Radioactive Strontium (Total)	9440	30	pCi/g	=
5108M0016	Technetium-99	10.1	1.8	pCi/g	=
5108M0016	Thorium-229	-55	78	pCi/g	U

Radiological data for Bldg. 3030 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5108M0016	Thorium-230	100	1600	pCi/g	U
5108M0016	Tritium	21	23	pCi/g	U
5108M0016	Uranium-233/234	0.637	0.072	pCi/g	=
5108M0016	Uranium-235/236	0.084	0.03	pCi/g	=
5108M0016	Uranium-238	0.444	0.06	pCi/g	=
5108M0017	Actinium-228	1.7	1.9	pCi/g	U
5108M0017	Americium-241	34.5	1.9	pCi/g	=
5108M0017	Barium-133	21.8	2	pCi/g	=
5108M0017	Carbon-14	21470	180	pCi/g	=
5108M0017	Cesium-137	54.2	4.6	pCi/g	=
5108M0017	Cobalt-60	0.72	0.54	pCi/g	U
5108M0017	Curium-243/244	0.03	0.27	pCi/g	U
5108M0017	Europium-152	3.1	1.9	pCi/g	U
5108M0017	Europium-154	3.1	3.2	pCi/g	U
5108M0017	Europium-155	3	4	pCi/g	U
5108M0017	Iodine-129	-7	23	pCi/g	U
5108M0017	Krypton-85	60	160	pCi/g	U
5108M0017	Lead-212	1.11	0.93	pCi/g	U
5108M0017	Lead-214	0.2	1.4	pCi/g	U
5108M0017	Neptunium-239	2.5	3.6	pCi/g	U
5108M0017	Nickel-63	31700	100	pCi/g	=
5108M0017	Plutonium-238	0.94	0.47	pCi/g	U
5108M0017	Plutonium-239/240	2.49	0.58	pCi/g	=
5108M0017	Plutonium-241	128	77	pCi/g	=
5108M0017	Plutonium-242	0.97	0.35	pCi/g	=
5108M0017	Plutonium-244	-0.034	0.066	pCi/g	U
5108M0017	Potassium-40	63	11	pCi/g	=
5108M0017	Protactinium-233	0.3	1.4	pCi/g	U
5108M0017	Radioactive Strontium (Total)	3930	20	pCi/g	=
5108M0017	Technetium-99	638	11	pCi/g	=
5108M0017	Thorium-229	-1.8	5.4	pCi/g	U
5108M0017	Thorium-230	210	250	pCi/g	U
5108M0017	Tritium	348	39	pCi/g	=
5108M0017	Uranium-233/234	-0.1	0.25	pCi/g	U
5108M0017	Uranium-235/236	-0.04	0.12	pCi/g	U
5108M0017	Uranium-238	0.65	0.31	pCi/g	=
5108M0018	Actinium-228	0.31	0.33	pCi/g	U
5108M0018	Americium-241	70.5	3.6	pCi/g	=
5108M0018	Barium-133	7.14	0.43	pCi/g	=

Radiological data for Bldg. 3030 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5108M0018	Carbon-14	311	19	pCi/sample	=
5108M0018	Cesium-137	82.8	6	pCi/g	=
5108M0018	Cobalt-60	0.137	0.091	pCi/g	U
5108M0018	Curium-243/244	0.67	0.55	pCi/g	U
5108M0018	Europium-152	7.34	0.6	pCi/g	=
5108M0018	Europium-154	3.29	0.51	pCi/g	=
5108M0018	Europium-155	0.92	0.4	pCi/g	U
5108M0018	Iodine-129	19.2	1.1	pCi/g	=
5108M0018	Krypton-85	0	15	pCi/g	U
5108M0018	Lead-212	0.06	0.15	pCi/g	U
5108M0018	Lead-214	-22.1	1.4	pCi/g	UJ
5108M0018	Neptunium-239	0.82	0.37	pCi/g	U
5108M0018	Nickel-63	13540	40	pCi/g	=
5108M0018	Plutonium-238	0.05	0.54	pCi/g	U
5108M0018	Plutonium-239/240	0.27	0.4	pCi/g	U
5108M0018	Plutonium-241	-32	99	pCi/g	U
5108M0018	Plutonium-242	0.16	0.21	pCi/g	U
5108M0018	Plutonium-244	-0.33	0.11	pCi/g	UJ
5108M0018	Potassium-40	65.2	4.4	pCi/g	=
5108M0018	Protactinium-233	-0.07	0.27	pCi/g	U
5108M0018	Radioactive Strontium (Total)	591	6	pCi/g	=
5108M0018	Technetium-99	226.3	6.8	pCi/g	=
5108M0018	Thorium-229	0.42	0.74	pCi/g	U
5108M0018	Thorium-230	103	12	pCi/g	=
5108M0018	Tritium	1247	56	pCi/sample	=
5108M0018	Uranium-233/234	1.05	0.5	pCi/g	=
5108M0018	Uranium-235/236	0	0.14	pCi/g	U
5108M0018	Uranium-238	0.69	0.39	pCi/g	=
5108M0019	Actinium-228	0.02	0.29	pCi/g	U
5108M0019	Americium-241	125	4	pCi/g	=
5108M0019	Barium-133	8.32	0.54	pCi/g	=
5108M0019	Carbon-14	236	17	pCi/sample	=
5108M0019	Cesium-137	101	9.8	pCi/g	=
5108M0019	Cobalt-60	0.362	0.089	pCi/g	=
5108M0019	Curium-243/244	1.28	0.57	pCi/g	=
5108M0019	Europium-152	12.04	0.83	pCi/g	=
5108M0019	Europium-154	5.2	0.57	pCi/g	=
5108M0019	Europium-155	0.96	0.17	pCi/g	=
5108M0019	Iodine-129	76.6	7.8	pCi/g	=

Radiological data for Bldg. 3030 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5108M0019	Krypton-85	-24	14	pCi/g	UJ
5108M0019	Lead-212	0.134	0.07	pCi/g	U
5108M0019	Lead-214	0.02	0.16	pCi/g	U
5108M0019	Neptunium-239	0.85	0.17	pCi/g	=
5108M0019	Nickel-63	24900	100	pCi/g	=
5108M0019	Plutonium-238	1.23	0.59	pCi/g	U
5108M0019	Plutonium-239/240	2.64	0.7	pCi/g	=
5108M0019	Plutonium-241	-27	96	pCi/g	U
5108M0019	Plutonium-242	0.75	0.38	pCi/g	=
5108M0019	Plutonium-244	0	0.09	pCi/g	U
5108M0019	Potassium-40	75.1	5.3	pCi/g	=
5108M0019	Protactinium-233	0.02	0.22	pCi/g	U
5108M0019	Radioactive Strontium (Total)	914	7	pCi/g	=
5108M0019	Technetium-99	303	8	pCi/g	=
5108M0019	Thorium-229	0	0.65	pCi/g	U
5108M0019	Thorium-230	121	13	pCi/g	=
5108M0019	Tritium	1488	61	pCi/sample	=
5108M0019	Uranium-233/234	0.38	0.4	pCi/g	U
5108M0019	Uranium-235/236	0.13	0.26	pCi/g	U
5108M0019	Uranium-238	1.03	0.5	pCi/g	=
5108M0020	Actinium-228	-0.15	0.27	pCi/g	U
5108M0020	Americium-241	0.02	0.018	pCi/g	U
5108M0020	Barium-133	0.044	0.066	pCi/g	U
5108M0020	Carbon-14	0.9	4.1	pCi/sample	U
5108M0020	Cesium-137	0.042	0.023	pCi/g	U
5108M0020	Cobalt-60	-0.063	0.058	pCi/g	UJ
5108M0020	Curium-243/244	-0.004	0.014	pCi/g	U
5108M0020	Europium-152	-0.15	0.15	pCi/g	U
5108M0020	Europium-154	-0.2	0.31	pCi/g	U
5108M0020	Europium-155	-0.04	0.12	pCi/g	U
5108M0020	Iodine-129	0.23	0.67	pCi/g	U
5108M0020	Krypton-85	3.1	7.7	pCi/g	U
5108M0020	Lead-212	-0.006	0.06	pCi/g	U
5108M0020	Lead-214	-0.12	0.13	pCi/g	U
5108M0020	Neptunium-239	-0.02	0.1	pCi/g	U
5108M0020	Nickel-63	4	12	pCi/g	U
5108M0020	Plutonium-238	0.004	0.018	pCi/g	U
5108M0020	Plutonium-239/240	0.004	0.01	pCi/g	U
5108M0020	Plutonium-241	-5	15	pCi/g	U

Radiological data for Bldg. 3030 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5108M0020	Plutonium-242	0	0.0043	pCi/g	U
5108M0020	Plutonium-244	0	0.0043	pCi/g	U
5108M0020	Potassium-40	1.1	1.1	pCi/g	U
5108M0020	Protactinium-233	-0.05	0.1	pCi/g	U
5108M0020	Radioactive Strontium (Total)	0.02	0.42	pCi/g	U
5108M0020	Technetium-99	0.2	1.2	pCi/g	U
5108M0020	Thorium-229	-0.06	0.32	pCi/g	U
5108M0020	Thorium-230	11.9	7.9	pCi/g	U
5108M0020	Tritium	0.5	8.4	pCi/sample	U
5108M0020	Uranium-233/234	0.004	0.009	pCi/g	U
5108M0020	Uranium-235/236	0.0049	0.0084	pCi/g	U
5108M0020	Uranium-238	0.012	0.01	pCi/g	U
5108M0021	Americium-241	-0.0525	0.232	pCi/g	U
5108M0021	Americium-243	0.0827	0.0809	pCi/g	U
5108M0021	Barium-133	-0.0211	0.0584	pCi/g	U
5108M0021	Carbon-14	131	112	pCi/g	U
5108M0021	Cesium-137	0	0.0488	pCi/g	UJ
5108M0021	Cobalt-60	0.0485	0.0431	pCi/g	U
5108M0021	Curium-242	0	0.241	pCi/g	U
5108M0021	Curium-243/244	-0.0777	0.235	pCi/g	U
5108M0021	Curium-245/246	0.125	0.352	pCi/g	U
5108M0021	Europium-152	-0.0283	0.123	pCi/g	U
5108M0021	Europium-154	-0.0726	0.119	pCi/g	U
5108M0021	Europium-155	0.0401	0.12	pCi/g	U
5108M0021	Iodine-129	2.08	4.86	pCi/g	U
5108M0021	Krypton-85	20.9	12.5	pCi/g	UJ
5108M0021	Neptunium-237	-0.0648	0.0734	pCi/g	U
5108M0021	Nickel-63	44.3	70.9	pCi/g	U
5108M0021	Plutonium-238	-0.0663	0.2	pCi/g	U
5108M0021	Plutonium-239/240	0.118	0.324	pCi/g	U
5108M0021	Plutonium-241	14	81.7	pCi/g	U
5108M0021	Plutonium-242	-0.0845	0.286	pCi/g	U
5108M0021	Plutonium-244	-0.0221	0.19	pCi/g	U
5108M0021	Potassium-40	0.0446	0.57	pCi/g	U
5108M0021	Protactinium-233	-0.0648	0.0734	pCi/g	U
5108M0021	Radium-226	0.234	1.34	pCi/g	U
5108M0021	Radium-228	0.000789	0.174	pCi/g	U
5108M0021	Strontium-90	-1.22	6.69	pCi/g	U
5108M0021	Technetium-99	-28.6	44.3	pCi/g	U

Radiological data for Bldg. 3030 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5108M0021	Thorium-228	0.0921	0.117	pCi/g	U
5108M0021	Thorium-229	-0.559	0.662	pCi/g	UJ
5108M0021	Thorium-230	-0.263	17.4	pCi/g	U
5108M0021	Thorium-232	2.83	50.3	pCi/g	U
5108M0021	Tritium	1420	1180	pCi/g	U
5108M0021	Uranium-233/234	-0.0221	0.19	pCi/g	U
5108M0021	Uranium-235/236	-0.0221	0.191	pCi/g	U
5108M0021	Uranium-238	0	0.185	pCi/g	U
5108M0022	Americium-241	0.0604	0.226	pCi/g	U
5108M0022	Americium-243	0.0248	0.054	pCi/g	U
5108M0022	Barium-133	-0.0164	0.0435	pCi/g	U
5108M0022	Carbon-14	154	149	pCi/g	U
5108M0022	Cesium-137	0.625	0.104	pCi/g	=
5108M0022	Cobalt-60	-0.0109	0.0285	pCi/g	U
5108M0022	Curium-242	-0.0423	0.187	pCi/g	U
5108M0022	Curium-243/244	0.16	0.319	pCi/g	U
5108M0022	Curium-245/246	0.0691	0.259	pCi/g	U
5108M0022	Europium-152	-0.0564	0.101	pCi/g	U
5108M0022	Europium-154	0.0188	0.0955	pCi/g	U
5108M0022	Europium-155	0.0537	0.0966	pCi/g	U
5108M0022	Iodine-129	1.79	2.93	pCi/g	U
5108M0022	Krypton-85	0	9.47	pCi/g	UJ
5108M0022	Neptunium-237	0.0301	0.0635	pCi/g	U
5108M0022	Nickel-63	29.7	69.2	pCi/g	U
5108M0022	Plutonium-238	0.0693	0.26	pCi/g	U
5108M0022	Plutonium-239/240	0.117	0.321	pCi/g	U
5108M0022	Plutonium-241	14.5	84.4	pCi/g	U
5108M0022	Plutonium-242	0.117	0.321	pCi/g	U
5108M0022	Plutonium-244	0.0693	0.26	pCi/g	U
5108M0022	Potassium-40	0.591	0.357	pCi/g	U
5108M0022	Protactinium-233	0.0301	0.0635	pCi/g	U
5108M0022	Radium-226	-0.217	0.743	pCi/g	U
5108M0022	Radium-228	0.0208	0.134	pCi/g	U
5108M0022	Strontium-90	4.57	6.03	pCi/g	U
5108M0022	Technetium-99	-27.2	43.8	pCi/g	U
5108M0022	Thorium-228	0.0184	0.103	pCi/g	U
5108M0022	Thorium-229	0.0994	0.487	pCi/g	U
5108M0022	Thorium-230	-4.26	12.8	pCi/g	U
5108M0022	Thorium-232	13.1	25.3	pCi/g	U

Radiological data for Bldg. 3030 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5108M0022	Tritium	1200	1490	pCi/g	U
5108M0022	Uranium-233/234	0.172	0.338	pCi/g	U
5108M0022	Uranium-235/236	0.0549	0.354	pCi/g	U
5108M0022	Uranium-238	-0.0469	0.207	pCi/g	U
5108M0023	Americium-241	-0.145	0.337	pCi/g	U
5108M0023	Americium-243	0.013	0.0505	pCi/g	U
5108M0023	Barium-133	-0.0263	0.07	pCi/g	U
5108M0023	Carbon-14	62.1	108	pCi/g	U
5108M0023	Cesium-137	0.533	0.109	pCi/g	=
5108M0023	Cobalt-60	0.0268	0.0341	pCi/g	U
5108M0023	Curium-242	0	0.333	pCi/g	U
5108M0023	Curium-243/244	0.114	0.427	pCi/g	U
5108M0023	Curium-245/246	-0.0416	0.359	pCi/g	U
5108M0023	Europium-152	0.0618	0.0854	pCi/g	U
5108M0023	Europium-154	-0.00906	0.0952	pCi/g	U
5108M0023	Europium-155	-0.0241	0.0796	pCi/g	U
5108M0023	Iodine-129	2.22	4.09	pCi/g	U
5108M0023	Krypton-85	-23.9	11.1	pCi/g	UJ
5108M0023	Neptunium-237	0.0601	0.0692	pCi/g	U
5108M0023	Nickel-63	53.3	53.5	pCi/g	U
5108M0023	Plutonium-238	0	0.399	pCi/g	U
5108M0023	Plutonium-239/240	0.198	0.556	pCi/g	U
5108M0023	Plutonium-241	-18.8	154	pCi/g	U
5108M0023	Plutonium-242	-0.0948	0.419	pCi/g	U
5108M0023	Plutonium-244	0	0.399	pCi/g	U
5108M0023	Potassium-40	-0.153	0.414	pCi/g	U
5108M0023	Protactinium-233	0.0601	0.0692	pCi/g	U
5108M0023	Radium-226	-0.309	0.741	pCi/g	U
5108M0023	Radium-228	0.0342	0.138	pCi/g	U
5108M0023	Strontium-90	5.54	5.75	pCi/g	U
5108M0023	Technetium-99	-48.7	33.4	pCi/g	UJ
5108M0023	Thorium-228	-0.03	0.0619	pCi/g	U
5108M0023	Thorium-229	0.254	0.492	pCi/g	U
5108M0023	Thorium-230	11.4	11.4	pCi/g	U
5108M0023	Thorium-232	-22.4	22.5	pCi/g	U
5108M0023	Tritium	1060	1120	pCi/g	U
5108M0023	Uranium-233/234	0.267	0.525	pCi/g	U
5108M0023	Uranium-235/236	0.0791	0.439	pCi/g	U
5108M0023	Uranium-238	-0.0364	0.314	pCi/g	U

Radiological data for Bldg. 3030 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5108M0024	Americium-241	-0.249	0.224	pCi/g	UJ
5108M0024	Americium-243	0.0276	0.063	pCi/g	U
5108M0024	Barium-133	0.0107	0.0662	pCi/g	U
5108M0024	Carbon-14	33.7	78.1	pCi/g	U
5108M0024	Cesium-137	0.334	0.0912	pCi/g	=
5108M0024	Cobalt-60	-0.00685	0.0449	pCi/g	U
5108M0024	Curium-242	-0.023	0.198	pCi/g	U
5108M0024	Curium-243/244	0.0683	0.306	pCi/g	U
5108M0024	Curium-245/246	0.372	0.438	pCi/g	U
5108M0024	Europium-152	-0.0324	0.121	pCi/g	U
5108M0024	Europium-154	-0.0632	0.109	pCi/g	U
5108M0024	Europium-155	-0.109	0.0991	pCi/g	U
5108M0024	Iodine-129	1.52	3.52	pCi/g	U
5108M0024	Krypton-85	4.52	11.6	pCi/g	U
5108M0024	Neptunium-237	-0.0206	0.0804	pCi/g	U
5108M0024	Nickel-63	86	80	pCi/g	U
5108M0024	Plutonium-238	0.115	0.324	pCi/g	U
5108M0024	Plutonium-239/240	0.115	0.324	pCi/g	U
5108M0024	Plutonium-241	-10.5	86	pCi/g	U
5108M0024	Plutonium-242	0.0046	0.341	pCi/g	U
5108M0024	Plutonium-244	-0.0553	0.245	pCi/g	U
5108M0024	Potassium-40	0.15	0.689	pCi/g	U
5108M0024	Protactinium-233	-0.0206	0.0804	pCi/g	U
5108M0024	Radium-226	0.034	1.37	pCi/g	U
5108M0024	Radium-228	0.0953	0.214	pCi/g	U
5108M0024	Strontium-90	-9.89	10.4	pCi/g	U
5108M0024	Technetium-99	-25.7	45.4	pCi/g	U
5108M0024	Thorium-228	0.00287	0.0784	pCi/g	U
5108M0024	Thorium-229	-0.511	0.712	pCi/g	U
5108M0024	Thorium-230	-3.39	12.6	pCi/g	U
5108M0024	Thorium-232	2.17	28.8	pCi/g	U
5108M0024	Tritium	566	796	pCi/g	U
5108M0024	Uranium-233/234	0.081	0.363	pCi/g	U
5108M0024	Uranium-235/236	-0.0244	0.21	pCi/g	U
5108M0024	Uranium-238	-0.0486	0.215	pCi/g	U
5108M0025	Americium-241	-0.111	0.218	pCi/g	U
5108M0025	Americium-243	0.0158	0.0513	pCi/g	U
5108M0025	Barium-133	0.0147	0.039	pCi/g	U
5108M0025	Carbon-14	40.5	128	pCi/g	U

Radiological data for Bldg. 3030 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5108M0025	Cesium-137	0.204	0.0566	pCi/g	=
5108M0025	Cobalt-60	0.0024	0.0294	pCi/g	U
5108M0025	Curium-242	-0.018	0.155	pCi/g	U
5108M0025	Curium-243/244	0.0535	0.24	pCi/g	U
5108M0025	Curium-245/246	-0.0186	0.16	pCi/g	U
5108M0025	Europium-152	-0.0309	0.0867	pCi/g	U
5108M0025	Europium-154	-0.0865	0.096	pCi/g	U
5108M0025	Europium-155	-0.0108	0.0963	pCi/g	U
5108M0025	Iodine-129	1.63	2.18	pCi/g	U
5108M0025	Krypton-85	-17.6	11.3	pCi/g	UJ
5108M0025	Neptunium-237	-0.00214	0.0605	pCi/g	U
5108M0025	Nickel-63	82.2	67.8	pCi/g	U
5108M0025	Plutonium-238	0.232	0.369	pCi/g	U
5108M0025	Plutonium-239/240	0.254	0.366	pCi/g	U
5108M0025	Plutonium-241	76.3	101	pCi/g	U
5108M0025	Plutonium-242	0.162	0.319	pCi/g	U
5108M0025	Plutonium-244	-0.0442	0.196	pCi/g	U
5108M0025	Potassium-40	0.186	0.332	pCi/g	U
5108M0025	Protactinium-233	-0.00214	0.0605	pCi/g	U
5108M0025	Radium-226	0.101	0.91	pCi/g	U
5108M0025	Radium-228	0.294	0.164	pCi/g	=
5108M0025	Strontium-90	7.31	5.3	pCi/g	UJ
5108M0025	Technetium-99	-64.1	46.4	pCi/g	UJ
5108M0025	Thorium-228	0.0237	0.0758	pCi/g	U
5108M0025	Thorium-229	0.127	0.468	pCi/g	U
5108M0025	Thorium-230	-7.36	12	pCi/g	U
5108M0025	Thorium-232	-22.2	22.4	pCi/g	U
5108M0025	Tritium	1020	1340	pCi/g	U
5108M0025	Uranium-233/234	-0.0513	0.227	pCi/g	U
5108M0025	Uranium-235/236	-0.0772	0.233	pCi/g	U
5108M0025	Uranium-238	0.00428	0.317	pCi/g	U
5108M0026	Americium-241	0.0347	0.193	pCi/g	U
5108M0026	Americium-243	-0.00954	0.0448	pCi/g	U
5108M0026	Barium-133	-0.0192	0.0389	pCi/g	U
5108M0026	Carbon-14	116	99.7	pCi/g	U
5108M0026	Cesium-137	0.157	0.0645	pCi/g	=
5108M0026	Cobalt-60	-0.00392	0.0298	pCi/g	U
5108M0026	Curium-242	0	0.146	pCi/g	U
5108M0026	Curium-243/244	0.0342	0.19	pCi/g	U

Radiological data for Bldg. 3030 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5108M0026	Curium-245/246	0	0.154	pCi/g	U
5108M0026	Europium-152	-0.0298	0.0884	pCi/g	U
5108M0026	Europium-154	-0.0649	0.0934	pCi/g	U
5108M0026	Europium-155	-0.0442	0.0885	pCi/g	U
5108M0026	Iodine-129	-1.55	3.86	pCi/g	U
5108M0026	Krypton-85	0	8.2	pCi/g	UJ
5108M0026	Neptunium-237	-0.0111	0.0613	pCi/g	U
5108M0026	Nickel-63	66.4	63.7	pCi/g	U
5108M0026	Plutonium-238	0.429	0.505	pCi/g	U
5108M0026	Plutonium-239/240	0.173	0.398	pCi/g	U
5108M0026	Plutonium-241	-43.4	86.6	pCi/g	U
5108M0026	Plutonium-242	0.0865	0.324	pCi/g	U
5108M0026	Plutonium-244	-0.0273	0.236	pCi/g	U
5108M0026	Potassium-40	-0.208	0.426	pCi/g	U
5108M0026	Protactinium-233	-0.0111	0.0613	pCi/g	U
5108M0026	Radium-226	-0.132	0.674	pCi/g	U
5108M0026	Radium-228	0.031	0.167	pCi/g	U
5108M0026	Strontium-90	4.12	4.71	pCi/g	U
5108M0026	Technetium-99	-36.4	44.5	pCi/g	U
5108M0026	Thorium-228	0.0276	0.0775	pCi/g	U
5108M0026	Thorium-229	-0.103	0.465	pCi/g	U
5108M0026	Thorium-230	-5.39	9.47	pCi/g	U
5108M0026	Thorium-232	0.222	22.8	pCi/g	U
5108M0026	Tritium	594	961	pCi/g	U
5108M0026	Uranium-233/234	-0.0827	0.192	pCi/g	U
5108M0026	Uranium-235/236	0	0.174	pCi/g	U
5108M0026	Uranium-238	-0.0413	0.183	pCi/g	U

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= = Validated result, which is detected and unqualified

TCLP metals data for Bldg. 3031

Sample ID	Chemical name	Result	Units	Validation qualifier
5109M0005	Arsenic	0.25	mg/L	U
5109M0005	Barium	5	mg/L	U
5109M0005	Cadmium	0.05	mg/L	U
5109M0005	Chromium	0.25	mg/L	U
5109M0005	Lead	0.45	mg/L	=
5109M0005	Selenium	0.05	mg/L	U
5109M0005	Silver	0.25	mg/L	U
5109M0005A	Mercury	0.0002	mg/L	U
5109M0006	Arsenic	0.25	mg/L	U
5109M0006	Barium	5	mg/L	U
5109M0006	Cadmium	0.05	mg/L	U
5109M0006	Chromium	0.25	mg/L	U
5109M0006	Lead	212.75	mg/L	=
5109M0006	Selenium	0.05	mg/L	U
5109M0006	Silver	0.25	mg/L	U
5109M0006A	Mercury	0.0002	mg/L	U
5109M0007	Arsenic	0.25	mg/L	U
5109M0007	Barium	5	mg/L	U
5109M0007	Cadmium	0.05	mg/L	U
5109M0007	Chromium	0.25	mg/L	U
5109M0007	Lead	0.25	mg/L	U
5109M0007	Selenium	0.05	mg/L	U
5109M0007	Silver	0.25	mg/L	U
5109M0007A	Mercury	0.0002	mg/L	U
5109M0008	Arsenic	0.25	mg/L	U
5109M0008	Barium	5	mg/L	U
5109M0008	Cadmium	0.05	mg/L	U
5109M0008	Chromium	0.25	mg/L	U
5109M0008	Lead	0.68	mg/L	=
5109M0008	Selenium	0.05	mg/L	U
5109M0008	Silver	0.25	mg/L	U
5109M0008A	Mercury	0.0002	mg/L	U
5109M0009	Arsenic	0.25	mg/L	U
5109M0009	Barium	5	mg/L	U
5109M0009	Cadmium	0.05	mg/L	U
5109M0009	Chromium	0.25	mg/L	U
5109M0009	Lead	1.03	mg/L	=
5109M0009	Selenium	0.05	mg/L	U
5109M0009	Silver	0.25	mg/L	U

TCLP and total metals data for Bldg. 3031 (cont.)

Sample ID	Chemical name	Result	Units	Validation qualifier
5109M0009A	Mercury	0.0002	mg/L	U
5109M0010	Arsenic	0.25	mg/L	U
5109M0010	Barium	5	mg/L	U
5109M0010	Cadmium	0.05	mg/L	U
5109M0010	Chromium	0.25	mg/L	U
5109M0010	Lead	0.33	mg/L	=
5109M0010	Selenium	0.05	mg/L	U
5109M0010	Silver	0.25	mg/L	U
5109M0010A	Mercury	0.0002	mg/L	U
5109M0011	Arsenic	0.25	mg/L	U
5109M0011	Barium	5	mg/L	U
5109M0011	Cadmium	0.05	mg/L	U
5109M0011	Chromium	0.25	mg/L	U
5109M0011	Lead	0.25	mg/L	U
5109M0011	Selenium	0.05	mg/L	U
5109M0011	Silver	0.25	mg/L	U
5109M0011A	Mercury	0.0002	mg/L	U
5109M0013	Arsenic	0.25	mg/L	U
5109M0013	Barium	5	mg/L	U
5109M0013	Cadmium	0.05	mg/L	U
5109M0013	Chromium	0.25	mg/L	U
5109M0013	Lead	0.25	mg/L	U
5109M0013	Selenium	0.05	mg/L	U
5109M0013	Silver	0.25	mg/L	U
5109M0013A	Mercury	0.0002	mg/L	U
5109M0014	Arsenic	0.25	mg/L	U
5109M0014	Barium	5	mg/L	U
5109M0014	Cadmium	0.05	mg/L	U
5109M0014	Chromium	0.25	mg/L	U
5109M0014	Lead	0.25	mg/L	U
5109M0014	Selenium	0.05	mg/L	U
5109M0014	Silver	0.25	mg/L	U
5109M0014A	Mercury	0.0002	mg/L	U
5109M0017	Arsenic	0.25	mg/L	U
5109M0017	Barium	5	mg/L	U
5109M0017	Cadmium	0.05	mg/L	U
5109M0017	Chromium	0.25	mg/L	U
5109M0017	Lead	33.78	mg/L	=
5109M0017	Selenium	0.05	mg/L	U

TCLP and total metals data for Bldg. 3031 (cont.)

Sample ID	Chemical name	Result	Units	Validation qualifier
5109M0017	Silver	0.25	mg/L	U
5109M0017A	Mercury	0.002	mg/L	U
5109M0019	Arsenic	0.3	mg/L	U
5109M0019	Barium	0.05	mg/L	U
5109M0019	Cadmium	0.05	mg/L	U
5109M0019	Chromium	0.363	mg/L	=
5109M0019	Lead	0.781	mg/L	=
5109M0019	Mercury	0.002	mg/L	UJ
5109M0019	Selenium	0.3	mg/L	U
5109M0019	Silver	0.05	mg/L	U
5109M0021	Arsenic	0.3	mg/L	U
5109M0021	Barium	0.05	mg/L	U
5109M0021	Cadmium	0.05	mg/L	U
5109M0021	Chromium	0.0992	mg/L	=
5109M0021	Lead	0.129	mg/L	=
5109M0021	Mercury	0.002	mg/L	UJ
5109M0021	Selenium	0.3	mg/L	U
5109M0021	Silver	0.05	mg/L	U

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= = Validated result, which is detected and unqualified

Radiological data for Bldg. 3031

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5109M0001	Actinium-228	0.004	0.0074	pCi/g	U
5109M0001	Americium-241	0.009	0.013	pCi/g	U
5109M0001	Barium-133	-0.0053	0.0047	pCi/g	UJ
5109M0001	Carbon-14	5.2	3.8	pCi/sample	U
5109M0001	Cesium-137	0.0705	0.008	pCi/g	=
5109M0001	Cobalt-60	0.0037	0.0053	pCi/g	U
5109M0001	Curium-243/244	-0.002	0.011	pCi/g	U
5109M0001	Europium-152	0.089	0.017	pCi/g	=
5109M0001	Europium-154	-0.003	0.028	pCi/g	U
5109M0001	Europium-155	-0.001	0.012	pCi/g	U
5109M0001	Iodine-129	0.503	0.056	pCi/g	=
5109M0001	Krypton-85	-1.01	0.66	pCi/g	UJ
5109M0001	Lead-212	-0.0001	0.0068	pCi/g	U
5109M0001	Lead-214	0.0008	0.0082	pCi/g	U
5109M0001	Neptunium-239	0.0007	0.0093	pCi/g	U
5109M0001	Nickel-63	-0.8	1.5	pCi/g	U
5109M0001	Plutonium-238	0.015	0.013	pCi/g	U
5109M0001	Plutonium-239/240	0.004	0.011	pCi/g	U
5109M0001	Plutonium-241	3.6	4.1	pCi/g	U
5109M0001	Plutonium-242	-0.002	0.007	pCi/g	U
5109M0001	Plutonium-244	-0.0064	0.0073	pCi/g	U
5109M0001	Potassium-40	-0.023	0.088	pCi/g	U
5109M0001	Protactinium-233	0.001	0.011	pCi/g	U
5109M0001	Radioactive Strontium (Total)	0.07	0.2	pCi/g	U
5109M0001	Technetium-99	0.32	0.76	pCi/g	U
5109M0001	Thorium-229	-0.009	0.032	pCi/g	U
5109M0001	Thorium-230	-0.02	0.57	pCi/g	U
5109M0001	Tritium	12.9	7.9	pCi/sample	=
5109M0001	Uranium-233/234	0.015	0.015	pCi/g	U
5109M0001	Uranium-235/236	-0.0023	0.0063	pCi/g	U
5109M0001	Uranium-238	0.0092	0.008	pCi/g	=
5109M0002	Actinium-228	-0.009	0.042	pCi/g	U
5109M0002	Americium-241	0.015	0.012	pCi/g	U
5109M0002	Barium-133	0	0.01	pCi/g	U
5109M0002	Carbon-14	8	4.2	pCi/sample	=
5109M0002	Cesium-137	0.0882	0.0093	pCi/g	=
5109M0002	Cobalt-60	0.0007	0.0043	pCi/g	U
5109M0002	Curium-243/244	0.004	0.012	pCi/g	U
5109M0002	Europium-152	0.024	0.026	pCi/g	U

Radiological data for Bldg. 3031 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5109M0002	Europium-154	-0.062	0.054	pCi/g	UJ
5109M0002	Europium-155	0.005	0.02	pCi/g	U
5109M0002	Iodine-129	0.172	0.081	pCi/g	=
5109M0002	Krypton-85	1.2	1.6	pCi/g	U
5109M0002	Lead-212	0.005	0.016	pCi/g	U
5109M0002	Lead-214	-0.005	0.023	pCi/g	U
5109M0002	Neptunium-239	0.001	0.018	pCi/g	U
5109M0002	Nickel-63	1.2	1.7	pCi/g	U
5109M0002	Plutonium-238	0	0.01	pCi/g	U
5109M0002	Plutonium-239/240	0.008	0.01	pCi/g	U
5109M0002	Plutonium-241	-1	3.7	pCi/g	U
5109M0002	Plutonium-242	0	0.0052	pCi/g	U
5109M0002	Plutonium-244	0	0.0037	pCi/g	U
5109M0002	Potassium-40	-0.08	0.18	pCi/g	U
5109M0002	Protactinium-233	0.002	0.017	pCi/g	U
5109M0002	Radioactive Strontium (Total)	0.14	0.21	pCi/g	U
5109M0002	Technetium-99	0.87	0.79	pCi/g	U
5109M0002	Thorium-229	0.025	0.055	pCi/g	U
5109M0002	Thorium-230	2.2	1.3	pCi/g	U
5109M0002	Tritium	21.5	9.1	pCi/sample	=
5109M0002	Uranium-233/234	0.011	0.011	pCi/g	U
5109M0002	Uranium-235/236	0.0045	0.0062	pCi/g	U
5109M0002	Uranium-238	0.0036	0.0061	pCi/g	U
5109M0003	Actinium-228	-0.002	0.007	pCi/g	U
5109M0003	Americium-241	0.006	0.013	pCi/g	U
5109M0003	Barium-133	-0.004	0.0062	pCi/g	U
5109M0003	Carbon-14	3.5	3.5	pCi/sample	U
5109M0003	Cesium-137	0.156	0.015	pCi/g	=
5109M0003	Cobalt-60	0.0067	0.0072	pCi/g	U
5109M0003	Curium-243/244	0.004	0.018	pCi/g	U
5109M0003	Europium-152	0.046	0.019	pCi/g	=
5109M0003	Europium-154	0.002	0.03	pCi/g	U
5109M0003	Europium-155	-0.007	0.018	pCi/g	U
5109M0003	Iodine-129	0.147	0.05	pCi/g	=
5109M0003	Krypton-85	-1.4	0.89	pCi/g	UJ
5109M0003	Lead-212	0.009	0.012	pCi/g	U
5109M0003	Lead-214	0.001	0.01	pCi/g	U
5109M0003	Neptunium-239	0.003	0.016	pCi/g	U
5109M0003	Nickel-63	0.6	1.7	pCi/g	U

Radiological data for Bldg. 3031 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5109M0003	Plutonium-238	-0.009	0.009	pCi/g	U
5109M0003	Plutonium-239/240	0.019	0.013	pCi/g	U
5109M0003	Plutonium-241	1.6	4.3	pCi/g	U
5109M0003	Plutonium-242	0.004	0.008	pCi/g	U
5109M0003	Plutonium-244	-0.0043	0.0059	pCi/g	U
5109M0003	Potassium-40	0.05	0.15	pCi/g	U
5109M0003	Protactinium-233	0.005	0.015	pCi/g	U
5109M0003	Radioactive Strontium (Total)	0.17	0.2	pCi/g	U
5109M0003	Technetium-99	1.13	0.8	pCi/g	U
5109M0003	Thorium-229	0.008	0.042	pCi/g	U
5109M0003	Thorium-230	0.33	0.8	pCi/g	U
5109M0003	Tritium	8.7	7.2	pCi/sample	U
5109M0003	Uranium-233/234	0.006	0.012	pCi/g	U
5109M0003	Uranium-235/236	-0.005	0.007	pCi/g	U
5109M0003	Uranium-238	-0.004	0.007	pCi/g	U
5109M0004	Actinium-228	170	370	pCi/g	U
5109M0004	Barium-133	-18	74	pCi/g	U
5109M0004	Cesium-137	40	63	pCi/g	U
5109M0004	Cobalt-60	-65	56	pCi/g	UJ
5109M0004	Europium-152	22800	1700	pCi/g	=
5109M0004	Europium-154	4750	630	pCi/g	=
5109M0004	Europium-155	310	120	pCi/g	=
5109M0004	Iodine-129	107300	8900	pCi/g	=
5109M0004	Krypton-85	-9000	17000	pCi/g	U
5109M0004	Lead-212	-70	110	pCi/g	U
5109M0004	Lead-214	-10	120	pCi/g	U
5109M0004	Neptunium-239	-176	95	pCi/g	UJ
5109M0004	Potassium-40	-300	990	pCi/g	U
5109M0004	Protactinium-233	-100	130	pCi/g	U
5109M0004	Thorium-229	-60	390	pCi/g	U
5109M0004	Thorium-230	-2200	7400	pCi/g	U
5109M0005	Actinium-228	0.24	0.49	pCi/g	U
5109M0005	Americium-241	0.446	0.062	pCi/g	=
5109M0005	Barium-133	0.31	0.21	pCi/g	U
5109M0005	Carbon-14	12.7	7.7	pCi/g	=
5109M0005	Cesium-137	77.3	5.7	pCi/g	=
5109M0005	Cobalt-60	-0.17	0.22	pCi/g	U
5109M0005	Curium-243/244	-0.008	0.018	pCi/g	U
5109M0005	Europium-152	63.5	3.7	pCi/g	=
5109M0005	Europium-154	14	1.2	pCi/g	=

