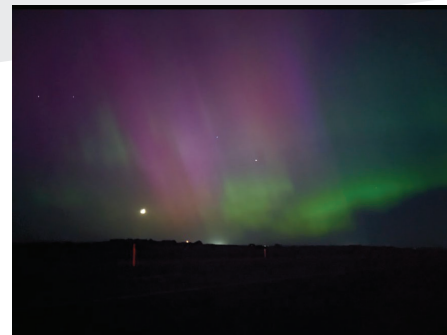




PNNL-20436-16

PNNL Richland Campus Radionuclide Air Emissions Report for Calendar Year 2025

June 2026

SF Snyder
LE Bisping
MC Klein
SG Ramos
LN Dinh



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

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PACIFIC NORTHWEST NATIONAL LABORATORY
operated by
BATTELLE
for the
UNITED STATES DEPARTMENT OF ENERGY
under Contract DE-AC05-76RL01830

Printed in the United States of America

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Pacific Northwest National Laboratory
Richland, Washington 99354

Summary

The U.S. Department of Energy (DOE) Office of Science Pacific Northwest National Laboratory Richland campus (PNNL Richland Campus) operates facilities that have the potential to release air effluent that contains radioactive materials. Operations conform to the Washington State Department of Health-issued Radioactive Air Emissions License-005.

This report documents radionuclide air emissions that result in the 2025 highest effective dose equivalent (EDE) to an offsite member of the public, referred to as the maximally exposed individual (MEI). The report has been prepared in compliance with the Code of Federal Regulations (CFR), Title 40, Protection of the Environment, Part 61, National Emission Standards for Hazardous Air Pollutants (NESHAP), Subpart H, "National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities," and Washington Administrative Code (WAC) Chapter 246-247, "Radiation Protection—Air Emissions."

Federal regulations in 40 CFR 61, Subpart H, require the measurement and reporting of radionuclides emitted from DOE facilities and the resulting offsite dose from those emissions. While the regulations are intended for the measurement of point source emissions, they include fugitive emissions with regard to complying with the dose standard. The regulations impose a standard of 10 mrem/yr EDE, which is not to be exceeded. Washington State adopted the 40 CFR 61 standard of 10 mrem/yr EDE in its regulations and reporting of the EDE to the MEI from both point source emissions and any fugitive source emissions of radionuclides. WAC 246-247 further requires the reporting of radionuclide emissions, including radon, from all PNNL Richland Campus sources.

The total radiological dose to the MEI from all PNNL Richland Campus radionuclide emissions in 2025, including fugitive emissions and radon, is $1.8\text{E-}05$ mrem ($1.8\text{E-}07$ mSv) EDE, or 100,000 times less than the federal and state standard of 10 mrem/yr, with which the PNNL Richland Campus is in compliance. The PNNL Richland Campus MEI dose from 2025 routine emissions (excluding radon) from registered sources is $1.8\text{E-}05$ mrem ($1.8\text{E-}07$ mSv) EDE. The dose from radon emissions is $1.5\text{E-}13$ mrem ($1.5\text{E-}15$ mSv) EDE. No unplanned releases from campus facilities occurred in 2025.

For further information concerning this report, contact Thomas M. McDermott, DOE Pacific Northwest Site Office, by telephone at (509) 713-5681 or by email at PNSOmanager@science.doe.gov.

Cover: An aurora as it appears over the PNNL and Hanford skies. Photo by: Joshua Hargraves

CERTIFICATION of PNNL-20436-16
DOE-SC
Pacific Northwest National Laboratory Campus
Radionuclide Air Emissions Report
Calendar Year 2025

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein and, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. See 18 U.S.C. 1001.

Ashley T. Morris, Acting Manager
U.S. Department of Energy
Pacific Northwest Site Office

Acronyms, Abbreviations, and Terms

Bq	becquerel(s)
campus	The land area permitted by WDOH under the RAEL-005. More formally, it is the “PNNL Richland Campus” and sometimes shortened to “Richland Campus.”
CAP88-PC	Clean Air Act Assessment Package 1988-Personal Computer
CFR	Code of Federal Regulations
Ci	curie(s)
CY	calendar year
DOE	U.S. Department of Energy
DOE-SC	U.S. Department of Energy, Office of Science
EDE	effective dose equivalent
EIM	Environmental Information Management
HEPA	high-efficiency particulate air (filter)
Major	a radionuclide emission point source having a radiological dose potential of greater than 0.1 mrem/yr EDE, based on emissions that would result if all pollution-control equipment did not exist, but facility operations were otherwise normal
MEI	maximally exposed individual
Minor	a radionuclide emission point source having a radiological dose potential of less than or equal to 0.1 mrem/yr EDE, based on emissions that would result if all pollution-control equipment did not exist, but facility operations were otherwise normal
NA	not applicable
ND	not detected
NDRM	non-dispersible radioactive material
NESHAP	National Emission Standards for Hazardous Air Pollutants
PIC	potential impact category
PNNL	Pacific Northwest National Laboratory
PSF	Physical Sciences Facility
QA	quality assurance
RAEL	Radioactive Air Emissions License
rem	roentgen equivalent man
SIOC	sources for instrument/operational checks
Sv	sievert
VRRM	volumetrically released radioactive material
WAC	Washington Administrative Code
WDOH	Washington State Department of Health

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1.0 Introduction

This report documents calendar year (CY) 2025 radionuclide air emissions from the U.S. Department of Energy (DOE) Office of Science (SC) Pacific Northwest National Laboratory Richland Campus (hereafter, PNNL Richland Campus or campus), and the resulting effective dose equivalent (EDE) to the maximally exposed individual (MEI) member of the public. This document complies with reporting requirements in the Code of Federal Regulations (CFR), Title 40, Protection of the Environment, Part 61, National Emission Standards for Hazardous Air Pollutants, Subpart H, “National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities,” and in Washington Administrative Code (WAC) Chapter 246-247, “Radiation Protection—Air Emissions.” This report satisfies the annual reporting requirements under the DOE PNNL Richland Campus license, Radioactive Air Emissions License (RAEL)-005, for CY2025 operations.

This report is available online at <https://science.osti.gov/pnso/Resources>.

Battelle Memorial Institute (Battelle) is contracted to operate PNNL for DOE-SC. Battelle manages operations at the PNNL Richland Campus and other leased/occupied research and office areas nearby. Activities at the campus include research and development in the physical, chemical, life, and environmental sciences, and relevant environmental monitoring.

1.1 PNNL Richland Campus Description

The PNNL Richland Campus is located in southeastern Washington State (Figure 1.1). It is adjacent to the much larger DOE Hanford Site (Figure 1.2). The campus occupies 1.2 mi² (3.0 km²) just south of the Hanford Site 300 Area, whereas the Hanford Site occupies about 580 mi² (1,500 km²).

The campus lies about 170 mi (275 km) east-northeast of Portland, Oregon; 170 mi (270 km) southeast of Seattle, Washington; and 125 mi (200 km) southwest of Spokane, Washington. Operations are permitted under RAEL-005 to perform radiological activities with potential air emissions.

The area south and east of the PNNL Richland Campus is developed with office, laboratory, residential, and retail space. The Columbia River borders the northern campus to the east. Environmental conditions of non-operational Hanford Site areas are also characteristic of the campus. More in-depth discussions on the characteristics of the Hanford Site are available in the Hanford Site National Environmental Policy Act characterization (Duncan et al. 2007). While northern areas of the campus have been undeveloped, infrastructure installation activities began in 2024 in preparation for future office space construction. Construction trailers were located in the north campus area in mid-2025, with construction continuing into 2026. No new radiological facilities are currently planned as part of this development activity.



Figure 1.1. DOE-SC PNNL Richland Campus Emission Units Locations

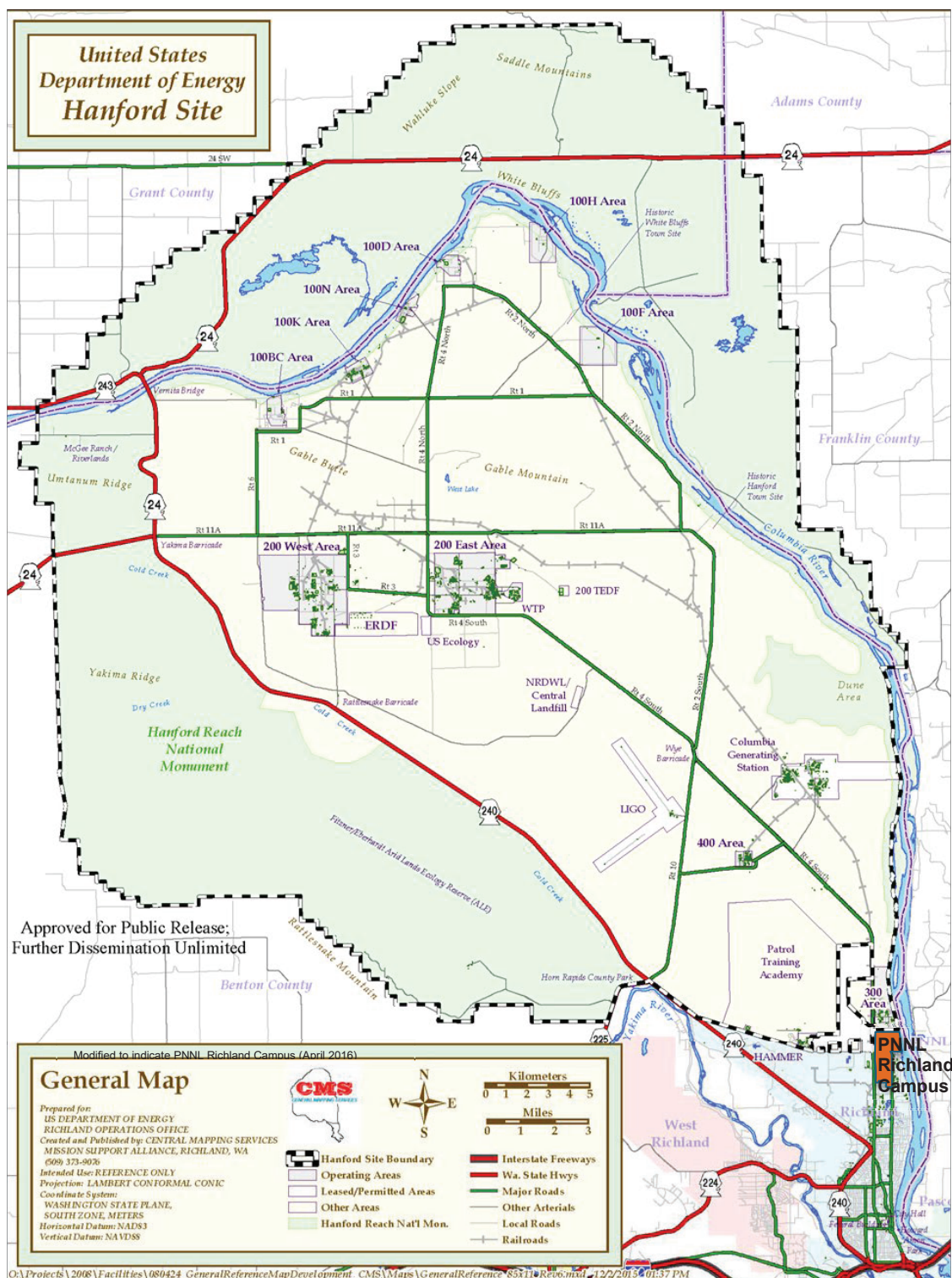


Figure 1.2. Location of the Hanford Site in Relation to the PNNL Richland Campus

1.1.1 Historical Background

In December 2003, DOE assigned responsibility to the Pacific Northwest Site Office within DOE-SC to oversee the operation of PNNL, which was established in 1965. Battelle is contracted to DOE to operate PNNL (contract DE-AC06-76RL01830) and has operated PNNL since 1965. The PNNL Richland Campus (orange boundary) includes active emission units in the Physical Sciences Facility (PSF), as identified in Figure 1.1.

The buildings or areas with emission units subject to 40 CFR 61, Subpart H, reporting are listed in Table 1.1. As a group of research buildings, the PSF buildings host changing types of research. Section 1.1.2 provides more detailed descriptions of the buildings with emission units subject to 40 CFR 61, Subpart H, reporting.

Table 1.1. PNNL Richland Campus Licensed Buildings – 2025

Building	Start Date of DOE-SC Radiological Operations
3410 Building – Materials Sciences and Technology Laboratory	August 2010
3420 Building – Radiation Detection Laboratory	August 2010
3425 Building – Underground Laboratory	October 2010
3430 Building – Ultra-Trace Laboratory	July 2010

The Hanford Site history is briefly described here because of its location adjacent to the PNNL Richland Campus and because it is a source of radiological airborne emissions. From the mid-1940s, facilities at the Hanford Site were dedicated to producing plutonium for national defense and to managing the radioactive and chemical wastes generated from those production processes. More recently, major efforts have been underway to clean up contamination in the environment and facilities resulting from past operational practices and the research and development of new and improved waste disposal technologies. The Hanford Site 300 Area, which is closest to the PNNL Richland Campus, contains research and development laboratories and ongoing remediation operations. The Department of Energy's Hanford Field Office provides oversight for the Hanford Site; the Pacific Northwest Site Office manages PNNL, which operates several Hanford Site 300 Area locations with radiological operations.

1.1.2 PNNL Richland Campus Facilities

Point source emission units are identified as major or minor. Other emissions are identified as a fugitive emission. The identifier for the emission unit considers whether radiological emissions are expected to expose a member of the public to a potential dose greater or less than 0.1 millirem per year (mrem/yr). A point source is designated *major* when hypothetically, in the absence of all abatement-control equipment, its potential maximum emissions can cause a dose greater than 0.1 mrem/yr (0.001 mSv/yr) EDE¹ to the nearest member of the public not employed by DOE or its contractors associated with the PNNL Richland Campus and who lives near and/or has unrestricted access to a place of employment on the campus. A point source is *minor* when under the same conditions its potential maximum emissions in the absence of all abatement-control equipment cannot cause a dose greater than 0.1 mrem/yr EDE. A source could be characterized as a fugitive emission if a potential source of radioactive material is not

¹ CAP88-PC Version 4.1.1, used for dose modeling, indicates dose as mrem/yr EDE in output files.

actively monitored or ventilated at the point of release.¹ Fugitive sources of radionuclide emissions are generally those that are not actively ventilated, not sealed to prevent the escape of volatile or resuspended radioactive material to the ambient air, and not as amenable to controlled routine sampling, as is done with stacks. Potential unabated emissions from campus fugitive source locations would be expected to have an extremely small dose impact, even under worst-case release conditions.

Handling and processing of radioactive material in each facility on the PNNL Richland Campus is described below. Additional emission unit information is available in Klein et al. (2025).

3410 Building – Materials Sciences and Technology Laboratory

The 3410 Building provides laboratory space and infrastructure for research associated with performance and life of materials in high-temperature, high-radiation, and corrosive environments found in next-generation technologies and applications for energy, construction, and transportation. Researchers work with metals, ceramics, polymeric materials, composites, and specialized coatings, and surface treatments to study these situations. Radioactive material emissions are discharged from this building through a major stack.

3420 Building – Radiation Detection Laboratory

The 3420 Building contains laboratories for a wide variety of radionuclide measurements. Projects support research in radionuclide measurement technologies, and capabilities used or under development include state-of-the-art analytical chemistry, radiation physics, light detection, particle detection, chromatography, scintillation materials, sorbents/“smart” materials, and field-deployable instrumentation. Applications for these capabilities range from fundamental science to applied systems. Radioactive material emissions are discharged from this building through either the major stack or the minor stack.

3425 Building – Underground Laboratory (Deep Lab)

The 3425 Building is an underground laboratory protected from background radiation to support the radiation detection capabilities in the 3420 Building. Research areas are located 40 ft (12 m) below ground. Projects support the development and advancement of radiation detection technologies. Additional activities include radiation physics experiments, development of ultra-low radioactivity materials, and other fundamental sciences studies. Radioactive material emissions from this building are fugitive emissions.

3430 Building – Ultra-Trace Laboratory

The 3430 Building provides ultra-trace radioanalytical capabilities for nuclear forensics. These capabilities include highly sensitive analytical systems such as mass spectrometers, optical microscopes, and electron microscopes to provide isotopic analyses and ultra-low-level radionuclide detection in a wide variety of sample matrices. Radioactive material emissions are discharged from this building through either the major stack or a minor stack.

¹ Section 4.0 provides a more detailed discussion of fugitive emissions.

Activity and dose information is generally reported to two significant digits. An annual dose rate of less than $1.0\text{E-}04$ mrem/yr ($1.0\text{E-}06$ mSv/yr) is very low and may be rounded to one significant digit (e.g., $3.9\text{E-}05$ mrem would be rounded to $4\text{E-}05$ mrem [$4\text{E-}07$ mSv]). More significant digits may be reported if they provide informative resolution or if the value is significantly larger than most of the other values reported with it (e.g., a $5.9723\text{E+}01$ Ci K-40 emission from one source and $2.4\text{E-}03$ Ci K-40 emission from another). Reported totals may be slightly different from the sum of individual values in the text because the individual text values are rounded whereas the reported total uses additional, unreported, significant digits in the summed individual value.

Types of emission units under the license include both major and minor emission units as well as fugitive emissions. Fugitive emissions also include Potential Impact Category (PIC)-5 permits for Campus-wide operations (Table 1.2; Figure 1.3 and Figure 1.1). When implemented, PIC-5 permits are credited with emissions from very low potential-to-emit activities that conform to PNNL operational controls; the emissions are conservatively reported as the permit maximum (Barnett 2018).

Table 1.2. Types of Emission Units under the DOE PNNL Richland Campus License – 2025

Facility/Building ID	Building Name or Campus-Wide Permit Name	Emission Unit Type(s)
PSF/ 3410	Materials Sciences and Technology Laboratory	Major
PSF/ 3420	Radiation Detection Laboratory	Major and Minor
PSF/ 3425	Underground Laboratory	Fugitive
PSF/ 3430	Ultra-Trace Laboratory	Major and Minor
Campus	Volumetrically Released Radioactive Material (VRRM; PIC-5)	Fugitive
	Non-dispersible Radioactive Material (NDRM; PIC-5)	Fugitive
	Facilities Restoration (PIC-5)	Fugitive
	Sources for Instrument/Operational Checks (SIOC; PIC-5)	Fugitive



Figure 1.3. PNNL Richland Campus Physical Sciences Facility (PSF) with Buildings Identified

1.1.3 Facilities Adjacent to the PNNL Richland Campus

Developed land adjacent to the PNNL Richland Campus is occupied by the Hanford Site (Figure 1.2), office and research facilities, and a smaller number of local businesses (e.g., restaurant, offices). Just north of the campus, the Hanford Site 300 Area hosts radiological operations. The current Hanford Site 300 Area activities include cleanup, research, and office support functions. Radiological emissions from the Hanford Site are described in the Hanford Site Radionuclide Air Emissions Report (Dyekman et al. 2026).