Radiological data for Bldg. 3031 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5109M0005	Europium-155	1.14	0.54	pCi/g	U
5109M0005	Iodine-129	254	15	pCi/g	=
5109M0005	Krypton-85	5	21	pCi/g	U
5109M0005	Lead-212	0.11	0.3	pCi/g	U
5109M0005	Lead-214	-0.13	0.39	pCi/g	U
5109M0005	Neptunium-239	-0.06	0.23	pCi/g	U
5109M0005	Nickel-63	1815	20	pCi/g	=
5109M0005	Plutonium-238	0.004	0.022	pCi/g	U
5109M0005	Plutonium-239/240	0.022	0.013	pCi/g	U
5109M0005	Plutonium-241	0.4	4.6	pCi/g	U
5109M0005	Plutonium-242	0.0018	0.0062	pCi/g	UJ
5109M0005	Plutonium-244	0	0.0036	pCi/g	U
5109M0005	Potassium-40	43.5	3.4	pCi/g	=
5109M0005	Protactinium-233	-0.3	0.42	pCi/g	U
5109M0005	Radioactive Strontium (Total)	260.7	4.1	pCi/g	=
5109M0005	Technetium-99	4.8	1.2	pCi/g	=
5109M0005	Thorium-229	-0.1	1.2	pCi/g	U
5109M0005	Thorium-230	6	31	pCi/g	U
5109M0005	Tritium	10.2	9.1	pCi/g	U
5109M0005	Uranium-233/234	0.11	0.03	pCi/g	=
5109M0005	Uranium-235/236	0.0075	0.0085	pCi/g	U
5109M0005	Uranium-238	0.113	0.03	pCi/g	=
5109M0006	Actinium-228	0.12	0.2	pCi/g	U
5109M0006	Americium-241	37.7	1.5	pCi/g	=
5109M0006	Barium-133	0.25	0.12	pCi/g	U
5109M0006	Carbon-14	61	20	pCi/g	=
5109M0006	Cesium-137	150	11	pCi/g	J
5109M0006	Cobalt-60	0.107	0.096	pCi/g	UJ
5109M0006	Curium-243/244	0.07	0.17	pCi/g	U
5109M0006	Europium-152	81	4.5	pCi/g	J
5109M0006	Europium-154	17.3	1.3	pCi/g	=
5109M0006	Europium-155	0.89	0.32	pCi/g	=
5109M0006	Iodine-129	265	15	pCi/g	J
5109M0006	Krypton-85	2	12	pCi/g	U
5109M0006	Lead-212	0.28	0.14	pCi/g	U
5109M0006	Lead-214	-0.33	0.24	pCi/g	UJ
5109M0006	Neptunium-239	1	0.39	pCi/g	=
5109M0006	Nickel-63	180	6	pCi/g	=
5109M0006	Plutonium-238	-0.03	0.13	pCi/g	U
5109M0006	Plutonium-239/240	0	0.09	pCi/g	U

Radiological data for Bldg. 3031 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5109M0006	Plutonium-241	22	42	pCi/g	U
5109M0006	Plutonium-242	-0.049	0.046	pCi/g	UJ
5109M0006	Plutonium-244	0.017	0.046	pCi/g	U
5109M0006	Potassium-40	0.33	0.31	pCi/g	U
5109M0006	Protactinium-233	-0.17	0.23	pCi/g	U
5109M0006	Radioactive Strontium (Total)	1682	10	pCi/g	=
5109M0006	Technetium-99	1.8	1	pCi/g	=
5109M0006	Thorium-229	0.26	0.69	pCi/g	U
5109M0006	Thorium-230	6	21	pCi/g	U
5109M0006	Tritium	62	24	pCi/g	J
5109M0006	Uranium-233/234	-0.02	0.07	pCi/g	U
5109M0006	Uranium-235/236	0.022	0.062	pCi/g	U
5109M0006	Uranium-238	0.054	0.061	pCi/g	U
5109M0007	Actinium-228	0.01	0.15	pCi/g	U
5109M0007	Americium-241	4.67	0.18	pCi/g	=
5109M0007	Barium-133	0.014	0.041	pCi/g	U
5109M0007	Carbon-14	47	19	pCi/g	=
5109M0007	Cesium-137	6.72	0.67	pCi/g	=
5109M0007	Cobalt-60	0.029	0.056	pCi/g	U
5109M0007	Curium-243/244	0.02	0.02	pCi/g	U
5109M0007	Europium-152	0.19	0.1	pCi/g	U
5109M0007	Europium-154	0.1	0.18	pCi/g	U
5109M0007	Europium-155	0.09	0.11	pCi/g	U
5109M0007	Iodine-129	0.99	0.73	pCi/g	U
5109M0007	Krypton-85	-4.1	4.8	pCi/g	U
5109M0007	Lead-212	0	0.063	pCi/g	U
5109M0007	Lead-214	0.043	0.075	pCi/g	U
5109M0007	Neptunium-239	0.032	0.085	pCi/g	U
5109M0007	Nickel-63	-0.7	1.6	pCi/g	U
5109M0007	Plutonium-238	-0.009	0.016	pCi/g	U
5109M0007	Plutonium-239/240	0.002	0.011	pCi/g	U
5109M0007	Plutonium-241	-0.1	4.1	pCi/g	U
5109M0007	Plutonium-242	-0.0036	0.005	pCi/g	UJ
5109M0007	Plutonium-244	0.0036	0.0061	pCi/g	U
5109M0007	Potassium-40	49	3.6	pCi/g	=
5109M0007	Protactinium-233	-0.014	0.053	pCi/g	U
5109M0007	Radioactive Strontium (Total)	38.9	1.6	pCi/g	=
5109M0007	Technetium-99	1.8	1	pCi/g	=
5109M0007	Thorium-229	0.09	0.25	pCi/g	U
5109M0007	Thorium-230	-0.1	8.4	pCi/g	U

Radiological data for Bldg. 3031 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5109M0007	Tritium	26	22	pCi/g	U
5109M0007	Uranium-233/234	-0.009	0.014	pCi/g	U
5109M0007	Uranium-235/236	-0.014	0.006	pCi/g	U
5109M0007	Uranium-238	0.032	0.019	pCi/g	U
5109M0008	Actinium-228	4.9	7.6	pCi/g	U
5109M0008	Americium-241	163	7	pCi/g	=
5109M0008	Barium-133	-3	15	pCi/g	U
5109M0008	Carbon-14	100	21	pCi/g	=
5109M0008	Cesium-137	6190	600	pCi/g	=
5109M0008	Cobalt-60	1.2	1.5	pCi/g	U
5109M0008	Curium-243/244	-0.6	0.7	pCi/g	U
5109M0008	Europium-152	41	31	pCi/g	U
5109M0008	Europium-154	-3.3	3.4	pCi/g	U
5109M0008	Europium-155	-5	23	pCi/g	U
5109M0008	Iodine-129	40	120	pCi/g	U
5109M0008	Krypton-85	400	2400	pCi/g	U
5109M0008	Lead-212	12	17	pCi/g	U
5109M0008	Lead-214	-2	23	pCi/g	U
5109M0008	Neptunium-239	-21	21	pCi/g	U
5109M0008	Nickel-63	13.1	2.4	pCi/g	=
5109M0008	Plutonium-238	0.2	0.7	pCi/g	U
5109M0008	Plutonium-239/240	0.08	0.31	pCi/g	U
5109M0008	Plutonium-241	30	180	pCi/g	U
5109M0008	Plutonium-242	0.16	0.34	pCi/g	UJ
5109M0008	Plutonium-244	-0.23	0.15	pCi/g	U
5109M0008	Potassium-40	22	37	pCi/g	U
5109M0008	Protactinium-233	-3	24	pCi/g	U
5109M0008	Radioactive Strontium (Total)	80.3	2.3	pCi/g	=
5109M0008	Technetium-99	2.4	1.1	pCi/g	=
5109M0008	Thorium-229	11	65	pCi/g	U
5109M0008	Thorium-230	-200	1300	pCi/g	U
5109M0008	Tritium	20	22	pCi/g	U
5109M0008	Uranium-233/234	0.3	0.44	pCi/g	U
5109M0008	Uranium-235/236	0	0.18	pCi/g	U
5109M0008	Uranium-238	0.3	0.29	pCi/g	=
5109M0009	Actinium-228	-0.29	0.94	pCi/g	U
5109M0009	Americium-241	108	3.7	pCi/g	=
5109M0009	Barium-133	0.7	1.2	pCi/g	U
5109M0009	Carbon-14	528	32	pCi/g	=
5109M0009	Cesium-137	1466	92	pCi/g	=

Radiological data for Bldg. 3031 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5109M0009	Cobalt-60	0.03	0.24	pCi/g	U
5109M0009	Curium-243/244	0.03	0.34	pCi/g	U
5109M0009	Europium-152	40.5	3	pCi/g	=
5109M0009	Europium-154	9.8	1.2	pCi/g	=
5109M0009	Europium-155	1.1	1.6	pCi/g	U
5109M0009	Iodine-129	285	13	pCi/g	=
5109M0009	Krypton-85	60	170	pCi/g	U
5109M0009	Lead-212	-0.5	1.3	pCi/g	U
5109M0009	Lead-214	0	1.7	pCi/g	U
5109M0009	Neptunium-239	0.3	1.4	pCi/g	U
5109M0009	Nickel-63	683	12	pCi/g	=
5109M0009	Plutonium-238	0.03	0.31	pCi/g	U
5109M0009	Plutonium-239/240	0.37	0.27	pCi/g	U
5109M0009	Plutonium-241	50	81	pCi/g	U
5109M0009	Plutonium-242	-0.034	0.066	pCi/g	UJ
5109M0009	Plutonium-244	-0.068	0.094	pCi/g	U
5109M0009	Potassium-40	44.2	4.2	pCi/g	=
5109M0009	Protactinium-233	1	1.6	pCi/g	U
5109M0009	Radioactive Strontium (Total)	902	7	pCi/g	=
5109M0009	Technetium-99	3.4	1.1	pCi/g	=
5109M0009	Thorium-229	0.4	2.8	pCi/g	U
5109M0009	Thorium-230	90	110	pCi/g	U
5109M0009	Tritium	139	28	pCi/g	=
5109M0009	Uranium-233/234	0.08	0.19	pCi/g	U
5109M0009	Uranium-235/236	-0.03	0.1	pCi/g	U
5109M0009	Uranium-238	0.19	0.15	pCi/g	U
5109M0010	Actinium-228	-0.037	0.06	pCi/g	U
5109M0010	Americium-241	0.088	0.03	pCi/g	=
5109M0010	Barium-133	0.043	0.011	pCi/g	=
5109M0010	Carbon-14	55	20	pCi/g	=
5109M0010	Cesium-137	5.4	0.53	pCi/g	=
5109M0010	Cobalt-60	0.0013	0.0091	pCi/g	U
5109M0010	Curium-243/244	0.017	0.018	pCi/g	U
5109M0010	Europium-152	5.1	0.32	pCi/g	=
5109M0010	Europium-154	0.839	0.097	pCi/g	=
5109M0010	Europium-155	0.071	0.042	pCi/g	U
5109M0010	Iodine-129	42	4.3	pCi/g	=
5109M0010	Krypton-85	-3.5	2.3	pCi/g	UJ
5109M0010	Lead-212	0.022	0.027	pCi/g	U
5109M0010	Lead-214	0.021	0.016	pCi/g	U

Radiological data for Bldg. 3031 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5109M0010	Neptunium-239	-0.006	0.014	pCi/g	U
5109M0010	Nickel-63	634	12	pCi/g	=
5109M0010	Plutonium-238	0.018	0.019	pCi/g	U
5109M0010	Plutonium-239/240	0.024	0.016	pCi/g	U
5109M0010	Plutonium-241	0.8	4.6	pCi/g	U
5109M0010	Plutonium-242	-0.002	0.0039	pCi/g	UJ
5109M0010	Plutonium-244	0	0.004	pCi/g	U
5109M0010	Potassium-40	-0.037	0.052	pCi/g	U
5109M0010	Protactinium-233	0.005	0.033	pCi/g	U
5109M0010	Radioactive Strontium (Total)	1.73	0.49	pCi/g	=
5109M0010	Technetium-99	0.48	0.97	pCi/g	U
5109M0010	Thorium-229	-0.058	0.093	pCi/g	U
5109M0010	Thorium-230	3	2.5	pCi/g	U
5109M0010	Tritium	38	23	pCi/g	=
5109M0010	Uranium-233/234	0.119	0.033	pCi/g	=
5109M0010	Uranium-235/236	0.005	0.0085	pCi/g	U
5109M0010	Uranium-238	0.099	0.028	pCi/g	=
5109M0011	Actinium-228	0.099	0.081	pCi/g	U
5109M0011	Americium-241	0.271	0.043	pCi/g	=
5109M0011	Barium-133	0.025	0.019	pCi/g	U
5109M0011	Carbon-14	611	34	pCi/g	=
5109M0011	Cesium-137	15.3	1.5	pCi/g	=
5109M0011	Cobalt-60	0.016	0.026	pCi/g	U
5109M0011	Curium-243/244	-0.018	0.011	pCi/g	U
5109M0011	Europium-152	-0.084	0.077	pCi/g	UJ
5109M0011	Europium-154	0.016	0.096	pCi/g	U
5109M0011	Europium-155	0.05	0.1	pCi/g	U
5109M0011	Iodine-129	-0.2	0.52	pCi/g	U
5109M0011	Krypton-85	-6.2	3.7	pCi/g	UJ
5109M0011	Lead-212	0.015	0.065	pCi/g	U
5109M0011	Lead-214	-0.024	0.016	pCi/g	UJ
5109M0011	Neptunium-239	0.036	0.089	pCi/g	U
5109M0011	Nickel-63	6.1	2	pCi/g	=
5109M0011	Plutonium-238	-0.015	0.011	pCi/g	U
5109M0011	Plutonium-239/240	0.045	0.018	pCi/g	=
5109M0011	Plutonium-241	0.9	4.1	pCi/g	U
5109M0011	Plutonium-242	-0.0018	0.005	pCi/g	UJ
5109M0011	Plutonium-244	0.0018	0.0036	pCi/g	U
5109M0011	Potassium-40	26.9	2.3	pCi/g	=
5109M0011	Protactinium-233	-0.009	0.036	pCi/g	U

Radiological data for Bldg. 3031 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5109M0011	Radioactive Strontium (Total)	323	4	pCi/g	=
5109M0011	Technetium-99	6.1	1.2	pCi/g	=
5109M0011	Thorium-229	-0.02	0.18	pCi/g	U
5109M0011	Thorium-230	3.2	7.4	pCi/g	U
5109M0011	Tritium	819	52	pCi/g	=
5109M0011	Uranium-233/234	0.13	0.032	pCi/g	=
5109M0011	Uranium-235/236	0.01	0.0098	pCi/g	=
5109M0011	Uranium-238	0.097	0.028	pCi/g	=
5109M0013	Actinium-228	0.101	0.084	pCi/g	U
5109M0013	Americium-241	0.384	0.057	pCi/g	=
5109M0013	Barium-133	0.073	0.028	pCi/g	U
5109M0013	Carbon-14	2400	60	pCi/g	=
5109M0013	Cesium-137	23.8	1.7	pCi/g	=
5109M0013	Cobalt-60	0.004	0.041	pCi/g	U
5109M0013	Curium-243/244	-0.014	0.016	pCi/g	U
5109M0013	Europium-152	5.8	0.36	pCi/g	=
5109M0013	Europium-154	0.92	0.15	pCi/g	=
5109M0013	Europium-155	0.09	0.11	pCi/g	U
5109M0013	Iodine-129	5.82	0.85	pCi/g	=
5109M0013	Krypton-85	-3.3	4.9	pCi/g	U
5109M0013	Lead-212	0.032	0.058	pCi/g	U
5109M0013	Lead-214	0.039	0.039	pCi/g	U
5109M0013	Neptunium-239	0.084	0.094	pCi/g	U
5109M0013	Nickel-63	456	10	pCi/g	=
5109M0013	Plutonium-238	0.026	0.022	pCi/g	U
5109M0013	Plutonium-239/240	0.022	0.014	pCi/g	U
5109M0013	Plutonium-241	1.2	4.7	pCi/g	U
5109M0013	Plutonium-242	-0.0039	0.0039	pCi/g	UJ
5109M0013	Plutonium-244	0.0079	0.0087	pCi/g	U
5109M0013	Potassium-40	24.2	1.6	pCi/g	=
5109M0013	Protactinium-233	-0.024	0.085	pCi/g	U
5109M0013	Radioactive Strontium (Total)	55.6	1.9	pCi/g	=
5109M0013	Technetium-99	0.32	0.96	pCi/g	U
5109M0013	Thorium-229	0.16	0.24	pCi/g	U
5109M0013	Thorium-230	7.1	6.1	pCi/g	U
5109M0013	Tritium	253	33	pCi/g	=
5109M0013	Uranium-233/234	0.263	0.046	pCi/g	=
5109M0013	Uranium-235/236	0.015	0.012	pCi/g	=
5109M0013	Uranium-238	0.227	0.042	pCi/g	=
5109M0014	Actinium-228	0.18	0.45	pCi/g	U

Radiological data for Bldg. 3031 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5109M0014	Americium-241	3.66	0.16	pCi/g	=
5109M0014	Barium-133	0.43	0.35	pCi/g	U
5109M0014	Carbon-14	1160	43	pCi/g	=
5109M0014	Cesium-137	321	20	pCi/g	=
5109M0014	Cobalt-60	0.28	0.11	pCi/g	=
5109M0014	Curium-243/244	-0.018	0.012	pCi/g	U
5109M0014	Europium-152	4.4	0.79	pCi/g	=
5109M0014	Europium-154	0.9	0.66	pCi/g	U
5109M0014	Europium-155	0.51	0.7	pCi/g	U
5109M0014	Iodine-129	-2.9	5.7	pCi/g	U
5109M0014	Krypton-85	-41	42	pCi/g	U
5109M0014	Lead-212	0.18	0.41	pCi/g	U
5109M0014	Lead-214	0.1	0.51	pCi/g	U
5109M0014	Neptunium-239	0.85	0.63	pCi/g	U
5109M0014	Nickel-63	1805	20	pCi/g	=
5109M0014	Plutonium-238	-0.005	0.013	pCi/g	U
5109M0014	Plutonium-239/240	0.406	0.053	pCi/g	=
5109M0014	Plutonium-241	-1.3	4	pCi/g	U
5109M0014	Plutonium-242	-0.0053	0.006	pCi/g	UJ
5109M0014	Plutonium-244	0.002	0.008	pCi/g	U
5109M0014	Potassium-40	31.8	2.1	pCi/g	=
5109M0014	Protactinium-233	-0.47	0.5	pCi/g	U
5109M0014	Radioactive Strontium (Total)	3250	10	pCi/g	=
5109M0014	Technetium-99	5.8	1.2	pCi/g	=
5109M0014	Thorium-229	0.8	1.7	pCi/g	U
5109M0014	Thorium-230	36	63	pCi/g	U
5109M0014	Tritium	1500	70	pCi/g	=
5109M0014	Uranium-233/234	0.542	0.069	pCi/g	=
5109M0014	Uranium-235/236	0.02	0.018	pCi/g	U
5109M0014	Uranium-238	0.55	0.066	pCi/g	=
5109M0015	Actinium-228	-0.01	0.13	pCi/g	U
5109M0015	Americium-241	1.64	0.11	pCi/g	=
5109M0015	Barium-133	-0.042	0.037	pCi/g	UJ
5109M0015	Carbon-14	10	5.2	pCi/sample	=
5109M0015	Cesium-137	2.2	0.17	pCi/g	=
5109M0015	Cobalt-60	0.003	0.039	pCi/g	U
5109M0015	Curium-243/244	0.008	0.015	pCi/g	U
5109M0015	Europium-152	4.85	0.31	pCi/g	=
5109M0015	Europium-154	0.93	0.18	pCi/g	=
5109M0015	Europium-155	0.009	0.067	pCi/g	U

Radiological data for Bldg. 3031 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5109M0015	Iodine-129	38	2.1	pCi/g	=
5109M0015	Krypton-85	-4.3	3.4	pCi/g	UJ
5109M0015	Lead-212	0.016	0.053	pCi/g	U
5109M0015	Lead-214	0.027	0.055	pCi/g	U
5109M0015	Neptunium-239	0.033	0.098	pCi/g	U
5109M0015	Nickel-63	354	6	pCi/g	=
5109M0015	Plutonium-238	0.072	0.027	pCi/g	=
5109M0015	Plutonium-239/240	0.014	0.015	pCi/g	U
5109M0015	Plutonium-241	-1.4	5.2	pCi/g	U
5109M0015	Plutonium-242	0	0.0057	pCi/g	U
5109M0015	Plutonium-244	0.0021	0.007	pCi/g	U
5109M0015	Potassium-40	-0.92	0.47	pCi/g	U
5109M0015	Protactinium-233	0.018	0.066	pCi/g	U
5109M0015	Radioactive Strontium (Total)	5.99	0.73	pCi/g	=
5109M0015	Technetium-99	2.6	1.5	pCi/g	=
5109M0015	Thorium-229	0.13	0.19	pCi/g	U
5109M0015	Thorium-230	5.5	4.8	pCi/g	U
5109M0015	Tritium	62	15	pCi/sample	=
5109M0015	Uranium-233/234	0.008	0.012	pCi/g	U
5109M0015	Uranium-235/236	0.005	0.01	pCi/g	U
5109M0015	Uranium-238	0.017	0.013	pCi/g	U
5109M0016	Actinium-228	-0.024	0.045	pCi/g	UJ
5109M0016	Americium-241	1.31	0.09	pCi/g	=
5109M0016	Barium-133	0.01	0.031	pCi/g	U
5109M0016	Carbon-14	17.4	5.9	pCi/sample	=
5109M0016	Cesium-137	1.58	0.16	pCi/g	J
5109M0016	Cobalt-60	0.027	0.026	pCi/g	U
5109M0016	Curium-243/244	0.014	0.013	pCi/g	U
5109M0016	Europium-152	4.61	0.3	pCi/g	J
5109M0016	Europium-154	0.91	0.16	pCi/g	J
5109M0016	Europium-155	0.037	0.074	pCi/g	U
5109M0016	Iodine-129	36.3	3.8	pCi/g	J
5109M0016	Krypton-85	-2.2	3.4	pCi/g	UJ
5109M0016	Lead-212	-0.013	0.033	pCi/g	U
5109M0016	Lead-214	0.024	0.038	pCi/g	U
5109M0016	Neptunium-239	0.033	0.066	pCi/g	U
5109M0016	Nickel-63	311	6	pCi/g	=
5109M0016	Plutonium-238	0.072	0.028	pCi/g	=
5109M0016	Plutonium-239/240	0.023	0.015	pCi/g	U
5109M0016	Plutonium-241	-0.2	4.6	pCi/g	U

Radiological data for Bldg. 3031 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5109M0016	Plutonium-242	-0.002	0.007	pCi/g	U
5109M0016	Plutonium-244	0	0.004	pCi/g	U
5109M0016	Potassium-40	-0.74	0.38	pCi/g	UJ
5109M0016	Protactinium-233	0.034	0.048	pCi/g	U
5109M0016	Radioactive Strontium (Total)	4.58	0.65	pCi/g	=
5109M0016	Technetium-99	1.1	1.3	pCi/g	U
5109M0016	Thorium-229	0.02	0.14	pCi/g	U
5109M0016	Thorium-230	0.2	2	pCi/g	U
5109M0016	Tritium	161	22	pCi/sample	=
5109M0016	Uranium-233/234	-0.002	0.013	pCi/g	U
5109M0016	Uranium-235/236	0	0.007	pCi/g	U
5109M0016	Uranium-238	0.023	0.014	pCi/g	=
5109M0017	Actinium-228	0.029	0.054	pCi/g	U
5109M0017	Americium-241	0.022	0.018	pCi/g	U
5109M0017	Barium-133	0.013	0.013	pCi/g	U
5109M0017	Carbon-14	10	5.2	pCi/sample	=
5109M0017	Cesium-137	0.009	0.014	pCi/g	U
5109M0017	Cobalt-60	0.008	0.012	pCi/g	U
5109M0017	Curium-243/244	0	0.018	pCi/g	U
5109M0017	Europium-152	0.018	0.032	pCi/g	U
5109M0017	Europium-154	-0.062	0.068	pCi/g	U
5109M0017	Europium-155	0.018	0.022	pCi/g	U
5109M0017	Iodine-129	0.07	0.16	pCi/g	U
5109M0017	Krypton-85	-2.8	2	pCi/g	UJ
5109M0017	Lead-212	-0.008	0.017	pCi/g	U
5109M0017	Lead-214	0.019	0.026	pCi/g	U
5109M0017	Neptunium-239	-0.002	0.023	pCi/g	U
5109M0017	Nickel-63	5	11	pCi/g	U
5109M0017	Plutonium-238	-0.012	0.014	pCi/g	U
5109M0017	Plutonium-239/240	0.008	0.009	pCi/g	U
5109M0017	Plutonium-241	-12	15	pCi/g	U
5109M0017	Plutonium-242	-0.002	0.0038	pCi/g	U
5109M0017	Plutonium-244	0	0.0067	pCi/g	U
5109M0017	Potassium-40	-0.14	0.24	pCi/g	U
5109M0017	Protactinium-233	0.001	0.021	pCi/g	U
5109M0017	Radioactive Strontium (Total)	-0.25	0.38	pCi/g	U
5109M0017	Technetium-99	-0.5	1.2	pCi/g	U
5109M0017	Thorium-229	-0.071	0.072	pCi/g	U
5109M0017	Thorium-230	3.7	2.1	pCi/g	U
5109M0017	Tritium	1.5	8.6	pCi/sample	U

Radiological data for Bldg. 3031 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5109M0017	Uranium-233/234	-0.002	0.009	pCi/g	U
5109M0017	Uranium-235/236	0	0.0041	pCi/g	U
5109M0017	Uranium-238	0	0.0046	pCi/g	U
5109M0018	Americium-241	-0.033	0.284	pCi/g	U
5109M0018	Americium-243	-.00177	0.0261	pCi/g	U
5109M0018	Barium-133	-.00301	0.0444	pCi/g	U
5109M0018	Carbon-14	111	80.8	pCi/g	U
5109M0018	Cesium-137	0.115	0.0606	pCi/g	=
5109M0018	Cobalt-60	0.0171	0.0327	pCi/g	U
5109M0018	Curium-242	-0.0719	0.318	pCi/g	U
5109M0018	Curium-243/244	0.00543	0.402	pCi/g	U
5109M0018	Curium-245/246	0.277	0.544	pCi/g	U
5109M0018	Europium-152	0.00431	0.0946	pCi/g	U
5109M0018	Europium-154	0.0438	0.105	pCi/g	U
5109M0018	Europium-155	0.0299	0.0719	pCi/g	U
5109M0018	Iodine-129	1.79	3.69	pCi/g	U
5109M0018	Krypton-85	-23.5	14.2	pCi/g	UJ
5109M0018	Neptunium-237	-0.0375	0.0542	pCi/g	U
5109M0018	Nickel-63	23.1	53.9	pCi/g	U
5109M0018	Plutonium-238	0.611	0.677	pCi/g	U
5109M0018	Plutonium-239/240	-0.122	0.283	pCi/g	U
5109M0018	Plutonium-241	57.2	125	pCi/g	U
5109M0018	Plutonium-242	0.00509	0.377	pCi/g	U
5109M0018	Plutonium-244	0	0.257	pCi/g	U
5109M0018	Potassium-40	-0.134	0.421	pCi/g	U
5109M0018	Protactinium-233	-0.0375	0.0542	pCi/g	U
5109M0018	Radium-226	0.307	1.01	pCi/g	U
5109M0018	Radium-228	0.00575	0.157	pCi/g	U
5109M0018	Strontium-90	2.84	4.32	pCi/g	U
5109M0018	Technetium-99	-39.2	34.1	pCi/g	UJ
5109M0018	Thorium-228	-0.0642	0.0604	pCi/g	U
5109M0018	Thorium-229	-0.443	0.432	pCi/g	U
5109M0018	Thorium-230	0.19	3.89	pCi/g	U
5109M0018	Thorium-232	-7.35	8.03	pCi/g	U
5109M0018	Tritium	604	794	pCi/g	U
5109M0018	Uranium-233/234	0.233	0.53	pCi/g	U
5109M0018	Uranium-235/236	0.0676	0.376	pCi/g	U
5109M0018	Uranium-238	0.228	0.448	pCi/g	U
5109M0019	Americium-241	0.0192	0.201	pCi/g	U
5109M0019	Americium-243	0.0419	0.0569	pCi/g	U

Radiological data for Bldg. 3031 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5109M0019	Barium-133	0.0615	0.0764	pCi/g	U
5109M0019	Carbon-14	142	122	pCi/g	U
5109M0019	Cesium-137	0.364	0.0934	pCi/g	=
5109M0019	Cobalt-60	-0.0122	0.0392	pCi/g	U
5109M0019	Curium-242	0.0733	0.206	pCi/g	U
5109M0019	Curium-243/244	-0.0325	0.144	pCi/g	U
5109M0019	Curium-245/246	0	0.158	pCi/g	U
5109M0019	Europium-152	0.418	0.24	pCi/g	=
5109M0019	Europium-154	0.165	0.107	pCi/g	U
5109M0019	Europium-155	0.0815	0.136	pCi/g	U
5109M0019	Iodine-129	3.49	5.27	pCi/g	U
5109M0019	Krypton-85	0	13.5	pCi/g	UJ
5109M0019	Neptunium-237	-.00893	0.0806	pCi/g	U
5109M0019	Nickel-63	10.1	62.9	pCi/g	U
5109M0019	Plutonium-238	0.38	0.379	pCi/g	U
5109M0019	Plutonium-239/240	0.092	0.253	pCi/g	U
5109M0019	Plutonium-241	-15.9	71.4	pCi/g	U
5109M0019	Plutonium-242	-0.138	0.173	pCi/g	U
5109M0019	Plutonium-244	0	0.145	pCi/g	U
5109M0019	Potassium-40	-0.217	0.46	pCi/g	U
5109M0019	Protactinium-233	-.00893	0.0806	pCi/g	U
5109M0019	Radium-226	0.0604	1.01	pCi/g	U
5109M0019	Radium-228	0.194	0.149	pCi/g	U
5109M0019	Strontium-90	6.02	5	pCi/g	U
5109M0019	Technetium-99	-47.6	43.5	pCi/g	UJ
5109M0019	Thorium-228	0.00323	0.103	pCi/g	U
5109M0019	Thorium-229	-0.0635	0.694	pCi/g	U
5109M0019	Thorium-230	7.34	13.1	pCi/g	U
5109M0019	Thorium-232	23.2	43.4	pCi/g	U
5109M0019	Tritium	832	1170	pCi/g	U
5109M0019	Uranium-233/234	0.0615	0.231	pCi/g	U
5109M0019	Uranium-235/236	-0.0195	0.168	pCi/g	U
5109M0019	Uranium-238	0	0.163	pCi/g	U
5109M0020	Americium-241	0.017	0.606	pCi/g	U
5109M0020	Americium-243	0.0203	0.121	pCi/g	U
5109M0020	Barium-133	-.00366	0.105	pCi/g	U
5109M0020	Carbon-14	140	102	pCi/g	U
5109M0020	Cesium-137	0.138	0.151	pCi/g	U
5109M0020	Cobalt-60	-0.0143	0.0709	pCi/g	U
5109M0020	Curium-242	0	0.306	pCi/g	U

Radiological data for Bldg. 3031 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5109M0020	Curium-243/244	-0.101	0.305	pCi/g	U
5109M0020	Curium-245/246	0.0065	0.482	pCi/g	U
5109M0020	Europium-152	0.372	0.29	pCi/g	U
5109M0020	Europium-154	0.0915	0.241	pCi/g	U
5109M0020	Europium-155	-0.0719	0.236	pCi/g	U
5109M0020	Iodine-129	-0.994	4.05	pCi/g	U
5109M0020	Krypton-85	0	22.2	pCi/g	UJ
5109M0020	Neptunium-237	-0.0399	0.161	pCi/g	U
5109M0020	Nickel-63	21.2	147	pCi/g	U
5109M0020	Plutonium-238	0.167	0.327	pCi/g	U
5109M0020	Plutonium-239/240	-0.0908	0.21	pCi/g	U
5109M0020	Plutonium-241	-19.9	101	pCi/g	U
5109M0020	Plutonium-242	-0.0227	0.196	pCi/g	U
5109M0020	Plutonium-244	-0.0227	0.196	pCi/g	U
5109M0020	Potassium-40	-0.283	0.968	pCi/g	U
5109M0020	Protactinium-233	-0.0399	0.161	pCi/g	U
5109M0020	Radium-226	0.453	3.24	pCi/g	U
5109M0020	Radium-228	0.0483	0.325	pCi/g	U
5109M0020	Strontium-90	9.57	17.2	pCi/g	U
5109M0020	Technetium-99	-98.1	104	pCi/g	U
5109M0020	Thorium-228	0.109	0.155	pCi/g	U
5109M0020	Thorium-229	-0.252	1.18	pCi/g	U
5109M0020	Thorium-230	22.3	23.1	pCi/g	U
5109M0020	Thorium-232	-27	47.1	pCi/g	U
5109M0020	Tritium	905	1010	pCi/g	U
5109M0020	Uranium-233/234	0.143	0.488	pCi/g	U
5109M0020	Uranium-235/236	0.105	0.393	pCi/g	U
5109M0020	Uranium-238	0.104	0.391	pCi/g	U
5109M0021	Americium-241	-0.0384	0.17	pCi/g	U
5109M0021	Americium-243	-.00521	0.0657	pCi/g	U
5109M0021	Barium-133	0.00594	0.0612	pCi/g	U
5109M0021	Carbon-14	138	92.4	pCi/g	U
5109M0021	Cesium-137	0.0447	0.0581	pCi/g	U
5109M0021	Cobalt-60	-0.0763	0.0498	pCi/g	UJ
5109M0021	Curium-242	0	0.172	pCi/g	U
5109M0021	Curium-243/244	-0.0189	0.163	pCi/g	U
5109M0021	Curium-245/246	0.0695	0.261	pCi/g	U
5109M0021	Europium-152	0.105	0.13	pCi/g	U
5109M0021	Europium-154	-0.079	0.113	pCi/g	U
5109M0021	Europium-155	0.0915	0.111	pCi/g	U

Radiological data for Bldg. 3031 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5109M0021	Iodine-129	0.223	3.34	pCi/g	U
5109M0021	Krypton-85	11.7	10.1	pCi/g	U
5109M0021	Neptunium-237	0.022	0.0918	pCi/g	U
5109M0021	Nickel-63	77.6	84.1	pCi/g	U
5109M0021	Plutonium-238	0.154	0.405	pCi/g	U
5109M0021	Plutonium-239/240	0.0315	0.359	pCi/g	U
5109M0021	Plutonium-241	-74.4	94.1	pCi/g	U
5109M0021	Plutonium-242	-0.114	0.309	pCi/g	U
5109M0021	Plutonium-244	-0.118	0.224	pCi/g	U
5109M0021	Potassium-40	0.0101	0.627	pCi/g	U
5109M0021	Protactinium-233	0.022	0.0918	pCi/g	U
5109M0021	Radium-226	-0.316	1.03	pCi/g	U
5109M0021	Radium-228	0.18	0.22	pCi/g	U
5109M0021	Strontium-90	-9.06	6.38	pCi/g	UJ
5109M0021	Technetium-99	-40.5	56	pCi/g	U
5109M0021	Thorium-228	-0.0111	0.0867	pCi/g	U
5109M0021	Thorium-229	-0.197	0.636	pCi/g	U
5109M0021	Thorium-230	-8.95	15.4	pCi/g	U
5109M0021	Thorium-232	-0.851	29	pCi/g	U
5109M0021	Tritium	818	908	pCi/g	U
5109M0021	Uranium-233/234	0.18	0.415	pCi/g	U
5109M0021	Uranium-235/236	0	0.24	pCi/g	U
5109M0021	Uranium-238	0	0.239	pCi/g	U
5109M0022	Americium-241	0.196	0.385	pCi/g	U
5109M0022	Americium-243	-0.0186	0.0868	pCi/g	U
5109M0022	Barium-133	0.0863	0.239	pCi/g	U
5109M0022	Carbon-14	30	86.8	pCi/g	U
5109M0022	Cesium-137	0.0854	0.108	pCi/g	U
5109M0022	Cobalt-60	-0.0334	0.108	pCi/g	U
5109M0022	Curium-242	0.152	0.418	pCi/g	U
5109M0022	Curium-243/244	-0.0528	0.233	pCi/g	U
5109M0022	Curium-245/246	-0.0306	0.264	pCi/g	U
5109M0022	Europium-152	0.0477	0.288	pCi/g	U
5109M0022	Europium-154	0.237	0.233	pCi/g	U
5109M0022	Europium-155	-0.0315	0.237	pCi/g	U
5109M0022	Iodine-129	-0.0855	3.64	pCi/g	U
5109M0022	Krypton-85	-8.24	28.6	pCi/g	U
5109M0022	Neptunium-237	0.0967	0.18	pCi/g	U
5109M0022	Nickel-63	65.8	98.1	pCi/g	U
5109M0022	Plutonium-238	0.667	0.786	pCi/g	U

Radiological data for Bldg. 3031 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5109M0022	Plutonium-239/240	0.269	0.619	pCi/g	U
5109M0022	Plutonium-241	-85.8	135	pCi/g	U
5109M0022	Plutonium-242	-0.127	0.385	pCi/g	U
5109M0022	Plutonium-244	0	0.357	pCi/g	U
5109M0022	Potassium-40	-1.2	1.1	pCi/g	U
5109M0022	Protactinium-233	0.0967	0.18	pCi/g	U
5109M0022	Radium-226	1.59	3.51	pCi/g	U
5109M0022	Radium-228	0.0691	0.447	pCi/g	U
5109M0022	Strontium-90	-6.17	12.2	pCi/g	U
5109M0022	Technetium-99	-72.5	72.8	pCi/g	U
5109M0022	Thorium-228	0.139	0.332	pCi/g	U
5109M0022	Thorium-229	1.23	2.01	pCi/g	U
5109M0022	Thorium-230	-20.7	17.8	pCi/g	UJ
5109M0022	Thorium-232	28.9	43.8	pCi/g	U
5109M0022	Tritium	921	890	pCi/g	U
5109M0022	Uranium-233/234	-0.0603	0.416	pCi/g	U
5109M0022	Uranium-235/236	0.242	0.475	pCi/g	U
5109M0022	Uranium-238	0.104	0.39	pCi/g	U

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit
UJ = Analyte, compound or nuclide not detected above the reported detection limit, and the reported detection limit is approximated due to quality deficiency
= = Validated result, which is detected and unqualified

TCLP metals data for Bldg. 3032

Sample ID	Chemical name	Result	Units	Validation qualifier
5110M0007	Arsenic	0.25	mg/L	U
5110M0007	Barium	5	mg/L	U
5110M0007	Cadmium	0.05	mg/L	U
5110M0007	Chromium	0.25	mg/L	U
5110M0007	Lead	0.25	mg/L	U
5110M0007	Selenium	0.05	mg/L	U
5110M0007	Silver	0.25	mg/L	UJ
5110M0007A	Mercury	0.002	mg/L	U
5110M0008	Arsenic	0.25	mg/L	U
5110M0008	Barium	5	mg/L	U
5110M0008	Cadmium	0.05	mg/L	U
5110M0008	Chromium	0.25	mg/L	U
5110M0008	Lead	0.25	mg/L	U
5110M0008	Selenium	0.05	mg/L	U
5110M0008	Silver	0.25	mg/L	UJ
5110M0008A	Mercury	0.002	mg/L	U
5110M0009	Arsenic	0.25	mg/L	U
5110M0009	Barium	5	mg/L	U
5110M0009	Cadmium	0.05	mg/L	U
5110M0009	Chromium	0.25	mg/L	U
5110M0009	Lead	0.25	mg/L	U
5110M0009	Selenium	0.05	mg/L	U
5110M0009	Silver	0.25	mg/L	UJ
5110M0009A	Mercury	0.002	mg/L	U
5110M0010	Arsenic	0.25	mg/L	U
5110M0010	Barium	5	mg/L	U
5110M0010	Cadmium	0.05	mg/L	U
5110M0010	Chromium	0.25	mg/L	U
5110M0010	Lead	0.25	mg/L	U
5110M0010	Selenium	0.05	mg/L	U
5110M0010	Silver	0.25	mg/L	UJ
5110M0010A	Mercury	0.002	mg/L	U
5110M0011	Arsenic	0.25	mg/L	U
5110M0011	Barium	5	mg/L	U
5110M0011	Cadmium	0.05	mg/L	U
5110M0011	Chromium	0.25	mg/L	U
5110M0011	Lead	0.25	mg/L	UJ
5110M0011	Selenium	0.05	mg/L	U
5110M0011	Silver	0.25	mg/L	UJ