In addition to the Hanford Site, some privately and publicly owned facilities capable of generating airborne radionuclide emissions are located adjacent to or near the PNNL Richland Campus. These facilities include those that are on the Hanford Site but are not part of DOE operations: 1) a low-level waste burial site on the Hanford Site 200 Area plateau and 2) a commercial nuclear power reactor and associated buildings near the Columbia River, north of the Hanford Site 300 Area. In addition, nearby private businesses with radiological operations include a tritium radiolabeling service south of the campus, a commercial nuclear reactor fuel fabrication facility, a waste treatment business west of the campus, and a nuclear power plant commercial laundry service southwest of the campus. These facilities are discussed in this report to the extent necessary. Emissions from these facilities are not included in this report because they are regulated separately from the campus.

1.2 Point Source Descriptions

This section describes point sources that emit or have the potential to emit radionuclides at the PNNL Richland Campus. A point source is reported in this document if it met the following two criteria during 2025:

- Required continuous sampling or periodic confirmatory measurements (including 40 CFR 61, Appendix D calculations) in accordance with 40 CFR 61, Subpart H, and with WAC 246-247.
- The emission unit was described in the Washington State Department of Health (WDOH)-issued RAEL-005 and registration remained active during 2025.

Table 1.3 lists the campus emission units registered with the WDOH for radiological emissions. PICs for each emission unit are provided (Barnett 2018).

Table 1.3. PNNL Richland Campus Registered Radioactive Air Emissions Units

Building	Discharge Point ID	Discharge Point Description	Compliance Method ^(a)
3410	EP-3410-01-S	Major point source. Main stack. PIC-2.	Continuous sampling, Appendix D
3420	EP-3420-01-S	Major point source. Main stack. PIC-2.	Continuous sampling, Appendix D
	EP-3420-02-S	Minor point source. Areas not exhausted to main stack. Calculations used to determine radionuclide emissions in lieu of monitoring. PIC-4.	Appendix D
3425	J-3425	Fugitive emissions. Calculations used to determine radionuclide emissions in lieu of monitoring. PIC-4.	Appendix D
3430	EP-3430-01-S	Major point source. Main stack. PIC-2.	Continuous sampling, Appendix D
	EP-3430-02-S	Minor point source. Areas not exhausted to main stack. Calculations used to determine radionuclide emissions in lieu of monitoring. PIC-4.	Appendix D
Campus	J-VRRM	Volumetrically released radioactive material	PIC-5
	J-NDRM	Non-dispersible radioactive material	PIC-5
	J-Facilities Restoration	Facilities restoration	PIC-5
	J-SIOC	Sources for instrument/operational checks	PIC-5

(a) Appendix D means that values are calculated from in-facility material inventories and estimates and 40 CFR 61, Appendix D. PIC-5 source compliance indicated per permit methods during years that the source was implemented.

In general, radionuclide air emissions from point sources are discharged from stacks and vents. Table 1.4 provides the emission point characteristics for the sampled emission units. The effective discharge height of 3410-01-S used in modeling was 98.0 ft (29.9 m) and was applied to all PSF major stack emissions, as a conservative assumption. All PIC-5 permits were implemented in 2025.

High-efficiency particulate air (HEPA) filters were the principal emission abatement method used at the major emission units to remove radioactive constituents from stack emissions. In general, one-stage of HEPA filtration was used as the final particulate-removal method before an air emission stream was exhausted to the atmosphere. (Table 1.4 lists the emission abatement technologies at sampled stacks.) The single-stage HEPA filter abatement technology listed in the table has a minimum acceptable test criteria rating of 99% efficient.

Table 1.4. Characteristics of Sampled Emission Points

Unit Type/ Emission Point ID	Average Flow Rate	Total Flow	Temper- ature	Physical Discharge Height	Physical Discharge Diameter	Effective Discharge Height	Abatement Technology
Major EP-3410-01-S	21,595 ft ³ /min (10.2 m ³ /s)	1.14E+10 ft ³ (3.21E+08 m ³)	62.7°F (17.1°C)	44 ft (13.5 m)	3.3 ft (1.0 m)	98.0 ft (29.9 m)	Single- stage HEPA filter
Major EP-3420-01-S	65,621 ft ³ /min (31.0 m ³ /s)	3.45E+10 ft ³ (9.77E+08 m ³)	62.4°F (16.9°C)	51 ft (15.5 m)	4.3 ft (1.3 m)	145 ft (44.2 m)	Single- stage HEPA filter
Major EP-3430-01-S	33,862 ft ³ /min (16.0 m ³ /s)	1.78E+10 ft ³ (5.04E+08 m ³)	70.1°F (21.2°C)	53 ft (16.2 m)	3.8 ft (1.2 m)	132 ft (40.2 m)	Single- stage HEPA filter

2.0 Radionuclide Air Emissions

This section presents information on quantities of radionuclide emissions on the PNNL Richland Campus. The sampled point sources listed are actively ventilated stacks using electrically powered exhausters and from which emissions are discharged under controlled conditions. Also included are minor and fugitive emission units.

Three tables are provided to indicate emissions from campus sources:

- Table 2.1 indicates emissions from sampled point sources on the campus in 2025.
- Minor point and fugitive source emissions are shown in two tables:
 - Table 2.2 shows the emissions that resulted in 99.6% of the dose impact from minor and fugitive emission units, whereas
 - Table 2.3 shows the remaining 0.4%.

Then, Table 2.4 summarizes the nuclide emissions from major sources and from minor and fugitive sources that result in more than 99.6% of the total dose impact to the MEI. Appendix B lists the radioactive materials handled or potentially handled at the PNNL Richland Campus in 2025.

Table 2.1. Campus Radionuclide Emissions (Ci) from Sampled Point Sources in 2025

Nuclide	EP-3410-01-S 3410 Building	EP-3420-01-S 3420 Building	EP-3430-01-S 3430 Building	Total (Ci)
gross $\alpha^{(a)}$	1.72E-08	7.30E-08	3.94E-08	1.3E-07
gross $\beta^{(a)}$	1.29E-07	7.34E-07	3.87E-07	1.3E-06
H-3 ^(b)	6.50E-05	NA	NA	6.5E-05
Fe-55	1.47E-08	NA	NA	1.5E-08
Co-60	ND	6.91E-10 ^(c)	8.34E-12 ^(c)	7.0E-10 ^(c)
Xe-133 ^(b)	NA	4.56E-07	NA	4.6E-07
Cs-137	NA	NA	3.44E-08	3.4E-08
Ce-141	NA	5.73E-08	NA	5.7E-08
U-233/234 ^(c)	NA	NA	8.65E-08	8.7E-08 ^(c)
U-238	2.01E-09	NA	NA	2.0E-09
Pu-238 ^(c)	1.64E-10	1.12E-08	NA	1.1E-08 ^(c)
Pu-239/240	1.52E-09	5.44E-09	5.61E-10	7.5E-09
Am-241 ^(c)	9.96E-11	5.43E-09	8.64E-10	6.4E-09 ^(c)
Am-243 ^(c)	2.93E-12	7.05E-11	NA	7.3E-11 ^(c)
Cm-243/244	6.79E-14 ^(c)	2.46E-09	3.32E-09	5.8E-09 ^(c)

NA = not applicable; ND = not detected.

To convert Ci to GBq, multiply Ci by 37.

(a) Maximum of the biweekly or composited average measurement.

(b) Value based on release records.

(c) Value based wholly or partially on calculated Appendix D methods of 40 CFR 61.

Table 2.2. PNNL Richland Campus Appendix D Calculated and Release Record Radionuclide Emissions (Ci) Resulting in 99.6% of the Offsite Dose from Minor Emissions Units and Fugitive Sources – 2025^(a,b)

Nuclide	EP-3420-02-S 3420 Building PSF	EP-3430-02-S 3430 Building PSF	J-3425 3425 Building PSF	Total (Ci)
H-3 ^(a)	1.04E-12	4.10E-11	3.20E-13	4.2E-11
Fe-55	2.16E-13	4.50E-11	8.11E-15	4.5E-11
Co-60	5.17E-10	2.10E-10	9.91E-11	8.3E-10
Zn-65	3.19E-08	4.32E-11	6.08E-11	3.2E-08
Rb-83	1.00E-05	NA	NA	1.0E-05
Y-88	3.27E-08	3.96E-10	8.69E-11	3.3E-08
Xe-131m ^(c)	1.80E-03	NA	NA	1.8E-03
Xe-133 ^(c)	8.60E-03	2.35E-09	NA	8.6E-03
Cs-134	1.94E-09	NA	1.92E-09	3.9E-09
Cs-137	2.96E-10	5.75E-10	5.58E-11	9.3E-10
Ce-141 ^(c)	9.97E-12	NA	NA	1.0E-11
Pb-210	1.57E-09	8.90E-10	1.65E-10	2.6E-09
Rn-220 ^(d)	2.70E-10	NA	NA	2.7E-10
Ra-224	2.70E-10	9.00E-12	NA	2.8E-10
Th-228	2.70E-10	1.05E-12	1.72E-13	2.7E-10
U-233/234	3.50E-08	1.29E-10	9.51E-14	3.5E-08
U-238	1.01E-11	9.08E-11	9.46E-14	1.0E-10
Pu-238 ^(c)	4.04E-16	3.30E-12	4.04E-16	3.3E-12
Pu-239/240 ^(c)	1.95E-14	9.02E-12	1.95E-14	9.1E-12
Am-241 ^(c)	1.89E-10	1.25E-10	2.05E-11	3.3E-10
Am-243 ^(c)	8.65E-10	2.80E-12	NA	8.7E-10
Cm-243/244 ^(c)	NA	2.80E-12	NA	2.8E-12
Cm-248	NA	2.80E-12	NA	2.8E-12
Cm-250	NA	1.00E-12	NA	1.0E-12

NA = not applicable.

To convert Ci to GBq, multiply Ci by 37.

- (a) Values are not from actual measurements but are calculated from in-facility material inventories and estimates (Barnett et al. 2024; Snyder et al. 2025c) and 40 CFR 61, Appendix D. Values for gases are based on release records.
- (b) Listed nuclides account for 99.6% of dose impact from release record and Appendix D calculated minor and fugitive sources in 2025. In addition, nuclides sampled at major emission units that are also reported from listed stacks are included (see footnote c).
- (c) While not significant dose contributors, several nuclides are included for completeness. These include nuclides that are major emission unit sampled nuclides (Fe-55, Ce-141, Pu-239/240, and Cm-243/244), a significant nuclide (Pu-238, Am-241, Am-243), or gas emissions. Table 2.1 indicates major emission unit nuclides and emissions.
- (d) Radon dose to MEI; see Sections 3.4 and 3.5.3.

Table 2.3. Nonsignificant (0.4% of Offsite Dose Contributors) PNNL Richland Campus
Radionuclide Emissions (Ci) from Minor Emission Units and Fugitive Sources – 2025

Nuclide	Release ^(a) (Ci)	Nuclide	Release ^(a) (Ci)	Nuclide	Release ^(a) (Ci)	Nuclide	Release ^(a) (Ci)
Ac-227	1.0E-12	Eu-154	1.0E-15	Pb-214	1.2E-14	Sr-89	8.1E-11
Ac-228	3.6E-13	Eu-155	4.5E-11	Pd-107	4.5E-11	Sr-90	2.7E-11
Ag-109m	3.0E-14	Eu-156	5.8E-15	Pd-109	3.0E-14	Sr-91	3.9E-10
Ag-111	1.3E-14	Fe-59	1.2E-12	Pm-147	1.8E-15	Sr-92	1.6E-15
Ag-112	2.3E-14	Gd-159	1.4E-15	Pm-149	2.1E-11	Tb-161	3.5E-12
Am-240	5.4E-12	Hg-203	4.9E-11	Pm-151	1.1E-11	Tc-99	4.7E-11
Am-242m	1.0E-12	I-125	1.1E-11	Po-208	1.0E-12	Tc-99m	1.7E-10
Ar-37	3.7E-12	I-129	1.0E-12	Po-209	1.0E-12	Te-123m	1.4E-10
Ba-133	9.9E-13	I-131	2.6E-11	Po-210	1.0E-12	Te-127	1.7E-13
Ba-137m	3.4E-15	I-132	1.6E-10	Po-212	1.7E-10	Te-127m	2.2E-16
Ba-140	5.6E-11	I-133	4.0E-10	Po-216	2.7E-10	Te-129	2.2E-14
Be-7	4.1E-16	I-135	1.9E-10	Pr-143	1.0E-11	Te-129m	1.7E-14
Bi-212	2.7E-10	In-115m	2.1E-14	Pr-144	1.3E-13	Te-131	1.4E-13
Bi-214	1.1E-14	K-40	8.4E-11	Pr-144m	1.7E-15	Te-131m	4.2E-11
Bk-247	1.0E-12	K-42	1.9E-12	Pu-241	2.3E-12	Te-132	1.4E-10
Br-82	1.3E-08	Kr-83m	5.0E-09	Pu-242	3.3E-12	Th-229	1.8E-12
Br-83	3.9E-17	Kr-85	4.1E-15	Pu-244	3.3E-12	Th-230	3.1E-12
C-14	4.5E-11	Kr-85m	1.7E-14	Ra-223	9.0E-12	Th-231	3.0E-16
Ca-47	2.7E-13	Kr-88	1.6E-15	Ra-226	5.1E-12	Th-232	1.0E-11
Cd-109	2.8E-09	La-140	1.0E-11	Ra-228	1.0E-12	Tl-208	9.7E-11
Cd-115	1.9E-14	La-141	6.7E-11	Rb-88	1.8E-15	U-232	2.5E-11
Ce-139	1.9E-11	Mn-54	8.4E-10	Rh-103m	4.8E-13	U-235	8.6E-11
Ce-143	3.1E-10	Mn-56	1.8E-11	Rh-105	2.6E-11	U-236	5.4E-11
Ce-144	1.3E-13	Mo-99	2.1E-10	Rh-105m	5.6E-15	Xe-133m	3.1E-13
Cf-249	1.0E-12	Na-22	4.1E-16	Rh-106	7.0E-15	Xe-135	5.4E-10
Cf-251	1.0E-12	Na-24	1.3E-08	Ru-103	4.8E-13	Xe-135m	1.6E-11
Cl-36	1.8E-12	Nb-95	1.3E-13	Ru-105	2.0E-14	Y-89m	5.7E-17
Cm-245	1.0E-12	Nb-95m	2.3E-15	Ru-106	7.0E-15	Y-90	4.0E-14
Cm-246	1.0E-12	Nb-97	3.8E-10	Sb-122	5.2E-14	Y-91	6.2E-13
Cm-247	1.0E-12	Nb-97m	3.4E-10	Sb-127	1.9E-13	Y-91m	2.0E-10
Co-56	1.8E-15	Nd-147	1.1E-11	Sb-129	9.7E-15	Y-92	1.4E-10
Co-57	1.2E-10	Ni-59	4.5E-11	Se-79	4.5E-11	Y-93	3.6E-10
Co-58	1.2E-13	Ni-63	4.7E-11	Sm-151	1.6E-12	Zr-95	6.5E-13
Cr-51	3.2E-09	Np-236	2.8E-12	Sm-153	2.6E-13	Zr-97	3.5E-10
Cs-136	1.9E-15	Np-237	2.8E-12	Sn-113	5.4E-10	-	-
Cu-64	7.0E-14	P-32	1.1E-14	Sn-121	2.0E-14	-	-
Cu-67	7.6E-17	Pa-231	2.8E-12	Sn-125	5.8E-15	-	-
Eu-152	8.3E-15	Pb-212	2.7E-10	Sr-85	6.8E-10	-	-
						Total (Ci)	4.6E-08

To convert Ci to GBq, multiply Ci by 37.

Values may not sum to the indicated total due to rounding of tabulated emissions.

(a) Values based on release records for gases. Other emissions are calculated from in-facility material inventories and estimates (Barnett et al. 2024; Snyder et al. 2025c) and 40 CFR 61, Appendix D.

Table 2.4. PNNL Richland Campus Radionuclide Emissions (Ci) in 2025

Nuclide	Major Emissions Units	Minor and Fugitive Emissions Units ^(a)	Total (Ci)
gross α	1.3E-07 ^(b)	NA	1.3E-07
gross β	1.3E-06 ^(b)	NA	1.3E-06
H-3	6.5E-05 ^(c)	4.2E-11 ^(c)	6.5E-05 ^(c)
Fe-55	1.5E-08	4.5E-11	1.5E-08
Co-60	7.0E-10	8.3E-10	1.5E-09
Zn-65	NA	3.2E-08	3.2E-08
Rb-83	NA	1.0E-05	1.0E-05
Y-88	NA	3.3E-08	3.3E-08
Xe-131m	NA	1.8E-03 ^(c)	1.8E-03 ^(c)
Xe-133	4.6E-07 ^(c)	8.6E-03 ^(c)	8.6E-03 ^(c)
Cs-134	NA	3.9E-09	3.9E-09
Cs-137	3.4E-08	9.3E-10	3.5E-08
Ce-141	5.7E-08	1.0E-11	5.7E-08
Pb-210	NA	2.6E-09	2.6E-09
Rn-220	NA	2.7E-10 ^(c)	2.7E-10 ^(c)
Ra-224	NA	2.8E-10	2.8E-10
Th-228	NA	2.7E-10	2.7E-10
U-233/234	8.7E-08	3.5E-08	1.2E-07
U-238	2.0E-09	1.0E-10	2.1E-09
Pu-238	1.1E-08	3.3E-12	1.1E-08
Pu-239/240	7.5E-09	9.1E-12	7.5E-09
Am-241	6.4E-09	3.3E-10	6.7E-09
Am-243	7.3E-11	8.7E-10	9.4E-10
Cm-243/244	5.8E-09	2.8E-12	5.8E-09
Cm-248	NA	2.8E-12	2.8E-12
Cm-250	NA	1.0E-12	1.0E-12
TOTAL (Ci)	6.7E-05	1.0E-02	1.0E-02

NA = not applicable; ND = not detected.

To convert Ci to GBq, multiply Ci by 37.

Total Ci may not equal the major and the minor and fugitive sum due to rounding.

(a) Includes nuclides that contribute 99.6% of the minor and fugitive dose to the MEI. See Table 2.3 for the nuclides that contribute the remaining 0.4% of dose impact.

(b) Maximum of the biweekly or semi-annual average measurement. Gross α is assumed to be Pu-239 and gross β is assumed to be Cs-137 for dose assessment.

(c) Value based on release records.

3.0 Dose Assessment

This section presents the method for determining the MEI dose from PNNL Richland Campus radiological emissions.

3.1 Description of Dose Model and Receptor Evaluation

The dose to the MEI was calculated using the dose-modeling program Clean Air Act Assessment Package 1988-Personal Computer (CAP88-PC) Version 4.1.1 (EPA 2020), approved by the U.S. Environmental Protection Agency. The dose estimate result was used to determine compliance of the PNNL Richland Campus with the dose standard of 10 mrem/yr EDE to any member of the public as required by 40 CFR 61, Subpart H, and WAC 246-247.

CAP88-PC Version 4.1.1 is an environmental dispersion model that allows user-entered emission point characteristics, annual emissions, site-specific meteorology, and public exposure characteristics to be used to calculate the dose to an exposed individual. This model is used to determine the dose to the MEI from campus radionuclide emissions (Table 2.4).