TCLP and total metals data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Units	Validation qualifier
5110M0011A	Mercury	0.0173	mg/L	=
5110M0012	Arsenic	0.25	mg/L	U
5110M0012	Barium	5	mg/L	U
5110M0012	Cadmium	0.05	mg/L	U
5110M0012	Chromium	0.25	mg/L	U
5110M0012	Lead	0.25	mg/L	U
5110M0012	Selenium	0.05	mg/L	U
5110M0012	Silver	0.25	mg/L	UJ
5110M0012A	Mercury	0.002	mg/L	U
5110M0013	Arsenic	0.25	mg/L	U
5110M0013	Barium	5	mg/L	U
5110M0013	Cadmium	0.05	mg/L	U
5110M0013	Chromium	0.25	mg/L	U
5110M0013	Lead	0.25	mg/L	U
5110M0013	Selenium	0.05	mg/L	U
5110M0013	Silver	0.25	mg/L	UJ
5110M0013A	Mercury	0.002	mg/L	U
5110M0014	Arsenic	0.25	mg/L	U
5110M0014	Barium	5	mg/L	U
5110M0014	Cadmium	0.05	mg/L	U
5110M0014	Chromium	0.25	mg/L	U
5110M0014	Lead	0.25	mg/L	U
5110M0014	Selenium	0.05	mg/L	U
5110M0014	Silver	0.25	mg/L	UJ
5110M0014A	Mercury	0.002	mg/L	U
5110M0015	Arsenic	0.25	mg/L	U
5110M0015	Barium	5	mg/L	U
5110M0015	Cadmium	0.05	mg/L	U
5110M0015	Chromium	0.25	mg/L	U
5110M0015	Lead	0.25	mg/L	U
5110M0015	Selenium	0.05	mg/L	U
5110M0015	Silver	0.25	mg/L	UJ
5110M0015A	Mercury	0.002	mg/L	U
5110M0016	Arsenic	0.25	mg/L	U
5110M0016	Barium	5	mg/L	U
5110M0016	Cadmium	0.05	mg/L	U
5110M0016	Chromium	0.25	mg/L	U
5110M0016	Lead	0.68	mg/L	=
5110M0016	Selenium	0.05	mg/L	U

TCLP and total metals data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Units	Validation qualifier
5110M0016	Silver	0.25	mg/L	UJ
5110M0016A	Mercury	0.00276	mg/L	=
5110M0017	Arsenic	0.25	mg/L	U
5110M0017	Barium	5	mg/L	U
5110M0017	Cadmium	0.05	mg/L	U
5110M0017	Chromium	0.25	mg/L	U
5110M0017	Lead	0.25	mg/L	U
5110M0017	Selenium	0.05	mg/L	U
5110M0017	Silver	0.25	mg/L	UJ
5110M0017A	Mercury	0.002	mg/L	U
5110M0018	Arsenic	0.25	mg/L	U
5110M0018	Barium	5	mg/L	U
5110M0018	Cadmium	0.05	mg/L	U
5110M0018	Chromium	0.25	mg/L	U
5110M0018	Lead	0.35	mg/L	=
5110M0018	Selenium	0.05	mg/L	U
5110M0018	Silver	0.25	mg/L	UJ
5110M0018A	Mercury	0.002	mg/L	U
5110M0019	Arsenic	0.25	mg/L	U
5110M0019	Barium	5	mg/L	U
5110M0019	Cadmium	0.05	mg/L	U
5110M0019	Chromium	0.25	mg/L	U
5110M0019	Lead	0.25	mg/L	U
5110M0019	Selenium	0.05	mg/L	U
5110M0019	Silver	0.25	mg/L	UJ
5110M0019A	Mercury	0.002	mg/L	U
5110M0020	Arsenic	0.25	mg/L	U
5110M0020	Barium	5	mg/L	U
5110M0020	Cadmium	0.05	mg/L	U
5110M0020	Chromium	0.25	mg/L	U
5110M0020	Lead	0.25	mg/L	U
5110M0020	Selenium	0.05	mg/L	U
5110M0020	Silver	0.25	mg/L	UJ
5110M0020A	Mercury	0.00233	mg/L	=
5110M0023	Arsenic	0.3	mg/L	U
5110M0023	Barium	0.117	mg/L	=
5110M0023	Cadmium	0.05	mg/L	U
5110M0023	Chromium	0.162	mg/L	=
5110M0023	Lead	0.323	mg/L	=

TCLP and total metals data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Units	Validation qualifier
5110M0023	Mercury	0.002	mg/L	UJ
5110M0023	Selenium	0.3	mg/L	U
5110M0023	Silver	0.05	mg/L	U
5110M0025	Arsenic	0.3	mg/L	U
5110M0025	Barium	0.112	mg/L	=
5110M0025	Cadmium	0.05	mg/L	U
5110M0025	Chromium	0.186	mg/L	=
5110M0025	Lead	0.448	mg/L	=
5110M0025	Mercury	0.002	mg/L	UJ
5110M0025	Selenium	0.3	mg/L	U
5110M0025	Silver	0.05	mg/L	U
5110M0027	Arsenic	0.3	mg/L	U
5110M0027	Barium	0.05	mg/L	U
5110M0027	Cadmium	0.05	mg/L	U
5110M0027	Chromium	0.053	mg/L	=
5110M0027	Lead	3.29	mg/L	=
5110M0027	Mercury	0.002	mg/L	UJ
5110M0027	Selenium	0.3	mg/L	U
5110M0027	Silver	0.05	mg/L	U

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit
UJ = Analyte, compound or nuclide not detected above the reported detection limit, and the reported detection limit is approximated due to quality deficiency
= = Validated result, which is detected and unqualified

Radiological data for Bldg. 3032

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0001	Actinium-228	0.034	0.037	pCi/g	U
5110M0001	Americium-241	0.007	0.016	pCi/g	U
5110M0001	Barium-133	-0.0038	0.0093	pCi/g	U
5110M0001	Carbon-14	3.7	3.6	pCi/sample	U
5110M0001	Cesium-137	0.0304	0.0098	pCi/g	=
5110M0001	Cobalt-60	0.0014	0.0076	pCi/g	U
5110M0001	Curium-243/244	-0.004	0.01	pCi/g	U
5110M0001	Europium-152	0.016	0.022	pCi/g	U
5110M0001	Europium-154	-0.022	0.044	pCi/g	U
5110M0001	Europium-155	0.003	0.017	pCi/g	U
5110M0001	Iodine-129	0.037	0.072	pCi/g	U
5110M0001	Krypton-85	-2.5	1.6	pCi/g	UJ
5110M0001	Lead-212	0.001	0.013	pCi/g	U
5110M0001	Lead-214	-0.01	0.02	pCi/g	U
5110M0001	Neptunium-239	0.004	0.015	pCi/g	U
5110M0001	Nickel-63	0.7	1.7	pCi/g	U
5110M0001	Plutonium-238	-0.004	0.009	pCi/g	U
5110M0001	Plutonium-239/240	0.015	0.012	pCi/g	U
5110M0001	Plutonium-241	2.8	4.3	pCi/g	U
5110M0001	Plutonium-242	0.0021	0.0042	pCi/g	U
5110M0001	Plutonium-244	0	0.0042	pCi/g	U
5110M0001	Potassium-40	0.03	0.16	pCi/g	U
5110M0001	Protactinium-233	0.008	0.015	pCi/g	U
5110M0001	Radioactive Strontium (Total)	0.2	0.22	pCi/g	U
5110M0001	Technetium-99	1.11	0.8	pCi/g	U
5110M0001	Thorium-229	0.008	0.05	pCi/g	U
5110M0001	Thorium-230	0.02	0.67	pCi/g	U
5110M0001	Tritium	6.1	6.8	pCi/sample	U
5110M0001	Uranium-233/234	0.065	0.026	pCi/g	=
5110M0001	Uranium-235/236	0.002	0.008	pCi/g	U
5110M0001	Uranium-238	0.004	0.01	pCi/g	U
5110M0002	Actinium-228	0.045	0.05	pCi/g	U
5110M0002	Americium-241	0.044	0.022	pCi/g	U
5110M0002	Barium-133	0.009	0.015	pCi/g	U
5110M0002	Carbon-14	2.5	3.4	pCi/sample	U
5110M0002	Cesium-137	1.411	0.049	pCi/g	=
5110M0002	Cobalt-60	0.004	0.0097	pCi/g	U
5110M0002	Curium-243/244	0	0.012	pCi/g	U
5110M0002	Europium-152	0.011	0.032	pCi/g	U

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0002	Europium-154	-0.049	0.055	pCi/g	U
5110M0002	Europium-155	0.024	0.023	pCi/g	U
5110M0002	Iodine-129	0.02	0.11	pCi/g	U
5110M0002	Krypton-85	-11.6	3.7	pCi/g	UJ
5110M0002	Lead-212	0.014	0.013	pCi/g	U
5110M0002	Lead-214	-0.005	0.025	pCi/g	U
5110M0002	Neptunium-239	0.027	0.02	pCi/g	U
5110M0002	Nickel-63	1.3	1.7	pCi/g	U
5110M0002	Plutonium-238	0.009	0.013	pCi/g	U
5110M0002	Plutonium-239/240	0.065	0.024	pCi/g	=
5110M0002	Plutonium-241	0	4.4	pCi/g	U
5110M0002	Plutonium-242	-0.004	0.006	pCi/g	U
5110M0002	Plutonium-244	-0.0112	0.0099	pCi/g	UJ
5110M0002	Potassium-40	0.02	0.2	pCi/g	U
5110M0002	Protactinium-233	0	0.021	pCi/g	U
5110M0002	Radioactive Strontium (Total)	0.42	0.22	pCi/g	=
5110M0002	Technetium-99	0.47	0.77	pCi/g	U
5110M0002	Thorium-229	-0.033	0.071	pCi/g	U
5110M0002	Thorium-230	1.2	1.6	pCi/g	U
5110M0002	Tritium	11.2	7.6	pCi/sample	U
5110M0002	Uranium-233/234	0.275	0.047	pCi/g	=
5110M0002	Uranium-235/236	0.018	0.013	pCi/g	=
5110M0002	Uranium-238	0.037	0.019	pCi/g	=
5110M0003	Actinium-228	0.001	0.019	pCi/g	U
5110M0003	Americium-241	0.274	0.048	pCi/g	=
5110M0003	Barium-133	-0.016	0.015	pCi/g	UJ
5110M0003	Carbon-14	4.9	3.8	pCi/sample	U
5110M0003	Cesium-137	1.116	0.076	pCi/g	J
5110M0003	Cobalt-60	0.005	0.011	pCi/g	U
5110M0003	Curium-243/244	-0.004	0.007	pCi/g	U
5110M0003	Europium-152	0.023	0.03	pCi/g	U
5110M0003	Europium-154	-0.029	0.05	pCi/g	U
5110M0003	Europium-155	-0.006	0.028	pCi/g	U
5110M0003	Iodine-129	-0.019	0.073	pCi/g	UJ
5110M0003	Krypton-85	-2	1.4	pCi/g	UJ
5110M0003	Lead-212	-0.005	0.02	pCi/g	UJ
5110M0003	Lead-214	0.007	0.017	pCi/g	U
5110M0003	Neptunium-239	-0.005	0.025	pCi/g	U
5110M0003	Nickel-63	1.2	1.7	pCi/g	U

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0003	Plutonium-238	0.011	0.012	pCi/g	U
5110M0003	Plutonium-239/240	0.097	0.027	pCi/g	=
5110M0003	Plutonium-241	3.5	4.2	pCi/g	U
5110M0003	Plutonium-242	0.0018	0.0062	pCi/g	U
5110M0003	Plutonium-244	0.0037	0.0051	pCi/g	U
5110M0003	Potassium-40	-0.03	0.22	pCi/g	U
5110M0003	Protactinium-233	0.018	0.021	pCi/g	U
5110M0003	Radioactive Strontium (Total)	0.68	0.24	pCi/g	=
5110M0003	Technetium-99	0.27	0.76	pCi/g	U
5110M0003	Thorium-229	-0.002	0.066	pCi/g	U
5110M0003	Thorium-230	-0.6	1.2	pCi/g	UJ
5110M0003	Tritium	4.2	6.4	pCi/sample	U
5110M0003	Uranium-233/234	0.236	0.043	pCi/g	=
5110M0003	Uranium-235/236	0.005	0.0069	pCi/g	U
5110M0003	Uranium-238	0.054	0.021	pCi/g	=
5110M0004	Actinium-228	0.012	0.028	pCi/g	U
5110M0004	Americium-241	-0.002	0.007	pCi/g	U
5110M0004	Barium-133	0.0019	0.0072	pCi/g	U
5110M0004	Carbon-14	-0.2	1.1	pCi/g	U
5110M0004	Cesium-137	0.0058	0.0051	pCi/g	U
5110M0004	Cobalt-60	0.0045	0.0065	pCi/g	U
5110M0004	Curium-243/244	-0.009	0.004	pCi/g	U
5110M0004	Europium-152	-0.009	0.018	pCi/g	U
5110M0004	Europium-154	-0.012	0.035	pCi/g	U
5110M0004	Europium-155	-0.003	0.014	pCi/g	U
5110M0004	Iodine-129	-0.017	0.056	pCi/g	U
5110M0004	Krypton-85	8.2	2.5	pCi/g	=
5110M0004	Lead-212	0.0173	0.008	pCi/g	U
5110M0004	Lead-214	0.019	0.014	pCi/g	U
5110M0004	Neptunium-239	-0.003	0.013	pCi/g	U
5110M0004	Nickel-63	0.8	1.7	pCi/g	U
5110M0004	Plutonium-238	0.023	0.014	pCi/g	U
5110M0004	Plutonium-239/240	0.0061	0.0073	pCi/g	U
5110M0004	Plutonium-241	1.2	3.8	pCi/g	U
5110M0004	Plutonium-242	-0.0046	0.0052	pCi/g	U
5110M0004	Plutonium-244	-0.0046	0.0042	pCi/g	U
5110M0004	Potassium-40	0.15	0.13	pCi/g	U
5110M0004	Protactinium-233	0.0014	0.0083	pCi/g	U
5110M0004	Radioactive Strontium (Total)	0.11	0.19	pCi/g	U

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0004	Technetium-99	0.4	0.77	pCi/g	U
5110M0004	Thorium-229	0	0.036	pCi/g	U
5110M0004	Thorium-230	0.83	0.99	pCi/g	U
5110M0004	Tritium	-0.4	2.5	pCi/g	U
5110M0004	Uranium-233/234	0.075	0.024	pCi/g	=
5110M0004	Uranium-235/236	0	0.0066	pCi/g	U
5110M0004	Uranium-238	0.062	0.022	pCi/g	=
5110M0005	Actinium-228	0.019	0.033	pCi/g	U
5110M0005	Americium-241	0.017	0.015	pCi/g	U
5110M0005	Barium-133	-0.0044	0.0064	pCi/g	U
5110M0005	Carbon-14	-0.8	1	pCi/g	U
5110M0005	Cesium-137	0.0054	0.006	pCi/g	U
5110M0005	Cobalt-60	0.0012	0.0075	pCi/g	U
5110M0005	Curium-243/244	-0.019	0.012	pCi/g	U
5110M0005	Europium-152	-0.008	0.019	pCi/g	U
5110M0005	Europium-154	-0.023	0.035	pCi/g	U
5110M0005	Europium-155	-0.011	0.017	pCi/g	U
5110M0005	Iodine-129	-0.007	0.048	pCi/g	U
5110M0005	Krypton-85	-2.5	1	pCi/g	UJ
5110M0005	Lead-212	0.01	0.0088	pCi/g	U
5110M0005	Lead-214	0.013	0.011	pCi/g	U
5110M0005	Neptunium-239	-0.005	0.016	pCi/g	U
5110M0005	Nickel-63	1.5	1.7	pCi/g	U
5110M0005	Plutonium-238	-0.01	0.005	pCi/g	U
5110M0005	Plutonium-239/240	0.01	0.009	pCi/g	U
5110M0005	Plutonium-241	-1.6	4	pCi/g	UJ
5110M0005	Plutonium-242	-0.002	0.0038	pCi/g	U
5110M0005	Plutonium-244	0.0039	0.0067	pCi/g	U
5110M0005	Potassium-40	0.204	0.051	pCi/g	=
5110M0005	Protactinium-233	0.007	0.014	pCi/g	U
5110M0005	Radioactive Strontium (Total)	2.85	0.35	pCi/g	=
5110M0005	Technetium-99	4.66	0.95	pCi/g	J
5110M0005	Thorium-229	-0.029	0.042	pCi/g	U
5110M0005	Thorium-230	-0.4	1.3	pCi/g	U
5110M0005	Tritium	1.3	2.6	pCi/g	U
5110M0005	Uranium-233/234	0.066	0.021	pCi/g	=
5110M0005	Uranium-235/236	0	0.004	pCi/g	U
5110M0005	Uranium-238	0.088	0.024	pCi/g	=
5110M0006	Actinium-228	0.025	0.039	pCi/g	U

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0006	Americium-241	0.006	0.013	pCi/g	U
5110M0006	Barium-133	0.001	0.011	pCi/g	U
5110M0006	Carbon-14	3.6	3.5	pCi/sample	U
5110M0006	Cesium-137	0.0203	0.0094	pCi/g	U
5110M0006	Cobalt-60	-0.0075	0.0095	pCi/g	U
5110M0006	Curium-243/244	0.006	0.012	pCi/g	U
5110M0006	Europium-152	-0.005	0.025	pCi/g	U
5110M0006	Europium-154	-0.021	0.036	pCi/g	U
5110M0006	Europium-155	-0.004	0.018	pCi/g	U
5110M0006	Iodine-129	-0.071	0.092	pCi/g	U
5110M0006	Krypton-85	-2.9	1.7	pCi/g	UJ
5110M0006	Lead-212	0.007	0.011	pCi/g	U
5110M0006	Lead-214	-0.002	0.021	pCi/g	U
5110M0006	Neptunium-239	-0.007	0.016	pCi/g	U
5110M0006	Nickel-63	0	1.6	pCi/g	U
5110M0006	Plutonium-238	-0.004	0.01	pCi/g	U
5110M0006	Plutonium-239/240	0.011	0.01	pCi/g	U
5110M0006	Plutonium-241	1.4	3.8	pCi/g	U
5110M0006	Plutonium-242	0.0019		pCi/g	U
5110M0006	Plutonium-244	-0.0019	0.0037	pCi/g	U
5110M0006	Potassium-40	-0.04	0.17	pCi/g	U
5110M0006	Protactinium-233	-0.004	0.016	pCi/g	U
5110M0006	Radioactive Strontium (Total)	0.31	0.22	pCi/g	U
5110M0006	Technetium-99	0.06	0.75	pCi/g	U
5110M0006	Thorium-229	-0.004	0.053	pCi/g	U
5110M0006	Thorium-230	0.4	1.5	pCi/g	U
5110M0006	Tritium	11.8	7.7	pCi/sample	=
5110M0006	Uranium-233/234	0.013	0.0096	pCi/g	=
5110M0006	Uranium-235/236	0	0.0045	pCi/g	U
5110M0006	Uranium-238	0.0037	0.0051	pCi/g	U
5110M0007	Actinium-228	0.077	0.023	pCi/g	=
5110M0007	Americium-241	4.95	0.19	pCi/g	=
5110M0007	Barium-133	0.006	0.01	pCi/g	U
5110M0007	Carbon-14	28	1.9	pCi/g	=
5110M0007	Cesium-137	0.132	0.016	pCi/g	=
5110M0007	Cobalt-60	-0.003	0.012	pCi/g	U
5110M0007	Curium-243/244	-0.007	0.015	pCi/g	U
5110M0007	Europium-152	0.071	0.033	pCi/g	=
5110M0007	Europium-154	0.08	0.04	pCi/g	U

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0007	Europium-155	-0.003	0.021	pCi/g	U
5110M0007	Iodine-129	0.06	0.12	pCi/g	U
5110M0007	Krypton-85	-0.2	1.1	pCi/g	U
5110M0007	Lead-212	0.058	0.019	pCi/g	=
5110M0007	Lead-214	0.033	0.017	pCi/g	U
5110M0007	Neptunium-239	-0.002	0.028	pCi/g	U
5110M0007	Nickel-63	53.8	3.7	pCi/g	=
5110M0007	Plutonium-238	-0.002	0.013	pCi/g	U
5110M0007	Plutonium-239/240	0.012	0.01	pCi/g	U
5110M0007	Plutonium-241	0.4	4.3	pCi/g	U
5110M0007	Plutonium-242	0	0.0039	pCi/g	U
5110M0007	Plutonium-244	-0.002	0.0039	pCi/g	U
5110M0007	Potassium-40	0.42	0.2	pCi/g	U
5110M0007	Protactinium-233	-0.012	0.022	pCi/g	U
5110M0007	Radioactive Strontium (Total)	0.07	0.21	pCi/g	U
5110M0007	Technetium-99	0.53	0.77	pCi/g	U
5110M0007	Thorium-229	0.035	0.042	pCi/g	U
5110M0007	Thorium-230	1.8	1.6	pCi/g	U
5110M0007	Tritium	33.7	1.8	pCi/g	=
5110M0007	Uranium-233/234	1.14	0.09	pCi/g	=
5110M0007	Uranium-235/236	0.07	0.026	pCi/g	=
5110M0007	Uranium-238	0.127	0.031	pCi/g	=
5110M0008	Actinium-228	-0.009	0.044	pCi/g	U
5110M0008	Americium-241	0.117	0.031	pCi/g	=
5110M0008	Barium-133	0.0688	0.008	pCi/g	=
5110M0008	Carbon-14	97800	300	pCi/g	=
5110M0008	Cesium-137	0.655	0.044	pCi/g	=
5110M0008	Cobalt-60	0.002	0.019	pCi/g	U
5110M0008	Curium-243/244	0.027	0.02	pCi/g	U
5110M0008	Europium-152	0.43	0.031	pCi/g	=
5110M0008	Europium-154	0.226	0.061	pCi/g	=
5110M0008	Europium-155	0.163	0.022	pCi/g	=
5110M0008	Iodine-129	1.94	0.11	pCi/g	=
5110M0008	Krypton-85	-1.2	1	pCi/g	UJ
5110M0008	Lead-212	0.009	0.017	pCi/g	U
5110M0008	Lead-214	-0.17	0.03	pCi/g	UJ
5110M0008	Neptunium-239	0.168	0.048	pCi/g	=
5110M0008	Nickel-63	252	8	pCi/g	=
5110M0008	Plutonium-238	0.081	0.026	pCi/g	=

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0008	Plutonium-239/240	0.0083	0.0072	pCi/g	=
5110M0008	Plutonium-241	2.2	3.6	pCi/g	U
5110M0008	Plutonium-242	2.02	0.11	pCi/g	=
5110M0008	Plutonium-244	0.086	0.024	pCi/g	=
5110M0008	Potassium-40	22	1.3	pCi/g	=
5110M0008	Protactinium-233	3.81	0.21	pCi/g	=
5110M0008	Radioactive Strontium (Total)	0.77	0.25	pCi/g	=
5110M0008	Technetium-99	268.8	4.6	pCi/g	=
5110M0008	Thorium-229	0.012	0.068	pCi/g	U
5110M0008	Thorium-230	0.5	0.56	pCi/g	U
5110M0008	Uranium-233/234	0.187	0.036	pCi/g	=
5110M0008	Uranium-235/236	-0.002	0.007	pCi/g	U
5110M0008	Uranium-238	0.099	0.027	pCi/g	=
5110M0009	Actinium-228	0.003	0.013	pCi/g	U
5110M0009	Americium-241	0.032	0.025	pCi/g	U
5110M0009	Barium-133	0.0162	0.0038	pCi/g	=
5110M0009	Carbon-14	90	10	pCi/sample	=
5110M0009	Cesium-137	0.438	0.029	pCi/g	=
5110M0009	Cobalt-60	-0.0024	0.0062	pCi/g	U
5110M0009	Curium-243/244	0.002	0.017	pCi/g	U
5110M0009	Europium-152	0.396	0.028	pCi/g	=
5110M0009	Europium-154	0.108	0.027	pCi/g	=
5110M0009	Europium-155	0.01	0.014	pCi/g	U
5110M0009	Iodine-129	1.799	0.09	pCi/g	=
5110M0009	Krypton-85	-0.6	0.57	pCi/g	UJ
5110M0009	Lead-212	0.002	0.007	pCi/g	U
5110M0009	Lead-214	-0.003	0.0047	pCi/g	U
5110M0009	Neptunium-239	0.006	0.015	pCi/g	U
5110M0009	Nickel-63	2.1	1.7	pCi/g	U
5110M0009	Plutonium-238	0.004	0.017	pCi/g	U
5110M0009	Plutonium-239/240	0.004	0.012	pCi/g	U
5110M0009	Plutonium-241	2.2	4.5	pCi/g	U
5110M0009	Plutonium-242	0.022	0.014	pCi/g	U
5110M0009	Plutonium-244	0.004	0.01	pCi/g	U
5110M0009	Potassium-40	-0.007	0.078	pCi/g	U
5110M0009	Protactinium-233	0.0163	0.0089	pCi/g	U
5110M0009	Radioactive Strontium (Total)	0.24	0.22	pCi/g	U
5110M0009	Technetium-99	333.4	5.1	pCi/g	=
5110M0009	Thorium-229	-0.002	0.033	pCi/g	U

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0009	Thorium-230	0.3	1	pCi/g	U
5110M0009	Tritium	199	23	pCi/sample	=
5110M0009	Uranium-233/234	-0.01	0.014	pCi/g	U
5110M0009	Uranium-235/236	0.008	0.011	pCi/g	U
5110M0009	Uranium-238	0.051	0.022	pCi/g	=
5110M0010	Actinium-228	0.039	0.048	pCi/g	U
5110M0010	Americium-241	704	29	pCi/g	=
5110M0010	Barium-133	3.85	0.22	pCi/g	=
5110M0010	Carbon-14	1314	39	pCi/sample	=
5110M0010	Cesium-137	1.67	0.11	pCi/g	=
5110M0010	Cobalt-60	-0.006	0.012	pCi/g	U
5110M0010	Curium-243/244	0.6	1.2	pCi/g	U
5110M0010	Europium-152	2.01	0.13	pCi/g	=
5110M0010	Europium-154	0.315	0.056	pCi/g	=
5110M0010	Europium-155	0.07	0.044	pCi/g	U
5110M0010	Iodine-129	9.96	0.74	pCi/g	=
5110M0010	Krypton-85	-2.6	1.4	pCi/g	UJ
5110M0010	Lead-212	-0.001	0.018	pCi/g	U
5110M0010	Lead-214	-0.016	0.02	pCi/g	U
5110M0010	Neptunium-239	0.03	0.045	pCi/g	U
5110M0010	Nickel-63	4.1	1.8	pCi/g	=
5110M0010	Plutonium-238	0.146	0.038	pCi/g	=
5110M0010	Plutonium-239/240	0.77	0.08	pCi/g	=
5110M0010	Plutonium-241	5.5	5.2	pCi/g	U
5110M0010	Plutonium-242	0.102	0.03	pCi/g	=
5110M0010	Plutonium-244	0.004	0.01	pCi/g	U
5110M0010	Potassium-40	10.49	0.71	pCi/g	=
5110M0010	Protactinium-233	0.203	0.018	pCi/g	=
5110M0010	Radioactive Strontium (Total)	57.9	1.4	pCi/g	=
5110M0010	Technetium-99	15640	30	pCi/g	=
5110M0010	Thorium-229	-0.013	0.089	pCi/g	U
5110M0010	Thorium-230	13.2	5	pCi/g	=
5110M0010	Tritium	1586	64	pCi/sample	=
5110M0010	Uranium-233/234	1.9	1.5	pCi/g	=
5110M0010	Uranium-235/236	0.3	0.77	pCi/g	U
5110M0010	Uranium-238	0.9	1.1	pCi/g	U
5110M0011	Actinium-228	0.012	0.04	pCi/g	U
5110M0011	Americium-241	0.013	0.02	pCi/g	U
5110M0011	Barium-133	0	0.012	pCi/g	U

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0011	Carbon-14	7.5	4	pCi/sample	=
5110M0011	Cesium-137	0.312	0.019	pCi/g	J
5110M0011	Cobalt-60	0.023	0.01	pCi/g	U
5110M0011	Curium-243/244	-0.022	0.013	pCi/g	U
5110M0011	Europium-152	0.701	0.044	pCi/g	J
5110M0011	Europium-154	0.219	0.034	pCi/g	=
5110M0011	Europium-155	0.012	0.021	pCi/g	U
5110M0011	Iodine-129	3.59	0.16	pCi/g	J
5110M0011	Krypton-85	-1	1.4	pCi/g	U
5110M0011	Lead-212	0.011	0.015	pCi/g	U
5110M0011	Lead-214	0.004	0.02	pCi/g	U
5110M0011	Neptunium-239	0.035	0.019	pCi/g	UJ
5110M0011	Nickel-63	3.7	1.8	pCi/g	=
5110M0011	Plutonium-238	0.007	0.017	pCi/g	U
5110M0011	Plutonium-239/240	0.0055	0.008	pCi/g	U
5110M0011	Plutonium-241	-0.3	4.1	pCi/g	U
5110M0011	Plutonium-242	-0.0036	0.0036	pCi/g	U
5110M0011	Plutonium-244	0.0018	0.005	pCi/g	U
5110M0011	Potassium-40	-0.04	0.16	pCi/g	U
5110M0011	Protactinium-233	0.005	0.017	pCi/g	U
5110M0011	Radioactive Strontium (Total)	0.14	0.23	pCi/g	U
5110M0011	Technetium-99	10.9	1.2	pCi/g	=
5110M0011	Thorium-229	-0.022	0.057	pCi/g	U
5110M0011	Thorium-230	-0.6	1.6	pCi/g	U
5110M0011	Tritium	10.1	8.5	pCi/sample	U
5110M0011	Uranium-233/234	0.015	0.012	pCi/g	U
5110M0011	Uranium-235/236	-0.0045	0.0044	pCi/g	U
5110M0011	Uranium-238	0.009	0.011	pCi/g	U
5110M0012	Actinium-228	0.15	0.28	pCi/g	U
5110M0012	Americium-241	26.9	0.9	pCi/g	=
5110M0012	Barium-133	20.3	0.78	pCi/g	=
5110M0012	Carbon-14	30	6.4	pCi/sample	=
5110M0012	Cesium-137	55.9	1.5	pCi/g	=
5110M0012	Cobalt-60	0.233	0.082	pCi/g	=
5110M0012	Curium-243/244	32.8	1	pCi/g	=
5110M0012	Europium-152	0.38	0.31	pCi/g	U
5110M0012	Europium-154	-0.023	0.097	pCi/g	U
5110M0012	Europium-155	3.03	0.27	pCi/g	=
5110M0012	Iodine-129	-2	1.4	pCi/g	UJ

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0012	Krypton-85	-23	17	pCi/g	UJ
5110M0012	Lead-212	-0.09	0.17	pCi/g	U
5110M0012	Lead-214	-0.85	0.25	pCi/g	UJ
5110M0012	Neptunium-239	2.7	0.37	pCi/g	=
5110M0012	Nickel-63	58200	100	pCi/g	=
5110M0012	Plutonium-238	2.09	0.12	pCi/g	=
5110M0012	Plutonium-239/240	1.14	0.09	pCi/g	=
5110M0012	Plutonium-241	1	4.1	pCi/g	U
5110M0012	Plutonium-242	7.45	0.23	pCi/g	=
5110M0012	Plutonium-244	0.257	0.044	pCi/g	=
5110M0012	Potassium-40	81.6	3.4	pCi/g	=
5110M0012	Protactinium-233	7.45	0.36	pCi/g	=
5110M0012	Radioactive Strontium (Total)	14.21	0.73	pCi/g	=
5110M0012	Technetium-99	31.8	1.7	pCi/g	=
5110M0012	Thorium-229	-0.15	0.73	pCi/g	U
5110M0012	Thorium-230	-24	34	pCi/g	U
5110M0012	Tritium	42	12	pCi/sample	=
5110M0012	Uranium-233/234	1340	40	pCi/g	=
5110M0012	Uranium-235/236	45.4	7.3	pCi/g	=
5110M0012	Uranium-238	36.4	5.9	pCi/g	=
5110M0013	Actinium-228	0.1	0.14	pCi/g	U
5110M0013	Americium-241	6.17	0.2	pCi/g	=
5110M0013	Barium-133	54.2	3.1	pCi/g	=
5110M0013	Carbon-14	2870	10	pCi/g	=
5110M0013	Cesium-137	89	5.7	pCi/g	=
5110M0013	Cobalt-60	0.364	0.059	pCi/g	=
5110M0013	Curium-243/244	5.94	0.2	pCi/g	=
5110M0013	Europium-152	-0.09	0.22	pCi/g	U
5110M0013	Europium-154	-0.06	0.18	pCi/g	U
5110M0013	Europium-155	1.9	0.21	pCi/g	=
5110M0013	Iodine-129	-0.27	0.48	pCi/g	U
5110M0013	Krypton-85	-7.3	9	pCi/g	U
5110M0013	Lead-212	0.19	0.14	pCi/g	U
5110M0013	Lead-214	-0.16	0.16	pCi/g	U
5110M0013	Neptunium-239	1.7	0.26	pCi/g	=
5110M0013	Nickel-63	112600	200	pCi/g	=
5110M0013	Plutonium-238	0.476	0.057	pCi/g	=
5110M0013	Plutonium-239/240	0.458	0.055	pCi/g	=
5110M0013	Plutonium-241	5.1	4.4	pCi/g	U

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0013	Plutonium-242	10.49	0.26	pCi/g	=
5110M0013	Plutonium-244	0.728	0.069	pCi/g	=
5110M0013	Potassium-40	53.6	3.6	pCi/g	=
5110M0013	Protactinium-233	20.2	1.2	pCi/g	=
5110M0013	Radioactive Strontium (Total)	12.58	0.69	pCi/g	=
5110M0013	Technetium-99	25	1.6	pCi/g	=
5110M0013	Thorium-229	-0.04	0.66	pCi/g	U
5110M0013	Thorium-230	-17	14	pCi/g	UJ
5110M0013	Tritium	3.7	1	pCi/g	J
5110M0013	Uranium-233/234	699	20	pCi/g	=
5110M0013	Uranium-235/236	23.1	4.1	pCi/g	=
5110M0013	Uranium-238	12.6	2.7	pCi/g	=
5110M0014	Actinium-228	-0.03	0.11	pCi/g	U
5110M0014	Americium-241	9.72	0.27	pCi/g	=
5110M0014	Barium-133	-0.009	0.025	pCi/g	U
5110M0014	Carbon-14	29.2	2	pCi/g	=
5110M0014	Cesium-137	0.455	0.034	pCi/g	=
5110M0014	Cobalt-60	-0.001	0.03	pCi/g	U
5110M0014	Curium-243/244	0.006	0.0078	pCi/g	U
5110M0014	Europium-152	0.302	0.064	pCi/g	=
5110M0014	Europium-154	0.307	0.066	pCi/g	=
5110M0014	Europium-155	0.041	0.046	pCi/g	U
5110M0014	Iodine-129	1.28	0.27	pCi/g	=
5110M0014	Krypton-85	-7.3	3.8	pCi/g	UJ
5110M0014	Lead-212	0.034	0.03	pCi/g	U
5110M0014	Lead-214	0.143	0.046	pCi/g	=
5110M0014	Neptunium-239	-0.005	0.042	pCi/g	U
5110M0014	Nickel-63	29.1	2.9	pCi/g	=
5110M0014	Plutonium-238	0.0081	0.0089	pCi/g	U
5110M0014	Plutonium-239/240	0.018	0.013	pCi/g	U
5110M0014	Plutonium-241	-0.5	3.9	pCi/g	U
5110M0014	Plutonium-242	0.004	0.0056	pCi/g	U
5110M0014	Plutonium-244	0	0.004	pCi/g	U
5110M0014	Potassium-40	39.9	1.5	pCi/g	=
5110M0014	Protactinium-233	-0.01	0.038	pCi/g	U
5110M0014	Radioactive Strontium (Total)	1.35	0.3	pCi/g	=
5110M0014	Technetium-99	3.42	0.9	pCi/g	=
5110M0014	Thorium-229	-0.15	0.13	pCi/g	UJ
5110M0014	Thorium-230	2.7	1.4	pCi/g	U

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0014	Tritium	0.19	0.87	pCi/g	U
5110M0014	Uranium-233/234	2.38	0.14	pCi/g	=
5110M0014	Uranium-235/236	0.081	0.029	pCi/g	=
5110M0014	Uranium-238	0.264	0.046	pCi/g	=
5110M0015	Actinium-228	-0.002	0.024	pCi/g	U
5110M0015	Americium-241	0.171	0.036	pCi/g	=
5110M0015	Barium-133	-0.052	0.036	pCi/g	UJ
5110M0015	Carbon-14	4120	20	pCi/g	=
5110M0015	Cesium-137	5.47	0.33	pCi/g	=
5110M0015	Cobalt-60	-0.001	0.017	pCi/g	U
5110M0015	Curium-243/244	0.002	0.013	pCi/g	U
5110M0015	Europium-152	0.091	0.029	pCi/g	U
5110M0015	Europium-154	0.074	0.076	pCi/g	U
5110M0015	Europium-155	0.238	0.038	pCi/g	=
5110M0015	Iodine-129	-2.64	0.27	pCi/g	UJ
5110M0015	Krypton-85	-2	2.4	pCi/g	U
5110M0015	Lead-212	0.081	0.042	pCi/g	U
5110M0015	Lead-214	0.033	0.029	pCi/g	U
5110M0015	Neptunium-239	0.263	0.081	pCi/g	=
5110M0015	Nickel-63	88.3	4.6	pCi/g	=
5110M0015	Plutonium-238	0.014	0.013	pCi/g	U
5110M0015	Plutonium-239/240	0.0036	0.005	pCi/g	U
5110M0015	Plutonium-241	2.7	4	pCi/g	U
5110M0015	Plutonium-242	3.03	0.14	pCi/g	=
5110M0015	Plutonium-244	0.009	0.0087	pCi/g	U
5110M0015	Potassium-40	21.3	1.4	pCi/g	=
5110M0015	Protactinium-233	3.69	0.21	pCi/g	=
5110M0015	Radioactive Strontium (Total)	2.14	0.33	pCi/g	=
5110M0015	Technetium-99	44.6	2	pCi/g	=
5110M0015	Thorium-229	-0.01	0.15	pCi/g	U
5110M0015	Thorium-230	1.6	4.7	pCi/g	U
5110M0015	Tritium	-0.04	0.93	pCi/g	U
5110M0015	Uranium-233/234	0.314	0.052	pCi/g	=
5110M0015	Uranium-235/236	0.016	0.013	pCi/g	=
5110M0015	Uranium-238	0.171	0.038	pCi/g	=
5110M0016	Actinium-228	0.06	0.11	pCi/g	U
5110M0016	Americium-241	3.26	0.15	pCi/g	=
5110M0016	Barium-133	1.357	0.084	pCi/g	=
5110M0016	Carbon-14	89600	100	pCi/g	=