The nearest location (e.g., dwelling, business, school, office) to the PNNL Richland Campus where a public receptor has the potential to receive the maximum exposure from RAEL-005 permitted emission units is determined. This may be a hypothetical person, but there must be some potential for continued occupancy at the location indicated. For example, the campus northwest fence-line was not considered because no individual routinely occupies this location, which is in a shrub-steppe field. In addition to the nearest location, the offsite location with the potential for the greatest annual impact from emissions is determined, regardless of occupancy. Due to the proximity of offsite businesses and the annual variability of dispersion estimates at close distances, several options for businesses at boundary locations are the likely maximally impacted locations based on past evaluations. Table 3.1 indicates the location of the 2025 MEI and provides information on these nearest receptors, including distances to the nearest farms that produce milk, meat, and vegetables.

The PNNL Richland Campus MEI is a member of the public who hypothetically receives the highest calculated radiological dose attributable to exposure to campus emissions in one calendar year. Selection of the annual MEI is contingent on an individual's place of residence or employment.

Potential MEI locations are evaluated with 1) the CAP88-PC Version 4.1.1 model; 2) PNNL Richland Campus 2025 facility emissions and release point characterization; and 3) CY2025 meteorological data (Appendix A) to determine the 2025 MEI receptor location from campus emissions. The receptor is presumed to produce their own food supply at the MEI location.

The CY2025 MEI location was determined to be an office building at 3200 George Washington Way.

Table 3.1. Receptor Locations for the PNNL Richland Campus

Locale	Distance Relative to PSF (3410 Building) km (mi)
2025 PNNL Richland Campus MEI	
Office, 3200 George Washington Way	0.625 (0.39) SSE
Offsite nearest residence, business, school	
Residence	0.97 (0.60) SE
School or preschool	1.6 (1.0) S
Business ^(a)	0.63 (0.39) SSE
Farm with potential for crops or livestock	
Nearest to PSF (east of Columbia River)	1.51 (0.93) E
Offsite MEI maximum annual air concentrations	
Office, Tetra Tech Building, 3200 George Washington Way	
From major emission units ^(b)	0.625 (0.39) SSE of 3410-01-S
From minor and fugitive emission units ^(b)	0.73 (0.45) SSE of 3420-02-S
Richland Campus Historical MEI Doses and Locations^(c)	
CY2024 / 1.3E-05 mrem	0.65 (0.40) SSE
CY2023 / 2.0E-05 mrem	0.74 (0.46) SSE
CY2022 / 2.3E-05 mrem	0.63 (0.39) SSE
CY2021 / 1.8E-05 mrem	0.64 (0.40) SSE
CY2020 / 1.7E-05 mrem	0.55 (0.34) SSE
CY2019 / 1.5E-05 mrem	0.67 (0.42) SSE
CY2018 / 1.8E-05 mrem	0.64 (0.40) SSE
CY2017 / 2.3E-05 mrem	0.70 (0.43) SSE
CY2016 / 5.8E-04 mrem	1.86 (1.16) S
CY2015 / 2.6E-04 mrem	1.86 (1.16) S
CY2014 / 2.8E-05 mrem	0.70 (0.43) SSE
CY2013 / 1.8E-05 mrem	0.75 (0.47) SSE
CY2012 / 9.2E-06 mrem	0.55 (0.34) SSE
CY2011 / 1.7E-05 mrem	0.55 (0.34) SSE

(a) Locations with PNNL access control are considered part of the PNNL Richland Campus.

(b) This location is 2.43 km south of the Hanford Site 300 Area. Minor and fugitive emission unit distances are relative to 3420 Building because the 3410 Building has no minor or fugitive emission points.

(c) To convert mrem to mSv, multiply mrem by 0.01. Dose includes point, non-point, and radon emissions.

3.2 Summary of Input Parameters

Radionuclide emissions data from the PNNL Richland Campus (Table 2.4) were used in the dose calculations. Emissions were modeled in CAP88-PC Version 4.1.1 with 2025 meteorology and applicable stack characteristics given in Section 1.2. The greatest dose impact from facility emissions is calculated for 3200 George Washington Way, SSE of the 3410 Building, where an office is located; as a result, this is the 2025 MEI location. PSF emissions reported as gross alpha or gross beta were conservatively evaluated as Pu-239 or Cs-137, respectively. Appendix A provides additional data used for dose calculations; all other radionuclide-specific parameters used were default values in the CAP88-PC data libraries. The entire hypothetical MEI diet was constructed using the "local" food production option in CAP88-PC for ingestion-pathway parameters. This assumption overestimates the dose to the MEI because no food is grown at the 2025 MEI location.



Figure 3.1. Locations of PNNL Richland Campus Potential Receptors and MEI

3.3 Meteorological Data

Radionuclide air emissions disperse once they enter the atmosphere. Atmospheric dispersion models predict the degree of dilution and the magnitude of resulting air concentrations at downwind locations. Site-specific measurements of the occurrence frequencies for wind speed, wind direction, and atmospheric stability are used in the CAP88-PC model.

Radionuclide air concentrations at receptor locations are determined using the site-specific meteorological data. CAP88-PC Version 4.1.1 wind files were prepared from data collected at

the Hanford Site 300 Area meteorological tower, just north of the PNNL Richland Campus (refer to Figure 5.1), representing the average of hourly data recorded in 2025. Appendix A tables indicate meteorological data for 2025 as joint frequency of wind speed, wind direction, and stability category for the Hanford Site 300 Area station, 10 m instrumentation height. The proximity of the 300 Area meteorological station (less than 500 m from the campus boundary) and lack of turbulent interference allows the station data to be used to represent the PNNL Richland Campus meteorology.

Raw and processed meteorological data was compared against annual and multiyear data; and historical CAP88-PC dispersion trends. Some temperature data used for stability class determinations were substituted when data capture for the typical instrumentation level was missing. The data set was accepted for use. When data is found to be unacceptable, historical multiyear averaged data for the 300 Area is used. Overall, the 2025 average temperature (56.7°F) was 2.4°F (1.3°C) above the long-term average (54.3°F). The 2025 average precipitation (7.24 in. [18.4 cm]) was about the same as the long-term average (7.15 in.).¹

3.4 Compliance Assessment

Federal and state reporting requirements for doses (summarized in Table 3.2) vary. Section 3.4.1 and Section 3.4.2 give details on doses reported under 40 CFR 61, Subpart H, and the WAC, respectively.

Table 3.2. Summary of Reported 2025 Doses

	40 CFR 61, Subpart H Campus MEI (3200 GW Way)	WAC 246-247 Campus MEI (3200 GW Way)	Offsite Maximum Air ^(a) for Campus Emissions (PNL-1 station)
PNNL Richland Campus MEI Location			
Location relative to PSF (3410 Building)	0.63 km (0.39 mi) SSE	0.63 km (0.39 mi) SSE	0.72 km (0.45 mi) NW
Radon Emissions			
Rn-220			
3420-02-S	NA	2.7E-10 Ci	2.7E-10 Ci
Rn-222	NA	NA	NA
Receptor Dose			
Dose excluding radon emissions ^(b)	1.8E-05 mrem	1.8E-05 mrem	2.1E-05 mrem
Radon	NA	1.5E-13 mrem	3.6E-14 mrem
Total	1.8E-05 mrem	1.8E-05 mrem	2.1E-05 mrem

NA = not applicable.

Total dose may not equal the sum of parts due to rounding.

To convert Ci to GBq, multiply Ci by 37. To convert mrem to mSv, multiply mrem by 0.01.

(a) WAC 173-480. See Figure 5.1 for PNL-1 ambient air surveillance station location.

(b) Dose from routine major and minor points' emissions, fugitive emissions, PIC-5, and nonroutine events.

3.4.1 40 CFR 61, Subpart H, Regulatory Standard

The regulatory standard for a maximum dose to any member of the public is 10 mrem/yr (0.10 mSv/yr) EDE. The standard is in 40 CFR 61, Subpart H, and applies to radionuclide air emissions, other than radon, from DOE facilities. For CY2025, the PNNL Richland Campus MEI location was 0.63 km (0.39 mi) SSE of the 3410 Building. The campus MEI dose is 1.8E-05 mrem (1.8E-07 mSv) (see Table 3.2, 40 CFR 61, Subpart H).

¹ Hanford Site Meteorological Monitoring Network, Summary Dec 2025 <https://www.hanford.gov/files.cfm/Dec25Nar.pdf>.

Table 3.3 indicates nuclide-specific doses to the CY2025 campus MEI. The MEI dose includes routine and, as applicable, unplanned (i.e., nonroutine) point source emissions (see Section 3.5.4). The fugitive PIC-5 category doses are about 16% of the CY2025 campus MEI dose estimate.

Table 3.3. PNNL Richland Campus 2025 Combined Radionuclide Emissions and Dose Contributions by Nuclide from Major and Minor Emission Units and Fugitive Emissions

Radionuclide ^(a)	Releases (Ci)	Campus MEI Dose (mrem EDE)	% of Total EDE
Gross α ^(b)	1.3E-07	5.3E-06	30%
Gross β ^(c)	1.3E-06	5.2E-06	29%
H-3	6.5E-05	9.2E-09	<1%
Fe-55	1.5E-08	1.6E-10	<1%
Co-60	1.5E-09	9.6E-09	<1%
Zn-65	3.2E-08	4.7E-08	<1%
Rb-83	1.0E-05	2.2E-06	12%
Y-88	3.3E-08	2.0E-08	<1%
Xe-131m	1.8E-03	1.3E-08	<1%
Xe-133	8.6E-03	2.3E-07	1%
Cs-134	3.9E-09	2.6E-08	<1%
Cs-137	3.5E-08	1.6E-07	<1%
Ce-141	5.7E-08	3.1E-10	<1%
Pb-210	2.6E-09	4.8E-08	<1%
Rn-220	2.7E-10	1.5E-13	<1%
Ra-224	2.8E-10	1.9E-09	<1%
Th-228	2.7E-10	3.0E-08	<1%
U-233/234	1.2E-07	5.7E-07	3%
U-238	2.1E-09	7.1E-09	<1%
Pu-238	1.1E-08	4.3E-07	2%
Pu-239/240	7.5E-09	3.1E-07	2%
Am-241	6.7E-09	2.6E-07	1%
Am-243	9.4E-10	1.2E-07	1%
Cm-243/244	5.8E-09	1.5E-07	1%
Cm-248	2.8E-12	1.4E-09	<1%
Cm-250	1.0E-12	3.6E-09	<1%
Table 2.3 nuclides	4.6E-08	1.3E-08	<1%
PIC-5 emissions – VRRM	NA	9.4E-07 ^(d)	5%
PIC-5 emissions – NDRM	NA	6.6E-08 ^(d)	<1%
PIC-5 emissions – Fac. Restoration	NA	8.4E-07 ^(d)	5%
PIC-5 emissions – SIOC	NA	1.0E-06 ^(d)	6%
Total^(e)	1.0E-02 Ci	1.8E-05 mrem EDE	100%

NA = not applicable.

To convert Ci to GBq, multiply Ci by 37. To convert mrem to mSv, multiply mrem by 0.01.

(a) Release in whole or in part based on 40 CFR 61, Appendix D, release records, or measurements. See Table 2.1 and Table 2.2.

(b) Gross alpha from PSF emission unit sampling assumed to be Pu-239 for dose modeling.

(c) Gross beta from PSF emission unit sampling assumed to be Cs-137 for dose modeling.

(d) The PIC-5 emission doses are assigned based on implementation and permit value.

(e) Totals may not add up to value indicated due to rounding.

Table 3.4 provides the campus MEI dose attributed to each emission point. The doses assigned to the fugitive VRRM, NDRM, Facility Restoration, and J-SOIC PIC-5 permitted emissions indicate a maximum dose impact for permit implementation in 2025. All respective dose estimates were below the abated emission dose limit of each emission unit.

Table 3.4. Subpart H Dose Contributions from Each Registered Emission Point

Facility/ Building	Emission Unit ID	RAEL-005 Abated Limit ^(a)	Emissions ^(b)	Campus MEI Subpart H Dose (mrem EDE) ^(c)	% of Total MEI Dose
PSF					
3420 Building	3420-01-S	3.3E-01 mrem	Sampled, Estimated	6.9E-06	39%
3430 Building	3430-01-S	6.13E-02 mrem	Sampled, Estimated	3.7E-06	21%
3420 Building	3420-02-S	3.2E-04 mrem	Estimated	3.1E-06	17%
3410 Building	3410-01-S	7.93E-02 mrem	Sampled, Estimated	1.3E-06	7%
3430 Building	3430-02-S	3.2E-04 mrem	Estimated	5.4E-08	0.3%
3425 Building	J-3425	2.7E-04 mrem	Estimated	2.1E-08	<1%
Campus-wide					
Campus	J-SIOC	1.0E-06 mrem	PIC-5	1.0E-06 ^(b,d)	6%
Campus	J-VRRM	9.4E-07 mrem	PIC-5	9.4E-07 ^(d)	5%
Campus	J-Facilities Restoration	8.4E-07 mrem	PIC-5	8.4E-07 ^(d)	5%
Campus	J-NDRM	6.6E-08 mrem	PIC-5	6.6E-08 ^(d)	<1%

To convert mrem to mSv, multiply mrem by 0.01.

(a) RAEL-005 abated emission dose limit for each emission unit.

(b) Emissions "estimated" are determined by 40 CFR 61, Appendix D, and may include gas emissions from release records.

(c) Subpart H dose values do not include radon. Radon contributes an additional 1.5E-13 mrem (3420-02-S) under WAC 246-247.

(d) Dose assigned by permit determination, or for J-SIOC a dose estimate may be done.

For comparison, the Subpart H MEI dose for the PNNL Richland Campus in 2025 and average U.S. background radiation (NCRP 2009) are shown below:

• Annual natural background radiation	310.0	mrem/yr
• Daily natural background radiation	0.85	mrem/d
• Hourly natural background radiation	0.035	mrem/hr
• Per minute natural background radiation	0.00059	mrem/min
• PNNL Richland Campus 2025 MEI dose (40 CFR 61, Subpart H)	0.000018	mrem/yr
• Per second natural background radiation	0.0000098	mrem/sec

Dose from anthropogenic sources, overwhelmingly a result of medical procedure exposures, adds another 310 mrem (3.1 mSv) to the annual average U.S. dose (HPS 2020). Last year, the campus MEI dose was 1.3E-05 mrem/yr (1.3E-07 mSv/yr).

3.4.2 Washington Administrative Code

For PNNL Richland Campus radionuclide air emissions, Washington State in WAC 246-247-040(1) has adopted the federal dose standard of 10 mrem/yr found in 40 CFR 61, Subpart H. In addition to the maximum dose attributable to radionuclides emitted from point sources, WAC 246-247 requires that the dose to the MEI also include doses attributable to fugitive emissions, radon, and nonroutine events. Radon is exempt from consideration in determining compliance with the dose standard of 40 CFR 61, Subpart H, but it is encompassed by state regulations, as in WAC-246-247-040(6), which states that “[a]ll emissions of radionuclides ... are subject to the standards of this section...”

The WAC 246-247 receptor location considers whether an individual resides or abides at the evaluated location (see Table 3.2, WAC 246-247). For 2025, the WAC-246-247 dose is $1.8\text{E-}05$ mrem/yr ($1.8\text{E-}07$ mSv/yr). An additional assessment was performed for the location with maximum offsite nuclide air concentrations, whether the reside/abide criterion was met or not (see Table 3.2, WAC 173-480). For CY2025, the maximum modeled air concentration is at the PNL-1 ambient sampling station, on the western boundary of the PNNL Richland Campus; this WAC 173-480 dose is $2.1\text{E-}05$ mrem/yr ($2.1\text{E-}07$ mSv/yr) and excludes the CY2025 $1.8\text{E-}06$ mrem/yr PIC-5 permit dose assignments, which are conservatively non-sampled reported values.

3.4.3 PNNL Richland Campus and Hanford Site Subpart H Doses

For information purposes only, the nearby Hanford Site, which is the adjacent DOE site with major emissions units, was considered for comparative evaluation. PNNL Richland Campus air compliance is a distinctly separate issue, but the dose from such nearby major radiological emitters is worth considering for total DOE-source impacts to the region. Hanford Site 300 Area emissions and the Hanford Site MEI for CY2025 were reviewed. Both the PNNL Richland Campus and the Hanford Site (Dyekman et al. 2026) are in compliance with the 10 mrem/yr regulatory standard for CY2025 radiological emissions.

The CY2025 Hanford Site MEI location is on the PNNL Richland Campus, directly south of the Hanford Site 300 Area. As a result, no dose to the Hanford Site MEI from campus emissions was estimated for 2025. The dose to both the PNNL Richland Campus MEI and the Hanford Site MEI from the Hanford Site 300 Area emissions in 2025, excluding Rn-220 and Rn-222 (see Dyekman et al. 2026), is indicated in Table 3.5. Essentially all of the dose from Hanford Site 300 Area emissions to the campus MEI (and Hanford Site MEI) is attributable to H-3 releases.

Table 3.5. Subpart H Doses to PNNL Richland Campus MEI and Hanford Site MEI

Receptor	Dose from 2025 PNNL Richland Campus Emissions	Dose from 2025 Hanford Site 300 Area Emissions
Hanford Site 2025 MEI	NA ^(a)	2.1E-02 mrem
PNNL Richland Campus 2025 MEI	1.8E-05 mrem	1.6E-02 mrem

NA = not applicable.
To convert mrem to mSv, multiply mrem by 0.01.
(a) Hanford Site receptor is located at the PNNL Richland Campus.

3.5 Additional Compliance Information

3.5.1 Applicability of Stack Emissions Data to Air Emission Permits and Licenses

The WDOH license (RAEL-005) requires that an environmental monitoring program be established for the PNNL Richland Campus as a condition of operation. Environmental monitoring supplements the required stack sampling and provides additional assurance that airborne radiological releases comply with federal and state standards. The requirements for site selection and sampling program optimization are documented in Snyder et al. 2024. There are currently five particulate ambient air sampling stations. The most recent programmatic review occurred in 2024 (Snyder et al. 2024). The campus Environmental Monitoring Plan is documented in Snyder et al. 2025a.

The RAEL-005 applicable during the CY2025 operating period expired January 1, 2026. The permit was renewed with a current RAEL-005 effective date of January 2026 to January 2031.

3.5.2 Approvals to Construct or Modify

No approvals under 40 CFR 61.96 were requested or granted in 2025.

3.5.3 Radon-220 and Radon-222 Emissions

No radon-222 was emitted from PNNL Richland Campus operations in 2025. Some radon-220 was emitted. See Section 3.4 for radon emissions and dose results.

3.5.4 Unplanned Releases of Radionuclides to the Atmosphere

No unplanned releases were reported in 2025.

4.0 Fugitive Sources of Emissions

The Clean Air Act (i.e., 40 CFR 61, Subpart H) governs emissions of radionuclides from DOE facilities and the resulting radiological doses to members of the public. A dose standard of 10 mrem/yr EDE was implemented, to which compliance is expected for radionuclide emissions emanating from both point and fugitive sources. Measuring and/or modeling these emissions are fundamental to demonstrating compliance with the standard.

In general, fugitive sources of radioactive emissions are radionuclide air emissions that do not and could not reasonably pass through a stack, vent, or other functionally equivalent structure and that are not feasible to measure directly or quantify (WAC 246-247-030). Some fugitive sources can be classified as diffuse (i.e., area) sources (DOE 2022). The PNNL Richland Campus has no diffuse sources.

PNNL facility-specific fugitive sources include only J-3425. In addition to facility-specific fugitive sources, campus-wide permits for fugitive emissions are registered with WDOH. These include the following:

- J-VRRM Volumetrically released radioactive material
- J-NDRM Non-dispersible radioactive material
- J-Facilities Restoration Facilities restoration
- J-SIOC Sources for instrument/operational checks

These four permitted fugitive emissions sources are managed such that the dose assigned when a particular permit is implemented in a calendar year (see Table 3.3) overestimates the actual dose from respective applicable campus-wide releases. These permits include PIC-5 (Barnett 2018) levels of radionuclide emissions and cover a broad range of the nuclides, as listed in Appendix B.

The 2025 PNNL Richland Campus emissions from facility fugitive sources were estimated (see Table 2.2 for a list of dose-significant emissions) and dose was determined (see Table 3.4). Table 3.4 also indicates the relative magnitudes and the permit-assigned doses from campus-wide fugitive emission sources. Fugitive emissions from facility and permitted fugitive emissions account for 2.9E-06 mrem/yr (2.9E-08 mSv/yr), which is about 16% of the total MEI dose for 2025.

Emissions from fugitive sources mix with ambient air, which may also include emissions from point sources. Emissions from all PNNL Richland Campus sources *and* non-PNNL and background sources are monitored by five particulate air sampling stations. The air surveillance program conducted in 2025 is described in Section 5.3.

Past operations at the nearby Hanford Site created a number of fugitive sources within the landscape, whose emissions could affect the PNNL Richland Campus. The Hanford Site fugitive emissions are evaluated in detail in their Radiological Air Emissions Report (e.g., Dyekman et al. 2026).

5.0 Supplemental Information

This section provides the following supplemental information related to PNNL Richland Campus radionuclide air emissions in 2025:

- Collective dose estimate (DOE 1995)
- Compliance status with 40 CFR 61, Subparts Q (2000) and T (2000)
- Radionuclide emission estimates and periodic confirmatory measurement information related to notices of construction
- Ambient air sampling measurements
- Quality assurance (QA) program status of compliance with 40 CFR 61, Appendix B, Method 114

5.1 Collective Dose Estimate

The estimated regional collective dose from PNNL Richland Campus air emissions in 2025 was calculated using CAP88-PC Version 4.1.1. Regional populations were based on 2020 U.S. Census data within a 50-mi (80-km) radius of the campus (Rose et al. 2023). Pathways evaluated for population exposure include inhalation, air submersion, ground shine, and food consumption. CAP88-PC Version 4.1.1 calculates the collective dose by considering site-specific meteorology and population distributions, and subsequently summing the individual sector doses.

The 2025 total collective dose from radionuclide air emissions estimated from nuclides that originated from the PNNL Richland Campus was 1.7E-04 person-rem (1.7E-06 person-Sv). This represents a slight increase from the 2024 estimate of 1.3E-04 person-rem (1.3E-06 person-Sv) (Snyder et al. 2025b).

5.2 Compliance Status with 40 CFR, Subparts Q and T

In 40 CFR 61, Subpart Q, “National Emission Standards for Radon Emissions From Department of Energy Facilities,” paragraph 61.190 states that the Subpart Q provisions apply to the design and operation of all storage and disposal facilities for radium-bearing material that emits Rn-222 to the air. Paragraph 61.191(b) states that a source means any building, structure, pile, impoundment, or area used for interim storage or disposal that is or contains waste material containing radium in sufficient concentration to emit Rn-222 in excess of a standard of 20 pCi/m²/s. No operations from the storage and disposal of radium-bearing material resulting in radon emissions are conducted on the PNNL Richland Campus.

Activities at the campus were evaluated for compliance with 40 CFR 61, Subpart T, “National Emissions Standards for Radon Emissions from the Disposal of Uranium Mill Tailings.” In paragraph 61.220, “Designation of Facilities,” owners and operators of such facilities are subject to the provisions in Subpart T: those whose sites were used for the disposal of tailings and that managed residual radioactive material or uranium byproduct materials during and following the processing of uranium ores and that are listed in or designated by the Secretary of Energy under Title I of the Uranium Mill Tailings Control Act of 1978 or regulated under Title II of that

act. No uranium milling and uranium ore processing activities are conducted on the PNNL Richland Campus.

Subparts Q and T do not apply to the PNNL Richland Campus for CY2025 operations.

5.3 Environmental Surveillance for the PNNL Richland Campus

Environmental surveillance activities for the PNNL Richland Campus radionuclide emissions sources include ambient particulate air sampling and ambient external dose monitoring. Data for environmental surveillance sample planning, collection, tracking, and reporting are managed by the cloud-based Environmental Information Management (EIM)¹ software system.

5.3.1 Ambient Air Surveillance

Under the requirements of the WDOH license (RAEL-005), the PNNL Richland Campus must operate and maintain a radiological air monitoring program. The requirements for site selection and sampling program optimization are documented in Snyder et al. 2024. A particulate air sampling network was established in 2010 to monitor radioactive particulates in ambient air near the campus. This sampling was initiated before starting radiological operations at the new PSF buildings. The first full calendar year of air surveillance was 2011. To satisfy air permit requirements, samples were collected in 2025 at four ambient air sampling stations within and along the perimeter of the PNNL Richland Campus and at a background monitoring station that was established in Benton City, Washington (Figure 5.1). In addition to campus emissions, these samplers can collect radioactive particulates released from other nearby sources. During 2025, the Hanford Site 300 Area would have contributed most of the non-PNNL particulates detected from offsite facilities.

Routine surveillance activities at the PNNL Richland Campus include air sampling for particulate radionuclides. The air surveillance program is described in the Environmental Radiological Air Monitoring Plan (Snyder et al. 2025; Bisping et al. 2024a,b; Snyder and Cooley 2024). During 2025, environmental air surveillance continued at PNL-1 (solar), PNL-2 (solar), PNL-3, PNL-4, and PNL-5 (background location) (Figure 5.1).

Unless conditions warrant otherwise, particulate air samples are routinely collected biweekly (every 2 weeks) and analyzed for gross alpha activity and gross beta activity. Semi-annually, filters are composited for specific radionuclide analysis. The composite analyses reported for 2025 include gamma-emitting isotopes Co-60 and Cs-137, U-233/234,² Pu-238 and Pu 239/240, Am-241, Am-243, and Cm-243/244.

Wildfire smoke and wind-blown dust can prompt more frequent filter changes at ambient air stations. Unlike previous years marked by widespread wildfires in the Pacific Northwest, 2025 saw only minimal wildfire smoke in September. This resulted in just one of the five particulate air sampling stations (solar-powered station PNL-2) requiring weekly, rather than biweekly, filter changes to maintain proper airflow. Additionally, strong winds in February 2025 generated elevated ambient air dust levels, prompting weekly filter changes at two of the five stations (solar-powered stations PNL-1 and PNL-2). However, the volume collected for one of the PNL-2 filters was insufficient for further analysis. These events did not significantly affect the annual

¹ Locus EIM, provided by Locus Technologies, Mountain View, California. <https://locustec.com/>.

² U-234 is a naturally occurring radionuclide. It is co-reported with U-233 by the analytical laboratory because the emission peaks overlap.

operational frequency for CY2025, since all five-sampling stations maintained an operational frequency above the 85% acceptance criterion.

Air sampling results are summarized in Table 5.1. The biweekly gross alpha and gross beta results were comparable to background levels and detectable semi-annual composite values are within the uncertainty of the PNL-5 background values. All nuclide-specific results shown in Table 5.1 were less than the values in Table 2 of 40 CFR 61, Appendix E. Monitoring results indicate that levels of sampled particulate radionuclides near the PNNL Richland Campus are below regulatory standards. The particulate ambient air sampling results are provided in Appendix C for the CY2025 campus sampling, including composite gross alpha and gross beta results.

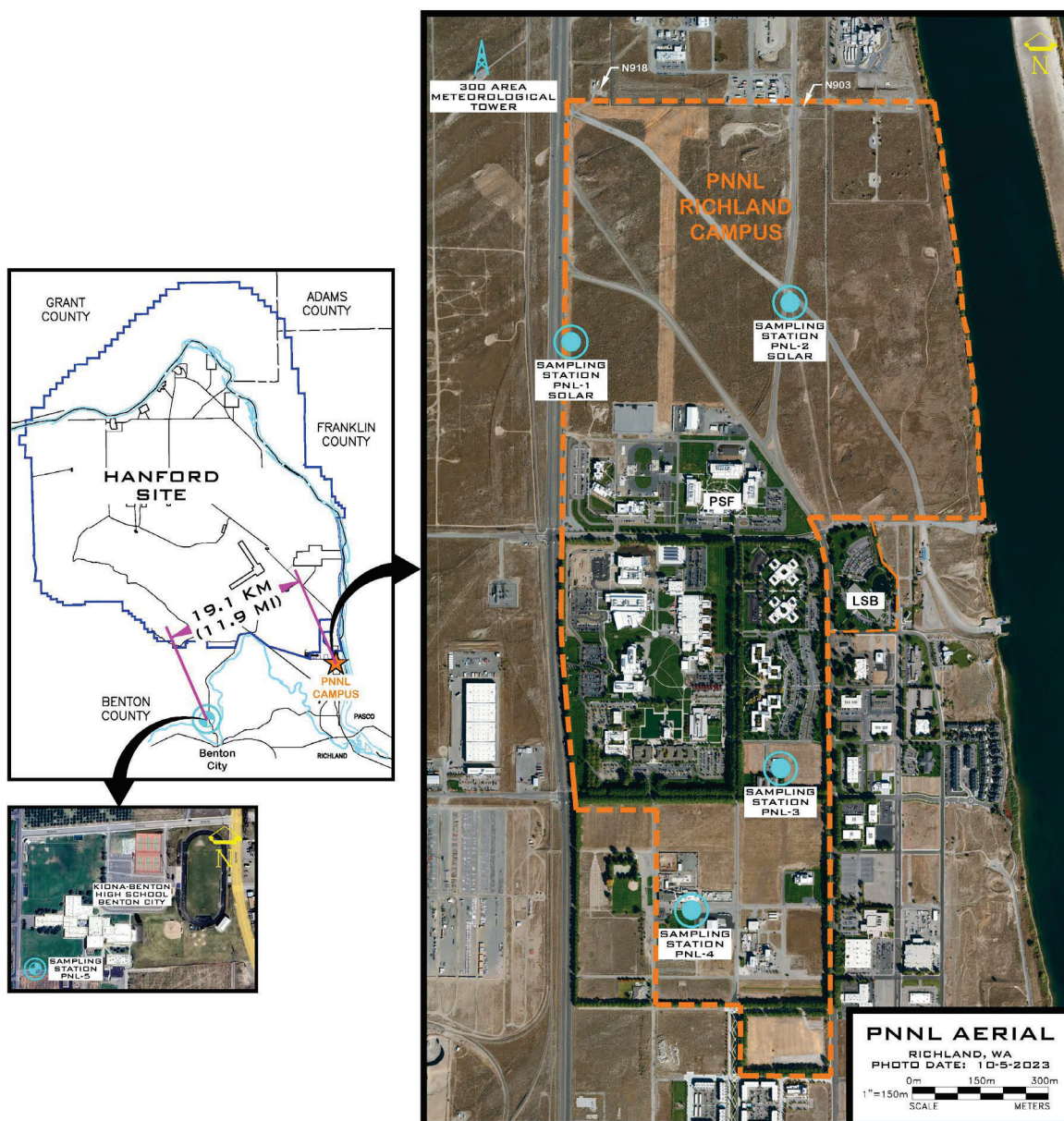


Figure 5.1. Air Surveillance Station Locations for the PNNL Richland Campus CY2025

Table 5.1. Summary of 2025 Air Sampling Results

Nuclide	Location ^(a)	No. of Samples Analyzed	No. of Detections	Value $\pm$ Error (pCi/m ³) ^(b)		
Gross Alpha	PNL-1	27	17	6.8E-04	$\pm$	2.4E-03
	PNL-2	26	20	8.1E-04	$\pm$	2.9E-03
	PNL-3	26	21	6.0E-04	$\pm$	2.1E-03
	PNL-4	26	21	5.4E-04	$\pm$	1.9E-03
	PNL-5	25	18	6.6E-04	$\pm$	2.2E-03
Gross Beta	PNL-1	27	27	1.5E-02	$\pm$	7.9E-03
	PNL-2	26	26	1.9E-02	$\pm$	1.1E-02
	PNL-3	26	26	1.4E-02	$\pm$	6.9E-03
	PNL-4	26	26	1.3E-02	$\pm$	6.6E-03
	PNL-5	25	25	1.4E-02	$\pm$	7.0E-03
Co-60 ^(c)	PNL-1	2	0	-1.5E-05	$\pm$	8.2E-05
	PNL-2	2	0	2.3E-05	$\pm$	1.3E-04
	PNL-3	2	0	1.1E-05	$\pm$	8.2E-05
	PNL-4	2	0	1.5E-05	$\pm$	5.9E-05
	PNL-5	2	0	1.3E-05	$\pm$	1.0E-04
Cs-137 ^(c)	PNL-1	2	0	1.9E-05	$\pm$	9.0E-05
	PNL-2	2	0	-8.4E-06	$\pm$	9.3E-05
	PNL-3	2	0	3.4E-05	$\pm$	1.0E-04
	PNL-4	2	0	4.8E-06	$\pm$	7.8E-05
	PNL-5	2	0	7.2E-06	$\pm$	6.1E-05
U-233/234 ^(c)	PNL-1	2	1	5.8E-05	$\pm$	6.1E-05
	PNL-2	2	1	6.5E-05	$\pm$	6.8E-05
	PNL-3	2	0	2.1E-05	$\pm$	4.9E-05
	PNL-4	2	0	2.9E-05	$\pm$	5.3E-05
	PNL-5	2	0	4.5E-05	$\pm$	6.4E-05
Pu-238 ^(c)	PNL-1	2	0	1.3E-06	$\pm$	1.0E-05
	PNL-2	2	0	6.5E-06	$\pm$	1.7E-05
	PNL-3	2	0	6.7E-06	$\pm$	1.3E-05
	PNL-4	2	0	1.8E-06	$\pm$	1.7E-05
	PNL-5	2	0	4.2E-06	$\pm$	1.5E-05
Pu-239/240 ^(c)	PNL-1	2	0	4.5E-06	$\pm$	1.9E-05
	PNL-2	2	0	5.9E-06	$\pm$	1.8E-05
	PNL-3	2	0	4.4E-06	$\pm$	1.3E-05
	PNL-4	2	0	3.5E-06	$\pm$	1.4E-05
	PNL-5	2	0	8.5E-06	$\pm$	1.6E-05
Am-241 ^(c)	PNL-1	2	0	1.1E-06	$\pm$	1.8E-05
	PNL-2	2	0	5.5E-06	$\pm$	1.6E-05
	PNL-3	2	0	8.0E-07	$\pm$	7.7E-06
	PNL-4	2	0	1.6E-06	$\pm$	1.4E-05
	PNL-5	2	0	1.0E-06	$\pm$	1.5E-05
Am-243 ^(c)	PNL-1	2	0	1.3E-05	$\pm$	3.2E-05
	PNL-2	2	0	6.9E-13	$\pm$	1.8E-05
	PNL-3	2	0	-4.8E-06	$\pm$	1.3E-05
	PNL-4	2	0	8.6E-13	$\pm$	1.8E-05
	PNL-5	2	0	-9.7E-06	$\pm$	1.9E-05
Cm-243/244 ^(c)	PNL-1	2	0	-4.1E-06	$\pm$	1.1E-05
	PNL-2	2	0	-2.6E-06	$\pm$	9.6E-06
	PNL-3	2	0	-2.4E-06	$\pm$	6.6E-06
	PNL-4	2	0	-8.8E-06	$\pm$	1.2E-05
	PNL-5	2	0	4.9E-06	$\pm$	2.3E-05

To convert pCi/m³ to Bq/m³, multiply pCi/m³ by 0.037.

(a) Refer to Figure 5.1 for the locations of PNL-1, PNL-2, PNL-3, PNL-4, and PNL-5.

(b) The value is the average of samples collected throughout the year with no background (PNL-5) results subtracted.

(c) Semiannual composite analyses.

5.3.2 Ambient External Dose Monitoring

Ambient levels of external dose from beta, gamma, and X-ray sources were monitored quarterly at the five particulate air monitoring stations during 2025. No current PNNL Richland Campus radioactive air emissions include significant quantities of external dose contributors. The program establishes baseline ambient external dose levels at the perimeter particulate sampling stations and the background (PNL-5) station.

Ambient air external dose is measured with control and station dosimeters for each sample period. A new, larger dosimeter vault (lead pig) was acquired for control dosimeter storage. An additional dosimeter was acquired to determine the dose rate inherent in the material of this new vault. Measurements were sampled over two¹ 6-month periods to determine an average vault dose rate (0.005 mrem/hr). This dose rate is now considered when determining annual ambient external doses at each of the five sampling stations. In the past, dosimeter results were reported as either above or below the annual regional background dose. The availability of the vault dose now provides complete data on station and regional background ambient external dose so that perimeter and background dose rates can be calculated and reported per the ANSI/HPS N13.37 standard (ANSI/HPS 2014). Previously, the results were processed to indicate whether annual dose at campus locations was statistically above or below the background location dose.

The CY2025 ambient external dose monitoring results at campus monitoring stations ranged from 89–98 mrem/yr (0.88–0.98 mSv/yr), and the background station indicated a local ambient external dose of 92 mrem/yr (0.92 mSv/yr). The reported error for the external dosimeters is 12%. Additional details regarding ambient external dose monitoring will be in the next PNNL Site Environmental Report of 2025 operations (e.g., Hay et al. 2025).

5.4 Quality Assurance Program Compliance Status

Air emissions data reported in this document reflect the product of many QA activities concerned with the collection, handling, analyzing, validating, and reporting of samples and the resultant analytical data. Those activities are identified in the QA plans (Barnett 2024) and in the PNNL Richland Campus Environmental Radiological Air Monitoring Plan (Snyder et al. 2025). The effluent monitoring QA elements described in PNNL (2024) were compatible with one or more of the documents shown in Table 5.2 during CY2025. QA requirements are implemented, as appropriate, at the campus as new facilities become operational and programmatic plans are developed.

¹ A third 6-month sampling period will end in 2026 and will be incorporated into CY2026 reporting. Note: previous CY results cannot be updated/re-evaluated because this new vault differs from that used in prior CYs.

Table 5.2. Summary List of QA-Related Documents

10 CFR 830, <i>Nuclear Safety Management</i>
40 CFR 61, Appendix B, "Method 114 – Test Methods for Measuring Radionuclide Emissions from Stationary Sources"
ANSI/ASME NQA-1-2022, <i>Quality Assurance Requirements for Nuclear Facility Applications</i>
DOE Order 414.1D (2020), <i>Quality Assurance</i>
ISO14001:2015 (ISO 2015), <i>Environmental Management Systems – Requirements with Guidance for Use</i>
DOE Order 458.1 (2025), <i>Radiation Protection of the Public and the Environment</i>
DOE-HDBK-1216-2015, <i>Environmental Radiological Effluent Monitoring and Environmental Surveillance</i> (DOE 2022)
EPA QA/R-5, <i>EPA Requirements for Quality Assurance Project Plans</i> (EPA 2001)

6.0 References

10 CFR 830. "Nuclear Safety Management." Code of Federal Regulations, U.S. Government Printing Office, Washington, D.C.

40 CFR 61, Appendix B. "Test Methods." Code of Federal Regulations, U.S. Government Printing Office, Washington, D.C.

40 CFR 61, Appendix D. "Methods for Estimating Radionuclide Emissions." Code of Federal Regulations, U.S. Government Printing Office, Washington, D.C.