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0016	Cesium-137	17.2	1.1	pCi/g	=
5110M0016	Cobalt-60	0.027	0.027	pCi/g	U
5110M0016	Curium-243/244	0.288	0.047	pCi/g	=
5110M0016	Europium-152	11.27	0.66	pCi/g	=
5110M0016	Europium-154	3.82	0.26	pCi/g	=
5110M0016	Europium-155	0.207	0.096	pCi/g	U
5110M0016	Iodine-129	17.6	1.1	pCi/g	=
5110M0016	Krypton-85	-4	3.8	pCi/g	UJ
5110M0016	Lead-212	8.76	0.62	pCi/g	=
5110M0016	Lead-214	0.019	0.025	pCi/g	U
5110M0016	Neptunium-239	0.184	0.088	pCi/g	U
5110M0016	Nickel-63	33.4	3.1	pCi/g	=
5110M0016	Plutonium-238	0.165	0.039	pCi/g	=
5110M0016	Plutonium-239/240	0.215	0.043	pCi/g	=
5110M0016	Plutonium-241	-1	4.3	pCi/g	U
5110M0016	Plutonium-242	0.142	0.036	pCi/g	=
5110M0016	Plutonium-244	0.013	0.011	pCi/g	U
5110M0016	Potassium-40	15.3	1	pCi/g	=
5110M0016	Protactinium-233	0.158	0.06	pCi/g	=
5110M0016	Radioactive Strontium (Total)	5.1	0.46	pCi/g	=
5110M0016	Technetium-99	201.1	4	pCi/g	=
5110M0016	Thorium-229	0.007	0.083	pCi/g	U
5110M0016	Thorium-230	1.7	6.6	pCi/g	U
5110M0016	Tritium	8.9	1.2	pCi/g	=
5110M0016	Uranium-233/234	0.42	0.15	pCi/g	=
5110M0016	Uranium-235/236	0.072	0.071	pCi/g	=
5110M0016	Uranium-238	0.42	0.15	pCi/g	=
5110M0017	Actinium-228	0.039	0.041	pCi/g	U
5110M0017	Americium-241	102	2	pCi/g	=
5110M0017	Barium-133	9.58	0.35	pCi/g	=
5110M0017	Carbon-14	1392	10	pCi/g	=
5110M0017	Cesium-137	1.842	0.056	pCi/g	=
5110M0017	Cobalt-60	-0.0043	0.0093	pCi/g	U
5110M0017	Curium-243/244	1.37	0.22	pCi/g	=
5110M0017	Europium-152	1.171	0.065	pCi/g	=
5110M0017	Europium-154	0.384	0.04	pCi/g	=
5110M0017	Europium-155	0.07	0.021	pCi/g	U
5110M0017	Iodine-129	5.24	0.38	pCi/g	=
5110M0017	Krypton-85	-4	1.9	pCi/g	UJ

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0017	Lead-212	0.021	0.023	pCi/g	U
5110M0017	Lead-214	0.007	0.026	pCi/g	U
5110M0017	Neptunium-239	0.063	0.02	pCi/g	U
5110M0017	Nickel-63	3.3	1.7	pCi/g	=
5110M0017	Plutonium-238	0.78	0.08	pCi/g	=
5110M0017	Plutonium-239/240	4.41	0.18	pCi/g	=
5110M0017	Plutonium-241	42.3	7.1	pCi/g	=
5110M0017	Plutonium-242	0.162	0.037	pCi/g	=
5110M0017	Plutonium-244	0	0.0068	pCi/g	U
5110M0017	Potassium-40	0.18	0.15	pCi/g	U
5110M0017	Protactinium-233	0.244	0.028	pCi/g	=
5110M0017	Radioactive Strontium (Total)	8.33	0.57	pCi/g	=
5110M0017	Technetium-99	487	6	pCi/g	=
5110M0017	Thorium-229	-0.13	0.12	pCi/g	UJ
5110M0017	Thorium-230	-2.8	2.9	pCi/g	U
5110M0017	Tritium	46.4	5.1	pCi/g	=
5110M0017	Uranium-233/234	0.186	0.039	pCi/g	=
5110M0017	Uranium-235/236	0.0051	0.0086	pCi/g	U
5110M0017	Uranium-238	0.111	0.03	pCi/g	=
5110M0018	Actinium-228	-0.005	0.021	pCi/g	U
5110M0018	Americium-241	15.9	0.7	pCi/g	=
5110M0018	Barium-133	23.9	1.4	pCi/g	=
5110M0018	Carbon-14	633000	0	pCi/g	J
5110M0018	Cesium-137	15.9	1	pCi/g	=
5110M0018	Cobalt-60	0.01	0.005	pCi/g	U
5110M0018	Curium-243/244	0.31	0.1	pCi/g	=
5110M0018	Europium-152	2.68	0.17	pCi/g	=
5110M0018	Europium-154	1.98	0.15	pCi/g	=
5110M0018	Europium-155	0.068	0.066	pCi/g	U
5110M0018	Iodine-129	1.6	0.29	pCi/g	=
5110M0018	Krypton-85	0.2	1.9	pCi/g	U
5110M0018	Lead-212	0.047	0.017	pCi/g	U
5110M0018	Lead-214	0.056	0.021	pCi/g	U
5110M0018	Neptunium-239	-0.121	0.096	pCi/g	UJ
5110M0018	Nickel-63	1955	21	pCi/g	=
5110M0018	Plutonium-238	0.072	0.027	pCi/g	=
5110M0018	Plutonium-239/240	0.2	0.039	pCi/g	=
5110M0018	Plutonium-241	0.9	4	pCi/g	U
5110M0018	Plutonium-242	0.177	0.036	pCi/g	=

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0018	Plutonium-244	0.0055	0.0072	pCi/g	U
5110M0018	Potassium-40	0.07	0.11	pCi/g	U
5110M0018	Protactinium-233	0.236	0.024	pCi/g	=
5110M0018	Radioactive Strontium (Total)	6.25	0.48	pCi/g	=
5110M0018	Technetium-99	73.1	2.5	pCi/g	=
5110M0018	Thorium-229	-0.04	0.16	pCi/g	U
5110M0018	Thorium-230	20.1	5.3	pCi/g	=
5110M0018	Tritium	122	27	pCi/g	=
5110M0018	Uranium-233/234	18	0.4	pCi/g	=
5110M0018	Uranium-235/236	0.66	0.076	pCi/g	=
5110M0018	Uranium-238	0.86	0.08	pCi/g	=
5110M0019	Actinium-228	0.047	0.029	pCi/g	U
5110M0019	Americium-241	0.52	0.064	pCi/g	=
5110M0019	Barium-133	0.643	0.04	pCi/g	=
5110M0019	Carbon-14	388	5	pCi/g	=
5110M0019	Cesium-137	3.77	0.24	pCi/g	=
5110M0019	Cobalt-60	0.0036	0.0062	pCi/g	U
5110M0019	Curium-243/244	0.008	0.02	pCi/g	U
5110M0019	Europium-152	0.056	0.027	pCi/g	U
5110M0019	Europium-154	0.025	0.024	pCi/g	U
5110M0019	Europium-155	-0.013	0.029	pCi/g	U
5110M0019	Iodine-129	-0.114	0.086	pCi/g	U
5110M0019	Krypton-85	-1.7	1	pCi/g	UJ
5110M0019	Lead-212	0.0426	0.0099	pCi/g	=
5110M0019	Lead-214	0.057	0.012	pCi/g	=
5110M0019	Neptunium-239	-0.034	0.027	pCi/g	UJ
5110M0019	Nickel-63	189	7	pCi/g	=
5110M0019	Plutonium-238	-0.031	0.014	pCi/g	UJ
5110M0019	Plutonium-239/240	0.016	0.013	pCi/g	U
5110M0019	Plutonium-241	2.7	4.3	pCi/g	U
5110M0019	Plutonium-242	0.008	0.011	pCi/g	U
5110M0019	Plutonium-244	-0.014	0.005	pCi/g	UJ
5110M0019	Potassium-40	0.21	0.12	pCi/g	U
5110M0019	Protactinium-233	0.0107	0.0069	pCi/g	U
5110M0019	Radioactive Strontium (Total)	0.23	0.22	pCi/g	U
5110M0019	Technetium-99	42.8	1.9	pCi/g	=
5110M0019	Thorium-229	-0.027	0.058	pCi/g	U
5110M0019	Thorium-230	0.8	1.5	pCi/g	U
5110M0019	Tritium	-1.8	2.5	pCi/g	U

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0019	Uranium-233/234	30.9	1.8	pCi/g	=
5110M0019	Uranium-235/236	1.17	0.39	pCi/g	=
5110M0019	Uranium-238	1.87	0.44	pCi/g	=
5110M0020	Actinium-228	0.011	0.044	pCi/g	U
5110M0020	Americium-241	0.204	0.041	pCi/g	=
5110M0020	Barium-133	0.008	0.01	pCi/g	U
5110M0020	Carbon-14	54.1	8.3	pCi/sample	=
5110M0020	Cesium-137	0.989	0.036	pCi/g	=
5110M0020	Cobalt-60	0.006	0.01	pCi/g	U
5110M0020	Curium-243/244	0.014	0.019	pCi/g	U
5110M0020	Europium-152	1.776	0.078	pCi/g	=
5110M0020	Europium-154	0.048	0.057	pCi/g	U
5110M0020	Europium-155	0.164	0.036	pCi/g	=
5110M0020	Iodine-129	9.35	0.33	pCi/g	=
5110M0020	Krypton-85	-2.2	1.9	pCi/g	UJ
5110M0020	Lead-212	0.011	0.017	pCi/g	U
5110M0020	Lead-214	-0.001	0.029	pCi/g	U
5110M0020	Neptunium-239	-0.021	0.011	pCi/g	UJ
5110M0020	Nickel-63	1.5	1.6	pCi/g	U
5110M0020	Plutonium-238	0.031	0.023	pCi/g	U
5110M0020	Plutonium-239/240	-0.002	0.008	pCi/g	U
5110M0020	Plutonium-241	4.7	4.2	pCi/g	U
5110M0020	Plutonium-242	0.443	0.055	pCi/g	=
5110M0020	Plutonium-244	0.0108	0.0086	pCi/g	=
5110M0020	Potassium-40	-0.08	0.16	pCi/g	U
5110M0020	Protactinium-233	0.752	0.035	pCi/g	=
5110M0020	Radioactive Strontium (Total)	4.71	0.44	pCi/g	=
5110M0020	Technetium-99	140.4	3.3	pCi/g	=
5110M0020	Thorium-229	-0.031	0.068	pCi/g	U
5110M0020	Thorium-230	1.2	2.3	pCi/g	U
5110M0020	Tritium	52	13	pCi/sample	=
5110M0020	Uranium-233/234	0.011	0.011	pCi/g	U
5110M0020	Uranium-235/236	0.0022	0.0042	pCi/g	U
5110M0020	Uranium-238	0.072	0.022	pCi/g	=
5110M0021	Actinium-228	0.002	0.016	pCi/g	U
5110M0021	Americium-241	1.21	0.1	pCi/g	=
5110M0021	Barium-133	0.0068	0.0031	pCi/g	U
5110M0021	Carbon-14	2.2	3.3	pCi/sample	U
5110M0021	Cesium-137	0.1142	0.0091	pCi/g	=

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0021	Cobalt-60	0.0077	0.0035	pCi/g	=
5110M0021	Curium-243/244	-0.008	0.009	pCi/g	U
5110M0021	Europium-152	0.0158	0.0071	pCi/g	U
5110M0021	Europium-154	0.003	0.015	pCi/g	U
5110M0021	Europium-155	-0.0021	0.0084	pCi/g	U
5110M0021	Iodine-129	0.087	0.029	pCi/g	=
5110M0021	Krypton-85	-0.49	0.44	pCi/g	UJ
5110M0021	Lead-212	-0.0006	0.0038	pCi/g	U
5110M0021	Lead-214	0.0095	0.0049	pCi/g	U
5110M0021	Neptunium-239	0.0026	0.0075	pCi/g	U
5110M0021	Nickel-63	11.8	2.3	pCi/g	=
5110M0021	Plutonium-238	0.006	0.013	pCi/g	U
5110M0021	Plutonium-239/240	0.013	0.013	pCi/g	U
5110M0021	Plutonium-241	-0.4	4.6	pCi/g	U
5110M0021	Plutonium-242	0.013	0.01	pCi/g	=
5110M0021	Plutonium-244	0.0022	0.0042	pCi/g	U
5110M0021	Potassium-40	0.517	0.059	pCi/g	=
5110M0021	Protactinium-233	0.0027	0.0066	pCi/g	U
5110M0021	Radioactive Strontium (Total)	0.12	0.2	pCi/g	U
5110M0021	Technetium-99	0.82	0.79	pCi/g	U
5110M0021	Thorium-229	-0.017	0.019	pCi/g	U
5110M0021	Thorium-230	0.55	0.57	pCi/g	U
5110M0021	Tritium	6.5	6.8	pCi/sample	U
5110M0021	Uranium-233/234	0.125	0.031	pCi/g	=
5110M0021	Uranium-235/236	0.0025	0.0069	pCi/g	U
5110M0021	Uranium-238	0.024	0.016	pCi/g	U
5110M0022	Americium-241	0.323	0.478	pCi/g	U
5110M0022	Americium-243	0.112	0.0955	pCi/g	U
5110M0022	Barium-133	-0.0374	0.0709	pCi/g	U
5110M0022	Carbon-14	45.7	94.4	pCi/g	U
5110M0022	Cesium-137	2.33	0.168	pCi/g	=
5110M0022	Cobalt-60	0.00969	0.048	pCi/g	U
5110M0022	Curium-242	0	0.228	pCi/g	U
5110M0022	Curium-243/244	0.0377	0.715	pCi/g	U
5110M0022	Curium-245/246	0.0923	0.346	pCi/g	U
5110M0022	Europium-152	-0.093	0.146	pCi/g	U
5110M0022	Europium-154	-0.0992	0.137	pCi/g	U
5110M0022	Europium-155	0.0877	0.146	pCi/g	U
5110M0022	Iodine-129	1.66	4.18	pCi/g	U

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0022	Krypton-85	0	13.8	pCi/g	UJ
5110M0022	Neptunium-237	0.058	0.0996	pCi/g	U
5110M0022	Nickel-63	71.7	92.4	pCi/g	U
5110M0022	Plutonium-238	0.346	0.498	pCi/g	U
5110M0022	Plutonium-239/240	0.19	0.437	pCi/g	U
5110M0022	Plutonium-241	-29.9	91.9	pCi/g	U
5110M0022	Plutonium-242	-0.03	0.259	pCi/g	U
5110M0022	Plutonium-244	-0.03	0.259	pCi/g	U
5110M0022	Potassium-40	0	0.508	pCi/g	UJ
5110M0022	Protactinium-233	0.058	0.0996	pCi/g	U
5110M0022	Radium-226	-0.516	1.04	pCi/g	U
5110M0022	Radium-228	0.115	0.253	pCi/g	U
5110M0022	Strontium-90	3.15	8.67	pCi/g	U
5110M0022	Technetium-99	-35.3	57.1	pCi/g	U
5110M0022	Thorium-228	0.0559	0.175	pCi/g	U
5110M0022	Thorium-229	-0.529	0.774	pCi/g	U
5110M0022	Thorium-230	13.7	31.4	pCi/g	U
5110M0022	Thorium-232	9.97	32.9	pCi/g	U
5110M0022	Tritium	826	970	pCi/g	U
5110M0022	Uranium-233/234	0.126	0.353	pCi/g	U
5110M0022	Uranium-235/236	0.252	0.432	pCi/g	U
5110M0022	Uranium-238	0.0654	0.363	pCi/g	U
5110M0023	Americium-241	-0.13	0.439	pCi/g	U
5110M0023	Americium-243	0.0112	0.045	pCi/g	U
5110M0023	Barium-133	-.00283	0.0624	pCi/g	U
5110M0023	Carbon-14	14	82.2	pCi/g	U
5110M0023	Cesium-137	0.387	0.102	pCi/g	=
5110M0023	Cobalt-60	-.00838	0.0626	pCi/g	U
5110M0023	Curium-242	-0.0367	0.317	pCi/g	U
5110M0023	Curium-243/244	0.15	0.58	pCi/g	U
5110M0023	Curium-245/246	-0.0387	0.334	pCi/g	U
5110M0023	Europium-152	0.0479	0.137	pCi/g	U
5110M0023	Europium-154	0.0163	0.105	pCi/g	U
5110M0023	Europium-155	0.0272	0.114	pCi/g	U
5110M0023	Iodine-129	3.39	3.92	pCi/g	U
5110M0023	Krypton-85	-27.1	15.1	pCi/g	UJ
5110M0023	Neptunium-237	0.0113	0.0869	pCi/g	U
5110M0023	Nickel-63	44.9	58	pCi/g	U
5110M0023	Plutonium-238	0.269	0.618	pCi/g	U

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0023	Plutonium-239/240	-0.0849	0.375	pCi/g	U
5110M0023	Plutonium-241	23.1	134	pCi/g	U
5110M0023	Plutonium-242	0.403	0.712	pCi/g	U
5110M0023	Plutonium-244	-0.0424	0.366	pCi/g	U
5110M0023	Potassium-40	-0.58	0.624	pCi/g	U
5110M0023	Protactinium-233	0.0113	0.0869	pCi/g	U
5110M0023	Radium-226	0.124	1.28	pCi/g	U
5110M0023	Radium-228	-0.0944	0.221	pCi/g	U
5110M0023	Strontium-90	1.3	4.09	pCi/g	U
5110M0023	Technetium-99	-51	36.2	pCi/g	UJ
5110M0023	Thorium-228	0.0659	0.109	pCi/g	U
5110M0023	Thorium-229	0.629	0.654	pCi/g	U
5110M0023	Thorium-230	-2.92	10.1	pCi/g	U
5110M0023	Thorium-232	17	26.7	pCi/g	U
5110M0023	Tritium	674	839	pCi/g	U
5110M0023	Uranium-233/234	-0.0825	0.365	pCi/g	U
5110M0023	Uranium-235/236	-0.0827	0.366	pCi/g	U
5110M0023	Uranium-238	0.131	0.49	pCi/g	U
5110M0024	Americium-241	-0.154	0.217	pCi/g	U
5110M0024	Americium-243	-0.0727	0.0768	pCi/g	U
5110M0024	Barium-133	-0.0207	0.0528	pCi/g	U
5110M0024	Carbon-14	4.01	78.1	pCi/g	U
5110M0024	Cesium-137	0.0957	0.0908	pCi/g	=
5110M0024	Cobalt-60	0.0275	0.0515	pCi/g	U
5110M0024	Curium-242	0	0.196	pCi/g	U
5110M0024	Curium-243/244	0.296	0.405	pCi/g	U
5110M0024	Curium-245/246	0.184	0.362	pCi/g	U
5110M0024	Europium-152	-0.0896	0.118	pCi/g	U
5110M0024	Europium-154	-0.0339	0.17	pCi/g	U
5110M0024	Europium-155	0.0175	0.13	pCi/g	U
5110M0024	Iodine-129	0.0469	3.56	pCi/g	U
5110M0024	Krypton-85	21.5	11.2	pCi/g	U
5110M0024	Neptunium-237	-0.0149	0.0836	pCi/g	U
5110M0024	Nickel-63	-6.18	84.4	pCi/g	U
5110M0024	Plutonium-238	0.258	0.508	pCi/g	U
5110M0024	Plutonium-239/240	0.258	0.508	pCi/g	U
5110M0024	Plutonium-241	29.6	112	pCi/g	U
5110M0024	Plutonium-242	0.0762	0.423	pCi/g	U
5110M0024	Plutonium-244	0.147	0.412	pCi/g	U

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0024	Potassium-40	-0.126	0.631	pCi/g	U
5110M0024	Protactinium-233	-0.0149	0.0836	pCi/g	U
5110M0024	Radium-226	0.622	1.39	pCi/g	U
5110M0024	Radium-228	-0.127	0.201	pCi/g	U
5110M0024	Strontium-90	3.38	10.9	pCi/g	U
5110M0024	Technetium-99	-82.5	57.5	pCi/g	UJ
5110M0024	Thorium-228	0.034	0.114	pCi/g	U
5110M0024	Thorium-229	0.000554	0.671	pCi/g	U
5110M0024	Thorium-230	-2.43	15.6	pCi/g	U
5110M0024	Thorium-232	15.6	49.8	pCi/g	U
5110M0024	Tritium	1080	865	pCi/g	U
5110M0024	Uranium-233/234	3.04	1.11	pCi/g	=
5110M0024	Uranium-235/236	0.076	0.285	pCi/g	U
5110M0024	Uranium-238	0.0996	0.28	pCi/g	U
5110M0025	Americium-241	0.0793	0.355	pCi/g	U
5110M0025	Americium-243	-0.057	0.0866	pCi/g	U
5110M0025	Barium-133	-0.00973	0.0546	pCi/g	U
5110M0025	Carbon-14	55.5	63.7	pCi/g	U
5110M0025	Cesium-137	0.114	0.082	pCi/g	=
5110M0025	Cobalt-60	-0.0171	0.0487	pCi/g	U
5110M0025	Curium-242	0	0.213	pCi/g	U
5110M0025	Curium-243/244	0.0548	0.354	pCi/g	U
5110M0025	Curium-245/246	-0.0272	0.235	pCi/g	U
5110M0025	Europium-152	-0.0568	0.151	pCi/g	U
5110M0025	Europium-154	0.0611	0.15	pCi/g	U
5110M0025	Europium-155	0.11	0.122	pCi/g	U
5110M0025	Iodine-129	1.08	2.27	pCi/g	U
5110M0025	Krypton-85	-27.2	14.2	pCi/g	UJ
5110M0025	Neptunium-237	-0.029	0.0832	pCi/g	U
5110M0025	Nickel-63	10.3	71.1	pCi/g	U
5110M0025	Plutonium-238	0.559	0.602	pCi/g	U
5110M0025	Plutonium-239/240	-0.0593	0.262	pCi/g	U
5110M0025	Plutonium-241	25.2	94.8	pCi/g	U
5110M0025	Plutonium-242	-0.0889	0.268	pCi/g	U
5110M0025	Plutonium-244	0	0.249	pCi/g	U
5110M0025	Potassium-40	-0.145	0.671	pCi/g	U
5110M0025	Protactinium-233	-0.029	0.0832	pCi/g	U
5110M0025	Radium-226	-0.286	1.17	pCi/g	U
5110M0025	Radium-228	-0.0877	0.189	pCi/g	U

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0025	Strontium-90	5.08	8.58	pCi/g	U
5110M0025	Technetium-99	-11.1	43.8	pCi/g	U
5110M0025	Thorium-228	0.0117	0.0766	pCi/g	U
5110M0025	Thorium-229	-0.0206	0.686	pCi/g	U
5110M0025	Thorium-230	-8.33	14.6	pCi/g	U
5110M0025	Thorium-232	31.8	53.8	pCi/g	U
5110M0025	Tritium	125	596	pCi/g	U
5110M0025	Uranium-233/234	0.229	0.455	pCi/g	U
5110M0025	Uranium-235/236	0.0854	0.32	pCi/g	U
5110M0025	Uranium-238	0	0.226	pCi/g	U
5110M0026	Americium-241	-0.0245	0.368	pCi/g	U
5110M0026	Americium-243	0.0605	0.0968	pCi/g	U
5110M0026	Barium-133	-0.0468	0.0755	pCi/g	U
5110M0026	Carbon-14	31.4	136	pCi/g	U
5110M0026	Cesium-137	0.0519	0.0576	pCi/g	U
5110M0026	Cobalt-60	0.0144	0.0644	pCi/g	U
5110M0026	Curium-242	0.131	0.367	pCi/g	U
5110M0026	Curium-243/244	-0.0581	0.257	pCi/g	U
5110M0026	Curium-245/246	0.213	0.49	pCi/g	U
5110M0026	Europium-152	-0.157	0.169	pCi/g	UJ
5110M0026	Europium-154	0.0437	0.136	pCi/g	U
5110M0026	Europium-155	-0.0863	0.163	pCi/g	U
5110M0026	Iodine-129	2.09	3.38	pCi/g	U
5110M0026	Krypton-85	28.7	15.5	pCi/g	U
5110M0026	Neptunium-237	0.017	0.109	pCi/g	U
5110M0026	Nickel-63	-23.6	102	pCi/g	U
5110M0026	Plutonium-238	0.615	0.627	pCi/g	U
5110M0026	Plutonium-239/240	0.326	0.517	pCi/g	U
5110M0026	Plutonium-241	-42.2	70.2	pCi/g	U
5110M0026	Plutonium-242	0.00516	0.383	pCi/g	U
5110M0026	Plutonium-244	0	0.26	pCi/g	U
5110M0026	Potassium-40	-0.0441	0.622	pCi/g	U
5110M0026	Protactinium-233	0.017	0.109	pCi/g	U
5110M0026	Radium-226	1.29	1.62	pCi/g	UJ
5110M0026	Radium-228	-0.0133	0.24	pCi/g	U
5110M0026	Strontium-90	0.304	10.1	pCi/g	U
5110M0026	Technetium-99	30.9	78.4	pCi/g	U
5110M0026	Thorium-228	0.0938	0.132	pCi/g	U
5110M0026	Thorium-229	-0.067	0.961	pCi/g	U

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0026	Thorium-230	10.6	22	pCi/g	U
5110M0026	Thorium-232	29.8	60.1	pCi/g	U
5110M0026	Tritium	1440	1180	pCi/g	U
5110M0026	Uranium-233/234	0.0907	0.34	pCi/g	U
5110M0026	Uranium-235/236	0.091	0.341	pCi/g	U
5110M0026	Uranium-238	0	0.241	pCi/g	U
5110M0027	Americium-241	-0.0818	0.362	pCi/g	U
5110M0027	Americium-243	-0.00867	0.0699	pCi/g	U
5110M0027	Barium-133	-0.01	0.054	pCi/g	U
5110M0027	Carbon-14	55.4	122	pCi/g	U
5110M0027	Cesium-137	0.0361	0.046	pCi/g	U
5110M0027	Cobalt-60	-0.00116	0.0405	pCi/g	U
5110M0027	Curium-242	0	0.366	pCi/g	U
5110M0027	Curium-243/244	-0.121	0.366	pCi/g	U
5110M0027	Curium-245/246	0	0.393	pCi/g	U
5110M0027	Europium-152	0.0115	0.102	pCi/g	U
5110M0027	Europium-154	-0.0121	0.0993	pCi/g	U
5110M0027	Europium-155	0.0658	0.126	pCi/g	U
5110M0027	Iodine-129	3.09	3.63	pCi/g	U
5110M0027	Krypton-85	0	10.7	pCi/g	UJ
5110M0027	Neptunium-237	0.027	0.0703	pCi/g	U
5110M0027	Nickel-63	23.3	91.9	pCi/g	U
5110M0027	Plutonium-238	0.518	0.63	pCi/g	U
5110M0027	Plutonium-239/240	-0.0922	0.279	pCi/g	U
5110M0027	Plutonium-241	16.5	74.3	pCi/g	U
5110M0027	Plutonium-242	-0.123	0.285	pCi/g	U
5110M0027	Plutonium-244	0	0.258	pCi/g	U
5110M0027	Potassium-40	0.547	0.459	pCi/g	U
5110M0027	Protactinium-233	0.027	0.0703	pCi/g	U
5110M0027	Radium-226	-0.0901	0.891	pCi/g	U
5110M0027	Radium-228	0.196	0.199	pCi/g	U
5110M0027	Strontium-90	5.32	7.66	pCi/g	U
5110M0027	Technetium-99	29	69.6	pCi/g	U
5110M0027	Thorium-228	0.0153	0.0715	pCi/g	U
5110M0027	Thorium-229	-0.547	0.536	pCi/g	U
5110M0027	Thorium-230	-13.1	15.8	pCi/g	U
5110M0027	Thorium-232	5.08	43.7	pCi/g	U
5110M0027	Tritium	-268	924	pCi/g	U
5110M0027	Uranium-233/234	0.441	0.559	pCi/g	U

Radiological data for Bldg. 3032 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5110M0027	Uranium-235/236	0.161	0.443	pCi/g	U
5110M0027	Uranium-238	0.251	0.43	pCi/g	U

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit
UJ = Analyte, compound or nuclide not detected above the reported detection limit, and the reported detection limit is approximated due to quality deficiency
= = Validated result, which is detected and unqualified

TCLP and total metals data for Bldg. 3033

Sample ID	Chemical name	Result	Units	Validation qualifier
5111M0006	Arsenic	0.25	mg/L	U
5111M0006	Barium	5	mg/L	U
5111M0006	Cadmium	0.14	mg/L	=
5111M0006	Chromium	0.25	mg/L	U
5111M0006	Lead	0.25	mg/L	U
5111M0006	Selenium	0.05	mg/L	U
5111M0006	Silver	0.25	mg/L	U
5111M0006A	Mercury	0.002	mg/L	U
5111M0007	Arsenic	0.25	mg/L	U
5111M0007	Barium	5	mg/L	U
5111M0007	Cadmium	0.22	mg/L	=
5111M0007	Chromium	0.25	mg/L	U
5111M0007	Lead	1.3	mg/L	=
5111M0007	Selenium	0.05	mg/L	U
5111M0007	Silver	0.25	mg/L	U
5111M0007A	Mercury	0.002	mg/L	U
5111M0008	Arsenic	0.25	mg/L	U
5111M0008	Barium	5	mg/L	U
5111M0008	Cadmium	0.07	mg/L	=
5111M0008	Chromium	0.25	mg/L	U
5111M0008	Lead	0.25	mg/L	U
5111M0008	Selenium	0.05	mg/L	U
5111M0008	Silver	0.25	mg/L	U
5111M0008A	Mercury	0.002	mg/L	U
5111M0009	Arsenic	0.25	mg/L	U
5111M0009	Barium	5	mg/L	U
5111M0009	Cadmium	0.18	mg/L	=
5111M0009	Chromium	0.25	mg/L	U
5111M0009	Lead	0.25	mg/L	U
5111M0009	Selenium	0.05	mg/L	U
5111M0009	Silver	0.25	mg/L	U
5111M0009A	Mercury	0.002	mg/L	U
5111M0010	Arsenic	0.25	mg/L	U
5111M0010	Barium	5	mg/L	U
5111M0010	Cadmium	0.05	mg/L	U
5111M0010	Chromium	0.25	mg/L	U
5111M0010	Lead	0.25	mg/L	U
5111M0010	Selenium	0.05	mg/L	UJ
5111M0010	Silver	0.25	mg/L	U

TCLP and total metals data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Units	Validation qualifier
5111M0010A	Mercury	0.002	mg/L	U
5111M0011	Arsenic	0.25	mg/L	U
5111M0011	Barium	5	mg/L	U
5111M0011	Cadmium	0.05	mg/L	U
5111M0011	Chromium	0.25	mg/L	U
5111M0011	Lead	0.25	mg/L	U
5111M0011	Selenium	0.05	mg/L	U
5111M0011	Silver	0.25	mg/L	U
5111M0011A	Mercury	0.002	mg/L	U
5111M0012	Arsenic	0.25	mg/L	U
5111M0012	Barium	5	mg/L	U
5111M0012	Cadmium	0.05	mg/L	U
5111M0012	Chromium	0.25	mg/L	U
5111M0012	Lead	0.25	mg/L	U
5111M0012	Selenium	0.05	mg/L	U
5111M0012	Silver	0.25	mg/L	U
5111M0012A	Mercury	0.002	mg/L	U
5111M0013	Arsenic	0.25	mg/L	U
5111M0013	Barium	5	mg/L	U
5111M0013	Cadmium	0.05	mg/L	U
5111M0013	Chromium	0.25	mg/L	U
5111M0013	Lead	1.3	mg/L	=
5111M0013	Selenium	0.05	mg/L	U
5111M0013	Silver	0.25	mg/L	U
5111M0013A	Mercury	1.14	mg/L	=
5111M0014	Arsenic	0.25	mg/L	U
5111M0014	Barium	5	mg/L	U
5111M0014	Cadmium	2.14	mg/L	=
5111M0014	Chromium	0.3	mg/L	=
5111M0014	Lead	2.64	mg/L	=
5111M0014	Selenium	0.12	mg/L	=
5111M0014	Silver	0.25	mg/L	U
5111M0014A	Mercury	0.002	mg/L	U
5111M0015	Arsenic	0.25	mg/L	U
5111M0015	Barium	5	mg/L	U
5111M0015	Cadmium	0.05	mg/L	U
5111M0015	Chromium	0.25	mg/L	U
5111M0015	Lead	0.25	mg/L	U
5111M0015	Selenium	0.11	mg/L	=

TCLP and total metals data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Units	Validation qualifier
5111M0015	Silver	0.25	mg/L	U
5111M0015A	Mercury	0.002	mg/L	U
5111M0018	Arsenic	0.25	mg/L	U
5111M0018	Barium	5	mg/L	U
5111M0018	Cadmium	0.05	mg/L	U
5111M0018	Chromium	0.25	mg/L	U
5111M0018	Lead	0.25	mg/L	U
5111M0018	Selenium	0.05	mg/L	U
5111M0018	Silver	0.25	mg/L	U
5111M0018A	Mercury	0.002	mg/L	U
5111M0019	Arsenic	0.25	mg/L	U
5111M0019	Barium	5	mg/L	U
5111M0019	Cadmium	0.05	mg/L	U
5111M0019	Chromium	0.25	mg/L	U
5111M0019	Lead	0.25	mg/L	U
5111M0019	Selenium	0.05	mg/L	UJ
5111M0019	Silver	0.25	mg/L	U
5111M0019A	Mercury	0.002	mg/L	U
5111M0020	Arsenic	0.25	mg/L	U
5111M0020	Barium	5	mg/L	U
5111M0020	Cadmium	0.05	mg/L	U
5111M0020	Chromium	0.25	mg/L	U
5111M0020	Lead	0.74	mg/L	=
5111M0020	Selenium	0.05	mg/L	U
5111M0020	Silver	0.25	mg/L	U
5111M0020A	Mercury	0.002	mg/L	U
5111M0021	Arsenic	0.25	mg/L	U
5111M0021	Barium	5	mg/L	U
5111M0021	Cadmium	0.05	mg/L	U
5111M0021	Chromium	0.25	mg/L	U
5111M0021	Lead	2.13	mg/L	=
5111M0021	Selenium	0.05	mg/L	U
5111M0021	Silver	0.25	mg/L	U
5111M0021A	Mercury	0.002	mg/L	U
5111M0023	Arsenic	0.3	mg/L	U
5111M0023	Barium	0.111	mg/L	=
5111M0023	Cadmium	0.05	mg/L	U
5111M0023	Chromium	0.713	mg/L	=
5111M0023	Lead	0.1	mg/L	U

TCLP and total metals data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Units	Validation qualifier
5111M0023	Mercury	0.002	mg/L	UJ
5111M0023	Selenium	0.3	mg/L	U
5111M0023	Silver	0.05	mg/L	U
5111M0025	Arsenic	0.3	mg/L	U
5111M0025	Barium	0.514	mg/L	=
5111M0025	Cadmium	0.05	mg/L	U
5111M0025	Chromium	0.0971	mg/L	=
5111M0025	Lead	0.816	mg/L	=
5111M0025	Mercury	0.002	mg/L	UJ
5111M0025	Selenium	0.3	mg/L	U
5111M0025	Silver	0.05	mg/L	U

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= = Validated result, which is detected and unqualified

Radiological data for Bldg. 3033

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0001	Actinium-228	-0.012	0.02	pCi/g	U
5111M0001	Americium-241	0.064	0.024	pCi/g	=
5111M0001	Barium-133	0.0044	0.0039	pCi/g	U
5111M0001	Carbon-14	7.7	4.4	pCi/sample	=
5111M0001	Cesium-137	0.1784	0.0087	pCi/g	=
5111M0001	Cobalt-60	0.0018	0.0032	pCi/g	U
5111M0001	Curium-243/244	0.0018		pCi/g	U
5111M0001	Europium-152	0.0195	0.0096	pCi/g	U
5111M0001	Europium-154	0.005	0.017	pCi/g	U
5111M0001	Europium-155	0.0013	0.0072	pCi/g	U
5111M0001	Iodine-129	0.08	0.031	pCi/g	=
5111M0001	Krypton-85	-0.7	0.59	pCi/g	UJ
5111M0001	Lead-212	0.0003	0.0042	pCi/g	U
5111M0001	Lead-214	-0.0002	0.0084	pCi/g	U
5111M0001	Neptunium-239	0.0008	0.0064	pCi/g	U
5111M0001	Nickel-63	0.46	0.85	pCi/g	U
5111M0001	Plutonium-238	0.007	0.016	pCi/g	U
5111M0001	Plutonium-239/240	0.0017	0.0067	pCi/g	U
5111M0001	Plutonium-241	1.8	4	pCi/g	U
5111M0001	Plutonium-242	-0.0034	0.0057	pCi/g	U
5111M0001	Plutonium-244	-0.0017	0.0047	pCi/g	U
5111M0001	Potassium-40	0.41	0.075	pCi/g	=
5111M0001	Protactinium-233	-0.0007	0.0062	pCi/g	U
5111M0001	Radioactive Strontium (Total)	0.52	0.38	pCi/g	U
5111M0001	Technetium-99	1.39	0.83	pCi/g	=
5111M0001	Thorium-229	-0.003	0.021	pCi/g	U
5111M0001	Thorium-230	0.41	0.57	pCi/g	U
5111M0001	Tritium	15.4	9.1	pCi/sample	=
5111M0001	Uranium-233/234	0.027	0.021	pCi/g	U
5111M0001	Uranium-235/236	0.0047	0.0065	pCi/g	U
5111M0001	Uranium-238	0.038	0.017	pCi/g	=
5111M0002	Actinium-228	0.028	0.046	pCi/g	U
5111M0002	Americium-241	0.116	0.03	pCi/g	=
5111M0002	Barium-133	0.004	0.013	pCi/g	U
5111M0002	Carbon-14	16.8	5.7	pCi/sample	=
5111M0002	Cesium-137	0.962	0.067	pCi/g	=
5111M0002	Cobalt-60	0.001	0.011	pCi/g	U
5111M0002	Curium-243/244	0.011	0.01	pCi/g	U
5111M0002	Europium-152	0.03	0.029	pCi/g	U

Radiological data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0002	Europium-154	-0.021	0.05	pCi/g	U
5111M0002	Europium-155	0	0.027	pCi/g	U
5111M0002	Iodine-129	-0.028	0.07	pCi/g	U
5111M0002	Krypton-85	-3.8	1.6	pCi/g	UJ
5111M0002	Lead-212	0.019	0.018	pCi/g	U
5111M0002	Lead-214	0.01	0.022	pCi/g	U
5111M0002	Neptunium-239	-0.003	0.025	pCi/g	U
5111M0002	Nickel-63	0.73	0.86	pCi/g	U
5111M0002	Plutonium-238	0.006	0.017	pCi/g	U
5111M0002	Plutonium-239/240	0.056	0.022	pCi/g	=
5111M0002	Plutonium-241	1.8	4.5	pCi/g	U
5111M0002	Plutonium-242	0.012	0.01	pCi/g	U
5111M0002	Plutonium-244	0.002	0.0039	pCi/g	U
5111M0002	Potassium-40	0.04	0.22	pCi/g	U
5111M0002	Protactinium-233	0	0.023	pCi/g	U
5111M0002	Radioactive Strontium (Total)	0.32	0.37	pCi/g	U
5111M0002	Technetium-99	9.9	1.1	pCi/g	=
5111M0002	Thorium-229	0.036	0.064	pCi/g	U
5111M0002	Thorium-230	-0.3	1.1	pCi/g	U
5111M0002	Tritium	39	11	pCi/sample	=
5111M0002	Uranium-233/234	0.128	0.031	pCi/g	=
5111M0002	Uranium-235/236	0.019	0.013	pCi/g	=
5111M0002	Uranium-238	0.079	0.024	pCi/g	=
5111M0003	Actinium-228	-0.7	1.2	pCi/g	U
5111M0003	Americium-241	0.02	0.016	pCi/g	U
5111M0003	Barium-133	0.45	0.38	pCi/g	U
5111M0003	Carbon-14	153	15	pCi/sample	=
5111M0003	Cesium-137	0.13	0.36	pCi/g	U
5111M0003	Cobalt-60	0.14	0.33	pCi/g	U
5111M0003	Curium-243/244	-0.002	0.013	pCi/g	U
5111M0003	Europium-152	-0.31	0.86	pCi/g	U
5111M0003	Europium-154	1.6	1.1	pCi/g	U
5111M0003	Europium-155	0.05	0.69	pCi/g	U
5111M0003	Iodine-129	0.6	3.9	pCi/g	U
5111M0003	Krypton-85	38	58	pCi/g	U
5111M0003	Lead-212	0.45	0.53	pCi/g	U
5111M0003	Lead-214	0.14	0.54	pCi/g	U
5111M0003	Neptunium-239	-0.1	0.62	pCi/g	U
5111M0003	Nickel-63	1.05	0.87	pCi/g	U