40 CFR 61, Appendix E. "Compliance Procedures Methods for Determining Compliance with Subpart I." Code of Federal Regulations, U.S. Government Printing Office, Washington, D.C.

40 CFR 61, Subpart H. "National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities." Code of Federal Regulations, U.S. Government Printing Office, Washington, D.C.

40 CFR 61, Subpart Q. "National Emission Standards for Radon Emissions from Department of Energy Facilities." Code of Federal Regulations, U.S. Government Printing Office, Washington, D.C.

40 CFR 61, Subpart T. "National Emission Standards for Radon Emissions from the Disposal of Uranium Mill Tailings." Code of Federal Regulations, U.S. Government Printing Office, Washington, D.C.

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Appendix A – Dose Modeling and Meteorological Data

Wind rose for Hanford Site 300 Area, station #11, indicating from which direction that the wind blows.

300 Area, Station #11
10-m instrumentation
Jan-Dec 2025

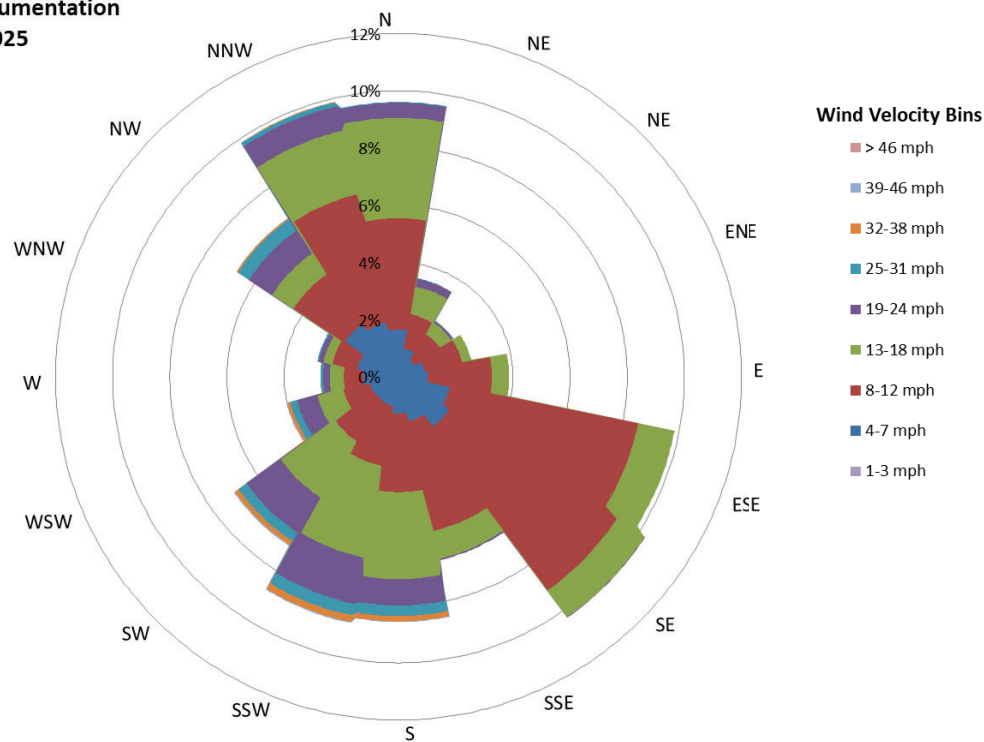


Figure A.1. Hanford Site 300 Area Meteorological Station Wind Rose and Histogram for 2025

Table A.1. Annual Average Joint Frequency during 2025 (as percent of time) of Wind Speed, Stability Class, and Direction for the Hanford Site 300 Area (Station 11) at the 10-meter Level (3 sheets)

Wind Speed (m/sec)	Stability Class	Wind Direction Toward																Total		
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE			
0.89	A	0.15	0.09	0.09	0.06	0.06	0.18	0.14	0.12	0.06	0.03	0.02	0.08	0.03	0.03	0.06	0.05	1.25		
	B	0.02	0.03	0.05	0.04	0.01	0.01	0.04	0.04	0.02	0.01	0.00	0.01	0.01	0.02	0.01	0.04	0.36		
	C	0.06	0.05	0.03	0.04	0.02	0.05	0.02	0.04	0.05	0.00	0.00	0.01	0.05	0.03	0.02	0.05	0.52		
	D	0.37	0.37	0.20	0.29	0.35	0.56	0.56	0.32	0.29	0.24	0.30	0.33	0.33	0.22	0.42	0.36	5.51		
	E	0.41	0.26	0.16	0.23	0.33	0.54	0.79	0.54	0.54	0.39	0.38	0.31	0.50	0.56	0.77	0.58	7.29		
	F	0.50	0.17	0.14	0.24	0.22	0.44	0.53	0.44	0.25	0.27	0.25	0.27	0.29	0.48	0.67	0.72	5.88		
	G	0.20	0.06	0.03	0.06	0.07	0.10	0.10	0.14	0.11	0.13	0.08	0.05	0.05	0.17	0.36	0.21	1.92		
	Total	1.71	1.03	0.70	0.96	1.06	1.88	2.18	1.64	1.32	1.07	1.03	1.06	1.26	1.51	2.31	2.01	22.73		
2.65	A	0.35	0.26	0.56	0.95	1.16	1.23	1.02	0.36	0.44	0.56	0.42	0.12	0.05	0.03	0.04	0.18	7.73		
	B	0.10	0.10	0.04	0.06	0.12	0.16	0.22	0.10	0.07	0.09	0.08	0.05	0.02	0.01	0.00	0.03	1.25		
	C	0.17	0.10	0.14	0.06	0.10	0.18	0.23	0.15	0.12	0.12	0.08	0.06	0.01	0.03	0.05	0.10	1.70		
	D	1.25	0.45	0.27	0.25	0.46	1.40	1.16	0.72	0.60	0.51	0.39	0.33	0.20	0.29	0.63	1.11	10.02		
	E	1.02	0.20	0.06	0.02	0.30	1.81	2.11	1.29	0.99	0.54	0.41	0.25	0.23	0.29	0.68	1.49	11.69		
	F	0.78	0.10	0.00	0.02	0.07	1.24	1.50	0.88	0.43	0.27	0.24	0.11	0.13	0.14	0.51	1.29	7.71		
	G	0.22	0.01	0.01	0.00	0.03	0.70	0.74	0.42	0.09	0.05	0.08	0.02	0.03	0.10	0.26	0.40	3.16		
	Total	3.89	1.22	1.08	1.36	2.24	6.72	6.98	3.92	2.74	2.14	1.70	0.94	0.67	0.89	2.17	4.60	43.26		
4.70	A	0.40	0.40	0.37	0.31	0.49	0.66	0.39	0.18	0.63	1.07	0.95	0.25	0.07	0.06	0.07	0.14	6.44		
	B	0.10	0.06	0.04	0.00	0.00	0.00	0.00	0.03	0.13	0.12	0.08	0.04	0.01	0.02	0.03	0.02	0.68		
	C	0.15	0.14	0.01	0.00	0.00	0.03	0.07	0.03	0.13	0.20	0.09	0.00	0.03	0.01	0.03	0.05	0.97		
	D	0.78	0.17	0.04	0.01	0.04	0.15	0.18	0.19	0.67	0.73	0.44	0.25	0.08	0.12	0.53	0.88	5.26		
	E	0.91	0.16	0.03	0.01	0.06	0.16	0.22	0.29	1.14	0.86	0.59	0.29	0.22	0.09	0.17	0.70	5.90		
	F	0.94	0.05	0.00	0.00	0.02	0.16	0.17	0.22	0.31	0.23	0.15	0.08	0.06	0.03	0.06	0.39	2.87		
	G	0.25	0.00	0.00	0.00	0.00	0.16	0.11	0.06	0.05	0.05	0.05	0.03	0.03	0.00	0.00	0.11	0.90		
	Total	3.53	0.98	0.49	0.33	0.61	1.32	1.14	1.00	3.06	3.26	2.35	0.94	0.50	0.33	0.89	2.29	23.02		

Table A.1 (contd)

Wind Speed (m/sec)	Stability Class	Wind Direction Toward																Total	
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE		
7.15	A	0.09	0.19	0.02	0.00	0.00	0.00	0.00	0.01	0.21	0.47	0.55	0.38	0.12	0.08	0.11	0.03	2.26	
	B	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.17	0.13	0.05	0.00	0.00	0.04	0.04	0.57	
	C	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.13	0.09	0.07	0.00	0.02	0.07	0.05	0.58	
	D	0.21	0.05	0.04	0.00	0.00	0.00	0.00	0.01	0.25	0.34	0.22	0.03	0.04	0.04	0.56	0.56	2.35	
	E	0.08	0.04	0.01	0.00	0.00	0.00	0.00	0.03	0.24	0.41	0.40	0.13	0.07	0.03	0.20	0.19	1.83	
	F	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.11	0.06	0.06	0.00	0.00	0.00	0.01	0.31	
	G	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.04	
Total		0.53	0.28	0.07	0.00	0.00	0.00	0.01	0.05	0.92	1.64	1.45	0.73	0.23	0.17	0.98	0.88	7.94	
9.8	A	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.06	0.03	0.05	0.03	0.02	0.10	0.02	0.37	
	B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.06	0.00	0.09	
	C	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.03	0.02	0.01	0.01	0.04	0.00	0.15	
	D	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.13	0.03	0.05	0.02	0.00	0.17	0.09	0.63	
	E	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.17	0.21	0.21	0.06	0.03	0.01	0.08	0.04	0.83	
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.04	0.00	0.00	0.00	0.00	0.06	
	G	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	
Total		0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.38	0.42	0.33	0.23	0.09	0.04	0.45	0.15	2.14	
12.7	A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.01	0.00	0.00	0.00	0.00	0.02	0.13	
	B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.04	
	C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.00	0.02	0.00	0.00	0.00	0.00	0.08	
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.05	0.01	0.00	0.00	0.00	0.05	0.00	0.14	
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.07	0.12	0.06	0.01	0.00	0.00	0.00	0.35	
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	G	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.22	0.15	0.09	0.01	0.00	0.05	0.02	0.74	

Table A.1 (contd)

Wind Speed (m/sec)	Stability Class	Wind Direction Toward															Total	
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE		SSE
15.6	A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
	B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.02
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.02
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	G	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.02	0.00	0.00	0.00	0.01	0.00	0.09
19	A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.02
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	G	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.02
Total	A	1.00	0.94	1.04	1.32	1.71	2.07	1.55	0.67	1.45	2.23	1.98	0.88	0.30	0.22	0.39	0.44	18.19
	B	0.26	0.19	0.13	0.10	0.13	0.17	0.26	0.17	0.33	0.41	0.32	0.16	0.04	0.05	0.14	0.13	2.99
	C	0.43	0.30	0.18	0.10	0.12	0.26	0.32	0.22	0.44	0.52	0.29	0.18	0.10	0.10	0.21	0.25	4.02
	D	2.62	1.04	0.55	0.55	0.85	2.11	1.90	1.24	1.99	2.02	1.39	0.99	0.67	0.67	2.36	3.00	23.95
	E	2.43	0.66	0.27	0.26	0.69	2.51	3.12	2.15	3.17	2.48	2.14	1.11	1.06	0.98	1.90	3.00	27.93
	F	2.28	0.32	0.14	0.26	0.31	1.84	2.20	1.54	1.00	0.89	0.71	0.56	0.48	0.65	1.24	2.41	16.83
	G	0.67	0.07	0.04	0.06	0.10	0.96	0.96	0.62	0.26	0.24	0.21	0.12	0.11	0.27	0.62	0.72	6.03
Total		9.69	3.52	2.35	2.65	3.91	9.92	10.31	6.61	8.64	8.79	7.04	4.00	2.76	2.94	6.86	9.95	99.94

Table A.2. Exposure and Consumption Data for the PNNL Richland Campus

FOOD SOURCE FOR THE MAXIMALLY EXPOSED INDIVIDUAL
(fraction of food produced at indicated location)

<u>Food</u>	<u>Local</u>	<u>Regional</u>	<u>Imported</u>
Vegetable	1.000	0.000	0.000
Meat	1.000	0.000	0.000
Milk	1.000	0.000	0.000

VALUES FOR RADIONUCLIDE-INDEPENDENT VARIABLES

HUMAN INHALATION RATE (cm^3/hr) = $5.26 \text{ E}+03$

SOIL PARAMETERS

Effective surface density, $\text{kg}/\text{sq m}$, dry weight
(assumes 15-cm plow layer) = $2.15 \text{ E}+02$

BUILDUP TIMES

For activity in soil (yr) = $1.00 \text{ E}+02$
For radionuclides deposited on ground/water (d) = $3.65\text{E}+04$

DELAY TIMES

Ingestion of pasture grass by animals (hr) = $0.00 \text{ E}+00$
Ingestion of stored feed by animals (hr) = $2.16 \text{ E}+03$
Ingestion of leafy vegetables by man (hr) = $3.36 \text{ E}+02$
Ingestion of produce by man (hours) = $3.36 \text{ E}+02$
Transport time from animal feed-milk-man (d) = $2.00 \text{ E}+00$
Time from slaughter to consumption (d) = $2.00 \text{ E}+01$

WEATHERING

Removal rate constant for physical loss (per hr) = $2.90 \text{ E}-03$

CROP EXPOSURE DURATION

Pasture grass (hr) = $7.20 \text{ E}+02$
Crops/leafy vegetables (hr) = $1.44 \text{ E}+03$

AGRICULTURAL PRODUCTIVITY

Grass-cow-milk-man pathway (kg/m^2) = $2.80 \text{ E}-01$
Produce/leafy veg for human consumption (kg/m^2) = $7.16 \text{ E}-01$

FALLOUT INTERCEPTION FRACTIONS

Vegetables = $2.00 \text{ E}-01$
Pasture = $5.70 \text{ E}-01$

GRAZING PARAMETERS

Fraction of year animals graze on pasture = $4.00 \text{ E}-01$
Fraction of daily feed that is pasture grass when animal grazes on pasture = $4.30 \text{ E}-01$

ANIMAL FEED CONSUMPTION FACTORS

Contaminated feed/forage (kg/day , dry weight) = $1.56 \text{ E}+01$

DAIRY PRODUCTIVITY

Milk production of cow (L/day) = $1.10 \text{ E}+01$

Table A.2. (contd)

MEAT ANIMAL SLAUGHTER PARAMETERS

Muscle mass of animal at slaughter (kg) = 2.00 E+02

Fraction of herd slaughtered (per day) = 3.81 E-03

DECONTAMINATION

Fraction of radioactivity retained after washing
or leafy vegetables and produce = 5.00 E-01

FRACTIONS GROWN IN GARDEN OF INTEREST

Produce ingested = 1.00 E+0

Leafy vegetables ingested = 1.00 E+00

INGESTION RATIOS:

IMMEDIATE SURROUNDING AREA/TOTAL WITHIN AREA

Vegetables = 1.00 E+00

Meat = 1.00 E+00

Milk = 1.00 E+00

MINIMUM INGESTION FRACTIONS FROM OUTSIDE AREA

(Minimum fractions of food types from outside area listed below are actual fixed values.)

Vegetables = 0.00 E+00

Meat = 0.00 E+00

Milk = 0.00 E+00

HUMAN FOOD UTILIZATION FACTORS

Produce ingestion (kg/yr) = 7.62 E+01

Milk ingestion (L/yr) = 5.30 E+01

Meat ingestion (kg/yr) = 8.40 E+01

Leafy vegetable ingestion (kg/yr) = 7.79 E+00

SWIMMING PARAMETERS

Fraction of time spent swimming = 0.00 E+00

Dilution depth for water (cm) = 1.00 E+00

EXTERNAL DOSE

Ground surface contamination correction factor = 5.00 E-01

Table A.3. PNNL Richland Campus Meteorological Data — General Information

HEIGHT OF LID

LIDAI = 1,000 m

RAINFALL RATE [2025]

RR = 18.4 cm/yr (7.24 in/yr)

AVERAGE AIR TEMPERATURE [2025]

A = 13.7 degrees C (56.7 degrees F; 286.9 K)

SURFACE ROUGHNESS LENGTH

0 = 0.010 m

VERTICAL TEMPERATURE GRADIENTS: (TG) (K/m)

STABILITY E 0.073

STABILITY F 0.109

STABILITY G 0.146

Appendix B – List of Radioactive Materials Handled or Potentially Handled at the PNNL Richland Campus in 2025

Table B.1. Radionuclides Handled and/or Potentially Handled at the PNNL Richland Campus in 2025