Radiological data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0003	Plutonium-238	-0.004	0.016	pCi/g	U
5111M0003	Plutonium-239/240	0.013	0.011	pCi/g	U
5111M0003	Plutonium-241	2.4	4.5	pCi/g	U
5111M0003	Plutonium-242	0.0075	0.0074	pCi/g	=
5111M0003	Plutonium-244	0.0019	0.0064	pCi/g	U
5111M0003	Potassium-40	54	7.5	pCi/g	=
5111M0003	Protactinium-233	0.05	0.57	pCi/g	U
5111M0003	Radioactive Strontium (Total)	0.08	0.37	pCi/g	U
5111M0003	Technetium-99	16510	340	pCi/g	=
5111M0003	Thorium-229	1.6	1.8	pCi/g	U
5111M0003	Thorium-230	66	65	pCi/g	U
5111M0003	Tritium	120	17	pCi/sample	=
5111M0003	Uranium-233/234	-0.004	0.015	pCi/g	U
5111M0003	Uranium-235/236	-0.01	0.005	pCi/g	U
5111M0003	Uranium-238	0.012	0.012	pCi/g	U
5111M0006	Actinium-228	0.041	0.07	pCi/g	U
5111M0006	Americium-241	6.45	0.25	pCi/g	=
5111M0006	Barium-133	0.003	0.011	pCi/g	U
5111M0006	Carbon-14	240000	1000	pCi/g	=
5111M0006	Cesium-137	0.239	0.031	pCi/g	=
5111M0006	Cobalt-60	-0.002	0.025	pCi/g	U
5111M0006	Curium-243/244	0.575	0.079	pCi/g	=
5111M0006	Europium-152	0.063	0.033	pCi/g	U
5111M0006	Europium-154	-0.01	0.072	pCi/g	U
5111M0006	Europium-155	0.04	0.039	pCi/g	U
5111M0006	Iodine-129	0.16	0.22	pCi/g	U
5111M0006	Krypton-85	-3.1	1.8	pCi/g	UJ
5111M0006	Lead-212	-0.026	0.024	pCi/g	UJ
5111M0006	Lead-214	0.015	0.018	pCi/g	U
5111M0006	Neptunium-239	0.052	0.038	pCi/g	U
5111M0006	Nickel-63	648	9	pCi/g	=
5111M0006	Plutonium-238	0.235	0.054	pCi/g	=
5111M0006	Plutonium-239/240	0.609	0.081	pCi/g	=
5111M0006	Plutonium-241	7.1	5.7	pCi/g	U
5111M0006	Plutonium-242	0.003	0.011	pCi/g	U
5111M0006	Plutonium-244	-0.003	0.008	pCi/g	U
5111M0006	Potassium-40	50.1	3.5	pCi/g	=
5111M0006	Protactinium-233	0.009	0.027	pCi/g	U
5111M0006	Radioactive Strontium (Total)	0	0.47	pCi/g	U

Radiological data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0006	Technetium-99	12	1.9	pCi/g	=
5111M0006	Thorium-229	-0.016	0.081	pCi/g	U
5111M0006	Thorium-230	1.6	2.4	pCi/g	U
5111M0006	Tritium	804000	2000	pCi/g	=
5111M0006	Uranium-233/234	0.112	0.034	pCi/g	=
5111M0006	Uranium-235/236	-0.0032	0.0063	pCi/g	U
5111M0006	Uranium-238	0.083	0.029	pCi/g	=
5111M0007	Actinium-228	-0.009	0.021	pCi/g	U
5111M0007	Americium-241	4.6	0.19	pCi/g	=
5111M0007	Barium-133	-0.002	0.019	pCi/g	U
5111M0007	Carbon-14	11190	130	pCi/g	=
5111M0007	Cesium-137	4.33	0.28	pCi/g	=
5111M0007	Cobalt-60	0.363	0.034	pCi/g	=
5111M0007	Curium-243/244	0.106	0.033	pCi/g	=
5111M0007	Europium-152	0.076	0.038	pCi/g	U
5111M0007	Europium-154	-0.041	0.088	pCi/g	U
5111M0007	Europium-155	-0.006	0.034	pCi/g	U
5111M0007	Iodine-129	0.12	0.26	pCi/g	U
5111M0007	Krypton-85	-1.2	2.4	pCi/g	U
5111M0007	Lead-212	0.011	0.021	pCi/g	U
5111M0007	Lead-214	0.029	0.036	pCi/g	U
5111M0007	Neptunium-239	-0.01	0.027	pCi/g	U
5111M0007	Nickel-63	453	7	pCi/g	=
5111M0007	Plutonium-238	4.04	0.19	pCi/g	=
5111M0007	Plutonium-239/240	0.177	0.042	pCi/g	=
5111M0007	Plutonium-241	4.3	4.9	pCi/g	U
5111M0007	Plutonium-242	-0.005	0.01	pCi/g	U
5111M0007	Plutonium-244	-0.0069	0.0078	pCi/g	U
5111M0007	Potassium-40	65.9	2.3	pCi/g	=
5111M0007	Protactinium-233	0.014	0.03	pCi/g	U
5111M0007	Radioactive Strontium (Total)	0.34	0.5	pCi/g	U
5111M0007	Technetium-99	13.5	2	pCi/g	=
5111M0007	Thorium-229	0	0.1	pCi/g	U
5111M0007	Thorium-230	0.4	2.7	pCi/g	U
5111M0007	Tritium	12640	190	pCi/g	=
5111M0007	Uranium-233/234	0.175	0.04	pCi/g	=
5111M0007	Uranium-235/236	0.003	0.01	pCi/g	U
5111M0007	Uranium-238	0.127	0.032	pCi/g	=
5111M0008	Actinium-228	-0.027	0.027	pCi/g	UJ

Radiological data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0008	Americium-241	0.036	0.021	pCi/g	U
5111M0008	Barium-133	-0.0007	0.0075	pCi/g	U
5111M0008	Carbon-14	14.3	6.4	pCi/sample	=
5111M0008	Cesium-137	0.774	0.065	pCi/g	=
5111M0008	Cobalt-60	-0.002	0.031	pCi/g	U
5111M0008	Curium-243/244	0.007	0.013	pCi/g	U
5111M0008	Europium-152	0.058	0.042	pCi/g	U
5111M0008	Europium-154	0.052	0.093	pCi/g	U
5111M0008	Europium-155	-0.012	0.047	pCi/g	U
5111M0008	Iodine-129	0.22	0.2	pCi/g	U
5111M0008	Krypton-85	-3.3	2.1	pCi/g	UJ
5111M0008	Lead-212	0.007	0.027	pCi/g	U
5111M0008	Lead-214	-0.006	0.02	pCi/g	U
5111M0008	Neptunium-239	-0.004	0.042	pCi/g	U
5111M0008	Nickel-63	-0.2	1.3	pCi/g	U
5111M0008	Plutonium-238	-0.004	0.014	pCi/g	U
5111M0008	Plutonium-239/240	0.023	0.014	pCi/g	U
5111M0008	Plutonium-241	3.4	4.1	pCi/g	U
5111M0008	Plutonium-242	-0.0038	0.0053	pCi/g	U
5111M0008	Plutonium-244	0.0019	0.0053	pCi/g	U
5111M0008	Potassium-40	29.5	1.9	pCi/g	=
5111M0008	Protactinium-233	-0.029	0.033	pCi/g	U
5111M0008	Radioactive Strontium (Total)	0.34	0.5	pCi/g	U
5111M0008	Technetium-99	2	1.2	pCi/g	=
5111M0008	Thorium-229	0.084	0.092	pCi/g	U
5111M0008	Thorium-230	29.4	2.1	pCi/g	=
5111M0008	Tritium	90	17	pCi/sample	=
5111M0008	Uranium-233/234	0.082	0.025	pCi/g	=
5111M0008	Uranium-235/236	0.0021	0.0058	pCi/g	U
5111M0008	Uranium-238	0.051	0.019	pCi/g	=
5111M0009	Actinium-228	0.11	0.1	pCi/g	U
5111M0009	Americium-241	0.587	0.068	pCi/g	=
5111M0009	Barium-133	-0.048	0.05	pCi/g	U
5111M0009	Carbon-14	2.1	5.1	pCi/sample	U
5111M0009	Cesium-137	19.1	1.9	pCi/g	=
5111M0009	Cobalt-60	0.134	0.031	pCi/g	=
5111M0009	Curium-243/244	0.013	0.022	pCi/g	U
5111M0009	Europium-152	0.59	0.1	pCi/g	=
5111M0009	Europium-154	0.071	0.087	pCi/g	U

Radiological data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0009	Europium-155	0.061	0.09	pCi/g	U
5111M0009	Iodine-129	2.92	0.58	pCi/g	=
5111M0009	Krypton-85	-10	5.4	pCi/g	UJ
5111M0009	Lead-212	-0.005	0.061	pCi/g	U
5111M0009	Lead-214	-0.016	0.031	pCi/g	U
5111M0009	Neptunium-239	0.008	0.08	pCi/g	U
5111M0009	Nickel-63	46	2.6	pCi/g	=
5111M0009	Plutonium-238	0.03	0.024	pCi/g	U
5111M0009	Plutonium-239/240	0.236	0.044	pCi/g	=
5111M0009	Plutonium-241	5.5	4.6	pCi/g	U
5111M0009	Plutonium-242	0.004	0.008	pCi/g	U
5111M0009	Plutonium-244	0	0.0042	pCi/g	U
5111M0009	Potassium-40	0.77	0.59	pCi/g	U
5111M0009	Protactinium-233	0.051	0.081	pCi/g	U
5111M0009	Radioactive Strontium (Total)	2.45	0.78	pCi/g	=
5111M0009	Technetium-99	8.5	1.7	pCi/g	=
5111M0009	Thorium-229	0.12	0.22	pCi/g	U
5111M0009	Thorium-230	4.5	2	pCi/g	U
5111M0009	Tritium	8.5	9.4	pCi/sample	U
5111M0009	Uranium-233/234	0.549	0.064	pCi/g	=
5111M0009	Uranium-235/236	0.019	0.013	pCi/g	=
5111M0009	Uranium-238	0.314	0.049	pCi/g	=
5111M0010	Actinium-228	0.23	0.25	pCi/g	U
5111M0010	Americium-241	0.245	0.043	pCi/g	=
5111M0010	Barium-133	-0.099	0.069	pCi/g	U
5111M0010	Carbon-14	14910	220	pCi/g	=
5111M0010	Cesium-137	0.437	0.099	pCi/g	=
5111M0010	Cobalt-60	0.108	0.084	pCi/g	U
5111M0010	Curium-243/244	0.072	0.026	pCi/g	=
5111M0010	Europium-152	0.06	0.21	pCi/g	U
5111M0010	Europium-154	-0.4	0.43	pCi/g	U
5111M0010	Europium-155	0.12	0.2	pCi/g	U
5111M0010	Iodine-129	-0.04	0.7	pCi/g	U
5111M0010	Krypton-85	-11.3	9	pCi/g	UJ
5111M0010	Lead-212	-0.009	0.099	pCi/g	U
5111M0010	Lead-214	-0.042	0.052	pCi/g	U
5111M0010	Neptunium-239	-0.18	0.19	pCi/g	U
5111M0010	Nickel-63	99.2	3.5	pCi/g	=
5111M0010	Plutonium-238	0.056	0.023	pCi/g	J

Radiological data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0010	Plutonium-239/240	0.027	0.017	pCi/g	=
5111M0010	Plutonium-241	-2.3	3.7	pCi/g	U
5111M0010	Plutonium-242	-0.01	0.007	pCi/g	UJ
5111M0010	Plutonium-244	0.0024	0.0048	pCi/g	U
5111M0010	Potassium-40	1.3	1	pCi/g	U
5111M0010	Protactinium-233	-0.06	0.14	pCi/g	U
5111M0010	Radioactive Strontium (Total)	0.22	0.45	pCi/g	U
5111M0010	Technetium-99	11	1.9	pCi/g	=
5111M0010	Thorium-229	0.29	0.34	pCi/g	U
5111M0010	Thorium-230	7.6	3.8	pCi/g	U
5111M0010	Tritium	60900	600	pCi/g	=
5111M0010	Uranium-233/234	0.058	0.025	pCi/g	=
5111M0010	Uranium-235/236	0.008	0.01	pCi/g	U
5111M0010	Uranium-238	0.1	0.029	pCi/g	=
5111M0011	Actinium-228	0.038	0.032	pCi/g	U
5111M0011	Americium-241	0.149	0.036	pCi/g	=
5111M0011	Barium-133	0.0013	0.0095	pCi/g	U
5111M0011	Carbon-14	2.8	5.2	pCi/sample	U
5111M0011	Cesium-137	0.055	0.011	pCi/g	=
5111M0011	Cobalt-60	-0.0047	0.0086	pCi/g	U
5111M0011	Curium-243/244	0.017	0.016	pCi/g	U
5111M0011	Europium-152	-0.018	0.02	pCi/g	U
5111M0011	Europium-154	0	0.037	pCi/g	U
5111M0011	Europium-155	0.004	0.019	pCi/g	U
5111M0011	Iodine-129	0.012	0.084	pCi/g	U
5111M0011	Krypton-85	-1.8	1	pCi/g	UJ
5111M0011	Lead-212	0.007	0.014	pCi/g	U
5111M0011	Lead-214	-0.002	0.015	pCi/g	U
5111M0011	Neptunium-239	0.001	0.017	pCi/g	U
5111M0011	Nickel-63	67	3.1	pCi/g	=
5111M0011	Plutonium-238	0.02	0.018	pCi/g	U
5111M0011	Plutonium-239/240	0.004	0.012	pCi/g	U
5111M0011	Plutonium-241	4.9	4	pCi/g	U
5111M0011	Plutonium-242	0.002	0.009	pCi/g	U
5111M0011	Plutonium-244	0	0.0062	pCi/g	U
5111M0011	Potassium-40	-0.03	0.16	pCi/g	U
5111M0011	Protactinium-233	0.008	0.01	pCi/g	U
5111M0011	Radioactive Strontium (Total)	0.1	0.44	pCi/g	U
5111M0011	Technetium-99	1.9	1.2	pCi/g	U

Radiological data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0011	Thorium-229	0.003	0.042	pCi/g	U
5111M0011	Thorium-230	-0.1	0.78	pCi/g	U
5111M0011	Tritium	14090	180	pCi/sample	=
5111M0011	Uranium-233/234	0.053	0.02	pCi/g	=
5111M0011	Uranium-235/236	0.007	0.01	pCi/g	U
5111M0011	Uranium-238	0.276	0.045	pCi/g	=
5111M0012	Actinium-228	0.25	0.18	pCi/g	U
5111M0012	Americium-241	0.066	0.026	pCi/g	=
5111M0012	Barium-133	-0.048	0.053	pCi/g	U
5111M0012	Carbon-14	1355	71	pCi/g	=
5111M0012	Cesium-137	1.44	0.14	pCi/g	=
5111M0012	Cobalt-60	0.051	0.064	pCi/g	U
5111M0012	Curium-243/244	-0.014	0.015	pCi/g	U
5111M0012	Europium-152	0.22	0.16	pCi/g	U
5111M0012	Europium-154	0.06	0.29	pCi/g	U
5111M0012	Europium-155	-0.07	0.15	pCi/g	U
5111M0012	Iodine-129	0.11	0.54	pCi/g	U
5111M0012	Krypton-85	-3.7	7	pCi/g	U
5111M0012	Lead-212	-0.019	0.077	pCi/g	U
5111M0012	Lead-214	-0.02	0.13	pCi/g	U
5111M0012	Neptunium-239	0.04	0.13	pCi/g	U
5111M0012	Nickel-63	2.5	1.3	pCi/g	=
5111M0012	Plutonium-238	0	0.014	pCi/g	U
5111M0012	Plutonium-239/240	0.027	0.016	pCi/g	=
5111M0012	Plutonium-241	0.2	4.9	pCi/g	U
5111M0012	Plutonium-242	0.0068	0.0088	pCi/g	U
5111M0012	Plutonium-244	-0.0023	0.0063	pCi/g	U
5111M0012	Potassium-40	-0.2	1	pCi/g	U
5111M0012	Protactinium-233	-0.03	0.11	pCi/g	U
5111M0012	Radioactive Strontium (Total)	0.19	0.42	pCi/g	U
5111M0012	Technetium-99	4.5	1.5	pCi/g	=
5111M0012	Thorium-229	0.03	0.31	pCi/g	U
5111M0012	Thorium-230	3.3	2.7	pCi/g	U
5111M0012	Tritium	58900	600	pCi/g	=
5111M0012	Uranium-233/234	0.153	0.035	pCi/g	=
5111M0012	Uranium-235/236	0.01	0.012	pCi/g	U
5111M0012	Uranium-238	0.189	0.038	pCi/g	=
5111M0013	Actinium-228	0.007	0.057	pCi/g	U
5111M0013	Americium-241	-0.004	0.017	pCi/g	U

Radiological data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0013	Barium-133	-0.001	0.013	pCi/g	U
5111M0013	Carbon-14	1.8	5.1	pCi/sample	U
5111M0013	Cesium-137	0.023	0.011	pCi/g	U
5111M0013	Cobalt-60	0	0.012	pCi/g	U
5111M0013	Curium-243/244	-0.018	0.015	pCi/g	U
5111M0013	Europium-152	0.006	0.032	pCi/g	U
5111M0013	Europium-154	0.019	0.061	pCi/g	U
5111M0013	Europium-155	0.006	0.024	pCi/g	U
5111M0013	Iodine-129	0.08	0.13	pCi/g	U
5111M0013	Krypton-85	-0.2	1.2	pCi/g	U
5111M0013	Lead-212	-0.004	0.021	pCi/g	U
5111M0013	Lead-214	-0.006	0.029	pCi/g	U
5111M0013	Neptunium-239	0.006	0.021	pCi/g	U
5111M0013	Nickel-63	0.7	1.4	pCi/g	U
5111M0013	Plutonium-238	-0.002	0.018	pCi/g	U
5111M0013	Plutonium-239/240	0.004	0.01	pCi/g	U
5111M0013	Plutonium-241	2.4	4.3	pCi/g	U
5111M0013	Plutonium-242	-0.0041	0.0057	pCi/g	U
5111M0013	Plutonium-244	0	0.0057	pCi/g	U
5111M0013	Potassium-40	0	0.23	pCi/g	U
5111M0013	Protactinium-233	-0.014	0.017	pCi/g	U
5111M0013	Radioactive Strontium (Total)	-0.08	0.48	pCi/g	U
5111M0013	Technetium-99	2.2	1.2	pCi/g	=
5111M0013	Thorium-229	0.012	0.067	pCi/g	U
5111M0013	Thorium-230	1.6	1.9	pCi/g	U
5111M0013	Tritium	35	12	pCi/sample	=
5111M0013	Uranium-233/234	0.009	0.009	pCi/g	U
5111M0013	Uranium-235/236	-0.0022	0.006	pCi/g	U
5111M0013	Uranium-238	0.0017	0.0048	pCi/g	U
5111M0014	Actinium-228	0.32	0.17	pCi/g	U
5111M0014	Americium-241	0.59	0.07	pCi/g	=
5111M0014	Barium-133	-0.016	0.077	pCi/g	U
5111M0014	Carbon-14	-2	3.8	pCi/sample	U
5111M0014	Cesium-137	5.18	0.41	pCi/g	=
5111M0014	Cobalt-60	0.072	0.077	pCi/g	U
5111M0014	Curium-243/244	0.013	0.016	pCi/g	U
5111M0014	Europium-152	1.49	0.18	pCi/g	=
5111M0014	Europium-154	0.47	0.23	pCi/g	U
5111M0014	Europium-155	-0.11	0.2	pCi/g	U

Radiological data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0014	Iodine-129	9.1	1.3	pCi/g	J
5111M0014	Krypton-85	-52	17	pCi/g	UJ
5111M0014	Lead-212	0.081	0.085	pCi/g	U
5111M0014	Lead-214	-0.05	0.15	pCi/g	UJ
5111M0014	Neptunium-239	0.02	0.18	pCi/g	U
5111M0014	Nickel-63	5.6	1.9	pCi/g	=
5111M0014	Plutonium-238	0.47	0.06	pCi/g	=
5111M0014	Plutonium-239/240	0.025	0.014	pCi/g	=
5111M0014	Plutonium-241	1.3	4	pCi/g	U
5111M0014	Plutonium-242	-0.0038	0.0052	pCi/g	U
5111M0014	Plutonium-244	0.0038	0.0064	pCi/g	U
5111M0014	Potassium-40	0.7	1	pCi/g	U
5111M0014	Protactinium-233	-0.08	0.14	pCi/g	UJ
5111M0014	Radioactive Strontium (Total)	0.34	0.4	pCi/g	U
5111M0014	Technetium-99	2.7	1.4	pCi/g	=
5111M0014	Thorium-229	-0.02	0.39	pCi/g	U
5111M0014	Thorium-230	15.4	4.2	pCi/g	J
5111M0014	Tritium	-4.1	8.8	pCi/sample	U
5111M0014	Uranium-233/234	0.276	0.041	pCi/g	=
5111M0014	Uranium-235/236	0.01	0.009	pCi/g	U
5111M0014	Uranium-238	0.03	0.014	pCi/g	=
5111M0015	Actinium-228	0.1	0.21	pCi/g	U
5111M0015	Americium-241	0.078	0.028	pCi/g	=
5111M0015	Barium-133	0.037	0.03	pCi/g	U
5111M0015	Carbon-14	1.8	4.3	pCi/sample	U
5111M0015	Cesium-137	0.153	0.035	pCi/g	=
5111M0015	Cobalt-60	2.58	0.18	pCi/g	=
5111M0015	Curium-243/244	0.032	0.019	pCi/g	U
5111M0015	Europium-152	2.7	0.2	pCi/g	=
5111M0015	Europium-154	0.67	0.17	pCi/g	=
5111M0015	Europium-155	0.103	0.069	pCi/g	U
5111M0015	Iodine-129	22.3	2.4	pCi/g	=
5111M0015	Krypton-85	-37	10	pCi/g	UJ
5111M0015	Lead-212	0.032	0.052	pCi/g	U
5111M0015	Lead-214	0.073	0.078	pCi/g	U
5111M0015	Neptunium-239	-0.075	0.053	pCi/g	UJ
5111M0015	Nickel-63	6.6	1.9	pCi/g	=
5111M0015	Plutonium-238	0.267	0.044	pCi/g	=
5111M0015	Plutonium-239/240	0.014	0.011	pCi/g	U

Radiological data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0015	Plutonium-241	0.1	3.9	pCi/g	U
5111M0015	Plutonium-242	-0.0018	0.0035	pCi/g	U
5111M0015	Plutonium-244	-0.0036	0.005	pCi/g	U
5111M0015	Potassium-40	-0.1	0.72	pCi/g	U
5111M0015	Protactinium-233	-0.03	0.082	pCi/g	U
5111M0015	Radioactive Strontium (Total)	0.6	0.41	pCi/g	U
5111M0015	Technetium-99	1.6	1.3	pCi/g	U
5111M0015	Thorium-229	-0.08	0.24	pCi/g	U
5111M0015	Thorium-230	5.8	4.2	pCi/g	U
5111M0015	Tritium	9	11	pCi/sample	U
5111M0015	Uranium-233/234	0.084	0.026	pCi/g	=
5111M0015	Uranium-235/236	0.0044	0.0075	pCi/g	U
5111M0015	Uranium-238	0.03	0.015	pCi/g	=
5111M0016	Actinium-228	0.02	0.046	pCi/g	U
5111M0016	Americium-241	0.014	0.023	pCi/g	U
5111M0016	Barium-133	0.001	0.013	pCi/g	U
5111M0016	Carbon-14	110.9	3.2	pCi/g	=
5111M0016	Cesium-137	0.026	0.012	pCi/g	U
5111M0016	Cobalt-60	0.001	0.011	pCi/g	U
5111M0016	Curium-243/244	-0.01	0.008	pCi/g	U
5111M0016	Europium-152	0.012	0.027	pCi/g	U
5111M0016	Europium-154	-0.003	0.034	pCi/g	U
5111M0016	Europium-155	-0.009	0.022	pCi/g	U
5111M0016	Iodine-129	0.08	0.1	pCi/g	U
5111M0016	Krypton-85	-4.8	2.1	pCi/g	UJ
5111M0016	Lead-212	0.054	0.014	pCi/g	=
5111M0016	Lead-214	0.066	0.026	pCi/g	=
5111M0016	Neptunium-239	-0.01	0.02	pCi/g	U
5111M0016	Nickel-63	3.4	1.7	pCi/g	=
5111M0016	Plutonium-238	0.032	0.023	pCi/g	U
5111M0016	Plutonium-239/240	0.006	0.01	pCi/g	U
5111M0016	Plutonium-241	-1.7	4.1	pCi/g	U
5111M0016	Plutonium-242	0	0.0042	pCi/g	U
5111M0016	Plutonium-244	0.0021	0.0042	pCi/g	U
5111M0016	Potassium-40	0.4	0.2	pCi/g	U
5111M0016	Protactinium-233	-0.002	0.019	pCi/g	U
5111M0016	Radioactive Strontium (Total)	-0.1	0.21	pCi/g	U
5111M0016	Technetium-99	10.3	1.2	pCi/g	=
5111M0016	Thorium-229	-0.006	0.057	pCi/g	U

Radiological data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0016	Thorium-230	-0.2	1.9	pCi/g	U
5111M0016	Tritium	31.3	1.9	pCi/g	=
5111M0016	Uranium-233/234	0.137	0.033	pCi/g	=
5111M0016	Uranium-235/236	0	0.009	pCi/g	U
5111M0016	Uranium-238	0.152	0.035	pCi/g	=
5111M0017	Actinium-228	0.003	0.011	pCi/g	U
5111M0017	Americium-241	0.03	0.022	pCi/g	U
5111M0017	Barium-133	-0.007	0.01	pCi/g	U
5111M0017	Carbon-14	4.7	3.5	pCi/sample	U
5111M0017	Cesium-137	0.0106	0.0094	pCi/g	U
5111M0017	Cobalt-60	-0.004	0.013	pCi/g	U
5111M0017	Curium-243/244	0.008	0.014	pCi/g	U
5111M0017	Europium-152	-0.005	0.012	pCi/g	U
5111M0017	Europium-154	-0.045	0.055	pCi/g	U
5111M0017	Europium-155	0.001	0.029	pCi/g	U
5111M0017	Iodine-129	0.005	0.07	pCi/g	U
5111M0017	Krypton-85	-2.9	1.6	pCi/g	UJ
5111M0017	Lead-212	-0.009	0.022	pCi/g	U
5111M0017	Lead-214	-0.012	0.017	pCi/g	U
5111M0017	Neptunium-239	0.005	0.026	pCi/g	U
5111M0017	Nickel-63	2.1	1.7	pCi/g	U
5111M0017	Plutonium-238	0.016	0.018	pCi/g	U
5111M0017	Plutonium-239/240	0.021	0.012	pCi/g	J
5111M0017	Plutonium-241	5.4	4.6	pCi/g	U
5111M0017	Plutonium-242	0	0.0034	pCi/g	U
5111M0017	Plutonium-244	0.0018	0.0034	pCi/g	U
5111M0017	Potassium-40	0.44	0.25	pCi/g	U
5111M0017	Protactinium-233	0.017	0.018	pCi/g	U
5111M0017	Radioactive Strontium (Total)	-0.02	0.2	pCi/g	U
5111M0017	Technetium-99	1.04	0.79	pCi/g	U
5111M0017	Thorium-229	-0.004	0.066	pCi/g	U
5111M0017	Thorium-230	-1.2	1.2	pCi/g	U
5111M0017	Tritium	88	16	pCi/sample	=
5111M0017	Uranium-233/234	0.019	0.011	pCi/g	J
5111M0017	Uranium-235/236	0	0.0058	pCi/g	U
5111M0017	Uranium-238	0.0084	0.0081	pCi/g	U
5111M0018	Actinium-228	0.047	0.022	pCi/g	=
5111M0018	Americium-241	0.013	0.014	pCi/g	U
5111M0018	Barium-133	-0.009	0.0089	pCi/g	UJ

Radiological data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0018	Carbon-14	6324	85	pCi/sample	=
5111M0018	Cesium-137	-0.0004	0.0068	pCi/g	U
5111M0018	Cobalt-60	-0.003	0.011	pCi/g	U
5111M0018	Curium-243/244	-0.002	0.01	pCi/g	U
5111M0018	Europium-152	-0.013	0.026	pCi/g	U
5111M0018	Europium-154	-0.028	0.052	pCi/g	U
5111M0018	Europium-155	-0.005	0.025	pCi/g	U
5111M0018	Iodine-129	-0.031	0.088	pCi/g	U
5111M0018	Krypton-85	-9.2	2.7	pCi/g	UJ
5111M0018	Lead-212	0	0.011	pCi/g	U
5111M0018	Lead-214	-0.019	0.013	pCi/g	UJ
5111M0018	Neptunium-239	-0.009	0.022	pCi/g	U
5111M0018	Nickel-63	721	12	pCi/g	=
5111M0018	Plutonium-238	0.004	0.009	pCi/g	U
5111M0018	Plutonium-239/240	0.0019	0.0063	pCi/g	U
5111M0018	Plutonium-241	-0.4	3.3	pCi/g	U
5111M0018	Plutonium-242	0.0037	0.0051	pCi/g	U
5111M0018	Plutonium-244	0.0019	0.0036	pCi/g	U
5111M0018	Potassium-40	0.24	0.16	pCi/g	U
5111M0018	Protactinium-233	0.006	0.017	pCi/g	U
5111M0018	Radioactive Strontium (Total)	-0.12	0.33	pCi/g	U
5111M0018	Technetium-99	0.7	1.2	pCi/g	U
5111M0018	Thorium-229	-0.023	0.048	pCi/g	U
5111M0018	Thorium-230	0.1	1.2	pCi/g	U
5111M0018	Tritium	2072100	2300	pCi/sample	=
5111M0018	Uranium-233/234	0.0017	0.0066	pCi/g	U
5111M0018	Uranium-235/236	0.0021	0.0058	pCi/g	U
5111M0018	Uranium-238	0.008	0.009	pCi/g	U
5111M0019	Actinium-228	0.033	0.015	pCi/g	=
5111M0019	Americium-241	0.01	0.011	pCi/g	U
5111M0019	Barium-133	0.0004	0.0067	pCi/g	U
5111M0019	Carbon-14	161	14	pCi/sample	=
5111M0019	Cesium-137	0.0034	0.0062	pCi/g	U
5111M0019	Cobalt-60	0.0019	0.0061	pCi/g	U
5111M0019	Curium-243/244	0.002	0.01	pCi/g	U
5111M0019	Europium-152	0	0.014	pCi/g	U
5111M0019	Europium-154	-0.017	0.028	pCi/g	U
5111M0019	Europium-155	-0.002	0.013	pCi/g	U
5111M0019	Iodine-129	0.02	0.061	pCi/g	U

Radiological data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0019	Krypton-85	-5.8	1.7	pCi/g	UJ
5111M0019	Lead-212	0.0036	0.0075	pCi/g	U
5111M0019	Lead-214	-0.0019	0.0098	pCi/g	U
5111M0019	Neptunium-239	0	0.012	pCi/g	U
5111M0019	Nickel-63	0.8	1.6	pCi/g	U
5111M0019	Plutonium-238	0.019	0.014	pCi/g	U
5111M0019	Plutonium-239/240	0.0095	0.0083	pCi/g	=
5111M0019	Plutonium-241	-1	3.6	pCi/g	U
5111M0019	Plutonium-242	0	0.0037	pCi/g	U
5111M0019	Plutonium-244	0	0.0037	pCi/g	U
5111M0019	Potassium-40	0.1	0.12	pCi/g	U
5111M0019	Protactinium-233	0.0083	0.0066	pCi/g	U
5111M0019	Radioactive Strontium (Total)	0.19	0.37	pCi/g	U
5111M0019	Technetium-99	0.6	1.2	pCi/g	U
5111M0019	Thorium-229	-0.025	0.031	pCi/g	U
5111M0019	Thorium-230	-1.36	0.63	pCi/g	UJ
5111M0019	Tritium	68990	420	pCi/sample	=
5111M0019	Uranium-233/234	0.005	0.011	pCi/g	U
5111M0019	Uranium-235/236	-0.007	0.006	pCi/g	U
5111M0019	Uranium-238	0.018	0.012	pCi/g	U
5111M0020	Actinium-228	0.021	0.011	pCi/g	U
5111M0020	Americium-241	0.016	0.015	pCi/g	U
5111M0020	Barium-133	-0.0037	0.0049	pCi/g	U
5111M0020	Carbon-14	191	15	pCi/sample	=
5111M0020	Cesium-137	0.0056	0.0028	pCi/g	U
5111M0020	Cobalt-60	0.0005	0.0041	pCi/g	U
5111M0020	Curium-243/244	0.004	0.015	pCi/g	U
5111M0020	Europium-152	0.0159	0.0072	pCi/g	U
5111M0020	Europium-154	0.006	0.018	pCi/g	U
5111M0020	Europium-155	0.0055	0.0077	pCi/g	U
5111M0020	Iodine-129	0.135	0.051	pCi/g	=
5111M0020	Krypton-85	-3.1	1.2	pCi/g	UJ
5111M0020	Lead-212	0.0042	0.0053	pCi/g	U
5111M0020	Lead-214	-0.0114	0.0072	pCi/g	UJ
5111M0020	Neptunium-239	0.0032	0.007	pCi/g	U
5111M0020	Nickel-63	0.3	1.5	pCi/g	U
5111M0020	Plutonium-238	-0.004	0.013	pCi/g	U
5111M0020	Plutonium-239/240	0.004	0.008	pCi/g	U
5111M0020	Plutonium-241	4	3.9	pCi/g	U

Radiological data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0020	Plutonium-242	-0.004	0.006	pCi/g	U
5111M0020	Plutonium-244	-0.0057	0.0037	pCi/g	U
5111M0020	Potassium-40	-0.044	0.072	pCi/g	U
5111M0020	Protactinium-233	0.0054	0.0043	pCi/g	U
5111M0020	Radioactive Strontium (Total)	0.08	0.36	pCi/g	U
5111M0020	Technetium-99	3.7	1.4	pCi/g	=
5111M0020	Thorium-229	0.007	0.022	pCi/g	U
5111M0020	Thorium-230	0.91	0.39	pCi/g	=
5111M0020	Tritium	3243	92	pCi/sample	=
5111M0020	Uranium-233/234	0.0066	0.0072	pCi/g	U
5111M0020	Uranium-235/236	-0.002	0.004	pCi/g	U
5111M0020	Uranium-238	0.0082	0.0085	pCi/g	U
5111M0021	Actinium-228	0.026	0.013	pCi/g	U
5111M0021	Americium-241	0.008	0.0087	pCi/g	U
5111M0021	Barium-133	-0.0018	0.0058	pCi/g	U
5111M0021	Carbon-14	8.2	5.1	pCi/sample	=
5111M0021	Cesium-137	0.0033	0.0032	pCi/g	U
5111M0021	Cobalt-60	-0.0022	0.003	pCi/g	U
5111M0021	Curium-243/244	0.008	0.011	pCi/g	UJ
5111M0021	Europium-152	0.012	0.013	pCi/g	U
5111M0021	Europium-154	0.005	0.025	pCi/g	U
5111M0021	Europium-155	-0.0076	0.0099	pCi/g	U
5111M0021	Iodine-129	0.022	0.06	pCi/g	U
5111M0021	Krypton-85	-2.7	1.8	pCi/g	UJ
5111M0021	Lead-212	0.0021	0.0066	pCi/g	U
5111M0021	Lead-214	-0.0024	0.009	pCi/g	U
5111M0021	Neptunium-239	-0.0088	0.009	pCi/g	U
5111M0021	Nickel-63	1.3	1.6	pCi/g	U
5111M0021	Plutonium-238	-0.002	0.013	pCi/g	U
5111M0021	Plutonium-239/240	0.006	0.008	pCi/g	U
5111M0021	Plutonium-241	-1.2	3.7	pCi/g	U
5111M0021	Plutonium-242	-0.01	0.005	pCi/g	U
5111M0021	Plutonium-244	-0.0058	0.0066	pCi/g	U
5111M0021	Potassium-40	-0.081	0.089	pCi/g	U
5111M0021	Protactinium-233	-0.002	0.0084	pCi/g	U
5111M0021	Radioactive Strontium (Total)	0.27	0.37	pCi/g	U
5111M0021	Technetium-99	22.4	2.4	pCi/g	=
5111M0021	Thorium-229	-0.004	0.028	pCi/g	U
5111M0021	Thorium-230	0.45	0.5	pCi/g	U

Radiological data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0021	Tritium	4570	110	pCi/sample	=
5111M0021	Uranium-233/234	0.033	0.015	pCi/g	J
5111M0021	Uranium-235/236	0.0022	0.0042	pCi/g	U
5111M0021	Uranium-238	0.075	0.024	pCi/g	J
5111M0022	Americium-241	0.229	0.455	pCi/g	U
5111M0022	Americium-243	-0.0161	0.142	pCi/g	U
5111M0022	Barium-133	0.0911	0.127	pCi/g	U
5111M0022	Carbon-14	8.95	128	pCi/g	U
5111M0022	Cesium-137	0.162	0.135	pCi/g	U
5111M0022	Cobalt-60	0.0689	0.105	pCi/g	U
5111M0022	Curium-242	0	0.244	pCi/g	U
5111M0022	Curium-243/244	0.0576	0.32	pCi/g	U
5111M0022	Curium-245/246	0	0.259	pCi/g	U
5111M0022	Europium-152	-0.138	0.259	pCi/g	U
5111M0022	Europium-154	-0.224	0.233	pCi/g	U
5111M0022	Europium-155	0.225	0.233	pCi/g	U
5111M0022	Iodine-129	3.61	5.23	pCi/g	U
5111M0022	Krypton-85	-95.9	37.4	pCi/g	UJ
5111M0022	Neptunium-237	-.00885	0.177	pCi/g	U
5111M0022	Nickel-63	-13.9	203	pCi/g	U
5111M0022	Plutonium-238	-0.0583	0.258	pCi/g	U
5111M0022	Plutonium-239/240	0.335	0.483	pCi/g	U
5111M0022	Plutonium-241	-4.67	71.1	pCi/g	U
5111M0022	Plutonium-242	0.00485	0.359	pCi/g	U
5111M0022	Plutonium-244	0	0.245	pCi/g	U
5111M0022	Potassium-40	0.126	1.73	pCi/g	U
5111M0022	Protactinium-233	-.00885	0.177	pCi/g	U
5111M0022	Radium-226	-0.0574	2.34	pCi/g	U
5111M0022	Radium-228	0.289	0.459	pCi/g	U
5111M0022	Strontium-90	7.03	14.4	pCi/g	U
5111M0022	Technetium-99	24	150	pCi/g	U
5111M0022	Thorium-228	-0.0873	0.194	pCi/g	U
5111M0022	Thorium-229	0.11	1.71	pCi/g	U
5111M0022	Thorium-230	3.47	31.7	pCi/g	U
5111M0022	Thorium-232	4.33	107	pCi/g	U
5111M0022	Tritium	-520	962	pCi/g	U
5111M0022	Uranium-233/234	0.00451	0.334	pCi/g	U
5111M0022	Uranium-235/236	0	0.228	pCi/g	U
5111M0022	Uranium-238	0.171	0.393	pCi/g	U

Radiological data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0023	Americium-241	0.126	0.473	pCi/g	U
5111M0023	Americium-243	-.00814	0.103	pCi/g	U
5111M0023	Barium-133	-0.02	0.108	pCi/g	U
5111M0023	Carbon-14	-50.7	154	pCi/g	U
5111M0023	Cesium-137	0.16	0.0992	pCi/g	U
5111M0023	Cobalt-60	-0.0417	0.108	pCi/g	U
5111M0023	Curium-242	0	0.355	pCi/g	U
5111M0023	Curium-243/244	0	0.33	pCi/g	U
5111M0023	Curium-245/246	-0.0456	0.393	pCi/g	U
5111M0023	Europium-152	-0.223	0.248	pCi/g	U
5111M0023	Europium-154	0.045	0.254	pCi/g	U
5111M0023	Europium-155	-0.202	0.22	pCi/g	U
5111M0023	Iodine-129	0.333	4.08	pCi/g	U
5111M0023	Krypton-85	0	17.4	pCi/g	UJ
5111M0023	Neptunium-237	0.0393	0.16	pCi/g	U
5111M0023	Nickel-63	-105	168	pCi/g	U
5111M0023	Plutonium-238	0.00572	0.424	pCi/g	U
5111M0023	Plutonium-239/240	0.109	0.408	pCi/g	U
5111M0023	Plutonium-241	30.3	86.9	pCi/g	U
5111M0023	Plutonium-242	-0.2	0.454	pCi/g	U
5111M0023	Plutonium-244	0	0.288	pCi/g	U
5111M0023	Potassium-40	-0.245	1.12	pCi/g	U
5111M0023	Protactinium-233	0.0393	0.16	pCi/g	U
5111M0023	Radium-226	-1.56	1.95	pCi/g	U
5111M0023	Radium-228	-0.0815	0.368	pCi/g	U
5111M0023	Strontium-90	5.9	13.5	pCi/g	U
5111M0023	Technetium-99	33.9	142	pCi/g	U
5111M0023	Thorium-228	-0.121	0.172	pCi/g	U
5111M0023	Thorium-229	-0.0537	1.27	pCi/g	U
5111M0023	Thorium-230	1.01	25.2	pCi/g	U
5111M0023	Thorium-232	4.32	45.7	pCi/g	U
5111M0023	Tritium	0	1210	pCi/g	U
5111M0023	Uranium-233/234	-0.0962	0.29	pCi/g	U
5111M0023	Uranium-235/236	0.0697	0.387	pCi/g	U
5111M0023	Uranium-238	-0.0321	0.276	pCi/g	U
5111M0024	Americium-241	-0.0653	0.451	pCi/g	U
5111M0024	Americium-243	-0.0808	0.0523	pCi/g	UJ
5111M0024	Barium-133	-0.0377	0.084	pCi/g	U
5111M0024	Carbon-14	55.9	163	pCi/g	U

Radiological data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0024	Cesium-137	-0.00634	0.104	pCi/g	U
5111M0024	Cobalt-60	0.0267	0.0855	pCi/g	U
5111M0024	Curium-242	-0.0385	0.332	pCi/g	U
5111M0024	Curium-243/244	-0.0703	0.311	pCi/g	U
5111M0024	Curium-245/246	0	0.342	pCi/g	U
5111M0024	Europium-152	0.19	0.195	pCi/g	U
5111M0024	Europium-154	0.00469	0.218	pCi/g	U
5111M0024	Europium-155	-0.000386	0.14	pCi/g	U
5111M0024	Iodine-129	2.85	5.59	pCi/g	U
5111M0024	Krypton-85	0	22.3	pCi/g	UJ
5111M0024	Neptunium-237	-0.0447	0.14	pCi/g	U
5111M0024	Nickel-63	76	109	pCi/g	U
5111M0024	Plutonium-238	-0.0736	0.326	pCi/g	U
5111M0024	Plutonium-239/240	0	0.309	pCi/g	U
5111M0024	Plutonium-241	42.6	90.1	pCi/g	U
5111M0024	Plutonium-242	0.116	0.437	pCi/g	U
5111M0024	Plutonium-244	-0.0368	0.317	pCi/g	U
5111M0024	Potassium-40	0.206	0.839	pCi/g	U
5111M0024	Protactinium-233	-0.0447	0.14	pCi/g	U
5111M0024	Radium-226	0.88	1.78	pCi/g	U
5111M0024	Radium-228	-0.0391	0.352	pCi/g	U
5111M0024	Strontium-90	-13.2	12.9	pCi/g	UJ
5111M0024	Technetium-99	56.5	90.7	pCi/g	U
5111M0024	Thorium-228	0.161	0.179	pCi/g	U
5111M0024	Thorium-229	-0.885	0.973	pCi/g	U
5111M0024	Thorium-230	-5.85	8.52	pCi/g	U
5111M0024	Thorium-232	0	21.6	pCi/g	UJ
5111M0024	Tritium	1020	1360	pCi/g	U
5111M0024	Uranium-233/234	-0.419	0.5	pCi/g	U
5111M0024	Uranium-235/236	0.0415	0.434	pCi/g	U
5111M0024	Uranium-238	-0.0709	0.313	pCi/g	U
5111M0025	Americium-241	0.367	0.465	pCi/g	U
5111M0025	Americium-243	-0.0665	0.0785	pCi/g	U
5111M0025	Barium-133	0.0624	0.0863	pCi/g	U
5111M0025	Carbon-14	-31.4	111	pCi/g	U
5111M0025	Cesium-137	0.103	0.123	pCi/g	U
5111M0025	Cobalt-60	0.0472	0.0692	pCi/g	U
5111M0025	Curium-242	0.113	0.317	pCi/g	U
5111M0025	Curium-243/244	-0.0247	0.213	pCi/g	U

Radiological data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0025	Curium-245/246	-0.0287	0.247	pCi/g	U
5111M0025	Europium-152	-0.149	0.201	pCi/g	U
5111M0025	Europium-154	-0.0364	0.238	pCi/g	U
5111M0025	Europium-155	0.023	0.169	pCi/g	U
5111M0025	Iodine-129	-1.22	3.57	pCi/g	U
5111M0025	Krypton-85	0	17.1	pCi/g	UJ
5111M0025	Neptunium-237	-0.00481	0.114	pCi/g	U
5111M0025	Nickel-63	-14.1	120	pCi/g	U
5111M0025	Plutonium-238	-0.0298	0.257	pCi/g	U
5111M0025	Plutonium-239/240	-0.0298	0.257	pCi/g	U
5111M0025	Plutonium-241	14.2	72.9	pCi/g	U
5111M0025	Plutonium-242	0.0348	0.364	pCi/g	U
5111M0025	Plutonium-244	0	0.251	pCi/g	U
5111M0025	Potassium-40	0.335	0.938	pCi/g	U
5111M0025	Protactinium-233	-0.00481	0.114	pCi/g	U
5111M0025	Radium-226	-0.148	1.48	pCi/g	U
5111M0025	Radium-228	0.0524	0.296	pCi/g	U
5111M0025	Strontium-90	15.7	10.9	pCi/g	U
5111M0025	Technetium-99	-29.6	97.9	pCi/g	U
5111M0025	Thorium-228	0.166	0.139	pCi/g	U
5111M0025	Thorium-229	0.708	1.02	pCi/g	U
5111M0025	Thorium-230	-3.75	14.5	pCi/g	U
5111M0025	Thorium-232	5.43	28.8	pCi/g	U
5111M0025	Tritium	-81.5	882	pCi/g	U
5111M0025	Uranium-233/234	-0.232	0.327	pCi/g	U
5111M0025	Uranium-235/236	-0.0665	0.294	pCi/g	U
5111M0025	Uranium-238	0	0.278	pCi/g	U
5111M0026	Americium-241	0	0.317	pCi/g	U
5111M0026	Americium-243	-0.00754	0.0738	pCi/g	U
5111M0026	Barium-133	0.00896	0.0732	pCi/g	U
5111M0026	Carbon-14	-28.8	122	pCi/g	U
5111M0026	Cesium-137	0.0922	0.0839	pCi/g	U
5111M0026	Cobalt-60	-0.0378	0.0517	pCi/g	U
5111M0026	Curium-242	-0.0408	0.352	pCi/g	U
5111M0026	Curium-243/244	0	0.313	pCi/g	U
5111M0026	Curium-245/246	0	0.363	pCi/g	U
5111M0026	Europium-152	0.099	0.168	pCi/g	U
5111M0026	Europium-154	0.133	0.171	pCi/g	U
5111M0026	Europium-155	0.0978	0.141	pCi/g	U

Radiological data for Bldg. 3033 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5111M0026	Iodine-129	0.705	4.73	pCi/g	U
5111M0026	Krypton-85	30.7	14.5	pCi/g	U
5111M0026	Neptunium-237	0.069	0.111	pCi/g	U
5111M0026	Nickel-63	10.9	126	pCi/g	U
5111M0026	Plutonium-238	-0.0475	0.409	pCi/g	U
5111M0026	Plutonium-239/240	0.103	0.571	pCi/g	U
5111M0026	Plutonium-241	7.32	112	pCi/g	U
5111M0026	Plutonium-242	0.0553	0.578	pCi/g	U
5111M0026	Plutonium-244	0	0.398	pCi/g	U
5111M0026	Potassium-40	0.345	1.2	pCi/g	U
5111M0026	Protactinium-233	0.069	0.111	pCi/g	U
5111M0026	Radium-226	0.313	1.28	pCi/g	U
5111M0026	Radium-228	-0.187	0.291	pCi/g	U
5111M0026	Strontium-90	-5.99	11.4	pCi/g	U
5111M0026	Technetium-99	23.1	96.8	pCi/g	U
5111M0026	Thorium-228	0.0144	0.139	pCi/g	U
5111M0026	Thorium-229	0.224	0.764	pCi/g	U
5111M0026	Thorium-230	-7.52	15.5	pCi/g	U
5111M0026	Thorium-232	1.81	34.8	pCi/g	U
5111M0026	Tritium	323	1000	pCi/g	U
5111M0026	Uranium-233/234	0.16	0.857	pCi/g	U
5111M0026	Uranium-235/236	-0.131	0.396	pCi/g	U
5111M0026	Uranium-238	-0.0871	0.385	pCi/g	U

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit
UJ = Analyte, compound or nuclide not detected above the reported detection limit, and the reported detection limit is approximated due to quality deficiency
= = Validated result, which is detected and unqualified

TCLP and total metals data for Bldg. 3034

Sample ID	Chemical name	Result	Units	Validation qualifier
5113M0001	Antimony	5.2675	mg/kg	=
5113M0001	Arsenic	0.25	mg/L	U
5113M0001	Arsenic	0.122	mg/kg	U
5113M0001	Barium	5	mg/L	U
5113M0001	Barium	13.4066	mg/kg	=
5113M0001	Beryllium	0.0523	mg/kg	U
5113M0001	Cadmium	0.05	mg/L	U
5113M0001	Cadmium	1.0152	mg/kg	J
5113M0001	Chromium	0.25	mg/L	U
5113M0001	Chromium	90.1181	mg/kg	=
5113M0001	Copper	6.8297	mg/kg	=
5113M0001	Lead	1.89	mg/L	=
5113M0001	Lead	17.4659	mg/kg	=
5113M0001	Manganese	33.4166	mg/kg	=
5113M0001	Molybdenum	0.0872	mg/kg	U
5113M0001	Nickel	1.0461	mg/kg	U
5113M0001	Selenium	0.05	mg/L	U
5113M0001	Selenium	0.2964	mg/kg	U
5113M0001	Silver	0.25	mg/L	U
5113M0001	Silver	0.0523	mg/kg	U
5113M0001	Strontium	151.974	mg/kg	=
5113M0001	Vanadium	0.8227	mg/kg	J
5113M0001	Zinc	31.8201	mg/kg	U
5113M0001A	Boron	5	mg/kg	U
5113M0001A	Mercury	0.002	mg/L	U
5113M0001A	Mercury	0.4	mg/kg	U
5113M0001A	Tin	7.74	mg/kg	=
5113M0003	Antimony	31.2079	mg/kg	=
5113M0003	Arsenic	18.8847	mg/kg	=
5113M0003	Barium	74.6982	mg/kg	=
5113M0003	Beryllium	3.9788	mg/kg	U
5113M0003	Cadmium	14.5889	mg/kg	U
5113M0003	Chromium	9127.823	mg/kg	=
5113M0003	Copper	387.6888	mg/kg	=
5113M0003	Lead	12242.86	mg/kg	=
5113M0003	Manganese	1453.357	mg/kg	=
5113M0003	Molybdenum	465.6301	mg/kg	=
5113M0003	Nickel	192.1888	mg/kg	=
5113M0003	Selenium	22.5464	mg/kg	U
5113M0003	Silver	3.9788	mg/kg	U

TCLP and total metals data for Bldg. 3034 (cont.)

Sample ID	Chemical name	Result	Units	Validation qualifier
5113M0003	Strontium	13.2626	mg/kg	U
5113M0003	Vanadium	187.2643	mg/kg	=
5113M0003	Zinc	17,656.24	mg/kg	J
5113M0003A	Boron	247	mg/kg	UJ
5113M0003A	Mercury	0.4	mg/kg	UJ
5113M0003A	Tin	49.4	mg/kg	U
5113M0004	Antimony	5.9559	mg/kg	U
5113M0004	Arsenic	10.4229	mg/kg	U
5113M0004	Barium	37.2245	mg/kg	U
5113M0004	Beryllium	4.4669	mg/kg	U
5113M0004	Cadmium	28.3455	mg/kg	J
5113M0004	Chromium	192.1369	mg/kg	=
5113M0004	Copper	641.8609	mg/kg	=
5113M0004	Lead	1096.704	mg/kg	=
5113M0004	Manganese	77.9682	mg/kg	=
5113M0004	Molybdenum	86.4897	mg/kg	=
5113M0004	Nickel	147.7489	mg/kg	=
5113M0004	Selenium	25.3127	mg/kg	U
5113M0004	Silver	10.2976	mg/kg	=
5113M0004	Strontium	14.8898	mg/kg	U
5113M0004	Vanadium	26.7649	mg/kg	=
5113M0004	Zinc	30,499.92	mg/kg	J
5113M0004A	Boron	12.5	mg/kg	=
5113M0004A	Mercury	0.4	mg/kg	U
5113M0004A	Tin	17.8	mg/kg	=
5113M0005	Antimony	6.2422	mg/kg	U
5113M0005	Arsenic	10.9238	mg/kg	U
5113M0005	Barium	78.287	mg/kg	=
5113M0005	Beryllium	4.6816	mg/kg	U
5113M0005	Cadmium	38.2507	mg/kg	J
5113M0005	Chromium	3466.309	mg/kg	=
5113M0005	Copper	257.7439	mg/kg	=
5113M0005	Lead	2552.156	mg/kg	=
5113M0005	Manganese	513.0444	mg/kg	=
5113M0005	Molybdenum	93.0396	mg/kg	=
5113M0005	Nickel	123.7817	mg/kg	=
5113M0005	Selenium	26.5293	mg/kg	U
5113M0005	Silver	19.8938	mg/kg	=
5113M0005	Strontium	15.6055	mg/kg	U
5113M0005	Vanadium	83.1318	mg/kg	=

TCLP and total metals data for Bldg. 3034 (cont.)

Sample ID	Chemical name	Result	Units	Validation qualifier
5113M0005	Zinc	35,188.43	mg/kg	J
5113M0005A	Boron	34.4	mg/kg	=
5113M0005A	Mercury	4.61	mg/kg	=
5113M0005A	Tin	56.4	mg/kg	=
5113M0006	Antimony	6.4	mg/kg	=
5113M0006	Arsenic	0.4	mg/kg	U
5113M0006	Barium	0.84	mg/kg	=
5113M0006	Beryllium	0.1	mg/kg	U
5113M0006	Cadmium	4.34	mg/kg	=
5113M0006	Chromium	8.47	mg/kg	=
5113M0006	Cobalt	1.69	mg/kg	=
5113M0006	Copper	7.43	mg/kg	=
5113M0006	Lead	2.6	mg/kg	=
5113M0006	Manganese	55.53	mg/kg	=
5113M0006	Molybdenum	1	mg/kg	U
5113M0006	Nickel	40.66	mg/kg	=
5113M0006	Selenium	0.5	mg/kg	U
5113M0006	Silver	0.4	mg/kg	U
5113M0006	Strontium	1	mg/kg	U
5113M0006	Thallium	0.5	mg/kg	U
5113M0006	Vanadium	1	mg/kg	U
5113M0006	Zinc	7.2	mg/kg	=
5113M0007	Antimony	21.5	mg/kg	=
5113M0007	Arsenic	0.87	mg/kg	=
5113M0007	Barium	33.96	mg/kg	=
5113M0007	Beryllium	0.1	mg/kg	U
5113M0007	Cadmium	13.84	mg/kg	=
5113M0007	Chromium	218.23	mg/kg	=
5113M0007	Cobalt	9.95	mg/kg	=
5113M0007	Copper	29.7	mg/kg	=
5113M0007	Lead	20.2	mg/kg	=
5113M0007	Manganese	293.17	mg/kg	=
5113M0007	Molybdenum	1.2	mg/kg	=
5113M0007	Nickel	4.12	mg/kg	=
5113M0007	Selenium	0.5	mg/kg	U
5113M0007	Silver	0.4	mg/kg	U
5113M0007	Strontium	403.4	mg/kg	=
5113M0007	Thallium	0.5	mg/kg	U
5113M0007	Vanadium	9.5	mg/kg	=
5113M0007	Zinc	4655.6	mg/kg	=

Sample ID	Chemical name	Result	Units	Validation qualifier
5113M0008	Antimony	9.2	mg/kg	=
5113M0008	Arsenic	0.4	mg/kg	U
5113M0008	Barium	9.74	mg/kg	=
5113M0008	Beryllium	0.1	mg/kg	U
5113M0008	Cadmium	4.8	mg/kg	=
5113M0008	Chromium	66.12	mg/kg	=
5113M0008	Cobalt	2.31	mg/kg	=
5113M0008	Copper	10.54	mg/kg	=
5113M0008	Lead	4	mg/kg	=
5113M0008	Manganese	56.44	mg/kg	=
5113M0008	Molybdenum	1	mg/kg	U
5113M0008	Nickel	1.66	mg/kg	=
5113M0008	Selenium	0.5	mg/kg	U
5113M0008	Silver	0.4	mg/kg	U
5113M0008	Strontium	121.4	mg/kg	=
5113M0008	Thallium	0.5	mg/kg	U
5113M0008	Vanadium	1.2	mg/kg	=
5113M0008	Zinc	12.3	mg/kg	=
5113M0009	Antimony	5.9	mg/kg	=
5113M0009	Arsenic	0.4	mg/kg	U
5113M0009	Barium	14.59	mg/kg	=
5113M0009	Beryllium	0.1	mg/kg	U
5113M0009	Cadmium	2.51	mg/kg	=
5113M0009	Chromium	103.12	mg/kg	=
5113M0009	Cobalt	2.81	mg/kg	=
5113M0009	Copper	8.22	mg/kg	=
5113M0009	Lead	5.7	mg/kg	=
5113M0009	Manganese	71.54	mg/kg	=
5113M0009	Molybdenum	1	mg/kg	U
5113M0009	Nickel	0.95	mg/kg	=
5113M0009	Selenium	0.5	mg/kg	U
5113M0009	Silver	0.4	mg/kg	U
5113M0009	Strontium	184.9	mg/kg	=
5113M0009	Thallium	0.5	mg/kg	U
5113M0009	Vanadium	2.2	mg/kg	=
5113M0009	Zinc	1163.9	mg/kg	=

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit
UJ = Analyte, compound or nuclide not detected above the reported detection limit, and the reported detection limit is approximated due to quality deficiency
= = Validated result, which is detected and unqualified

Radiological data for Bldg. 3034

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5113M0001	Actinium-228	0.011	0.026	pCi/g	U
5113M0001	Americium-241	-0.01	0.02	pCi/g	U
5113M0001	Barium-133	0.0015	0.0063	pCi/g	U
5113M0001	Carbon-14	6	3.5	pCi/sample	=
5113M0001	Cesium-137	0.056	0.0076	pCi/g	=
5113M0001	Cobalt-60	0.0016	0.0054	pCi/g	U
5113M0001	Curium-243/244	0.025		pCi/g	U
5113M0001	Europium-152	0.01	0.015	pCi/g	U
5113M0001	Europium-154	-0.042	0.032	pCi/g	U
5113M0001	Europium-155	0.002	0.011	pCi/g	U
5113M0001	Iodine-129	-0.019	0.048	pCi/g	U
5113M0001	Krypton-85	-1.15	0.97	pCi/g	UJ
5113M0001	Lead-212	0.0021	0.007	pCi/g	U
5113M0001	Lead-214	-0.002	0.014	pCi/g	U
5113M0001	Neptunium-239	-0.002	0.01	pCi/g	U
5113M0001	Nickel-63	0.39	0.85	pCi/g	U
5113M0001	Plutonium-238	-0.015	0.014	pCi/g	U
5113M0001	Plutonium-239/240	-0.0019	0.0037	pCi/g	U
5113M0001	Plutonium-241	0.2	2.7	pCi/g	U
5113M0001	Plutonium-242	-0.0019	0.0036	pCi/g	U
5113M0001	Plutonium-244	0	0.0037	pCi/g	U
5113M0001	Potassium-40	0.09	0.11	pCi/g	U
5113M0001	Protactinium-233	-0.008	0.011	pCi/g	U
5113M0001	Radioactive Strontium (Total)	0.11	0.2	pCi/g	U
5113M0001	Technetium-99	-0.05	0.93	pCi/g	U
5113M0001	Thorium-229	0.008	0.033	pCi/g	U
5113M0001	Thorium-230	0.51	0.93	pCi/g	U
5113M0001	Tritium	-1.1	7.8	pCi/sample	U
5113M0001	Uranium-233/234	0.022	0.014	pCi/g	U
5113M0001	Uranium-235/236	0.0072	0.0082	pCi/g	U
5113M0001	Uranium-238	0.0098	0.0085	pCi/g	=
5113M0006	Actinium-228	0.07	0.031	pCi/g	=
5113M0006	Americium-241	0.033	0.02	pCi/g	U
5113M0006	Barium-133	0.002	0.014	pCi/g	U
5113M0006	Carbon-14	0.318	0.096	pCi/g	=
5113M0006	Cesium-137	0.254	0.023	pCi/g	=
5113M0006	Cobalt-60	0.009	0.015	pCi/g	U
5113M0006	Curium-243/244	0.02	0.021	pCi/g	U
5113M0006	Europium-152	0.022	0.041	pCi/g	U

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5113M0006	Europium-154	0.001	0.076	pCi/g	U
5113M0006	Europium-155	0.012	0.039	pCi/g	U
5113M0006	Iodine-129	0.003	0.093	pCi/g	U
5113M0006	Krypton-85	-13	4.1	pCi/g	U
5113M0006	Lead-212	-0.001	0.019	pCi/g	U
5113M0006	Lead-214	0.007	0.023	pCi/g	U
5113M0006	Neptunium-239	0.011	0.035	pCi/g	U
5113M0006	Nickel-63	0.3	1.2	pCi/g	U
5113M0006	Plutonium-238	0.006	0.01	pCi/g	U
5113M0006	Plutonium-239/240	0.016	0.012	pCi/g	U
5113M0006	Plutonium-241	-0.8	2.8	pCi/g	U
5113M0006	Plutonium-242	0	0.0032	pCi/g	U
5113M0006	Plutonium-244	0.0049	0.0064	pCi/g	U
5113M0006	Potassium-40	0.02	0.23	pCi/g	U
5113M0006	Protactinium-233	0.001	0.029	pCi/g	U
5113M0006	Radioactive Strontium (Total)	0.21	0.41	pCi/g	U
5113M0006	Technetium-99	0.4	1.3	pCi/g	U
5113M0006	Thorium-229	0.015	0.083	pCi/g	U
5113M0006	Thorium-230	1.3	1.5	pCi/g	U
5113M0006	Tritium	0.04	0.12	pCi/g	U
5113M0006	Uranium-233/234	0.01	0.01	pCi/g	U
5113M0006	Uranium-235/236	-0.002	0.0039	pCi/g	U
5113M0006	Uranium-238	0.0048	0.0055	pCi/g	=
5113M0007	Actinium-228	0.051	0.026	pCi/g	U
5113M0007	Americium-241	0.071	0.025	pCi/g	=
5113M0007	Barium-133	0.0041	0.01	pCi/g	U
5113M0007	Carbon-14	0.069	0.059	pCi/g	U
5113M0007	Cesium-137	0.502	0.036	pCi/g	=
5113M0007	Cobalt-60	0.0123	0.0098	pCi/g	U
5113M0007	Curium-243/244	0.01	0.02	pCi/g	U
5113M0007	Europium-152	0.006	0.025	pCi/g	U
5113M0007	Europium-154	0.003	0.044	pCi/g	U
5113M0007	Europium-155	-0.012	0.024	pCi/g	U
5113M0007	Iodine-129	-0.081	0.066	pCi/g	U
5113M0007	Krypton-85	-11.5	2.8	pCi/g	U
5113M0007	Lead-212	-0.001	0.013	pCi/g	U
5113M0007	Lead-214	-0.011	0.018	pCi/g	U
5113M0007	Neptunium-239	-0.002	0.021	pCi/g	U
5113M0007	Nickel-63	-0.4	1.2	pCi/g	U
5113M0007	Plutonium-238	-0.009	0.015	pCi/g	U
5113M0007	Plutonium-239/240	0.034	0.017	pCi/g	=

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5113M0007	Plutonium-241	7.9	3.7	pCi/g	=
5113M0007	Plutonium-242	0	0.0064	pCi/g	U
5113M0007	Plutonium-244	-0.0019	0.0037	pCi/g	U
5113M0007	Potassium-40	0.13	0.2	pCi/g	U
5113M0007	Protactinium-233	-0.024	0.021	pCi/g	U
5113M0007	Radioactive Strontium (Total)	0.33	0.43	pCi/g	U
5113M0007	Technetium-99	0.3	1.3	pCi/g	U
5113M0007	Thorium-229	0.034	0.055	pCi/g	U
5113M0007	Thorium-230	2.06	0.99	pCi/g	U
5113M0007	Tritium	-0.021	0.079	pCi/g	U
5113M0007	Uranium-233/234	0.054	0.02	pCi/g	=
5113M0007	Uranium-235/236	0	0.0044	pCi/g	U
5113M0007	Uranium-238	0.02	0.013	pCi/g	U
5113M0008	Actinium-228	0.04	0.022	pCi/g	U
5113M0008	Americium-241	0.033	0.018	pCi/g	U
5113M0008	Barium-133	-0.0078	0.0055	pCi/g	U
5113M0008	Carbon-14	0.031	0.049	pCi/g	U
5113M0008	Cesium-137	0.309	0.016	pCi/g	=
5113M0008	Cobalt-60	0.0089	0.0075	pCi/g	U
5113M0008	Curium-243/244	-0.013	0.014	pCi/g	U
5113M0008	Europium-152	0.007	0.022	pCi/g	U
5113M0008	Europium-154	-0.039	0.042	pCi/g	U
5113M0008	Europium-155	0.001	0.016	pCi/g	U
5113M0008	Iodine-129	0.02	0.065	pCi/g	U
5113M0008	Krypton-85	-5	2.9	pCi/g	U
5113M0008	Lead-212	0.005	0.011	pCi/g	U
5113M0008	Lead-214	0.008	0.016	pCi/g	U
5113M0008	Neptunium-239	0.005	0.014	pCi/g	U
5113M0008	Nickel-63	0	1.1	pCi/g	U
5113M0008	Plutonium-238	0	0.017	pCi/g	U
5113M0008	Plutonium-239/240	0.085	0.024	pCi/g	=
5113M0008	Plutonium-241	8.1	3.2	pCi/g	=
5113M0008	Plutonium-242	0	0.0047	pCi/g	U
5113M0008	Plutonium-244	-0.0034	0.0033	pCi/g	U
5113M0008	Potassium-40	0	0.14	pCi/g	U
5113M0008	Protactinium-233	0.002	0.014	pCi/g	U
5113M0008	Radioactive Strontium (Total)	-0.09	0.37	pCi/g	U
5113M0008	Technetium-99	0.6	1.3	pCi/g	U
5113M0008	Thorium-229	0.021	0.047	pCi/g	U
5113M0008	Thorium-230	0.69	0.83	pCi/g	U
5113M0008	Tritium	0.085	0.071	pCi/g	U

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5113M0008	Uranium-233/234	0.017	0.012	pCi/g	U
5113M0008	Uranium-235/236	-0.011	0.004	pCi/g	U
5113M0008	Uranium-238	-0.003	0.007	pCi/g	U
5113M0009	Actinium-228	0.024	0.038	pCi/g	U
5113M0009	Americium-241	0.02	0.017	pCi/g	U
5113M0009	Barium-133	-0.029	0.017	pCi/g	U
5113M0009	Carbon-14	0	0.062	pCi/g	U
5113M0009	Cesium-137	0.089	0.011	pCi/g	=
5113M0009	Cobalt-60	0.004	0.013	pCi/g	U
5113M0009	Curium-243/244	-0.013	0.015	pCi/g	U
5113M0009	Europium-152	-0.015	0.037	pCi/g	U
5113M0009	Europium-154	-0.047	0.042	pCi/g	U
5113M0009	Europium-155	-0.029	0.045	pCi/g	U
5113M0009	Iodine-129	0.18	0.2	pCi/g	U
5113M0009	Krypton-85	-13.7	3.2	pCi/g	U
5113M0009	Lead-212	0.001	0.018	pCi/g	U
5113M0009	Lead-214	0.005	0.022	pCi/g	U
5113M0009	Neptunium-239	-0.037	0.041	pCi/g	U
5113M0009	Nickel-63	0.6	1.2	pCi/g	U
5113M0009	Plutonium-238	0	0.017	pCi/g	U
5113M0009	Plutonium-239/240	0.023	0.015	pCi/g	U
5113M0009	Plutonium-241	1.3	3	pCi/g	U
5113M0009	Plutonium-242	-0.0056	0.0052	pCi/g	U
5113M0009	Plutonium-244	-0.0075	0.0037	pCi/g	U
5113M0009	Potassium-40	0.17	0.29	pCi/g	U
5113M0009	Protactinium-233	0.017	0.024	pCi/g	U
5113M0009	Radioactive Strontium (Total)	0.44	0.41	pCi/g	U
5113M0009	Technetium-99	0.1	1.2	pCi/g	U
5113M0009	Thorium-229	0.005	0.078	pCi/g	U
5113M0009	Thorium-230	-0.4	3.5	pCi/g	U
5113M0009	Tritium	-0.021	0.086	pCi/g	U
5113M0009	Uranium-233/234	0.002	0.012	pCi/g	U
5113M0009	Uranium-235/236	0	0.01	pCi/g	U
5113M0009	Uranium-238	0.007	0.01	pCi/g	U

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit
UJ = Analyte, compound or nuclide not detected above the reported detection limit, and the reported detection limit is approximated due to quality deficiency
= = Validated result, which is detected and unqualified

PCB data for Bldg. 3034

Sample ID	Chemical name	Result	Units	Validation qualifier
5113M0003A	PCB-1016	463	µg/kg	U
5113M0003A	PCB-1221	463	µg/kg	U
5113M0003A	PCB-1232	463	µg/kg	U
5113M0003A	PCB-1242	463	µg/kg	U
5113M0003A	PCB-1248	1650	µg/kg	=
5113M0003A	PCB-1254	2150	µg/kg	=
5113M0003A	PCB-1260	1110	µg/kg	=
5113M0003A	PCB-1262	463	µg/kg	U
5113M0003A	PCB-1268	463	µg/kg	U
5113M0003A	Polychlorinated biphenyl	4900	µg/kg	=
5113M0004A	PCB-1016	455	µg/kg	U
5113M0004A	PCB-1221	455	µg/kg	U
5113M0004A	PCB-1232	455	µg/kg	U
5113M0004A	PCB-1242	455	µg/kg	U
5113M0004A	PCB-1248	1210	µg/kg	=
5113M0004A	PCB-1254	2180	µg/kg	=
5113M0004A	PCB-1260	1250	µg/kg	=
5113M0004A	PCB-1262	455	µg/kg	U
5113M0004A	PCB-1268	455	µg/kg	U
5113M0004A	Polychlorinated biphenyl	4650	µg/kg	=
5113M0005A	PCB-1016	69,600	µg/kg	U
5113M0005A	PCB-1221	69,600	µg/kg	U
5113M0005A	PCB-1232	69,600	µg/kg	U
5113M0005A	PCB-1242	69,600	µg/kg	U
5113M0005A	PCB-1248	69,600	µg/kg	U
5113M0005A	PCB-1254	710,000	µg/kg	=
5113M0005A	PCB-1260	69,600	µg/kg	U
5113M0005A	PCB-1262	69,600	µg/kg	U
5113M0005A	PCB-1268	69,600	µg/kg	U
5113M0005A	Polychlorinated biphenyl	710,000	µg/kg	=

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit
= = Validated result, which is detected and unqualified

Metals data for Bldg. 3036

Sample ID	Chemical came	Result	Units	Validation qualifier
5114M0001	Antimony	0.4924	mg/kg	=
5114M0001	Arsenic	4.4076	mg/kg	=
5114M0001	Barium	2.2752	mg/kg	U
5114M0001	Beryllium	0.273	mg/kg	U
5114M0001	Cadmium	1.0011	mg/kg	U
5114M0001	Chromium	74.1136	mg/kg	=
5114M0001	Copper	54.1853	mg/kg	=
5114M0001	Lead	45.4647	mg/kg	=
5114M0001	Manganese	260.8503	mg/kg	=
5114M0001	Molybdenum	9.1214	mg/kg	=
5114M0001	Nickel	49.3103	mg/kg	=
5114M0001	Selenium	1.5471	mg/kg	U
5114M0001	Silver	0.273	mg/kg	U
5114M0001	Strontium	84.8405	mg/kg	=
5114M0001	Vanadium	1.4087	mg/kg	=
5114M0001	Zinc	33305.09	mg/kg	J
5114M0001A	Boron	238	mg/kg	UJ
5114M0001A	Mercury	0.4	mg/kg	UJ
5114M0001A	Tin	46.6	mg/kg	=
5114M0002	Antimony	0.1513	mg/kg	U
5114M0002	Arsenic	0.2649	mg/kg	U
5114M0002	Barium	408.0365	mg/kg	=
5114M0002	Beryllium	0.1135	mg/kg	U
5114M0002	Cadmium	0.4162	mg/kg	U
5114M0002	Chromium	2.7392	mg/kg	=
5114M0002	Copper	39.6638	mg/kg	=
5114M0002	Lead	7.2647	mg/kg	U
5114M0002	Manganese	572.7907	mg/kg	=
5114M0002	Molybdenum	0.1892	mg/kg	U
5114M0002	Nickel	3.4124	mg/kg	=
5114M0002	Selenium	0.6432	mg/kg	U
5114M0002	Silver	0.1135	mg/kg	U
5114M0002	Strontium	10.0609	mg/kg	=
5114M0002	Vanadium	4.9064	mg/kg	=
5114M0002	Zinc	69.052	mg/kg	U
5114M0002A	Boron	239	mg/kg	=
5114M0002A	Mercury	0.4	mg/kg	U
5114M0002A	Tin	7.14	mg/kg	=
5114M0004	Antimony	0.1023	mg/kg	U

Sample ID	Chemical came	Result	Units	Validation qualifier
5114M0004	Arsenic	0.179	mg/kg	U
5114M0004	Barium	879.3942	mg/kg	=
5114M0004	Beryllium	0.0767	mg/kg	U
5114M0004	Cadmium	0.2813	mg/kg	U
5114M0004	Chromium	2.7401	mg/kg	=
5114M0004	Copper	12.4975	mg/kg	=
5114M0004	Lead	4.9092	mg/kg	U
5114M0004	Manganese	305.4704	mg/kg	=
5114M0004	Molybdenum	0.1382	mg/kg	=
5114M0004	Nickel	9.4271	mg/kg	=
5114M0004	Selenium	0.4347	mg/kg	U
5114M0004	Silver	0.0767	mg/kg	U
5114M0004	Strontium	29.167	mg/kg	=
5114M0004	Vanadium	3.3111	mg/kg	=
5114M0004	Zinc	69.8753	mg/kg	J
5114M0004A	Boron	174	mg/kg	=
5114M0004A	Mercury	0.4	mg/kg	U
5114M0004A	Tin	6.94	mg/kg	=
5114M0005	Antimony	0.0621	mg/kg	U
5114M0005	Arsenic	0.2431	mg/kg	=
5114M0005	Barium	3.474	mg/kg	=
5114M0005	Beryllium	0.0465	mg/kg	U
5114M0005	Cadmium	0.1706	mg/kg	U
5114M0005	Chromium	0.8527	mg/kg	=
5114M0005	Copper	0.6139	mg/kg	=
5114M0005	Lead	2.9785	mg/kg	U
5114M0005	Manganese	7.703	mg/kg	=
5114M0005	Molybdenum	0.2961	mg/kg	=
5114M0005	Nickel	0.9308	mg/kg	U
5114M0005	Selenium	0.3029	mg/kg	=
5114M0005	Silver	0.0465	mg/kg	U
5114M0005	Strontium	344.9411	mg/kg	=
5114M0005	Vanadium	0.4573	mg/kg	=
5114M0005	Zinc	28.3109	mg/kg	U
5114M0005A	Boron	20.8	mg/kg	=
5114M0005A	Mercury	0.4	mg/kg	U
5114M0005A	Tin	189	mg/kg	U
5114M0006	Antimony	7.6491	mg/kg	=
5114M0006	Arsenic	0.9608	mg/kg	U
5114M0006	Barium	45.6911	mg/kg	=
5114M0006	Beryllium	0.4118	mg/kg	U

Sample ID	Chemical came	Result	Units	Validation qualifier
5114M0006	Cadmium	8.9467	mg/kg	J
5114M0006	Chromium	2.5741	mg/kg	=
5114M0006	Copper	5.2158	mg/kg	U
5114M0006	Lead	26.3535	mg/kg	U
5114M0006	Manganese	5.7798	mg/kg	=
5114M0006	Molybdenum	0.6863	mg/kg	U
5114M0006	Nickel	8.2355	mg/kg	U
5114M0006	Selenium	2.3334	mg/kg	U
5114M0006	Silver	0.4118	mg/kg	U
5114M0006	Strontium	5.5511	mg/kg	=
5114M0006	Vanadium	0.8235	mg/kg	U
5114M0006	Zinc	250.4957	mg/kg	U
5114M0008	Antimony	0.0627	mg/kg	U
5114M0008	Arsenic	0.4102	mg/kg	=
5114M0008	Barium	11.9479	mg/kg	=
5114M0008	Beryllium	0.047	mg/kg	U
5114M0008	Cadmium	0.1723	mg/kg	U
5114M0008	Chromium	5.7404	mg/kg	=
5114M0008	Copper	1.4422	mg/kg	=
5114M0008	Lead	20.9067	mg/kg	=
5114M0008	Manganese	16.6344	mg/kg	=
5114M0008	Molybdenum	0.3262	mg/kg	=
5114M0008	Nickel	1.2872	mg/kg	=
5114M0008	Selenium	0.2663	mg/kg	U
5114M0008	Silver	0.047	mg/kg	U
5114M0008	Strontium	104.2969	mg/kg	=
5114M0008	Vanadium	0.6102	mg/kg	=
5114M0008	Zinc	269.7165	mg/kg	J
5114M0008A	Boron	5	mg/kg	U
5114M0008A	Mercury	0.4	mg/kg	U
5114M0008A	Tin	61.1	mg/kg	=
5114M0009	Antimony	0.1635	mg/kg	=
5114M0009	Arsenic	0.1768	mg/kg	=
5114M0009	Barium	530.0334	mg/kg	=
5114M0009	Beryllium	0.0673	mg/kg	U
5114M0009	Cadmium	0.2469	mg/kg	U
5114M0009	Chromium	130.5985	mg/kg	=
5114M0009	Copper	2.7183	mg/kg	=
5114M0009	Lead	4.5207	mg/kg	=
5114M0009	Manganese	32.6829	mg/kg	=
5114M0009	Molybdenum	0.1122	mg/kg	U