Ac-225	Au-194	Br-84	Cm-250	Eu-154	Hg-205	Ir-189	Na-24	P-32
Ac-226	Au-195	Br-84m	Co-56	Eu-154m	Hg-206	Ir-190	Na-24m	P-33
Ac-227	Au-195m	Br-85	Co-57	Eu-155	Ho-163	Ir-192	Nb-100	Pa-231
Ac-228	Au-196	C-11	Co-58	Eu-156	Ho-164	Ir-194	Nb-101	Pa-232
Ag-105	Au-196m	C-14	Co-58m	Eu-157	Ho-164m	K-40	Nb-103	Pa-233
Ag-106m	Au-198	C-15	Co-60	F-18	Ho-166	K-42	Nb-91	Pa-234
Ag-108	Au-198m	Ca-41	Co-60m	Fe-55	Ho-166m	Kr-81	Nb-91m	Pa-234m
Ag-108m	Au-199	Ca-45	Cr-49	Fe-59	I-122	Kr-81m	Nb-92	Pb-203
Ag-109m	Ba-131	Ca-47	Cr-51	Fr-221	I-123	Kr-83m	Nb-92m	Pb-204m
Ag-110	Ba-131m	Cd-107	Cr-55	Fr-222	I-124	Kr-85	Nb-93m	Pb-205
Ag-110m	Ba-133	Cd-109	Cs-131	Fr-223	I-125	Kr-85m	Nb-94	Pb-209
Ag-111	Ba-133m	Cd-111m	Cs-132	Ga-67	I-126	Kr-87	Nb-94m	Pb-210
Ag-111m	Ba-135m	Cd-113	Cs-134	Ga-68	I-128	Kr-88	Nb-95	Pb-211
Ag-112	Ba-137m	Cd-113m	Cs-134m	Ga-70	I-129	Kr-89	Nb-95m	Pb-212
Al-26	Ba-139	Cd-115	Cs-135	Ga-72	I-130	Kr-90	Nb-96	Pb-214
Al-28	Ba-140	Cd-115m	Cs-135m	Gd-148	I-130m	La-137	Nb-97	Pd-103
Am-240	Ba-141	Cd-117	Cs-136	Gd-149	I-131	La-138	Nb-97m	Pd-107
Am-241	Ba-142	Cd-117m	Cs-137	Gd-150	I-132	La-140	Nb-98	Pd-109
Am-242	Ba-143	Ce-139	Cs-138	Gd-151	I-132m	La-141	Nd-144	Pd-109m
Am-242m	Be-10	Ce-141	Cs-138m	Gd-152	I-133	La-142	Nd-147	Pd-111
Am-243	Be-7	Ce-142	Cs-139	Gd-153	I-133m	La-144	Ni-56	Pd-112
Am-244	Bi-207	Ce-143	Cs-140	Gd-159	I-134	Lu-177	Ni-57	Pm-143
Am-244m	Bi-208	Ce-144	Cs-141	Ge-68	I-134m	Lu-177m	Ni-59	Pm-144
Am-245	Bi-210	Cf-249	Cu-64	Ge-69	I-135	Mg-27	Ni-63	Pm-145
Am-246	Bi-210m	Cf-250	Cu-66	Ge-71	In-106	Mg-28	Ni-65	Pm-146
Ar-37	Bi-211	Cf-251	Cu-67	Ge-71m	In-111	Mn-52	Ni-66	Pm-147
Ar-39	Bi-212	Cf-252	Dy-159	Ge-75	In-111m	Mn-52m	Np-235	Pm-148
Ar-41	Bi-212m	Cl-36	Dy-165	Ge-77	In-112	Mn-53	Np-236	Pm-148m
Ar-42	Bi-212n	Cl-38	Dy-169	Ge-77m	In-112m	Mn-54	Np-236m	Pm-149
As-73	Bi-213	Cm-241	Er-169	H-3	In-113m	Mn-56	Np-237	Pm-150
As-74	Bi-214	Cm-242	Er-171	Hf-175	In-114	Mo-93	Np-238	Pm-151
As-76	Bk-247	Cm-243	ES-253	Hf-177m	In-114m	Mo-93m	Np-239	Po-208
As-77	Bk-248m	Cm-244	Es-254	Hf-178m	In-115	Mo-99	Np-240	Po-209
At-211	Bk-249	Cm-245	Eu-150	Hf-179m	In-115m	Mo-103	Np-240m	Po-210
At-217	Bk-250	Cm-246	Eu-150m	Hf-180m	In-116	Mo-104	O-15	Po-211
At-218	Br-82	Cm-247	Eu-152	Hf-181	In-116m	Mo-105	O-19	Po-212
Au-193	Br-82m	Cm-248	Eu-152m	Hf-182	In-117	N-13	Os-185	Po-212m
Au-193m	Br-83	Cm-249	Eu-152n	Hg-203	In-117m	Na-22	Os-191	Po-213
Po-214	Pu-244	Rh-101m	Sb-127	Sn-119m	Tc-95m	Th-228	U-235m	Y-88
Po-215	Pu-246	Rh-102	Sb-128	Sn-121	Tc-96	Th-229	U-236	Y-89m
Po-216	Ra-223	Rh-102m	Sb-128m	Sn-121m	Tc-96m	Th-230	U-237	Y-90
Po-218	Ra-224	Rh-103m	Sb-129	Sn-123	Tc-97	Th-231	U-238	Y-90m
Pr-142	Ra-225	Rh-104	Sc-44	Sn-123m	Tc-97m	Th-232	U-239	Y-91
Pr-142m	Ra-226	Rh-104m	Sc-44m	Sn-125	Tc-98	Th-233	U-240	Y-91m
Pr-143	Ra-227	Rh-105	Sc-46	Sn-125m	Tc-99	Th-234	V-48	Y-92

Table B.1 (contd)

Pr-144	Ra-228	Rh-105m	Sc-47	Sn-126	Tc-99m	Ti-44	V-49	Y-93
Pr-144m	Rb-81	Rh-106	Sc-48	Sr-82	Tc-101	Ti-45	W-181	Yb-164
Pt-191	Rb-81m	Rn-218	Se-75	Sr-83	Tc-103	Ti-51	W-185	Yb-165
Pt-193	Rb-82	Rn-219	Se-77m	Sr-85	Tc-106	Tl-200	W-185m	Yb-166
Pt-193m	Rb-82m	Rn-220	Se-79	Sr-85m	Te-121	Tl-201	W-187	Yb-167
Pt-195m	Rb-83	Rn-222	Se-79m	Sr-87m	Te-121m	Tl-202	W-188	Yb-169
Pt-197	Rb-84	Rn-224	Si-31	Sr-89	Te-123	Tl-204	Xe-122	Yb-175
Pt-197m	Rb-84m	Ru-103	Si-32	Sr-90	Te-123m	Tl-206	Xe-123	Yb-177
Pt-199	Rb-86	Ru-105	Sm-145	Sr-91	Te-125m	Tl-206m	Xe-125	Zn-65
Pt-199m	Rb-86m	Ru-106	Sm-146	Sr-92	Te-127	Tl-207	Xe-127	Zn-69
Pu-234	Rb-87	Ru-97	Sm-147	Ta-179	Te-127m	Tl-208	Xe-127m	Zn-69m
Pu-235	Rb-88	S-35	Sm-148	Ta-180	Te-129	Tl-209	Xe-129m	Zr-88
Pu-236	Rb-89	Sb-122	Sm-151	Ta-182	Te-129m	Tl-210	Xe-131m	Zr-89
Pu-237	Rb-90	Sb-122m	Sm-153	Ta-182m	Te-131	Tm-168	Xe-133	Zr-89m
Pu-238	Rb-90m	Sb-124	Sm-155	Ta-183	Te-131m	Tm-170	Xe-133m	Zr-93
Pu-239	Re-186	Sb-124m	Sm-156	Tb-157	Te-132	Tm-171	Xe-135	Zr-95
Pu-240	Re-186m	Sb-124n	Sm-157	Tb-158	Te-133	U-232	Xe-135m	Zr-97
Pu-241	Re-187	Sb-125	Sn-113	Tb-160	Te-133m	U-233	Xe-137	Zr-98
Pu-242	Re-188	Sb-126	Sn-113m	Tb-161	Te-134	U-234	Xe-138	Zr-99
Pu-243	Rh-101	Sb-126m	Sn-117m	Tc-95	Th-227	U-235	Xe-139	Zr-100

Appendix C – Ambient Particulate Air Sampling Results for PNNL Richland Campus Air Surveillance in 2025

Table C.1. Definitions for Air Sampling Data

Column Heading	Data Type/Format	Content
Location ID	Text	Location of monitoring station: PNNL Richland Campus monitoring stations Background Location PNL-1, PNL-2, PNL-3, PNL-4 PNL-5
Field Sample ID	Number (#####)	Unique identifier assigned to a sample (typically six-digit number but characters allowed).
Sample Matrix	Text	Matrix of the sample at the time of sample collection (e.g., FILTER)
Start Date	Date (DD-MMM-YYYY)	Date when air sampling started.
Sample Date	Date (DD-MMM-YYYY)	Date when air sampling ended.
Parameter Name	Text	Code assigned to analytical parameter (e.g., Gross alpha, Cesium-137, Plutonium-238). Note: The sum of Uranium-233 and Uranium-234 is reported as either isotope and used for Uranium-233 reporting.
Result	Number (usually scientific notation)	Result reported by the analytical laboratory.
Units	Text	Picocuries per cubic meter. Units associated with the values shown in the Result, Counting Error, and Total Error columns.
Counting Error	Number (usually scientific notation)	The 2-sigma counting error for the radioanalytical results only.
Total Error	Number (usually scientific notation)	The 2-sigma total analytical error for the radioanalytical results only.
Lab Qualifier	Text or Blank	If "U", the Result was not detected above limiting criteria, which may include any of the following: Result < 0, or < Counting Error, or < Total Error, or <= Contract method detection limit/instrument detection limit/minimum detectable activity/practical quantitation limit. If "O", the case narrative contains additional information regarding quality control criteria not being met. If "X", see text in the Result Comment field regarding radio-analysis. If blank, no qualifier was assigned.
Sample Comment	Text or Blank	Additional information pertaining to the sample. If blank, no comment was needed
Result Comment	Text or Blank	Additional information pertaining to the analytical result. If blank, no comment was needed.
Composite	Y or Blank	Composite of two or more samples. If "Y", several samples from the same monitoring station were composited and the composite measured for radioactivity. If blank, a single sample was measured.
Further details on each PNNL Richland Campus sample event (e.g., sample volume, lab method) can be obtained from the project Environmental Information Management (EIM) software system provided by Locus Technologies.		

Table C.2. Air Sampling Results for the PNNL Richland Campus for Calendar Year 2025

Location ID	Field Sample ID	Sample Matrix	Start Date	Sample Date	Parameter Name	Result	Units	Counting Error	Total Error	Lab Qualifier	Sample Comment	Result Comment	Com- posite
PNL-1	250073	FILTER	12/23/2024	01/08/2025	Gross alpha	2.12E-04	pCi/m3	2.47E-04	2.47E-04	U			N
PNL-1	250078	FILTER	01/08/2025	01/22/2025	Gross alpha	6.36E-04	pCi/m3	4.31E-04	4.31E-04				N
PNL-1	250083	FILTER	01/22/2025	02/05/2025	Gross alpha	9.74E-04	pCi/m3	5.31E-04	5.31E-04				N
PNL-1	250088	FILTER	02/05/2025	02/19/2025	Gross alpha	6.64E-04	pCi/m3	3.98E-04	3.98E-04				N
PNL-1	250203	FILTER	02/19/2025	02/25/2025	Gross alpha	5.25E-04	pCi/m3	5.85E-04	5.85E-04	U	One-week filter collected early due to dust in air from high winds.		N
PNL-1	250093	FILTER	02/25/2025	03/05/2025	Gross alpha	-2.81E-05	pCi/m3	2.58E-04	2.58E-04	U	One-week filter.		N
PNL-1	250098	FILTER	03/05/2025	03/19/2025	Gross alpha	6.97E-04	pCi/m3	4.53E-04	4.53E-04				N
PNL-1	250103	FILTER	03/19/2025	04/02/2025	Gross alpha	4.26E-04	pCi/m3	3.64E-04	3.64E-04	U	Air sampler #27818 expiring 04/19/25, replaced 04/02/25 with #26472, expires 3/25/26.		N
PNL-1	250108	FILTER	04/02/2025	04/16/2025	Gross alpha	3.08E-04	pCi/m3	3.04E-04	3.04E-04	U			N
PNL-1	250113	FILTER	04/16/2025	04/30/2025	Gross alpha	6.25E-04	pCi/m3	4.33E-04	4.33E-04				N
PNL-1	250118	FILTER	04/30/2025	05/14/2025	Gross alpha	2.06E-04	pCi/m3	2.79E-04	2.79E-04	U			N
PNL-1	250123	FILTER	05/14/2025	05/28/2025	Gross alpha	5.08E-04	pCi/m3	3.75E-04	3.75E-04				N
PNL-1	250128	FILTER	05/28/2025	06/11/2025	Gross alpha	6.25E-04	pCi/m3	3.91E-04	3.91E-04				N
PNL-1	250133	FILTER	06/11/2025	06/25/2025	Gross alpha	5.09E-04	pCi/m3	3.49E-04	3.49E-04				N
PNL-1	250138	FILTER	06/25/2025	07/09/2025	Gross alpha	4.03E-04	pCi/m3	3.63E-04	3.63E-04	U			N
PNL-1	250143	FILTER	07/09/2025	07/23/2025	Gross alpha	7.77E-04	pCi/m3	4.74E-04	4.74E-04				N
PNL-1	250148	FILTER	07/23/2025	08/06/2025	Gross alpha	1.12E-03	pCi/m3	5.56E-04	5.56E-04				N
PNL-1	250153	FILTER	08/06/2025	08/20/2025	Gross alpha	3.46E-04	pCi/m3	3.42E-04	3.42E-04	U			N
PNL-1	250158	FILTER	08/20/2025	09/03/2025	Gross alpha	1.38E-03	pCi/m3	6.18E-04	6.18E-04				N
PNL-1	250163	FILTER	09/03/2025	09/17/2025	Gross alpha	1.10E-03	pCi/m3	5.68E-04	5.68E-04				N
PNL-1	250168	FILTER	09/17/2025	10/01/2025	Gross alpha	9.83E-04	pCi/m3	5.31E-04	5.31E-04				N
PNL-1	250173	FILTER	10/01/2025	10/15/2025	Gross alpha	2.66E-04	pCi/m3	3.06E-04	3.06E-04	U			N
PNL-1	250178	FILTER	10/15/2025	10/29/2025	Gross alpha	6.29E-04	pCi/m3	4.32E-04	4.32E-04				N
PNL-1	250183	FILTER	10/29/2025	11/12/2025	Gross alpha	4.20E-04	pCi/m3	3.67E-04	3.67E-04	U			N
PNL-1	250188	FILTER	11/12/2025	11/26/2025	Gross alpha	1.09E-03	pCi/m3	5.29E-04	5.29E-04				N
PNL-1	250193	FILTER	11/26/2025	12/10/2025	Gross alpha	1.77E-03	pCi/m3	7.09E-04	7.09E-04				N
PNL-1	250198	FILTER	12/10/2025	12/23/2025	Gross alpha	1.11E-03	pCi/m3	5.94E-04	5.94E-04				N
PNL-1	250073	FILTER	12/23/2024	01/08/2025	Gross beta	7.45E-03	pCi/m3	9.92E-04	9.94E-04				N
PNL-1	250078	FILTER	01/08/2025	01/22/2025	Gross beta	1.83E-02	pCi/m3	1.59E-03	1.59E-03				N
PNL-1	250083	FILTER	01/22/2025	02/05/2025	Gross beta	2.93E-02	pCi/m3	1.99E-03	2.00E-03				N
PNL-1	250088	FILTER	02/05/2025	02/19/2025	Gross beta	2.72E-02	pCi/m3	1.94E-03	1.95E-03				N
PNL-1	250203	FILTER	02/19/2025	02/25/2025	Gross beta	1.23E-02	pCi/m3	2.15E-03	2.15E-03		One-week filter collected early due to dust in air from high winds.		N
PNL-1	250093	FILTER	02/25/2025	03/05/2025	Gross beta	1.39E-02	pCi/m3	1.95E-03	1.96E-03		One-week filter.		N

Location ID	Field Sample ID	Sample Matrix	Start Date	Sample Date	Parameter Name	Result	Units	Counting Error	Total Error	Lab Qualifier	Sample Comment	Result Comment	Com- posite
PNL-1	250098	FILTER	03/05/2025	03/19/2025	Gross beta	6.98E-03	pCi/m3	1.03E-03	1.03E-03				N
PNL-1	250103	FILTER	03/19/2025	04/02/2025	Gross beta	6.94E-03	pCi/m3	1.03E-03	1.03E-03		Air sampler #27818 expiring 04/19/25, replaced 04/02/25 with #26472, expires 3/25/26.		N
PNL-1	250108	FILTER	04/02/2025	04/16/2025	Gross beta	1.13E-02	pCi/m3	1.26E-03	1.27E-03				N
PNL-1	250113	FILTER	04/16/2025	04/30/2025	Gross beta	1.25E-02	pCi/m3	1.35E-03	1.35E-03				N
PNL-1	250118	FILTER	04/30/2025	05/14/2025	Gross beta	1.20E-02	pCi/m3	1.33E-03	1.33E-03				N
PNL-1	250123	FILTER	05/14/2025	05/28/2025	Gross beta	1.09E-02	pCi/m3	1.24E-03	1.25E-03				N
PNL-1	250128	FILTER	05/28/2025	06/11/2025	Gross beta	1.19E-02	pCi/m3	1.30E-03	1.31E-03				N
PNL-1	250133	FILTER	06/11/2025	06/25/2025	Gross beta	1.07E-02	pCi/m3	1.26E-03	1.26E-03				N
PNL-1	250138	FILTER	06/25/2025	07/09/2025	Gross beta	1.28E-02	pCi/m3	1.34E-03	1.35E-03				N
PNL-1	250143	FILTER	07/09/2025	07/23/2025	Gross beta	1.17E-02	pCi/m3	1.30E-03	1.30E-03				N
PNL-1	250148	FILTER	07/23/2025	08/06/2025	Gross beta	1.42E-02	pCi/m3	1.40E-03	1.40E-03	O			N
PNL-1	250153	FILTER	08/06/2025	08/20/2025	Gross beta	9.55E-03	pCi/m3	1.19E-03	1.19E-03				N
PNL-1	250158	FILTER	08/20/2025	09/03/2025	Gross beta	2.94E-02	pCi/m3	1.98E-03	1.99E-03				N
PNL-1	250163	FILTER	09/03/2025	09/17/2025	Gross beta	2.49E-02	pCi/m3	1.85E-03	1.85E-03				N
PNL-1	250168	FILTER	09/17/2025	10/01/2025	Gross beta	2.24E-02	pCi/m3	1.75E-03	1.76E-03				N
PNL-1	250173	FILTER	10/01/2025	10/15/2025	Gross beta	1.48E-02	pCi/m3	1.44E-03	1.44E-03				N
PNL-1	250178	FILTER	10/15/2025	10/29/2025	Gross beta	1.29E-02	pCi/m3	1.35E-03	1.35E-03				N
PNL-1	250183	FILTER	10/29/2025	11/12/2025	Gross beta	1.61E-02	pCi/m3	1.51E-03	1.51E-03				N
PNL-1	250188	FILTER	11/12/2025	11/26/2025	Gross beta	2.01E-02	pCi/m3	1.65E-03	1.65E-03				N
PNL-1	250193	FILTER	11/26/2025	12/10/2025	Gross beta	2.48E-02	pCi/m3	1.83E-03	1.84E-03				N
PNL-1	250198	FILTER	12/10/2025	12/23/2025	Gross beta	9.67E-03	pCi/m3	1.25E-03	1.25E-03				N
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Gross alpha (Comp)	2.25E-03	pCi/m3	5.77E-04	5.77E-04			Lab Result exceeded Project Control Limit (0.0025 pCi/m3).	Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Gross alpha (Comp)	5.94E-03	pCi/m3	9.77E-04	9.79E-04				Y
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Gross beta (Comp)	1.70E-02	pCi/m3	1.02E-03	1.05E-03				Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Gross beta (Comp)	2.14E-02	pCi/m3	1.20E-03	1.23E-03				Y
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Antimony-125	-1.81E-04	pCi/m3	1.41E-04	1.64E-04	U			Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Antimony-125	1.11E-04	pCi/m3	2.05E-04	2.11E-04	U			Y
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Beryllium-7	3.97E-02	pCi/m3	1.65E-03	4.43E-03				Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Beryllium-7	2.73E-02	pCi/m3	3.63E-03	4.55E-03				Y
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Cesium-134	-6.89E-07	pCi/m3	3.78E-05	3.78E-05	U			Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Cesium-134	-1.41E-05	pCi/m3	9.30E-05	9.32E-05	U			Y
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Cesium-137	6.44E-06	pCi/m3	3.65E-05	3.66E-05	U			Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Cesium-137	3.12E-05	pCi/m3	8.06E-05	8.19E-05	U			Y
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Cobalt-60	-1.74E-05	pCi/m3	4.37E-05	4.44E-05	U			Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Cobalt-60	-1.26E-05	pCi/m3	6.83E-05	6.85E-05	U			Y