Sample ID	Chemical came	Result	Units	Validation qualifier
5114M0009	Nickel	1.3465	mg/kg	U
5114M0009	Selenium	0.3815	mg/kg	U
5114M0009	Silver	0.0673	mg/kg	U
5114M0009	Strontium	13.2501	mg/kg	=
5114M0009	Vanadium	3.4044	mg/kg	=
5114M0009	Zinc	759.9523	mg/kg	J
5114M0009A	Boron	342	mg/kg	=
5114M0009A	Mercury	0.4	mg/kg	U
5114M0009A	Tin	29.8	mg/kg	=
5114M0010	Antimony	2.097	mg/kg	=
5114M0010	Arsenic	18.4849	mg/kg	=
5114M0010	Barium	125.1161	mg/kg	=
5114M0010	Beryllium	0.1745	mg/kg	U
5114M0010	Cadmium	0.8518	mg/kg	J
5114M0010	Chromium	242.9378	mg/kg	=
5114M0010	Copper	349.2354	mg/kg	=
5114M0010	Lead	248.8106	mg/kg	=
5114M0010	Manganese	1643.539	mg/kg	=
5114M0010	Molybdenum	14.5255	mg/kg	=
5114M0010	Nickel	84.6445	mg/kg	=
5114M0010	Selenium	0.9886	mg/kg	U
5114M0010	Silver	0.2867	mg/kg	=
5114M0010	Strontium	2.7651	mg/kg	=
5114M0010	Vanadium	4.376	mg/kg	=
5114M0010	Zinc	124.5814	mg/kg	J
5114M0010A	Boron	849	mg/kg	=
5114M0010A	Mercury	0.607	mg/kg	=
5114M0010A	Tin	45.9	mg/kg	U
5114M0012	Molybdenum	1	mg/kg	U
5114M0012	Nickel	1.52	mg/kg	
5114M0012	Selenium	0.5	mg/kg	U
5114M0012	Silver	0.4	mg/kg	U
5114M0012	Strontium	191.8	mg/kg	
5114M0012	Thallium	0.5	mg/kg	U
5114M0012	Vanadium	1	mg/kg	U
5114M0012	Zinc	23	mg/kg	
5114M0013	Antimony	1.5	mg/kg	U
5114M0013	Arsenic	0.4	mg/kg	U
5114M0013	Barium	149.11	mg/kg	
5114M0013	Beryllium	0.1	mg/kg	U
5114M0013	Cadmium	0.2	mg/kg	U

Sample ID	Chemical came	Result	Units	Validation qualifier
5114M0013	Chromium	0.92	mg/kg	
5114M0013	Copper	0.2	mg/kg	U
5114M0013	Lead	17.42	mg/kg	
5114M0013	Manganese	2	mg/kg	
5114M0013	Molybdenum	207.83	mg/kg	
5114M0013	Nickel	1	mg/kg	U
5114M0013	Selenium	1.37	mg/kg	
5114M0013	Silver	0.5	mg/kg	U
5114M0013	Strontium	0.4	mg/kg	U
5114M0013	Vanadium	5.3	mg/kg	
5114M0013	Zinc	0.5	mg/kg	U
5114M0014	Antimony	1.5	mg/kg	U
5114M0014	Arsenic	0.75	mg/kg	
5114M0014	Barium	5.29	mg/kg	
5114M0014	Beryllium	0.1	mg/kg	U
5114M0014	Cadmium	0.2	mg/kg	U
5114M0014	Chromium	12.9	mg/kg	
5114M0014	Cobalt	1.61	mg/kg	
5114M0014	Copper	3.43	mg/kg	
5114M0014	Lead	52.4	mg/kg	
5114M0014	Manganese	39.44	mg/kg	
5114M0014	Molybdenum	1	mg/kg	U
5114M0014	Nickel	2.22	mg/kg	
5114M0014	Selenium	0.5	mg/kg	U
5114M0014	Silver	0.4	mg/kg	U
5114M0014	Strontium	311.9	mg/kg	
5114M0014	Thallium	0.5	mg/kg	U
5114M0014	Vanadium	1.6	mg/kg	
5114M0014	Zinc	78.5	mg/kg	U
5114M0015	Antimony	1.5	mg/kg	U
5114M0015	Arsenic	0.4	mg/kg	U
5114M0015	Barium	177.12	mg/kg	
5114M0015	Beryllium	0.1	mg/kg	U
5114M0015	Cadmium	0.64	mg/kg	
5114M0015	Chromium	1.48	mg/kg	
5114M0015	Copper	0.2	mg/kg	U
5114M0015	Lead	19.02	mg/kg	
5114M0015	Manganese	5.4	mg/kg	
5114M0015	Molybdenum	211.78	mg/kg	
5114M0015	Nickel	1	mg/kg	U
5114M0015	Selenium	1.72	mg/kg	

Sample ID	Chemical came	Result	Units	Validation qualifier
5114M0015	Silver	0.5	mg/kg	U
5114M0015	Strontium	0.4	mg/kg	U
5114M0015	Vanadium	6.1	mg/kg	
5114M0015	Zinc	0.5	mg/kg	U
5114M0016	Antimony	1.5	mg/kg	U
5114M0016	Arsenic	0.4	mg/kg	U
5114M0016	Barium	3.81	mg/kg	
5114M0016	Beryllium	0.1	mg/kg	U
5114M0016	Cadmium	0.2	mg/kg	U
5114M0016	Chromium	0.75	mg/kg	
5114M0016	Cobalt	0.2	mg/kg	U
5114M0016	Copper	0.64	mg/kg	
5114M0016	Lead	1.3	mg/kg	
5114M0016	Manganese	8.43	mg/kg	
5114M0016	Molybdenum	1	mg/kg	U
5114M0016	Nickel	0.85	mg/kg	
5114M0016	Selenium	0.5	mg/kg	U
5114M0016	Silver	0.4	mg/kg	U
5114M0016	Strontium	434.1	mg/kg	
5114M0016	Thallium	0.5	mg/kg	U
5114M0016	Vanadium	1	mg/kg	U
5114M0016	Zinc	2.3	mg/kg	
5114M0017	Antimony	1.5	mg/kg	U
5114M0017	Arsenic	0.4	mg/kg	U
5114M0017	Barium	188.02	mg/kg	
5114M0017	Beryllium	0.1	mg/kg	U
5114M0017	Cadmium	0.2	mg/kg	U
5114M0017	Chromium	0.5	mg/kg	U
5114M0017	Cobalt	0.2	mg/kg	U
5114M0017	Copper	5.28	mg/kg	
5114M0017	Lead	1	mg/kg	U
5114M0017	Manganese	64.72	mg/kg	
5114M0017	Molybdenum	1	mg/kg	U
5114M0017	Nickel	0.68	mg/kg	
5114M0017	Selenium	0.5	mg/kg	U
5114M0017	Silver	0.4	mg/kg	U
5114M0017	Strontium	8.3	mg/kg	
5114M0017	Thallium	0.5	mg/kg	U
5114M0017	Vanadium	1	mg/kg	U
5114M0017	Zinc	3112.5	mg/kg	

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit

UJ = Analyte, compound or nuclide not detected above the reported detection limit, and the reported detection limit is approximated due to quality deficiency

= = Validated result, which is detected and unqualified

Radiological data for Bldg. 3036

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5114M0001	Actinium-228	0.024		pCi/g	U
5114M0001	Americium-241	0.009		pCi/g	U
5114M0001	Barium-133	0.001	0.0048	pCi/g	U
5114M0001	Carbon-14	4.6	3.3	pCi/sample	U
5114M0001	Cesium-137	0.0228	0.0061	pCi/g	=
5114M0001	Curium-243/244	0.013	0.014	pCi/g	UJ
5114M0001	Europium-152	-0.006	0.013	pCi/g	U
5114M0001	Europium-154	-0.03	0.026	pCi/g	UJ
5114M0001	Europium-155	0.002	0.01	pCi/g	U
5114M0001	Iodine-129	0.005	0.031	pCi/g	U
5114M0001	Krypton-85	-1.57	0.76	pCi/g	UJ
5114M0001	Lead-212	0.0071	0.009	pCi/g	U
5114M0001	Lead-214	-0.008	0.012	pCi/g	U
5114M0001	Neptunium-239	0.0018	0.0081	pCi/g	U
5114M0001	Nickel-63	1.1	0.87	pCi/g	U
5114M0001	Plutonium-238	0.008	0.013	pCi/g	U
5114M0001	Plutonium-239/240	0.0048	0.0063	pCi/g	UJ
5114M0001	Plutonium-241	-1.1	2.6	pCi/g	U
5114M0001	Plutonium-242	0	0.0031	pCi/g	U
5114M0001	Plutonium-244	0	0.0031	pCi/g	U
5114M0001	Potassium-40	0.005	0.097	pCi/g	U
5114M0001	Protactinium-233	0.004	0.01	pCi/g	U
5114M0001	Radioactive Strontium (Total)	0.09	0.23	pCi/g	U
5114M0001	Technetium-99	0.42	0.96	pCi/g	U
5114M0001	Thorium-229	0.015	0.03	pCi/g	U
5114M0001	Thorium-230	-0.23	0.6	pCi/g	U
5114M0001	Tritium	0.8	8.1	pCi/sample	U
5114M0001	Uranium-233/234	0.006	0.009	pCi/g	U
5114M0001	Uranium-235/236	-0.0039	0.0038	pCi/g	U
5114M0001	Uranium-238	0.0016	0.0053	pCi/g	U
5114M0002	Actinium-228	0.025	0.055	pCi/g	U
5114M0002	Americium-241	0.024	0.023	pCi/g	U
5114M0002	Barium-133	0.037	0.028	pCi/g	U
5114M0002	Carbon-14	9	4	pCi/sample	=
5114M0002	Cesium-137	14.23	0.38	pCi/g	=
5114M0002	Curium-243/244	-0.002	0.02	pCi/g	U
5114M0002	Europium-152	0.044	0.065	pCi/g	U
5114M0002	Europium-154	-0.028	0.065	pCi/g	U
5114M0002	Europium-155	-0.001	0.041	pCi/g	U

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5114M0002	Iodine-129	0.02	0.13	pCi/g	U
5114M0002	Krypton-85	-2.5	3.3	pCi/g	U
5114M0002	Lead-212	0.031	0.036	pCi/g	U
5114M0002	Lead-214	0.001	0.047	pCi/g	U
5114M0002	Neptunium-239	-0.018	0.037	pCi/g	U
5114M0002	Nickel-63	0.67	0.86	pCi/g	U
5114M0002	Plutonium-238	-0.004	0.013	pCi/g	U
5114M0002	Plutonium-239/240	0.029	0.017	pCi/g	U
5114M0002	Plutonium-241	-0.8	2.9	pCi/g	U
5114M0002	Plutonium-242	-0.0018	0.005	pCi/g	U
5114M0002	Plutonium-244	0	0.005	pCi/g	U
5114M0002	Potassium-40	0.18	0.24	pCi/g	U
5114M0002	Protactinium-233	0.032	0.042	pCi/g	U
5114M0002	Radioactive Strontium (Total)	0.99	0.26	pCi/g	=
5114M0002	Technetium-99	6.1	1.2	pCi/g	=
5114M0002	Thorium-229	0.17	0.14	pCi/g	U
5114M0002	Thorium-230	2.5	3	pCi/g	U
5114M0002	Tritium	3.9	8.5	pCi/sample	U
5114M0002	Uranium-233/234	0.036	0.017	pCi/g	=
5114M0002	Uranium-235/236	0.0044	0.0075	pCi/g	U
5114M0002	Uranium-238	0.02	0.012	pCi/g	=
5114M0003	Actinium-228	0.044	0.022	pCi/g	U
5114M0003	Americium-241	0.003	0.018	pCi/g	U
5114M0003	Barium-133	-0.032	0.029	pCi/g	UJ
5114M0003	Carbon-14	0.86	0.82	pCi/g	U
5114M0003	Cesium-137	18.2	1.1	pCi/g	=
5114M0003	Curium-243/244	-0.041	0.013	pCi/g	UJ
5114M0003	Europium-152	0.035	0.066	pCi/g	U
5114M0003	Europium-154	0.001	0.023	pCi/g	U
5114M0003	Europium-155	0.002	0.017	pCi/g	U
5114M0003	Iodine-129	-0.209	0.093	pCi/g	UJ
5114M0003	Krypton-85	-3.9	2.7	pCi/g	UJ
5114M0003	Lead-212	0.027	0.024	pCi/g	U
5114M0003	Lead-214	0.035	0.048	pCi/g	U
5114M0003	Neptunium-239	0.013	0.022	pCi/g	U
5114M0003	Nickel-63	1.62	0.89	pCi/g	=
5114M0003	Plutonium-238	0.011	0.017	pCi/g	U
5114M0003	Plutonium-239/240	0.011	0.011	pCi/g	U
5114M0003	Plutonium-241	1.2	3	pCi/g	U
5114M0003	Plutonium-242	-0.0018	0.0036	pCi/g	U
5114M0003	Plutonium-244	-0.0019	0.0036	pCi/g	U

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5114M0003	Potassium-40	0.11	0.13	pCi/g	U
5114M0003	Protactinium-233	0.013	0.043	pCi/g	U
5114M0003	Radioactive Strontium (Total)	0.01	0.19	pCi/g	U
5114M0003	Technetium-99	0.37	0.96	pCi/g	U
5114M0003	Thorium-229	-0.07	0.12	pCi/g	U
5114M0003	Thorium-230	1	2.2	pCi/g	U
5114M0003	Tritium	237.5	4.6	pCi/g	=
5114M0003	Uranium-233/234	0.04	0.017	pCi/g	=
5114M0003	Uranium-235/236	0	0.0062	pCi/g	U
5114M0003	Uranium-238	0.036	0.016	pCi/g	=
5114M0004	Actinium-228	0.04	0.015	pCi/g	U
5114M0004	Americium-241	0.056	0.026	pCi/g	U
5114M0004	Barium-133	0.006	0.015	pCi/g	U
5114M0004	Carbon-14	6.8	3.7	pCi/sample	=
5114M0004	Cesium-137	6.04	0.39	pCi/g	=
5114M0004	Curium-243/244	-0.027	0.018	pCi/g	U
5114M0004	Europium-152	0.004	0.033	pCi/g	U
5114M0004	Europium-154	0.008	0.035	pCi/g	U
5114M0004	Europium-155	0.008	0.026	pCi/g	U
5114M0004	Iodine-129	0.003	0.042	pCi/g	U
5114M0004	Krypton-85	-1.6	1.6	pCi/g	U
5114M0004	Lead-212	0.006	0.015	pCi/g	U
5114M0004	Lead-214	0.019	0.024	pCi/g	U
5114M0004	Neptunium-239	-0.011	0.023	pCi/g	U
5114M0004	Nickel-63	1.24	0.88	pCi/g	U
5114M0004	Plutonium-238	0.021	0.019	pCi/g	U
5114M0004	Plutonium-239/240	0.059	0.022	pCi/g	=
5114M0004	Plutonium-241	3.2	3.4	pCi/g	U
5114M0004	Plutonium-242	-0.002	0.007	pCi/g	U
5114M0004	Plutonium-244	-0.013	0.004	pCi/g	UJ
5114M0004	Potassium-40	-0.15	0.16	pCi/g	U
5114M0004	Protactinium-233	0.007	0.025	pCi/g	U
5114M0004	Radioactive Strontium (Total)	0.38	0.22	pCi/g	=
5114M0004	Technetium-99	0.24	0.95	pCi/g	U
5114M0004	Thorium-229	-0.058	0.071	pCi/g	U
5114M0004	Thorium-230	0.72	0.56	pCi/g	U
5114M0004	Tritium	7.3	8.9	pCi/sample	U
5114M0004	Uranium-233/234	0.032	0.02	pCi/g	U
5114M0004	Uranium-235/236	-0.002	0.011	pCi/g	U
5114M0004	Uranium-238	0.004	0.012	pCi/g	U
5114M0005	Actinium-228	0.013	0.011	pCi/g	U

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5114M0005	Americium-241	-0.013	0.016	pCi/g	U
5114M0005	Barium-133	-0.0013	0.004	pCi/g	U
5114M0005	Carbon-14	-0.34	0.83	pCi/g	U
5114M0005	Cesium-137	0.0038	0.0046	pCi/g	U
5114M0005	Curium-243/244	-0.018	0.014	pCi/g	U
5114M0005	Europium-152	0.003	0.011	pCi/g	U
5114M0005	Europium-154	-0.005	0.021	pCi/g	U
5114M0005	Europium-155	-0.006	0.011	pCi/g	U
5114M0005	Iodine-129	-0.006	0.027	pCi/g	U
5114M0005	Krypton-85	-1.27	0.64	pCi/g	UJ
5114M0005	Lead-212	0.0154	0.0057	pCi/g	=
5114M0005	Lead-214	0.0295	0.0076	pCi/g	=
5114M0005	Neptunium-239	0.0022	0.0099	pCi/g	U
5114M0005	Nickel-63	0.76	0.86	pCi/g	U
5114M0005	Plutonium-238	-0.013	0.015	pCi/g	U
5114M0005	Plutonium-239/240	0.0019	0.0075	pCi/g	U
5114M0005	Plutonium-241	2	3	pCi/g	U
5114M0005	Plutonium-242	0	0.0037	pCi/g	U
5114M0005	Plutonium-244	-0.0019	0.0037	pCi/g	U
5114M0005	Potassium-40	0.01	0.095	pCi/g	U
5114M0005	Protactinium-233	-0.001	0.0091	pCi/g	U
5114M0005	Radioactive Strontium (Total)	0.13	0.21	pCi/g	U
5114M0005	Technetium-99	0.31	0.95	pCi/g	U
5114M0005	Thorium-229	0.001	0.025	pCi/g	U
5114M0005	Thorium-230	0.7	0.29	pCi/g	U
5114M0005	Tritium	1.3	1	pCi/g	U
5114M0005	Uranium-233/234	0.061	0.023	pCi/g	=
5114M0005	Uranium-235/236	0.002	0.008	pCi/g	U
5114M0005	Uranium-238	0.051	0.021	pCi/g	=
5114M0006	Actinium-228	0.15	0.18	pCi/g	U
5114M0006	Americium-241	0.044	0.025	pCi/g	U
5114M0006	Barium-133	0.023	0.043	pCi/g	U
5114M0006	Carbon-14	-2.3	2.4	pCi/g	U
5114M0006	Cesium-137	0.488	0.058	pCi/g	=
5114M0006	Curium-243/244	-0.006	0.016	pCi/g	U
5114M0006	Europium-152	0.07	0.1	pCi/g	U
5114M0006	Europium-154	0.07	0.18	pCi/g	U
5114M0006	Europium-155	-0.038	0.097	pCi/g	U
5114M0006	Iodine-129	-0.05	0.24	pCi/g	U
5114M0006	Krypton-85	-4.1	4.4	pCi/g	U
5114M0006	Lead-212	-0.045	0.061	pCi/g	U

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5114M0006	Lead-214	0.026	0.078	pCi/g	U
5114M0006	Neptunium-239	-0.054	0.088	pCi/g	U
5114M0006	Nickel-63	0.4	0.85	pCi/g	U
5114M0006	Plutonium-238	0.002	0.017	pCi/g	U
5114M0006	Plutonium-239/240	0.013	0.012	pCi/g	U
5114M0006	Plutonium-241	-0.5	2.9	pCi/g	U
5114M0006	Plutonium-242	0	0.0052	pCi/g	U
5114M0006	Plutonium-244	-0.0056	0.0064	pCi/g	U
5114M0006	Potassium-40	-0.11	0.82	pCi/g	U
5114M0006	Protactinium-233	-0.065	0.081	pCi/g	U
5114M0006	Radioactive Strontium (Total)	0.08	0.22	pCi/g	U
5114M0006	Technetium-99	0.58	0.97	pCi/g	U
5114M0006	Thorium-229	-0.01	0.12	pCi/g	U
5114M0006	Thorium-230	7.9	2.7	pCi/g	U
5114M0006	Tritium	10.7	3.3	pCi/g	=
5114M0006	Uranium-233/234	0.0055	0.0072	pCi/g	U
5114M0006	Uranium-235/236	-0.0023	0.0062	pCi/g	U
5114M0006	Uranium-238	0.009	0.009	pCi/g	U
5114M0007	Actinium-228	-0.0021	0.0098	pCi/g	U
5114M0007	Americium-241	0.017	0.017	pCi/g	U
5114M0007	Barium-133	-0.0007	0.0025	pCi/g	U
5114M0007	Carbon-14	-0.33	0.82	pCi/g	U
5114M0007	Cesium-137	0.0026	0.0026	pCi/g	U
5114M0007	Curium-243/244	-0.015	0.015	pCi/g	U
5114M0007	Europium-152	-0.0001	0.0064	pCi/g	U
5114M0007	Europium-154	0.001	0.012	pCi/g	U
5114M0007	Europium-155	0.0021	0.0047	pCi/g	U
5114M0007	Iodine-129	0.01	0.018	pCi/g	U
5114M0007	Krypton-85	0.3	0.53	pCi/g	U
5114M0007	Lead-212	-0.0008	0.004	pCi/g	U
5114M0007	Lead-214	-0.0002	0.0057	pCi/g	U
5114M0007	Neptunium-239	0.0027	0.0042	pCi/g	U
5114M0007	Nickel-63	0.66	0.86	pCi/g	U
5114M0007	Plutonium-238	0.012	0.017	pCi/g	U
5114M0007	Plutonium-239/240	-0.002	0.007	pCi/g	U
5114M0007	Plutonium-241	-1.1	2.9	pCi/g	U
5114M0007	Plutonium-242	0.002	0.008	pCi/g	U
5114M0007	Plutonium-244	0	0.0038	pCi/g	U
5114M0007	Potassium-40	-0.005	0.046	pCi/g	U
5114M0007	Protactinium-233	0.0015	0.0042	pCi/g	U
5114M0007	Radioactive Strontium (Total)	-0.03	0.19	pCi/g	U

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5114M0007	Technetium-99	0.9	0.99	pCi/g	U
5114M0007	Thorium-229	-0.007	0.014	pCi/g	U
5114M0007	Thorium-230	0.39	0.37	pCi/g	U
5114M0007	Tritium	-0.11	0.97	pCi/g	U
5114M0007	Uranium-233/234	0.019	0.012	pCi/g	=
5114M0007	Uranium-235/236	0	0.0064	pCi/g	U
5114M0007	Uranium-238	0.0075	0.0082	pCi/g	U
5114M0008	Actinium-228	0.019	0.014	pCi/g	U
5114M0008	Americium-241	-0.002	0.017	pCi/g	U
5114M0008	Barium-133	-0.0147	0.006	pCi/g	U
5114M0008	Carbon-14	-0.56	0.82	pCi/g	UJ
5114M0008	Cesium-137	0.0086	0.0041	pCi/g	U
5114M0008	Curium-243/244	-0.007	0.016	pCi/g	U
5114M0008	Europium-152	0	0.012	pCi/g	U
5114M0008	Europium-154	-0.005	0.022	pCi/g	U
5114M0008	Europium-155	-0.004	0.011	pCi/g	U
5114M0008	Iodine-129	0.006	0.027	pCi/g	U
5114M0008	Krypton-85	-0.73	0.52	pCi/g	UJ
5114M0008	Lead-212	0.0118	0.0078	pCi/g	U
5114M0008	Lead-214	0.003	0.01	pCi/g	U
5114M0008	Neptunium-239	-0.003	0.01	pCi/g	U
5114M0008	Nickel-63	0.39	0.85	pCi/g	U
5114M0008	Plutonium-238	-0.008	0.013	pCi/g	U
5114M0008	Plutonium-239/240	0.0017	0.0057	pCi/g	U
5114M0008	Plutonium-241	-0.8	2.5	pCi/g	U
5114M0008	Plutonium-242	0.0034	0.0046	pCi/g	U
5114M0008	Plutonium-244	0.0017	0.0033	pCi/g	U
5114M0008	Potassium-40	0.102	0.098	pCi/g	U
5114M0008	Protactinium-233	0.0048	0.009	pCi/g	U
5114M0008	Radioactive Strontium (Total)	-0.06	0.18	pCi/g	U
5114M0008	Technetium-99	1.3	1	pCi/g	U
5114M0008	Thorium-229	0.006	0.025	pCi/g	U
5114M0008	Thorium-230	0.2	0.27	pCi/g	U
5114M0008	Tritium	56	2.4	pCi/g	=
5114M0008	Uranium-233/234	0.028	0.015	pCi/g	=
5114M0008	Uranium-235/236	0	0.0045	pCi/g	U
5114M0008	Uranium-238	0.017	0.012	pCi/g	U
5114M0009	Actinium-228	-0.008	0.032	pCi/g	U
5114M0009	Americium-241	0.031	0.019	pCi/g	U
5114M0009	Barium-133	0.007	0.012	pCi/g	U
5114M0009	Carbon-14	6.4	3.6	pCi/sample	=

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5114M0009	Cesium-137	3.388	0.095	pCi/g	J
5114M0009	Curium-243/244	0.013	0.014	pCi/g	U
5114M0009	Europium-152	0	0.03	pCi/g	U
5114M0009	Europium-154	-0.039	0.043	pCi/g	U
5114M0009	Europium-155	-0.002	0.02	pCi/g	U
5114M0009	Iodine-129	0.04	0.07	pCi/g	U
5114M0009	Krypton-85	-1.6	1.5	pCi/g	UJ
5114M0009	Lead-212	0.0073	0.0092	pCi/g	U
5114M0009	Lead-214	-0.004	0.024	pCi/g	U
5114M0009	Neptunium-239	0	0.018	pCi/g	U
5114M0009	Nickel-63	0.56	0.85	pCi/g	U
5114M0009	Plutonium-238	0.009	0.016	pCi/g	U
5114M0009	Plutonium-239/240	0.046	0.018	pCi/g	=
5114M0009	Plutonium-241	0.3	2.8	pCi/g	U
5114M0009	Plutonium-242	-0.0053	0.006	pCi/g	U
5114M0009	Plutonium-244	-0.007	0.008	pCi/g	U
5114M0009	Potassium-40	0.06	0.14	pCi/g	UJ
5114M0009	Protactinium-233	-0.023	0.02	pCi/g	UJ
5114M0009	Radioactive Strontium (Total)	6.88	0.51	pCi/g	=
5114M0009	Technetium-99	0.85	0.98	pCi/g	U
5114M0009	Thorium-229	0.028	0.063	pCi/g	U
5114M0009	Thorium-230	-1.1	1.7	pCi/g	UJ
5114M0009	Tritium	0.5	8	pCi/sample	U
5114M0009	Uranium-233/234	0.01	0.016	pCi/g	U
5114M0009	Uranium-235/236	0.002	0.011	pCi/g	U
5114M0009	Uranium-238	-0.002	0.011	pCi/g	U
5114M0010	Actinium-228	-0.05	0.1	pCi/g	U
5114M0010	Americium-241	0.184	0.038	pCi/g	=
5114M0010	Barium-133	0.011	0.031	pCi/g	U
5114M0010	Carbon-14	4.9	3.3	pCi/sample	=
5114M0010	Cesium-137	8.87	0.25	pCi/g	=
5114M0010	Curium-243/244	-0.006	0.01	pCi/g	U
5114M0010	Europium-152	-0.022	0.08	pCi/g	U
5114M0010	Europium-154	-0.1	0.11	pCi/g	U
5114M0010	Europium-155	0.004	0.053	pCi/g	U
5114M0010	Iodine-129	-0.09	0.19	pCi/g	U
5114M0010	Krypton-85	-1.4	3.4	pCi/g	U
5114M0010	Lead-212	0.038	0.024	pCi/g	U
5114M0010	Lead-214	0.522	0.075	pCi/g	=
5114M0010	Neptunium-239	0.001	0.048	pCi/g	U
5114M0010	Nickel-63	0.89	0.86	pCi/g	U

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5114M0010	Plutonium-238	0.002	0.013	pCi/g	U
5114M0010	Plutonium-239/240	0.497	0.065	pCi/g	=
5114M0010	Plutonium-241	1.4	3.5	pCi/g	U
5114M0010	Plutonium-242	0	0.0043	pCi/g	U
5114M0010	Plutonium-244	-0.0044	0.0043	pCi/g	U
5114M0010	Potassium-40	-0.02	0.37	pCi/g	U
5114M0010	Protactinium-233	-0.009	0.05	pCi/g	U
5114M0010	Radioactive Strontium (Total)	6.65	0.49	pCi/g	=
5114M0010	Technetium-99	0.95	0.99	pCi/g	U
5114M0010	Thorium-229	0	0.17	pCi/g	U
5114M0010	Thorium-230	0	4.3	pCi/g	U
5114M0010	Tritium	3.1	8.4	pCi/sample	U
5114M0010	Uranium-233/234	0.231	0.044	pCi/g	=
5114M0010	Uranium-235/236	0.016	0.015	pCi/g	U
5114M0010	Uranium-238	0.123	0.032	pCi/g	=
5114M0012	Plutonium-241	1.3	3.2	pCi/g	U
5114M0012	Americium-241	0.025	0.017	pCi/g	U
5114M0012	Curium-243/244	-0.027	0.017	pCi/g	U
5114M0012	Plutonium-238	0.019	0.018	pCi/g	U
5114M0012	Plutonium-239/240	0.002	0.01	pCi/g	U
5114M0012	Plutonium-242	0	0.0054	pCi/g	U
5114M0012	Plutonium-244	0	0.0038	pCi/g	U
5114M0012	Uranium-233/234	0.024	0.014	pCi/g	U
5114M0012	Uranium-235/236	0	0.0044	pCi/g	U
5114M0012	Uranium-238	0.031	0.015	pCi/g	=
5114M0012	Nickel-63	0.2	1.2	pCi/g	U
5114M0012	Radioactive Strontium (Total)	-0.09	0.54	pCi/g	U
5114M0012	Technetium-99	-0.6	1.2	pCi/g	U
5114M0012	Tritium	67.7	6.6	pCi/g	=
5114M0012	Carbon-14	1.2	2.8	pCi/g	U
5114M0012	Actinium-228	0.065	0.024	pCi/g	=
5114M0012	Barium-133	0.0014	0.0095	pCi/g	U
5114M0012	Cesium-137	0.005	0.006	pCi/g	U
5114M0012	Cobalt-60	0.006	0.01	pCi/g	U
5114M0012	Europium-152	0.017	0.027	pCi/g	U
5114M0012	Europium-154	-0.028	0.055	pCi/g	U
5114M0012	Europium-155	-0.023	0.026	pCi/g	U
5114M0012	Iodine-129	-0.03	0.09	pCi/g	U
5114M0012	Krypton-85	-6.1	2.6	pCi/g	U
5114M0012	Lead-212	0.002	0.012	pCi/g	U
5114M0012	Lead-214	-0.004	0.015	pCi/g	U

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5114M0012	Neptunium-239	-0.002	0.023	pCi/g	U
5114M0012	Potassium-40	-0.18	0.16	pCi/g	U
5114M0012	Protactinium-233	0.015	0.018	pCi/g	U
5114M0012	Thorium-229	0.002	0.052	pCi/g	U
5114M0012	Thorium-230	1.13	0.49	pCi/g	U
5114M0013	Plutonium-241	-1.4	2.8	pCi/g	U
5114M0013	Americium-241	0.017	0.015	pCi/g	U
5114M0013	Curium-243/244	-0.023	0.014	pCi/g	U
5114M0013	Plutonium-238	0.002	0.014	pCi/g	U
5114M0013	Plutonium-239/240	0.08	0.024	pCi/g	=
5114M0013	Plutonium-242	-0.0018	0.0036	pCi/g	U
5114M0013	Plutonium-244	0.0018	0.0051	pCi/g	U
5114M0013	Uranium-233/234	0.017	0.014	pCi/g	U
5114M0013	Uranium-235/236	0.0063	0.0071	pCi/g	=
5114M0013	Uranium-238	0.0068	0.0081	pCi/g	U
5114M0013	Nickel-63	0.2	1.1	pCi/g	U
5114M0013	Radioactive Strontium (Total)	1.05	0.6	pCi/g	=
5114M0013	Technetium-99	-0.2	1.2	pCi/g	U
5114M0013	Tritium	0.015	0.078	pCi/g	U
5114M0013	Carbon-14	0.033	0.056	pCi/g	U
5114M0013	Actinium-228	0.033	0.03	pCi/g	U
5114M0013	Barium-133	-0.031	0.017	pCi/g	U
5114M0013	Cesium-137	9.16	0.89	pCi/g	=
5114M0013	Cobalt-60	-0.0008	0.0081	pCi/g	U
5114M0013	Europium-152	-0.029	0.037	pCi/g	U
5114M0013	Europium-154	-0.012	0.034	pCi/g	U
5114M0013	Europium-155	0	0.028	pCi/g	U
5114M0013	Iodine-129	-0.72	0.16	pCi/g	U
5114M0013	Krypton-85	-8.4	2.6	pCi/g	U
5114M0013	Lead-212	0.009	0.015	pCi/g	U
5114M0013	Lead-214	0.014	0.027	pCi/g	U
5114M0013	Neptunium-239	-0.017	0.026	pCi/g	U
5114M0013	Potassium-40	-0.14	0.15	pCi/g	U
5114M0013	Protactinium-233	-0.002	0.027	pCi/g	U
5114M0013	Thorium-229	0.056	0.076	pCi/g	U
5114M0013	Thorium-230	2.5	1.1	pCi/g	U
5114M0014	Plutonium-241	1.3	2.8	pCi/g	U
5114M0014	Americium-241	0.01	0.012	pCi/g	U
5114M0014	Curium-243/244	0.005	0.013	pCi/g	U
5114M0014	Plutonium-238	0.003	0.015	pCi/g	U

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5114M0014	Plutonium-239/240	0.005	0.01	pCi/g	U
5114M0014	Plutonium-242	0.005	0.0057	pCi/g	=
5114M0014	Plutonium-244	-0.0118	0.0088	pCi/g	U
5114M0014	Uranium-233/234	0.034	0.018	pCi/g	U
5114M0014	Uranium-235/236	-0.002	0.007	pCi/g	U
5114M0014	Uranium-238	0.028	0.015	pCi/g	=
5114M0014	Nickel-63	-0.3	1.1	pCi/g	U
5114M0014	Radioactive Strontium (Total)	-0.02	0.51	pCi/g	U
5114M0014	Technetium-99	-0.1	1.2	pCi/g	U
5114M0014	Tritium	77.9	5.9	pCi/g	=
5114M0014	Carbon-14	0.3	2.1	pCi/g	U
5114M0014	Actinium-228	0.052	0.02	pCi/g	=
5114M0014	Barium-133	-0.0018	0.0083	pCi/g	U
5114M0014	Cesium-137	0.0098	0.0049	pCi/g	U
5114M0014	Cobalt-60	0.0029	0.0067	pCi/g	U
5114M0014	Europium-152	0	0.018	pCi/g	U
5114M0014	Europium-154	-0.031	0.038	pCi/g	U
5114M0014	Europium-155	0.005	0.014	pCi/g	U
5114M0014	Iodine-129	-0.046	0.082	pCi/g	U
5114M0014	Krypton-85	-5	2.7	pCi/g	U
5114M0014	Lead-212	0.0143	0.0094	pCi/g	U
5114M0014	Lead-214	-0.001	0.013	pCi/g	U
5114M0014	Neptunium-239	0.006	0.012	pCi/g	U
5114M0014	Potassium-40	0.09	0.13	pCi/g	U
5114M0014	Protactinium-233	-0.006	0.013	pCi/g	U
5114M0014	Thorium-229	0.013	0.04	pCi/g	U
5114M0014	Thorium-230	1.42	0.7	pCi/g	U
5114M0015	Radioactive Strontium (Total)	0.85	0.56	pCi/g	U
5114M0015	Technetium-99	0.7	1.3	pCi/g	U
5114M0015	Tritium	-0.023	0.088	pCi/g	U
5114M0015	Carbon-14	0.024	0.065	pCi/g	U
5114M0015	Actinium-228	-0.02	0.047	pCi/g	U
5114M0015	Barium-133	0.012	0.025	pCi/g	U
5114M0015	Cesium-137	5.09	0.18	pCi/g	=
5114M0015	Cobalt-60	0	0.017	pCi/g	U
5114M0015	Europium-152	-0.047	0.058	pCi/g	U

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5114M0015	Europium-154	-0.002	0.057	pCi/g	U
5114M0015	Europium-155	-0.019	0.061	pCi/g	U
5114M0015	Iodine-129	-0.8	1.7	pCi/g	U
5114M0015	Krypton-85	-15.8	3.9	pCi/g	U
5114M0015	Lead-212	0.011	0.024	pCi/g	U
5114M0015	Lead-214	0.007	0.029	pCi/g	U
5114M0015	Neptunium-239	0.023	0.054	pCi/g	U
5114M0015	Potassium-40	-0.73	0.35	pCi/g	U
5114M0015	Protactinium-233	0.001	0.038	pCi/g	U
5114M0015	Thorium-229	-0.02	0.11	pCi/g	U
5114M0015	Thorium-230	3.7	3.7	pCi/g	U
5114M0015	Plutonium-241	1.6	3	pCi/g	U
5114M0015	Americium-241	0.157	0.03	pCi/g	=
5114M0015	Curium-243/244	-0.015	0.012	pCi/g	U
5114M0015	Plutonium-238	0.034	0.017	pCi/g	=
5114M0015	Plutonium-239/240	0.301	0.046	pCi/g	=
5114M0015	Plutonium-242	0	0.0049	pCi/g	U
5114M0015	Plutonium-244	0.0018	0.0035	pCi/g	U
5114M0015	Uranium-233/234	0.028	0.015	pCi/g	=
5114M0015	Uranium-235/236	-0.0087	0.0085	pCi/g	U
5114M0015	Uranium-238	0.005	0.009	pCi/g	U
5114M0015	Nickel-63	1.1	1.2	pCi/g	U
5114M0016	Uranium-233/234	0.057	0.019	pCi/g	U
5114M0016	Uranium-235/236	0.0039	0.0066	pCi/g	U
5114M0016	Uranium-238	0.072	0.021	pCi/g	=
5114M0016	Nickel-63	-0.8	1	pCi/g	U
5114M0016	Radioactive Strontium (Total)	-0.02	0.45	pCi/g	U
5114M0016	Technetium-99	0.1	1.1	pCi/g	U
5114M0016	Tritium	0.9	2.9	pCi/g	U
5114M0016	Carbon-14	1.7	2.1	pCi/g	U
5114M0016	Actinium-228	0.021	0.017	pCi/g	U
5114M0016	Barium-133	-0.0022	0.0029	pCi/g	U
5114M0016	Cesium-137	0.001	0.0072	pCi/g	U
5114M0016	Cobalt-60	-0.0028	0.008	pCi/g	U
5114M0016	Europium-152	-0.002	0.018	pCi/g	U
5114M0016	Europium-154	-0.034	0.035	pCi/g	U
5114M0016	Europium-155	-0.005	0.015	pCi/g	U
5114M0016	Iodine-129	0.041	0.053	pCi/g	U

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5114M0016	Krypton-85	-6.5	1.9	pCi/g	U
5114M0016	Lead-212	0.0039	0.0074	pCi/g	U
5114M0016	Lead-214	-0.003	0.01	pCi/g	U
5114M0016	Neptunium-239	-0.001	0.013	pCi/g	U
5114M0016	Potassium-40	-0.03	0.11	pCi/g	U
5114M0016	Protactinium-233	0	0.012	pCi/g	U
5114M0016	Thorium-229	0.016	0.034	pCi/g	U
5114M0016	Thorium-230	0.85	0.34	pCi/g	U
5114M0016	Plutonium-241	1.5	2.8	pCi/g	U
5114M0016	Americium-241	0.016	0.011	pCi/g	=
5114M0016	Curium-243/244	-0.01	0.016	pCi/g	U
5114M0016	Plutonium-238	-0.007	0.009	pCi/g	U
5114M0016	Plutonium-239/240	0.0034	0.0074	pCi/g	U
5114M0016	Plutonium-242	0.0067	0.0066	pCi/g	=
5114M0016	Plutonium-244	0.0017	0.0033	pCi/g	U
5114M0017	Plutonium-241	1.6	2.9	pCi/g	U
5114M0017	Americium-241	0.014	0.012	pCi/g	U
5114M0017	Curium-243/244	-0.0039	0.0039	pCi/g	U
5114M0017	Plutonium-238	0.007	0.013	pCi/g	U
5114M0017	Plutonium-239/240	0.0034	0.0075	pCi/g	U
5114M0017	Plutonium-242	-0.0017	0.0033	pCi/g	U
5114M0017	Plutonium-244	-0.0017	0.0034	pCi/g	U
5114M0017	Uranium-233/234	0.019	0.012	pCi/g	U
5114M0017	Uranium-235/236	-0.0065	0.0074	pCi/g	U
5114M0017	Uranium-238	0.0105	0.0084	pCi/g	=
5114M0017	Nickel-63	0	1.1	pCi/g	U
5114M0017	Radioactive Strontium (Total)	0.22	0.5	pCi/g	U
5114M0017	Technetium-99	0	1.2	pCi/g	U
5114M0017	Tritium	0	0.1	pCi/g	U
5114M0017	Carbon-14	0.045	0.075	pCi/g	U
5114M0017	Actinium-228	-0.008	0.042	pCi/g	U
5114M0017	Barium-133	-0.044	0.017	pCi/g	U
5114M0017	Cesium-137	2.388	0.09	pCi/g	=
5114M0017	Cobalt-60	0.005	0.013	pCi/g	U
5114M0017	Europium-152	-0.015	0.037	pCi/g	U
5114M0017	Europium-154	-0.046	0.047	pCi/g	U
5114M0017	Europium-155	-0.016	0.042	pCi/g	U
5114M0017	Iodine-129	-0.2	1.2	pCi/g	U
5114M0017	Krypton-85	-14.8	3.4	pCi/g	U

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5114M0017	Lead-212	-0.013	0.019	pCi/g	U
5114M0017	Lead-214	-0.012	0.023	pCi/g	U
5114M0017	Neptunium-239	0.007	0.037	pCi/g	U
5114M0017	Potassium-40	-0.21	0.32	pCi/g	U
5114M0017	Protactinium-233	0.004	0.025	pCi/g	U
5114M0017	Thorium-229	-0.031	0.057	pCi/g	U
5114M0017	Thorium-230	-5.3	2.2	pCi/g	U

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit
UJ = Analyte, compound or nuclide not detected above the reported detection limit, and the reported detection limit is approximated due to quality deficiency
= = Validated result, which is detected and unqualified

PCB Data for Bldg. 3036

Sample ID	Chemical came	Result	Units	Validation qualifier
5114M0007A	PCB-1016	980	ug/kg	U
5114M0007A	PCB-1221	980	ug/kg	U
5114M0007A	PCB-1232	980	ug/kg	U
5114M0007A	PCB-1242	980	ug/kg	U
5114M0007A	Polychlorinated biphenyl	980	ug/kg	U
5114M0007A	PCB-1254	980	ug/kg	U
5114M0007A	PCB-1260	980	ug/kg	U
5114M0007A	PCB-1262	980	ug/kg	U
5114M0007A	PCB-1268	980	ug/kg	U
5114M0007A	PCB-1248	980	ug/kg	U

Radiological data for Bldg. 3093

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5115M0001	Actinium-228	0.028	0.019	pCi/g	U
5115M0001	Americium-241	0.006	0.01	pCi/g	U
5115M0001	Barium-133	0.0007	0.0045	pCi/g	U
5115M0001	Carbon-14	223	39	pCi/g	=
5115M0001	Cesium-137	0.0432	0.008	pCi/g	=
5115M0001	Cobalt-60	0.0022	0.0057	pCi/g	U
5115M0001	Curium-243/244	-0.0075	0.0037	pCi/g	U
5115M0001	Europium-152	-0.009	0.013	pCi/g	U
5115M0001	Europium-154	-0.012	0.025	pCi/g	U
5115M0001	Europium-155	-0.009	0.013	pCi/g	U
5115M0001	Iodine-129	0.029	0.055	pCi/g	U
5115M0001	Krypton-85	-1.13	0.68	pCi/g	UJ
5115M0001	Lead-212	0.0053	0.0057	pCi/g	U
5115M0001	Lead-214	-0.004	0.0076	pCi/g	U
5115M0001	Neptunium-239	0.004	0.011	pCi/g	U
5115M0001	Nickel-63	1.3	1.1	pCi/g	U
5115M0001	Plutonium-238	0.008	0.016	pCi/g	U
5115M0001	Plutonium-239/240	0.0058	0.0084	pCi/g	U
5115M0001	Plutonium-241	0.3	4.9	pCi/g	U
5115M0001	Plutonium-242	0.0038	0.0075	pCi/g	U
5115M0001	Plutonium-244	-0.0038	0.0053	pCi/g	U
5115M0001	Potassium-40	0.64	0.12	pCi/g	=
5115M0001	Protactinium-233	0.0055	0.0099	pCi/g	U
5115M0001	Radioactive Strontium (Total)	-0.22	0.39	pCi/g	U
5115M0001	Technetium-99	0.2	1.1	pCi/g	U
5115M0001	Thorium-229	-0.004	0.029	pCi/g	U
5115M0001	Thorium-230	1.09	0.35	pCi/g	U
5115M0001	Tritium	369	59	pCi/g	=
5115M0001	Uranium-233/234	0.015	0.011	pCi/g	U
5115M0001	Uranium-235/236	0.002	0.008	pCi/g	U
5115M0001	Uranium-238	0.019	0.012	pCi/g	=
5115M0002	Actinium-228	0.014	0.07	pCi/g	U
5115M0002	Americium-241	0.004	0.013	pCi/g	U
5115M0002	Barium-133	-0.006	0.015	pCi/g	U
5115M0002	Carbon-14	28	29	pCi/g	U
5115M0002	Cesium-137	0.032	0.015	pCi/g	U
5115M0002	Cobalt-60	0.018	0.012	pCi/g	U
5115M0002	Curium-243/244	-0.023	0.01	pCi/g	UJ
5115M0002	Europium-152	-0.003	0.037	pCi/g	U

Radiological data for Bldg. 3093 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5115M0002	Europium-154	-0.126	0.084	pCi/g	UJ
5115M0002	Europium-155	-0.001	0.028	pCi/g	U
5115M0002	Iodine-129	0.02	0.16	pCi/g	U
5115M0002	Krypton-85	-2.6	2.3	pCi/g	UJ
5115M0002	Lead-212	0.072	0.017	pCi/g	=
5115M0002	Lead-214	0.025	0.033	pCi/g	U
5115M0002	Neptunium-239	-0.004	0.025	pCi/g	U
5115M0002	Nickel-63	0.4	1.2	pCi/g	U
5115M0002	Plutonium-238	0.01	0.011	pCi/g	U
5115M0002	Plutonium-239/240	0.007	0.0084	pCi/g	U
5115M0002	Plutonium-241	2.9	4.8	pCi/g	U
5115M0002	Plutonium-242	0.0035	0.0048	pCi/g	U
5115M0002	Plutonium-244	-0.0017	0.0034	pCi/g	U
5115M0002	Potassium-40	0.42	0.28	pCi/g	U
5115M0002	Protactinium-233	0.011	0.012	pCi/g	U
5115M0002	Radioactive Strontium (Total)	0.39	0.41	pCi/g	U
5115M0002	Technetium-99	-0.5	1.2	pCi/g	U
5115M0002	Thorium-229	-0.06	0.082	pCi/g	U
5115M0002	Thorium-230	-0.6	2.3	pCi/g	U
5115M0002	Tritium	23	37	pCi/g	UJ
5115M0002	Uranium-233/234	0.041	0.021	pCi/g	U
5115M0002	Uranium-235/236	0.0075	0.0085	pCi/g	U
5115M0002	Uranium-238	0.055	0.021	pCi/g	=
5115M0003	Actinium-228	-0.02	0.14	pCi/g	U
5115M0003	Americium-241	-0.011	0.011	pCi/g	U
5115M0003	Barium-133	-0.002	0.031	pCi/g	U
5115M0003	Carbon-14	27	29	pCi/g	U
5115M0003	Cesium-137	0.002	0.035	pCi/g	U
5115M0003	Cobalt-60	0.003	0.015	pCi/g	U
5115M0003	Curium-243/244	0.013	0.016	pCi/g	U
5115M0003	Europium-152	0.026	0.032	pCi/g	U
5115M0003	Europium-154	0.05	0.11	pCi/g	U
5115M0003	Europium-155	0.037	0.057	pCi/g	U
5115M0003	Iodine-129	0.2	0.32	pCi/g	U
5115M0003	Krypton-85	5.7	3.8	pCi/g	U
5115M0003	Lead-212	0.046	0.032	pCi/g	U
5115M0003	Lead-214	0.047	0.064	pCi/g	U
5115M0003	Neptunium-239	0.015	0.051	pCi/g	U
5115M0003	Nickel-63	1	1.3	pCi/g	U

Radiological data for Bldg. 3093 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5115M0003	Plutonium-238	0.009	0.012	pCi/g	U
5115M0003	Plutonium-239/240	0.0044	0.0074	pCi/g	U
5115M0003	Plutonium-241	-2	3.8	pCi/g	U
5115M0003	Plutonium-242	0.0087	0.0085	pCi/g	=
5115M0003	Plutonium-244	0	0.0043	pCi/g	U
5115M0003	Potassium-40	-0.44	0.53	pCi/g	U
5115M0003	Protactinium-233	-0.008	0.051	pCi/g	U
5115M0003	Radioactive Strontium (Total)	0.29	0.4	pCi/g	U
5115M0003	Technetium-99	-0.4	1.2	pCi/g	U
5115M0003	Thorium-229	0.01	0.17	pCi/g	U
5115M0003	Thorium-230	7.4	4.4	pCi/g	U
5115M0003	Tritium	38	38	pCi/g	U
5115M0003	Uranium-233/234	0.008	0.011	pCi/g	U
5115M0003	Uranium-235/236	0	0.0047	pCi/g	U
5115M0003	Uranium-238	0.018	0.012	pCi/g	U

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit
UJ = Analyte, compound or nuclide not detected above the reported detection limit, and the reported detection limit is approximated due to quality deficiency
= = Validated result, which is detected and unqualified

TCLP metals data for Bldg. 3118

Sample ID	Chemical name	Result	Units	Validation qualifier
5117M0004	Arsenic	0.25	mg/L	U
5117M0004	Barium	5	mg/L	U
5117M0004	Cadmium	0.05	mg/L	U
5117M0004	Chromium	1.58	mg/L	=
5117M0004	Lead	191.86	mg/L	=
5117M0004	Selenium	0.05	mg/L	U
5117M0004	Silver	0.25	mg/L	UJ
5117M0004A	Mercury	0.002	mg/L	U
5117M0005	Arsenic	0.3	mg/L	U
5117M0005	Barium	0.0541	mg/L	J
5117M0005	Cadmium	0.05	mg/L	U
5117M0005	Chromium	0.05	mg/L	U
5117M0005	Lead	0.1	mg/L	U
5117M0005	Mercury	0.002	mg/L	UJ
5117M0005	Selenium	0.3	mg/L	U
5117M0005	Silver	0.05	mg/L	U
5117M0007	Arsenic	0.3	mg/L	U
5117M0007	Barium	0.05	mg/L	U
5117M0007	Cadmium	0.05	mg/L	U
5117M0007	Chromium	0.05	mg/L	U
5117M0007	Lead	0.1	mg/L	U
5117M0007	Mercury	0.002	mg/L	UJ
5117M0007	Selenium	0.3	mg/L	U
5117M0007	Silver	0.05	mg/L	U
5117M0009	Arsenic	0.3	mg/L	U
5117M0009	Barium	0.05	mg/L	U
5117M0009	Cadmium	0.05	mg/L	U
5117M0009	Chromium	0.05	mg/L	U
5117M0009	Lead	0.1	mg/L	U
5117M0009	Mercury	0.002	mg/L	UJ
5117M0009	Selenium	0.3	mg/L	U
5117M0009	Silver	0.05	mg/L	U

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit
UJ = Analyte, compound or nuclide not detected above the reported detection limit, and the reported detection limit is approximated due to quality deficiency
= = Validated result, which is detected and unqualified

Radiological data for Bldg. 3118

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5117M0001	Actinium-228	0.101	0.086	pCi/g	U
5117M0001	Americium-241	0.002	0.013	pCi/g	U
5117M0001	Barium-133	0.006	0.025	pCi/g	U
5117M0001	Carbon-14	5	4	pCi/sample	U
5117M0001	Cesium-137	1.843	0.069	pCi/g	J
5117M0001	Cobalt-60	0.009	0.021	pCi/g	U
5117M0001	Curium-243/244	0.004	0.022	pCi/g	U
5117M0001	Europium-152	0.026	0.06	pCi/g	U
5117M0001	Europium-154	-0.018	0.088	pCi/g	U
5117M0001	Europium-155	0.006	0.043	pCi/g	U
5117M0001	Iodine-129	-0.13	0.22	pCi/g	U
5117M0001	Krypton-85	-9.9	4.6	pCi/g	UJ
5117M0001	Lead-212	0.04	0.024	pCi/g	UJ
5117M0001	Lead-214	0.088	0.054	pCi/g	U
5117M0001	Neptunium-239	0.009	0.039	pCi/g	U
5117M0001	Nickel-63	1.29	0.88	pCi/g	U
5117M0001	Plutonium-238	0	0.007	pCi/g	U
5117M0001	Plutonium-239/240	0.0038	0.0065	pCi/g	U
5117M0001	Plutonium-241	0.1	3.9	pCi/g	U
5117M0001	Plutonium-242	0.0038	0.0053	pCi/g	U
5117M0001	Plutonium-244	-0.0019	0.0037	pCi/g	UJ
5117M0001	Potassium-40	0.19	0.39	pCi/g	U
5117M0001	Protactinium-233	0.009	0.039	pCi/g	U
5117M0001	Radioactive Strontium (Total)	0.15	0.4	pCi/g	U
5117M0001	Technetium-99	0.44	0.79	pCi/g	U
5117M0001	Thorium-229	0.04	0.13	pCi/g	U
5117M0001	Thorium-230	2.2	3.2	pCi/g	U
5117M0001	Tritium	-0.6	7	pCi/sample	U
5117M0001	Uranium-233/234	0.034	0.016	pCi/g	=
5117M0001	Uranium-235/236	0.0042	0.0071	pCi/g	U
5117M0001	Uranium-238	0.0085	0.0088	pCi/g	U
5117M0002	Actinium-228	0.011	0.041	pCi/g	U
5117M0002	Americium-241	-0.012	0.011	pCi/g	U
5117M0002	Barium-133	-0.004	0.012	pCi/g	U
5117M0002	Carbon-14	3.9	3.8	pCi/sample	U
5117M0002	Cesium-137	0.0389	0.006	pCi/g	=
5117M0002	Cobalt-60	0.011	0.0096	pCi/g	U
5117M0002	Curium-243/244	0.0116		pCi/g	U
5117M0002	Europium-152	0.025	0.024	pCi/g	U

Radiological data for Bldg. 3118 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5117M0002	Europium-154	0.008	0.035	pCi/g	U
5117M0002	Europium-155	-0.008	0.024	pCi/g	U
5117M0002	Iodine-129	0.049	0.057	pCi/g	U
5117M0002	Krypton-85	-2.6	1.3	pCi/g	UJ
5117M0002	Lead-212	0.024	0.013	pCi/g	U
5117M0002	Lead-214	-0.013	0.014	pCi/g	U
5117M0002	Neptunium-239	-0.02	0.021	pCi/g	U
5117M0002	Nickel-63	0.36	0.85	pCi/g	U
5117M0002	Plutonium-238	0.008	0.011	pCi/g	U
5117M0002	Plutonium-239/240	0.0016	0.0068	pCi/g	U
5117M0002	Plutonium-241	-0.1	3.7	pCi/g	U
5117M0002	Plutonium-242	-0.0031	0.003	pCi/g	U
5117M0002	Plutonium-244	-0.0016	0.003	pCi/g	U
5117M0002	Potassium-40	0.12	0.19	pCi/g	U
5117M0002	Protactinium-233	0.026	0.018	pCi/g	U
5117M0002	Radioactive Strontium (Total)	-0.07	0.34	pCi/g	U
5117M0002	Technetium-99	0.23	0.78	pCi/g	U
5117M0002	Thorium-229	0.042	0.053	pCi/g	U
5117M0002	Thorium-230	-0.52	0.98	pCi/g	U
5117M0002	Tritium	4.2	7.7	pCi/sample	U
5117M0002	Uranium-233/234	0.012	0.013	pCi/g	U
5117M0002	Uranium-235/236	-0.0101	0.01	pCi/g	U
5117M0002	Uranium-238	0.002	0.004	pCi/g	U
5117M0003	Actinium-228	-0.022	0.074	pCi/g	U
5117M0003	Americium-241	0.013	0.011	pCi/g	U
5117M0003	Barium-133	-0.01	0.019	pCi/g	U
5117M0003	Carbon-14	3.5	3.7	pCi/sample	U
5117M0003	Cesium-137	1.104	0.047	pCi/g	=
5117M0003	Cobalt-60	0	0.016	pCi/g	U
5117M0003	Curium-243/244	0.006	0.011	pCi/g	U
5117M0003	Europium-152	0.012	0.029	pCi/g	U
5117M0003	Europium-154	-0.05	0.087	pCi/g	U
5117M0003	Europium-155	0.005	0.033	pCi/g	U
5117M0003	Iodine-129	0.13	0.14	pCi/g	U
5117M0003	Krypton-85	3.7	3.3	pCi/g	U
5117M0003	Lead-212	0.011	0.026	pCi/g	U
5117M0003	Lead-214	0.01	0.039	pCi/g	U
5117M0003	Neptunium-239	-0.007	0.029	pCi/g	U
5117M0003	Nickel-63	0.21	0.85	pCi/g	U

Radiological data for Bldg. 3118 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5117M0003	Plutonium-238	0.011	0.013	pCi/g	U
5117M0003	Plutonium-239/240	0.0091	0.008	pCi/g	=
5117M0003	Plutonium-241	-0.8	4	pCi/g	U
5117M0003	Plutonium-242	0.0018	0.0035	pCi/g	U
5117M0003	Plutonium-244	-0.0018	0.0036	pCi/g	U
5117M0003	Potassium-40	0.12	0.28	pCi/g	U
5117M0003	Protactinium-233	-0.001	0.025	pCi/g	U
5117M0003	Radioactive Strontium (Total)	0.27	0.37	pCi/g	U
5117M0003	Technetium-99	0.93	0.81	pCi/g	U
5117M0003	Thorium-229	0.181	0.1	pCi/g	U
5117M0003	Thorium-230	3.2	2.3	pCi/g	U
5117M0003	Tritium	4.8	7.8	pCi/sample	U
5117M0003	Uranium-233/234	0.014	0.013	pCi/g	U
5117M0003	Uranium-235/236	0.0025	0.005	pCi/g	U
5117M0003	Uranium-238	0.012	0.011	pCi/g	U
5117M0004	Actinium-228	0.015	0.067	pCi/g	U
5117M0004	Americium-241	0.014	0.016	pCi/g	U
5117M0004	Barium-133	0	0.035	pCi/g	U
5117M0004	Carbon-14	14.5	5	pCi/sample	=
5117M0004	Cesium-137	18.47	0.48	pCi/g	=
5117M0004	Cobalt-60	-0.005	0.021	pCi/g	U
5117M0004	Curium-243/244	0.007	0.016	pCi/g	U
5117M0004	Europium-152	0.181	0.038	pCi/g	=
5117M0004	Europium-154	0.059	0.083	pCi/g	U
5117M0004	Europium-155	0.007	0.049	pCi/g	U
5117M0004	Iodine-129	0.29	0.22	pCi/g	U
5117M0004	Krypton-85	-20.6	3.7	pCi/g	UJ
5117M0004	Lead-212	0.014	0.039	pCi/g	U
5117M0004	Lead-214	-0.005	0.053	pCi/g	U
5117M0004	Neptunium-239	0.033	0.043	pCi/g	U
5117M0004	Nickel-63	1.2	1.7	pCi/g	U
5117M0004	Plutonium-238	0.011	0.013	pCi/g	U
5117M0004	Plutonium-239/240	0.011	0.012	pCi/g	U
5117M0004	Plutonium-241	-1.1	3.9	pCi/g	U
5117M0004	Plutonium-242	-0.015	0.004	pCi/g	UJ
5117M0004	Plutonium-244	-0.0111	0.0089	pCi/g	UJ
5117M0004	Potassium-40	19.09	0.78	pCi/g	=
5117M0004	Protactinium-233	0.012	0.049	pCi/g	U
5117M0004	Radioactive Strontium (Total)	0.55	0.23	pCi/g	=

Radiological data for Bldg. 3118 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5117M0004	Technetium-99	0.59	0.78	pCi/g	U
5117M0004	Thorium-229	-0.06	0.16	pCi/g	U
5117M0004	Thorium-230	6.6	3.5	pCi/g	U
5117M0004	Tritium	8.6	7.2	pCi/sample	U
5117M0004	Uranium-233/234	0.02	0.013	pCi/g	=
5117M0004	Uranium-235/236	0.0092	0.009	pCi/g	=
5117M0004	Uranium-238	0.007	0.009	pCi/g	U
5117M0005	Americium-241	0.0521	0.29	pCi/g	U
5117M0005	Americium-243	-0.1	0.122	pCi/g	U
5117M0005	Barium-133	-0.0467	0.0858	pCi/g	U
5117M0005	Carbon-14	67.2	94.7	pCi/g	U
5117M0005	Cesium-137	0.327	0.164	pCi/g	=
5117M0005	Cobalt-60	-0.00185	0.0781	pCi/g	U
5117M0005	Curium-242	0	0.216	pCi/g	U
5117M0005	Curium-243/244	0	0.199	pCi/g	U
5117M0005	Curium-245/246	-0.0275	0.237	pCi/g	U
5117M0005	Europium-152	0.0965	0.2	pCi/g	U
5117M0005	Europium-154	-0.0719	0.205	pCi/g	U
5117M0005	Europium-155	0.0472	0.203	pCi/g	U
5117M0005	Iodine-129	4.07	5.65	pCi/g	U
5117M0005	Krypton-85	-46.3	25.7	pCi/g	UJ
5117M0005	Neptunium-237	0.104	0.141	pCi/g	U
5117M0005	Nickel-63	0	140	pCi/g	U
5117M0005	Plutonium-238	0.651	0.663	pCi/g	U
5117M0005	Plutonium-239/240	0	0.275	pCi/g	U
5117M0005	Plutonium-241	22	101	pCi/g	U
5117M0005	Plutonium-242	-0.197	0.317	pCi/g	U
5117M0005	Plutonium-244	0	0.275	pCi/g	U
5117M0005	Potassium-40	-0.913	0.889	pCi/g	U
5117M0005	Protactinium-233	0.104	0.141	pCi/g	U
5117M0005	Radium-226	-0.179	2.03	pCi/g	U
5117M0005	Radium-228	-0.265	0.313	pCi/g	U
5117M0005	Strontium-90	16.7	15.6	pCi/g	U
5117M0005	Technetium-99	-103	93.8	pCi/g	UJ
5117M0005	Thorium-228	0.0329	0.175	pCi/g	U
5117M0005	Thorium-229	-0.755	1.03	pCi/g	U
5117M0005	Thorium-230	-3.53	24.3	pCi/g	U
5117M0005	Thorium-232	8.44	69	pCi/g	U
5117M0005	Tritium	739	970	pCi/g	U

Radiological data for Bldg. 3118 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5117M0005	Uranium-233/234	0.00604	0.447	pCi/g	U
5117M0005	Uranium-235/236	0.266	0.524	pCi/g	U
5117M0005	Uranium-238	0	0.304	pCi/g	U
5117M0006	Americium-241	-0.026	0.224	pCi/g	U
5117M0006	Americium-243	0.00328	0.0819	pCi/g	U
5117M0006	Barium-133	0	0.244	pCi/g	UJ
5117M0006	Carbon-14	73.4	123	pCi/g	U
5117M0006	Cesium-137	0.422	0.167	pCi/g	=
5117M0006	Cobalt-60	-0.0249	0.072	pCi/g	U
5117M0006	Curium-242	0	0.237	pCi/g	U
5117M0006	Curium-243/244	0.00427	0.317	pCi/g	U
5117M0006	Curium-245/246	0.124	0.348	pCi/g	U
5117M0006	Europium-152	0.221	0.245	pCi/g	U
5117M0006	Europium-154	0.0447	0.183	pCi/g	U
5117M0006	Europium-155	0.00553	0.185	pCi/g	U
5117M0006	Iodine-129	2.38	2.2	pCi/g	U
5117M0006	Krypton-85	36	18.5	pCi/g	U
5117M0006	Neptunium-237	-0.11	0.138	pCi/g	U
5117M0006	Nickel-63	135	140	pCi/g	U
5117M0006	Plutonium-238	0.0353	0.369	pCi/g	U
5117M0006	Plutonium-239/240	-0.0604	0.267	pCi/g	U
5117M0006	Plutonium-241	-3.43	133	pCi/g	U
5117M0006	Plutonium-242	-0.0604	0.267	pCi/g	U
5117M0006	Plutonium-244	-0.0302	0.261	pCi/g	U
5117M0006	Potassium-40	-0.272	0.903	pCi/g	U
5117M0006	Protactinium-233	-0.11	0.138	pCi/g	U
5117M0006	Radium-226	-1.05	1.64	pCi/g	U
5117M0006	Radium-228	-0.0921	0.295	pCi/g	U
5117M0006	Strontium-90	1.14	13.9	pCi/g	U
5117M0006	Technetium-99	-114	97.4	pCi/g	UJ
5117M0006	Thorium-228	0.0688	0.173	pCi/g	U
5117M0006	Thorium-229	-0.186	1.14	pCi/g	U
5117M0006	Thorium-230	1.79	18.8	pCi/g	U
5117M0006	Thorium-232	37.3	47.8	pCi/g	U
5117M0006	Tritium	-383	1120	pCi/g	U
5117M0006	Uranium-233/234	0.113	0.425	pCi/g	U
5117M0006	Uranium-235/236	0.114	0.427	pCi/g	U
5117M0006	Uranium-238	0	0.301	pCi/g	U
5117M0007	Americium-241	0.0645	0.358	pCi/g	U

Radiological data for Bldg. 3118 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5117M0007	Americium-243	0.0334	0.098	pCi/g	U
5117M0007	Barium-133	-0.0836	0.0988	pCi/g	U
5117M0007	Carbon-14	91.6	93.5	pCi/g	U
5117M0007	Cesium-137	0.398	0.167	pCi/g	=
5117M0007	Cobalt-60	-0.00501	0.0984	pCi/g	U
5117M0007	Curium-242	0.0715	0.397	pCi/g	U
5117M0007	Curium-243/244	-0.0588	0.26	pCi/g	U
5117M0007	Curium-245/246	0.25	0.491	pCi/g	U
5117M0007	Europium-152	0.0824	0.24	pCi/g	U
5117M0007	Europium-154	0.181	0.213	pCi/g	U
5117M0007	Europium-155	0.0778	0.21	pCi/g	U
5117M0007	Iodine-129	4.57	4.65	pCi/g	U
5117M0007	Krypton-85	0	21.5	pCi/g	UJ
5117M0007	Neptunium-237	0.0866	0.187	pCi/g	U
5117M0007	Nickel-63	120	155	pCi/g	U
5117M0007	Plutonium-238	0.501	0.985	pCi/g	U
5117M0007	Plutonium-239/240	-0.137	0.604	pCi/g	U
5117M0007	Plutonium-241	-5.43	210	pCi/g	U
5117M0007	Plutonium-242	0	0.573	pCi/g	U
5117M0007	Plutonium-244	-0.137	0.604	pCi/g	U
5117M0007	Potassium-40	0.337	1.12	pCi/g	U
5117M0007	Protactinium-233	0.0866	0.187	pCi/g	U
5117M0007	Radium-226	0.738	2.54	pCi/g	U
5117M0007	Radium-228	0.00992	0.312	pCi/g	U
5117M0007	Strontium-90	-8.97	16.6	pCi/g	U
5117M0007	Technetium-99	-48.8	109	pCi/g	U
5117M0007	Thorium-228	0.117	0.29	pCi/g	U
5117M0007	Thorium-229	-0.384	1.22	pCi/g	U
5117M0007	Thorium-230	4.3	18.8	pCi/g	U
5117M0007	Thorium-232	19.5	50.2	pCi/g	U
5117M0007	Tritium	612	925	pCi/g	U
5117M0007	Uranium-233/234	0.239	0.601	pCi/g	U
5117M0007	Uranium-235/236	0.13	0.366	pCi/g	U
5117M0007	Uranium-238	0	0.262	pCi/g	U
5117M0008	Americium-241	0.273	0.482	pCi/g	U
5117M0008	Americium-243	0.11	0.14	pCi/g	U
5117M0008	Barium-133	-0.00687	0.0738	pCi/g	U
5117M0008	Carbon-14	70.9	96.6	pCi/g	U
5117M0008	Cesium-137	0.499	0.106	pCi/g	=

Radiological data for Bldg. 3118 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5117M0008	Cobalt-60	-0.0275	0.0605	pCi/g	U
5117M0008	Curium-242	-0.0312	0.269	pCi/g	U
5117M0008	Curium-243/244	-0.0283	0.244	pCi/g	U
5117M0008	Curium-245/246	0	0.276	pCi/g	U
5117M0008	Europium-152	0.0842	0.15	pCi/g	U
5117M0008	Europium-154	0.117	0.146	pCi/g	U
5117M0008	Europium-155	-0.0279	0.172	pCi/g	U
5117M0008	Iodine-129	2.63	4.55	pCi/g	U
5117M0008	Krypton-85	27.5	15.2	pCi/g	U
5117M0008	Neptunium-237	0.0265	0.104	pCi/g	U
5117M0008	Nickel-63	62.7	98.4	pCi/g	U
5117M0008	Plutonium-238	0.404	0.511	pCi/g	U
5117M0008	Plutonium-239/240	-0.0275	0.237	pCi/g	U
5117M0008	Plutonium-241	-5.08	106	pCi/g	U
5117M0008	Plutonium-242	-0.22	0.277	pCi/g	U
5117M0008	Plutonium-244	-0.0826	0.249	pCi/g	U
5117M0008	Potassium-40	0.865	0.549	pCi/g	U
5117M0008	Protactinium-233	0.0265	0.104	pCi/g	U
5117M0008	Radium-226	0.65	1.68	pCi/g	U
5117M0008	Radium-228	-0.00504	0.199	pCi/g	U
5117M0008	Strontium-90	6.79	10.5	pCi/g	U
5117M0008	Technetium-99	-72.7	60.4	pCi/g	UJ
5117M0008	Thorium-228	0.0844	0.116	pCi/g	U
5117M0008	Thorium-229	-0.99	0.833	pCi/g	U
5117M0008	Thorium-230	-6.33	22	pCi/g	U
5117M0008	Thorium-232	16.9	47.6	pCi/g	U
5117M0008	Tritium	1550	1030	pCi/g	U
5117M0008	Uranium-233/234	0.02	0.599	pCi/g	U
5117M0008	Uranium-235/236	0.0351	0.367	pCi/g	U
5117M0008	Uranium-238	-0.09	0.272	pCi/g	U
5117M0009	Americium-241	0.00518	0.384	pCi/g	U
5117M0009	Americium-243	-0.143	0.22	pCi/g	U
5117M0009	Barium-133	-0.0847	0.153	pCi/g	U
5117M0009	Carbon-14	74	118	pCi/g	U
5117M0009	Cesium-137	0	0.132	pCi/g	UJ
5117M0009	Cobalt-60	0.0398	0.116	pCi/g	U
5117M0009	Curium-242	0.139	0.39	pCi/g	U
5117M0009	Curium-243/244	0.00512	0.379	pCi/g	U
5117M0009	Curium-245/246	0.409	0.59	pCi/g	U

Radiological data for Bldg. 3118 (cont.)

Sample ID	Chemical name	Result	Rad error	Units	Validation qualifier
5117M0009	Europium-152	-0.109	0.346	pCi/g	U
5117M0009	Europium-154	-0.3	0.382	pCi/g	U
5117M0009	Europium-155	0.0996	0.325	pCi/g	U
5117M0009	Iodine-129	-0.968	4.98	pCi/g	U
5117M0009	Krypton-85	0	30.6	pCi/g	UJ
5117M0009	Neptunium-237	0.133	0.223	pCi/g	U
5117M0009	Nickel-63	202	172	pCi/g	U
5117M0009	Plutonium-238	-0.0361	0.312	pCi/g	U
5117M0009	Plutonium-239/240	-0.0361	0.312	pCi/g	U
5117M0009	Plutonium-241	-63.6	141	pCi/g	U
5117M0009	Plutonium-242	0.265	0.52	pCi/g	U
5117M0009	Plutonium-244	0.0783	0.435	pCi/g	U
5117M0009	Potassium-40	0.239	1.5	pCi/g	U
5117M0009	Protactinium-233	0.133	0.223	pCi/g	U
5117M0009	Radium-226	2.86	4.32	pCi/g	U
5117M0009	Radium-228	0.766	0.431	pCi/g	U
5117M0009	Strontium-90	11.4	15.6	pCi/g	U
5117M0009	Technetium-99	-102	108	pCi/g	U
5117M0009	Thorium-228	0.134	0.308	pCi/g	U
5117M0009	Thorium-229	-0.786	1.76	pCi/g	U
5117M0009	Thorium-230	-20.2	47.7	pCi/g	U
5117M0009	Thorium-232	31.2	114	pCi/g	U
5117M0009	Tritium	1230	1240	pCi/g	U
5117M0009	Uranium-233/234	0.112	0.421	pCi/g	U
5117M0009	Uranium-235/236	-0.0712	0.315	pCi/g	U
5117M0009	Uranium-238	0	0.298	pCi/g	U

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit
UJ = Analyte, compound or nuclide not detected above the reported detection limit, and the reported detection limit is approximated due to quality deficiency
= = Validated result, which is detected and unqualified

APPENDIX E

IN SITU OBJECT COUNTING SYSTEM DATA FOR ISOTOPE ROW FACILITIES PROCESS SYSTEMS

3031 Duct Above Hot-Cell		
Isotope Identified	**Activity (µCi)**	**Activity Uncertainty (µCi)**
Na-22	2.65E+01	1.28E+00
Co-60	1.46E+00	1.59E-01
Y-94*	7.10E+00	1.03E+00
Sb-122*	3.57E+00	5.04E-01
Cs-137	8.53E+02	5.13E+01
Eu-152	5.31E+02	9.96E+00

*Isotope identification rejected due to the short half-life of the isotope and process knowledge of operation cessation.

3030 Left Hood Duct		
Isotope Identified	**Activity (µCi)**	**Activity Uncertainty (µCi)**
Na-22	1.57E+00	9.54E-02
Co-60	2.59E+00	9.79E-02
Cd-109*	7.56E+01	8.61E+00
Cs-137	2.37E+02	1.43E+01
Eu-152	4.40E+00	1.75E-01
Am-241	6.44E+01	6.65E+00

*Lead characteristic x-ray mis-identified as Cd-109

3030 Duct Above Hot-Cell		
Isotope Identified	**Activity (µCi)**	**Activity Uncertainty (µCi)**
Na-22	9.48E+00	4.08E-01
Co-60	3.46E+00	1.19E-01
Cd-109*	5.06E+01	5.74E+00
Cs-137	7.12E+01	4.29E+00
Eu-152	4.15E+01	8.18E-01
Am-241	6.71E+00	8.27E-01

*Lead characteristic x-ray mis-identified as Cd-109

3093 Krypton Tanks		
Isotope Identified	**Activity (µCi)**	**Activity Uncertainty (µCi)**
Na-22	6.21E-01	6.15E-02
K-40	5.14E+00	5.62E-01
Co-60	3.13E+00	1.24E-01
Kr-85	4.41E+05	2.65E+04
Cs-137	6.96E+00	4.62E-01
Eu-152	2.19E+00	2.70E-01

In-situ measurements were performed using Canberra's in-situ HPGe measurement system. Calibration efficiencies were generated using ISOCS software from dimensions and material compositions measured during field activities. Background measurements were taken where feasible, which in this case included only the "3031 Duct Above Hot Cell" measurement. Shine from surrounding buildings, filters, and process equipment show up as low activity peaks in the spectrum.

APPENDIX F

BUILDING 3034 TOTAL AND REMOVABLE ACTIVITY

Table F-1. Bldg. 3034 Total and Removable Surface Activity Measurements							
Location ID	Surface	Total Surface Activity Measurement				Removable Activity	
		Alpha (cpm)	Alpha (dpm/100 cm²)	Beta (cpm)	Beta (dpm/100 cm²)	Removable Alpha (dpm/100cm²)	Removable Beta (dpm/100cm²)
5113R0001	Room 1, Wall 4	1	0	270	-230	-1	-1
5113R0002	Room 1, ceiling	5	41	320	-56	-1	-1
5113R0003	Room 1, Wall 3	2	10	260	-240	-1	2
5113R0004	Room 1, ceiling	1	0	330	-31	1	3
5113R0005	Room 1, ceiling	3	21	350	16	-1	3
5113R0006	Room 1, Wall 2	5	41	450	330	-1	3
5113R0007	Room 3, Wall 3	0	-10	210	-400	-1	-4
5113R0008	Room 3, Wall 1	1	0	330	28	-1	-1
5113R0009	Room 1, ceiling	0	-10	470	380	-1	3
5113R0010	Room 3, Wall 1	2	10	330	-28	1	-2
5113R0011	Room 1, ceiling	6	51	330	-31	-1	-1
5113R0012	Room 2, ceiling	4	31	500	480	-1	-1
5113R0013	Room 1, ceiling	4	31	300	-120	-1	0
5113R0014	Room 2, Wall 3	3	21	250	-300	-1	0
5113R0015	Room 2, Wall 4	1	0	230	-350	1	0
5113R0016	Room 3, floor	1	0	440	310	1	0
5113R0017	Room 3, Wall 1, Mezzanine	3	21	460	380	-1	0
5113R0018	Mezzanine	1	0	450	350	-1	1
5113R0019	East end of Room 2, floor	0	-10	430	280	-1	-3
5113R0020	Room 3, floor	1	0	420	240	1	4
5113R0021	Upper stairwell, floor	2	10	440	320	1	2
5113R0022	Room 3, upper Wall 3	1	0	410	200	-1	7
5113R0023	Room 3, upper Wall 3	1	0	400	180	-1	2
5113R0024	Room 3, upper Wall 3	1	0	440	310	1	4
5113R0025	Room 3, upper Wall 3	0	-10	440	300	-1	3
5113R0026	Room 3, top of pipe conduit	1	0	430	280	-1	-1