Location ID	Field Sample ID	Sample Matrix	Start Date	Sample Date	Parameter Name	Result	Units	Counting Error	Total Error	Lab Qualifier	Sample Comment	Result Comment	Com- posite
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Europium-152	-3.37E-05	pCi/m3	9.55E-05	9.68E-05	U			Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Europium-152	-7.55E-05	pCi/m3	2.04E-04	2.07E-04	U			Y
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Europium-154	4.43E-05	pCi/m3	1.16E-04	1.18E-04	U			Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Europium-154	1.38E-05	pCi/m3	2.63E-04	2.63E-04	U			Y
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Europium-155	9.58E-05	pCi/m3	1.27E-04	1.34E-04	U			Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Europium-155	2.76E-05	pCi/m3	1.90E-04	1.91E-04	U			Y
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Potassium-40	3.28E-03	pCi/m3	1.08E-03	1.13E-03			Results are considered a false positive due to no valid peak.	Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Potassium-40	1.79E-03	pCi/m3	2.65E-03	2.66E-03	XU			Y
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Ruthenium-106	8.48E-05	pCi/m3	3.43E-04	3.45E-04	U			Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Ruthenium-106	1.86E-03	pCi/m3	1.32E-03	1.33E-03	X		Results are considered a false positive due to no valid peak.	Y
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Americium-241	-3.75E-06	pCi/m3	1.04E-05	1.04E-05	U			Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Americium-241	2.11E-06	pCi/m3	1.24E-05	1.24E-05	U			Y
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Americium-243	-1.74E-05	pCi/m3	1.89E-05	1.89E-05	U			Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Americium-243	2.53E-05	pCi/m3	2.26E-05	2.28E-05	U			Y
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Curium-243/244	-1.86E-06	pCi/m3	6.32E-06	6.32E-06	U			Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Curium-243/244	-6.27E-06	pCi/m3	9.16E-06	9.16E-06	U			Y
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Plutonium-238	2.58E-06	pCi/m3	7.16E-06	7.17E-06	U			Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Plutonium-238	-1.60E-12	pCi/m3	1.31E-05	1.31E-05	U			Y
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Plutonium-239/240	1.29E-06	pCi/m3	7.59E-06	7.59E-06	U			Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Plutonium-239/240	7.69E-06	pCi/m3	1.77E-05	1.77E-05	U			Y
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Uranium-233/234	6.93E-05	pCi/m3	4.80E-05	4.92E-05				Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Uranium-233/234	4.73E-05	pCi/m3	3.50E-05	3.54E-05	U			Y
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Uranium-235	2.15E-06	pCi/m3	2.25E-05	2.25E-05	U			Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Uranium-235	1.71E-05	pCi/m3	2.15E-05	2.15E-05	U			Y
PNL-1	250205	FILTER	12/23/2024	06/25/2025	Uranium-238	3.13E-05	pCi/m3	3.29E-05	3.32E-05	U			Y
PNL-1	250211	FILTER	06/25/2025	12/23/2025	Uranium-238	5.61E-05	pCi/m3	3.31E-05	3.36E-05				Y

Location ID	Field Sample ID	Sample Matrix	Start Date	Sample Date	Parameter Name	Result	Units	Counting Error	Total Error	Lab Qualifier	Sample Comment	Result Comment	Com- posite
PNL-2	250074	FILTER	12/23/2024	01/08/2025	Gross alpha	--	--	--	--	--	No Sample. Main power lever in OFF position, no power to station. PNL-2 relocated Nov 2024 with final setup completed Dec 2024. On 01/08/25, electrician resolved power issue restoring power at 12:15 PM. Air sampler #24095 replaced 01/08/25 with #22974, expires 12/17/25.		N
PNL-2	250079	FILTER	01/08/2025	01/22/2025	Gross alpha	7.05E-04	pCi/m3	4.18E-04	4.18E-04				N
PNL-2	250084	FILTER	01/22/2025	02/05/2025	Gross alpha	1.13E-03	pCi/m3	5.43E-04	5.43E-04				N
PNL-2	250089	FILTER	02/05/2025	02/19/2025	Gross alpha	8.33E-04	pCi/m3	4.99E-04	4.99E-04				N
PNL-2	250204	FILTER	02/19/2025	02/25/2025	Gross alpha	--	--	--	--	--	No Sample. One-week filter collected early due to dust in air from high winds, insufficient volume for analyses.		N
PNL-2	250094	FILTER	02/25/2025	03/05/2025	Gross alpha	1.09E-03	pCi/m3	1.07E-03	1.07E-03	U	One-week filter.		N
PNL-2	250099	FILTER	03/05/2025	03/19/2025	Gross alpha	4.21E-04	pCi/m3	3.26E-04	3.26E-04				N
PNL-2	250104	FILTER	03/19/2025	04/02/2025	Gross alpha	4.70E-04	pCi/m3	3.47E-04	3.47E-04				N
PNL-2	250109	FILTER	04/02/2025	04/16/2025	Gross alpha	5.34E-04	pCi/m3	4.10E-04	4.10E-04				N
PNL-2	250114	FILTER	04/16/2025	04/30/2025	Gross alpha	3.06E-04	pCi/m3	2.82E-04	2.82E-04	U			N
PNL-2	250119	FILTER	04/30/2025	05/14/2025	Gross alpha	2.07E-04	pCi/m3	2.53E-04	2.53E-04	U			N
PNL-2	250124	FILTER	05/14/2025	05/28/2025	Gross alpha	9.22E-04	pCi/m3	5.12E-04	5.12E-04				N
PNL-2	250129	FILTER	05/28/2025	06/11/2025	Gross alpha	5.45E-04	pCi/m3	4.10E-04	4.10E-04				N
PNL-2	250134	FILTER	06/11/2025	06/25/2025	Gross alpha	7.88E-04	pCi/m3	4.85E-04	4.85E-04				N
PNL-2	250139	FILTER	06/25/2025	07/09/2025	Gross alpha	4.01E-04	pCi/m3	3.25E-04	3.25E-04				N
PNL-2	250144	FILTER	07/09/2025	07/23/2025	Gross alpha	3.54E-04	pCi/m3	3.04E-04	3.04E-04	U			N
PNL-2	250149	FILTER	07/23/2025	08/06/2025	Gross alpha	9.00E-04	pCi/m3	4.53E-04	4.54E-04				N
PNL-2	250154	FILTER	08/06/2025	08/20/2025	Gross alpha	6.57E-04	pCi/m3	4.04E-04	4.04E-04				N
PNL-2	250159	FILTER	08/20/2025	09/03/2025	Gross alpha	8.99E-04	pCi/m3	4.73E-04	4.73E-04				N

Location ID	Field Sample ID	Sample Matrix	Start Date	Sample Date	Parameter Name	Result	Units	Counting Error	Total Error	Lab Qualifier	Sample Comment	Result Comment	Com- posite
PNL-2	250210	FILTER	09/03/2025	09/11/2025	Gross alpha	2.87E-03	pCi/m3	1.68E-03	1.68E-03		Refer to Discrepancy Report EMP25-003 (OOT). One-week air filter due to wildfire smoke in the area. Air sampler stopped working when replacing air filter and #22974 expiring 12/17/25, replaced 09/11/25 with #24095, expires 02/03/26.	Lab Result exceeded Project Control Limit (0.0025 pCi/m3).	N
	250164	FILTER	09/11/2025	09/17/2025	Gross alpha	3.77E-04	pCi/m3	5.63E-04	5.63E-04	U	One-week air filter due to wildfire smoke in the area.		N
	250169	FILTER	09/17/2025	10/01/2025	Gross alpha	1.32E-03	pCi/m3	5.47E-04	5.47E-04				N
	250174	FILTER	10/01/2025	10/15/2025	Gross alpha	4.64E-04	pCi/m3	3.43E-04	3.43E-04				N
	250179	FILTER	10/15/2025	10/29/2025	Gross alpha	6.56E-04	pCi/m3	3.96E-04	3.96E-04				N
	250184	FILTER	10/29/2025	11/12/2025	Gross alpha	1.07E-03	pCi/m3	5.31E-04	5.31E-04				N
PNL-2	250189	FILTER	11/12/2025	11/26/2025	Gross alpha	1.45E-03	pCi/m3	6.42E-04	6.42E-04				N
	250194	FILTER	11/26/2025	12/10/2025	Gross alpha	1.16E-03	pCi/m3	5.23E-04	5.23E-04				N
	250199	FILTER	12/10/2025	12/23/2025	Gross alpha	4.07E-04	pCi/m3	3.57E-04	3.57E-04	U			N
	250074	FILTER	12/23/2024	01/08/2025	Gross beta	--	--	--	--	--	No Sample. Main power lever in OFF position, no power to station. PNL-2 relocated Nov 2024 with final setup completed Dec 2024. On 01/08/25, electrician resolved power issue restoring power at 12:15 PM. Air sampler #24095 replaced 01/08/25 with #22974, expires 12/17/25.		N
PNL-2	250079	FILTER	01/08/2025	01/22/2025	Gross beta	1.86E-02	pCi/m3	1.63E-03	1.64E-03				N
	250084	FILTER	01/22/2025	02/05/2025	Gross beta	3.01E-02	pCi/m3	2.01E-03	2.02E-03				N
	250089	FILTER	02/05/2025	02/19/2025	Gross beta	2.90E-02	pCi/m3	1.99E-03	2.00E-03				N
PNL-2	250204	FILTER	02/19/2025	02/25/2025	Gross beta	--	--	--	--	--	No Sample. One-week filter collected early due to dust in air from high winds, insufficient volume for analyses.		N

Location ID	Field Sample ID	Sample Matrix	Start Date	Sample Date	Parameter Name	Result	Units	Counting Error	Total Error	Lab Qualifier	Sample Comment	Result Comment	Com- posite
PNL-2	250094	FILTER	02/25/2025	03/05/2025	Gross beta	3.52E-02	pCi/m3	4.50E-03	4.50E-03		One-week filter.		N
PNL-2	250099	FILTER	03/05/2025	03/19/2025	Gross beta	8.63E-03	pCi/m3	1.15E-03	1.15E-03				N
PNL-2	250104	FILTER	03/19/2025	04/02/2025	Gross beta	7.99E-03	pCi/m3	1.12E-03	1.12E-03				N
PNL-2	250109	FILTER	04/02/2025	04/16/2025	Gross beta	1.09E-02	pCi/m3	1.25E-03	1.25E-03				N
PNL-2	250114	FILTER	04/16/2025	04/30/2025	Gross beta	1.40E-02	pCi/m3	1.42E-03	1.43E-03				N
PNL-2	250119	FILTER	04/30/2025	05/14/2025	Gross beta	1.31E-02	pCi/m3	1.36E-03	1.36E-03				N
PNL-2	250124	FILTER	05/14/2025	05/28/2025	Gross beta	9.83E-03	pCi/m3	1.21E-03	1.21E-03				N
PNL-2	250129	FILTER	05/28/2025	06/11/2025	Gross beta	1.20E-02	pCi/m3	1.33E-03	1.33E-03				N
PNL-2	250134	FILTER	06/11/2025	06/25/2025	Gross beta	9.41E-03	pCi/m3	1.19E-03	1.19E-03				N
PNL-2	250139	FILTER	06/25/2025	07/09/2025	Gross beta	1.21E-02	pCi/m3	1.32E-03	1.33E-03				N
PNL-2	250144	FILTER	07/09/2025	07/23/2025	Gross beta	1.31E-02	pCi/m3	1.37E-03	1.38E-03				N
PNL-2	250149	FILTER	07/23/2025	08/06/2025	Gross beta	1.58E-02	pCi/m3	1.49E-03	1.49E-03	O			N
PNL-2	250154	FILTER	08/06/2025	08/20/2025	Gross beta	9.03E-03	pCi/m3	1.17E-03	1.17E-03				N
PNL-2	250159	FILTER	08/20/2025	09/03/2025	Gross beta	2.69E-02	pCi/m3	1.93E-03	1.94E-03		Refer to Discrepancy Report EMP25-003 (OOT). One-week air filter due to wildfire smoke in the area. Air sampler stopped working when replacing air filter and #22974 expiring 12/17/25, replaced 09/11/25 with #24095, expires 02/03/26.		N
PNL-2	250164	FILTER	09/03/2025	09/11/2025	Gross beta	8.90E-02	pCi/m3	6.94E-03	6.97E-03				N
PNL-2	250169	FILTER	09/17/2025	09/17/2025	Gross beta	1.76E-02	pCi/m3	2.55E-03	2.55E-03		One-week air filter due to wildfire smoke in the area.		N
PNL-2	250174	FILTER	09/17/2025	10/01/2025	Gross beta	1.96E-02	pCi/m3	1.66E-03	1.66E-03				N
PNL-2	250179	FILTER	10/01/2025	10/15/2025	Gross beta	1.49E-02	pCi/m3	1.45E-03	1.45E-03				N
PNL-2	250184	FILTER	10/15/2025	10/29/2025	Gross beta	1.46E-02	pCi/m3	1.44E-03	1.44E-03				N
PNL-2	250189	FILTER	10/29/2025	11/12/2025	Gross beta	1.59E-02	pCi/m3	1.48E-03	1.48E-03				N
PNL-2	250194	FILTER	11/12/2025	11/26/2025	Gross beta	1.88E-02	pCi/m3	1.61E-03	1.62E-03				N
PNL-2	250199	FILTER	11/26/2025	12/10/2025	Gross beta	2.40E-02	pCi/m3	1.82E-03	1.83E-03				N
PNL-2	250206	FILTER	12/10/2025	12/23/2025	Gross beta	9.65E-03	pCi/m3	1.22E-03	1.22E-03			Lab Result exceeded Project Control Limit (0.0025 pCi/m3).	N
PNL-2	250212	FILTER	12/23/2024	06/25/2025	Gross alpha (Comp)	3.21E-03	pCi/m3	7.20E-04	7.20E-04			Lab Result exceeded Project Control Limit (0.0025 pCi/m3).	Y
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Gross alpha (Comp)	7.19E-03	pCi/m3	1.09E-03	1.09E-03				Y

Location ID	Field Sample ID	Sample Matrix	Start Date	Sample Date	Parameter Name	Result	Units	Counting Error	Total Error	Lab Qualifier	Sample Comment	Result Comment	Com- posite
PNL-2	250206	FILTER	12/23/2024	06/25/2025	Gross beta (Comp)	1.99E-02	pCi/m3	1.17E-03	1.18E-03				Y
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Gross beta (Comp)	2.32E-02	pCi/m3	1.23E-03	1.24E-03				Y
PNL-2	250206	FILTER	12/23/2024	06/25/2025	Antimony-125	1.47E-05	pCi/m3	1.07E-04	1.07E-04	U			Y
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Antimony-125	5.83E-05	pCi/m3	2.40E-04	2.41E-04	U			Y
PNL-2	250206	FILTER	12/23/2024	06/25/2025	Beryllium-7	4.44E-02	pCi/m3	2.08E-03	4.86E-03				Y
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Beryllium-7	2.75E-02	pCi/m3	3.62E-03	4.50E-03				Y
PNL-2	250206	FILTER	12/23/2024	06/25/2025	Cesium-134	5.11E-05	pCi/m3	5.94E-05	6.39E-05	U			Y
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Cesium-134	-2.73E-05	pCi/m3	1.02E-04	1.03E-04	U			Y
PNL-2	250206	FILTER	12/23/2024	06/25/2025	Cesium-137	-3.70E-06	pCi/m3	4.60E-05	4.61E-05	U			Y
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Cesium-137	-1.31E-05	pCi/m3	8.07E-05	8.09E-05	U			Y
PNL-2	250206	FILTER	12/23/2024	06/25/2025	Cobalt-60	4.65E-05	pCi/m3	8.60E-05	8.86E-05	U			Y
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Cobalt-60	-1.51E-05	pCi/m3	7.05E-05	7.08E-05	U			Y
PNL-2	250206	FILTER	12/23/2024	06/25/2025	Europium-152	-3.08E-05	pCi/m3	1.16E-04	1.17E-04	U			Y
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Europium-152	1.42E-04	pCi/m3	2.11E-04	2.21E-04	U			Y
PNL-2	250206	FILTER	12/23/2024	06/25/2025	Europium-154	-4.07E-05	pCi/m3	1.57E-04	1.58E-04	U			Y
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Europium-154	-2.89E-04	pCi/m3	2.55E-04	2.88E-04	U			Y
PNL-2	250206	FILTER	12/23/2024	06/25/2025	Europium-155	3.98E-05	pCi/m3	8.94E-05	9.13E-05	U			Y
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Europium-155	-4.80E-05	pCi/m3	1.87E-04	1.88E-04	U			Y
PNL-2	250206	FILTER	12/23/2024	06/25/2025	Potassium-40	3.35E-03	pCi/m3	1.87E-03	1.90E-03				Y
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Potassium-40	2.00E-03	pCi/m3	2.30E-03	2.31E-03	U			Y
PNL-2	250206	FILTER	12/23/2024	06/25/2025	Ruthenium-106	-3.94E-05	pCi/m3	4.44E-04	4.44E-04	U			Y
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Ruthenium-106	-3.21E-04	pCi/m3	6.82E-04	6.99E-04	U			Y
PNL-2	250206	FILTER	12/23/2024	06/25/2025	Americium-241	6.56E-06	pCi/m3	1.42E-05	1.42E-05	U			Y
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Americium-241	4.40E-06	pCi/m3	6.21E-06	6.23E-06	U			Y
PNL-2	250206	FILTER	12/23/2024	06/25/2025	Americium-243	1.38E-12	pCi/m3	1.29E-05	1.29E-05	U			Y
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Americium-243	-1.48E-05	pCi/m3	2.05E-05	2.05E-05	U			Y
PNL-2	250206	FILTER	12/23/2024	06/25/2025	Curium-243/244	-4.34E-06	pCi/m3	8.51E-06	8.52E-06	U			Y
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Curium-243/244	-8.72E-07	pCi/m3	4.52E-06	4.52E-06	U			Y
PNL-2	250206	FILTER	12/23/2024	06/25/2025	Plutonium-238	1.22E-12	pCi/m3	1.13E-05	1.13E-05	U			Y
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Plutonium-238	1.29E-05	pCi/m3	1.26E-05	1.27E-05	U			Y
PNL-2	250206	FILTER	12/23/2024	06/25/2025	Plutonium-239/240	3.65E-06	pCi/m3	1.43E-05	1.43E-05	U			Y
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Plutonium-239/240	8.05E-06	pCi/m3	1.05E-05	1.05E-05	U			Y
PNL-2	250206	FILTER	12/23/2024	06/25/2025	Uranium-233/234	5.17E-05	pCi/m3	4.61E-05	4.69E-05	U			Y
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Uranium-233/234	7.82E-05	pCi/m3	4.87E-05	4.97E-05				Y
PNL-2	250206	FILTER	12/23/2024	06/25/2025	Uranium-235	-4.61E-06	pCi/m3	2.04E-05	2.04E-05	U			Y
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Uranium-235	1.45E-05	pCi/m3	2.41E-05	2.42E-05	U			Y
PNL-2	250206	FILTER	12/23/2024	06/25/2025	Uranium-238	2.74E-05	pCi/m3	3.46E-05	3.49E-05	U			Y

Location ID	Field Sample ID	Sample Matrix	Start Date	Sample Date	Parameter Name	Result	Units	Counting Error	Total Error	Lab Qualifier	Sample Comment	Result Comment	Com- posite
PNL-2	250212	FILTER	06/25/2025	12/23/2025	Uranium-238	6.31E-05	pCi/m3	3.95E-05	4.02E-05				Y
PNL-3	250075	FILTER	12/23/2024	01/08/2025	Gross alpha	4.08E-04	pCi/m3	3.01E-04	3.01E-04				N
PNL-3	250080	FILTER	01/08/2025	01/22/2025	Gross alpha	8.25E-04	pCi/m3	4.89E-04	4.89E-04				N
PNL-3	250085	FILTER	01/22/2025	02/05/2025	Gross alpha	1.26E-03	pCi/m3	5.98E-04	5.98E-04		Totalizer #44484 expiring 2/22/25 was replaced on 2/19/25 with totalizer #43553, expires 9/10/25.		N
PNL-3	250090	FILTER	02/05/2025	02/19/2025	Gross alpha	8.83E-04	pCi/m3	4.95E-04	4.95E-04				N
PNL-3	250095	FILTER	02/19/2025	03/05/2025	Gross alpha	5.82E-04	pCi/m3	4.17E-04	4.17E-04				N
PNL-3	250100	FILTER	03/05/2025	03/19/2025	Gross alpha	5.34E-04	pCi/m3	4.03E-04	4.03E-04				N
PNL-3	250105	FILTER	03/19/2025	04/02/2025	Gross alpha	4.39E-04	pCi/m3	3.77E-04	3.77E-04	U			N
PNL-3	250110	FILTER	04/02/2025	04/16/2025	Gross alpha	5.01E-04	pCi/m3	3.51E-04	3.51E-04				N
PNL-3	250115	FILTER	04/16/2025	04/30/2025	Gross alpha	4.14E-04	pCi/m3	3.49E-04	3.49E-04				N
PNL-3	250120	FILTER	04/30/2025	05/14/2025	Gross alpha	3.93E-04	pCi/m3	3.82E-04	3.82E-04	U			N
PNL-3	250125	FILTER	05/14/2025	05/28/2025	Gross alpha	3.96E-04	pCi/m3	3.20E-04	3.20E-04				N
PNL-3	250130	FILTER	05/28/2025	06/11/2025	Gross alpha	4.26E-04	pCi/m3	3.30E-04	3.30E-04				N
PNL-3	250135	FILTER	06/11/2025	06/25/2025	Gross alpha	6.25E-04	pCi/m3	4.01E-04	4.01E-04				N
PNL-3	250140	FILTER	06/25/2025	07/09/2025	Gross alpha	5.54E-04	pCi/m3	3.98E-04	3.98E-04				N
PNL-3	250145	FILTER	07/09/2025	07/23/2025	Gross alpha	1.10E-03	pCi/m3	5.52E-04	5.52E-04				N
PNL-3	250150	FILTER	07/23/2025	08/06/2025	Gross alpha	5.67E-04	pCi/m3	3.98E-04	3.98E-04		Totalizer #43553 expiring 09/10/25 was replaced on 08/20/25 with totalizer #43554, expires 04/30/26. Pump also replaced after it would not restart after testing GFCI.		N
PNL-3	250155	FILTER	08/06/2025	08/20/2025	Gross alpha	6.52E-04	pCi/m3	4.33E-04	4.33E-04				N
PNL-3	250160	FILTER	08/20/2025	09/03/2025	Gross alpha	6.30E-04	pCi/m3	2.72E-04	2.72E-04		High Total Volume, adjusted flow regulating nob, checked pump hoses and added a hose clamp.		N
PNL-3	250165	FILTER	09/03/2025	09/17/2025	Gross alpha	2.01E-04	pCi/m3	1.62E-04	1.62E-04		High Total Volume. Totalizer #43344 expiring 03/07/26 was replaced on 09/17/25 with totalizer #44484, expires 03/07/26.		N
PNL-3	250170	FILTER	09/17/2025	10/01/2025	Gross alpha	6.24E-04	pCi/m3	4.37E-04	4.37E-04				N
PNL-3	250175	FILTER	10/01/2025	10/15/2025	Gross alpha	3.92E-04	pCi/m3	3.49E-04	3.49E-04	U			N
PNL-3	250180	FILTER	10/15/2025	10/29/2025	Gross alpha	7.27E-04	pCi/m3	4.44E-04	4.44E-04				N

Location ID	Field Sample ID	Sample Matrix	Start Date	Sample Date	Parameter Name	Result	Units	Counting Error	Total Error	Lab Qualifier	Sample Comment	Result Comment	Com- posite
PNL-3	250185	FILTER	10/29/2025	11/12/2025	Gross alpha	4.62E-04	pCi/m3	3.88E-04	3.88E-04	U			N
PNL-3	250190	FILTER	11/12/2025	11/26/2025	Gross alpha	8.27E-04	pCi/m3	4.41E-04	4.41E-04				N
PNL-3	250195	FILTER	11/26/2025	12/10/2025	Gross alpha	1.00E-03	pCi/m3	5.43E-04	5.43E-04				N
PNL-3	250200	FILTER	12/10/2025	12/23/2025	Gross alpha	2.59E-04	pCi/m3	3.23E-04	3.23E-04	U			N
PNL-3	250075	FILTER	12/23/2024	01/08/2025	Gross beta	9.17E-03	pCi/m3	1.09E-03	1.10E-03				N
PNL-3	250080	FILTER	01/08/2025	01/22/2025	Gross beta	1.67E-02	pCi/m3	1.52E-03	1.52E-03				N
PNL-3	250085	FILTER	01/22/2025	02/05/2025	Gross beta	3.10E-02	pCi/m3	2.04E-03	2.06E-03		Totalizer #44484 expiring 2/22/25 was replaced on 2/19/25 with totalizer #43553, expires 9/10/25.		N
PNL-3	250090	FILTER	02/05/2025	02/19/2025	Gross beta	2.74E-02	pCi/m3	1.94E-03	1.95E-03				N
PNL-3	250095	FILTER	02/19/2025	03/05/2025	Gross beta	9.80E-03	pCi/m3	1.21E-03	1.21E-03				N
PNL-3	250100	FILTER	03/05/2025	03/19/2025	Gross beta	5.85E-03	pCi/m3	9.86E-04	9.87E-04				N
PNL-3	250105	FILTER	03/19/2025	04/02/2025	Gross beta	6.74E-03	pCi/m3	1.04E-03	1.04E-03				N
PNL-3	250110	FILTER	04/02/2025	04/16/2025	Gross beta	1.17E-02	pCi/m3	1.33E-03	1.33E-03				N
PNL-3	250115	FILTER	04/16/2025	04/30/2025	Gross beta	1.20E-02	pCi/m3	1.35E-03	1.35E-03				N
PNL-3	250120	FILTER	04/30/2025	05/14/2025	Gross beta	1.28E-02	pCi/m3	1.39E-03	1.40E-03				N
PNL-3	250125	FILTER	05/14/2025	05/28/2025	Gross beta	9.93E-03	pCi/m3	1.24E-03	1.25E-03				N
PNL-3	250130	FILTER	05/28/2025	06/11/2025	Gross beta	1.05E-02	pCi/m3	1.17E-03	1.17E-03				N
PNL-3	250135	FILTER	06/11/2025	06/25/2025	Gross beta	9.48E-03	pCi/m3	1.14E-03	1.15E-03				N
PNL-3	250140	FILTER	06/25/2025	07/09/2025	Gross beta	1.20E-02	pCi/m3	1.28E-03	1.29E-03				N
PNL-3	250145	FILTER	07/09/2025	07/23/2025	Gross beta	1.11E-02	pCi/m3	1.25E-03	1.25E-03				N
PNL-3	250150	FILTER	07/23/2025	08/06/2025	Gross beta	1.29E-02	pCi/m3	1.33E-03	1.33E-03	O	Totalizer #43553 expiring 09/10/25 was replaced on 08/20/25 with totalizer #43554, expires 04/30/26. Pump also replaced after it would not restart after testing GFCI.		N
PNL-3	250155	FILTER	08/06/2025	08/20/2025	Gross beta	9.14E-03	pCi/m3	1.16E-03	1.16E-03				N
PNL-3	250160	FILTER	08/20/2025	09/03/2025	Gross beta	1.14E-02	pCi/m3	8.02E-04	8.07E-04		High Total Volume, adjusted flow regulating nob, checked pump hoses and added a hose clamp.		N
PNL-3	250165	FILTER	09/03/2025	09/17/2025	Gross beta	1.07E-02	pCi/m3	7.79E-04	7.83E-04		High Total Volume. Totalizer #43344 expiring 03/07/26 was replaced on 09/17/25 with totalizer #44484, expires 03/07/26.		N

Location ID	Field Sample ID	Sample Matrix	Start Date	Sample Date	Parameter Name	Result	Units	Counting Error	Total Error	Lab Qualifier	Sample Comment	Result Comment	Com- posite
PNL-3	250170	FILTER	09/17/2025	10/01/2025	Gross beta	2.03E-02	pCi/m3	1.73E-03	1.73E-03				N
PNL-3	250175	FILTER	10/01/2025	10/15/2025	Gross beta	1.36E-02	pCi/m3	1.36E-03	1.36E-03				N
PNL-3	250180	FILTER	10/15/2025	10/29/2025	Gross beta	1.28E-02	pCi/m3	1.30E-03	1.31E-03				N
PNL-3	250185	FILTER	10/29/2025	11/12/2025	Gross beta	1.46E-02	pCi/m3	1.38E-03	1.39E-03				N
PNL-3	250190	FILTER	11/12/2025	11/26/2025	Gross beta	1.95E-02	pCi/m3	1.62E-03	1.62E-03				N
PNL-3	250195	FILTER	11/26/2025	12/10/2025	Gross beta	2.43E-02	pCi/m3	1.78E-03	1.79E-03				N
PNL-3	250200	FILTER	12/10/2025	12/23/2025	Gross beta	9.45E-03	pCi/m3	1.21E-03	1.21E-03				N
PNL-3	250207	FILTER	12/23/2024	06/25/2025	Gross alpha (Comp)	1.70E-03	pCi/m3	5.06E-04	5.09E-04				Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Gross alpha (Comp)	1.93E-03	pCi/m3	5.03E-04	5.07E-04				Y
PNL-3	250207	FILTER	12/23/2024	06/25/2025	Gross beta (Comp)	1.67E-02	pCi/m3	1.02E-03	1.13E-03				Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Gross beta (Comp)	1.69E-02	pCi/m3	9.38E-04	1.06E-03				Y
PNL-3	250207	FILTER	12/23/2024	06/25/2025	Antimony-125	-7.04E-05	pCi/m3	1.07E-04	1.12E-04	U			Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Antimony-125	-4.65E-05	pCi/m3	1.25E-04	1.27E-04	U			Y
PNL-3	250207	FILTER	12/23/2024	06/25/2025	Beryllium-7	3.52E-02	pCi/m3	1.75E-03	3.72E-03				Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Beryllium-7	2.36E-02	pCi/m3	2.57E-03	3.55E-03				Y
PNL-3	250207	FILTER	12/23/2024	06/25/2025	Cesium-134	-5.05E-05	pCi/m3	5.43E-05	5.91E-05	U			Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Cesium-134	1.52E-05	pCi/m3	5.39E-05	5.43E-05	U			Y
PNL-3	250207	FILTER	12/23/2024	06/25/2025	Cesium-137	-2.34E-05	pCi/m3	4.76E-05	4.88E-05	U			Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Cesium-137	6.88E-05	pCi/m3	7.17E-05	7.22E-05	U			Y
PNL-3	250207	FILTER	12/23/2024	06/25/2025	Cobalt-60	3.31E-06	pCi/m3	4.48E-05	4.49E-05	U			Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Cobalt-60	1.82E-05	pCi/m3	6.78E-05	6.83E-05	U			Y
PNL-3	250207	FILTER	12/23/2024	06/25/2025	Europium-152	-4.35E-05	pCi/m3	1.13E-04	1.15E-04	U			Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Europium-152	4.70E-05	pCi/m3	1.24E-04	1.26E-04	U			Y
PNL-3	250207	FILTER	12/23/2024	06/25/2025	Europium-154	-9.26E-05	pCi/m3	1.28E-04	1.35E-04	U			Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Europium-154	-2.53E-05	pCi/m3	1.42E-04	1.43E-04	U			Y
PNL-3	250207	FILTER	12/23/2024	06/25/2025	Europium-155	4.67E-05	pCi/m3	9.29E-05	9.53E-05	U			Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Europium-155	5.92E-05	pCi/m3	9.86E-05	1.02E-04	U			Y
PNL-3	250207	FILTER	12/23/2024	06/25/2025	Potassium-40	2.51E-03	pCi/m3	1.21E-03	1.24E-03				Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Potassium-40	2.07E-03	pCi/m3	1.34E-03	1.36E-03				Y
PNL-3	250207	FILTER	12/23/2024	06/25/2025	Ruthenium-106	-8.30E-05	pCi/m3	3.73E-04	3.75E-04	U			Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Ruthenium-106	2.57E-05	pCi/m3	4.72E-04	4.72E-04	U			Y
PNL-3	250207	FILTER	12/23/2024	06/25/2025	Americium-241	1.59E-06	pCi/m3	5.41E-06	5.41E-06	U			Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Americium-241	-3.38E-06	pCi/m3	1.15E-05	1.15E-05	U			Y
PNL-3	250207	FILTER	12/23/2024	06/25/2025	Americium-243	-3.28E-06	pCi/m3	7.89E-06	7.89E-06	U			Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Americium-243	-6.35E-06	pCi/m3	1.08E-05	1.08E-05	U			Y
PNL-3	250207	FILTER	12/23/2024	06/25/2025	Curium-243/244	-4.74E-06	pCi/m3	6.93E-06	6.93E-06	U			Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Curium-243/244	0.00E+00	pCi/m3	4.65E-06	4.66E-06	U			Y
PNL-3	250207	FILTER	12/23/2024	06/25/2025	Plutonium-238	4.43E-06	pCi/m3	7.65E-06	7.66E-06	U			Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Plutonium-238	9.01E-06	pCi/m3	1.06E-05	1.06E-05	U			Y

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PNL-3	250207	FILTER	12/23/2024	06/25/2025	Plutonium-239/240	8.84E-06	pCi/m3	9.13E-06	9.16E-06	U			Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Plutonium-239/240	-1.80E-06	pCi/m3	1.06E-05	1.06E-05	U			Y
PNL-3	250207	FILTER	12/23/2024	06/25/2025	Uranium-233/234	1.75E-05	pCi/m3	3.78E-05	3.79E-05	U			Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Uranium-233/234	2.52E-05	pCi/m3	3.10E-05	3.12E-05	U			Y
PNL-3	250207	FILTER	12/23/2024	06/25/2025	Uranium-235	9.70E-06	pCi/m3	3.31E-05	3.32E-05	U			Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Uranium-235	1.16E-06	pCi/m3	1.42E-05	1.42E-05	U			Y
PNL-3	250207	FILTER	12/23/2024	06/25/2025	Uranium-238	7.18E-05	pCi/m3	4.94E-05	5.06E-05	U			Y
PNL-3	250213	FILTER	06/25/2025	12/23/2025	Uranium-238	3.05E-05	pCi/m3	3.24E-05	3.25E-05	U			Y
PNL-4	250076	FILTER	12/23/2024	01/08/2025	Gross alpha	4.98E-04	pCi/m3	3.45E-04	3.45E-04				N
PNL-4	250081	FILTER	01/08/2025	01/22/2025	Gross alpha	4.35E-04	pCi/m3	3.34E-04	3.34E-04				N
PNL-4	250086	FILTER	01/22/2025	02/05/2025	Gross alpha	1.20E-03	pCi/m3	5.00E-04	5.00E-04		Totalizer #43344 expiring 2/23/25 was replaced on 2/19/25 with totalizer #43554, expires 9/11/25.		N
PNL-4	250091	FILTER	02/05/2025	02/19/2025	Gross alpha	8.36E-04	pCi/m3	4.68E-04	4.68E-04				N
PNL-4	250096	FILTER	02/19/2025	03/05/2025	Gross alpha	1.08E-04	pCi/m3	1.72E-04	1.72E-04	U			N
PNL-4	250101	FILTER	03/05/2025	03/19/2025	Gross alpha	-1.13E-05	pCi/m3	8.68E-05	8.68E-05	U			N
PNL-4	250106	FILTER	03/19/2025	04/02/2025	Gross alpha	4.04E-04	pCi/m3	3.25E-04	3.25E-04		Upon arrival, power was off to station, reset GFCI power restored; total volume (993 m3) sufficient for analyses. Total volume 1619m3 high. Totalizer #43554 expiring 09/11/25 was replaced on 04/16/25 with totalizer #43344, expires 03/07/26.		N
PNL-4	250111	FILTER	04/02/2025	04/16/2025	Gross alpha	1.20E-04	pCi/m3	1.56E-04	1.56E-04	U			N
PNL-4	250116	FILTER	04/16/2025	04/30/2025	Gross alpha	5.36E-04	pCi/m3	3.58E-04	3.58E-04				N
PNL-4	250121	FILTER	04/30/2025	05/14/2025	Gross alpha	5.75E-04	pCi/m3	3.47E-04	3.47E-04				N
PNL-4	250126	FILTER	05/14/2025	05/28/2025	Gross alpha	5.52E-04	pCi/m3	3.80E-04	3.80E-04				N
PNL-4	250131	FILTER	05/28/2025	06/11/2025	Gross alpha	4.34E-04	pCi/m3	3.31E-04	3.31E-04				N
PNL-4	250136	FILTER	06/11/2025	06/25/2025	Gross alpha	5.67E-04	pCi/m3	3.81E-04	3.81E-04				N
PNL-4	250141	FILTER	06/25/2025	07/09/2025	Gross alpha	5.11E-04	pCi/m3	3.57E-04	3.57E-04				N
PNL-4	250146	FILTER	07/09/2025	07/23/2025	Gross alpha	4.98E-04	pCi/m3	3.41E-04	3.41E-04				N
PNL-4	250151	FILTER	07/23/2025	08/06/2025	Gross alpha	7.00E-04	pCi/m3	3.91E-04	3.91E-04				N
PNL-4	250156	FILTER	08/06/2025	08/20/2025	Gross alpha	9.25E-05	pCi/m3	1.84E-04	1.84E-04	U			N
PNL-4	250161	FILTER	08/20/2025	09/03/2025	Gross alpha	8.51E-04	pCi/m3	4.32E-04	4.32E-04				N
PNL-4	250166	FILTER	09/03/2025	09/17/2025	Gross alpha	5.02E-04	pCi/m3	3.49E-04	3.49E-04				N

Location ID	Field Sample ID	Sample Matrix	Start Date	Sample Date	Parameter Name	Result	Units	Counting Error	Total Error	Lab Qualifier	Sample Comment	Result Comment	Com- posite
PNL-4	250171	FILTER	09/17/2025	10/01/2025	Gross alpha	3.31E-04	pCi/m3	2.78E-04	2.78E-04				N
PNL-4	250176	FILTER	10/01/2025	10/15/2025	Gross alpha	5.01E-04	pCi/m3	3.42E-04	3.42E-04				N
PNL-4	250181	FILTER	10/15/2025	10/29/2025	Gross alpha	8.58E-04	pCi/m3	4.47E-04	4.47E-04				N
PNL-4	250186	FILTER	10/29/2025	11/12/2025	Gross alpha	3.57E-04	pCi/m3	2.80E-04	2.80E-04				N
PNL-4	250191	FILTER	11/12/2025	11/26/2025	Gross alpha	1.08E-03	pCi/m3	5.22E-04	5.22E-04				N
PNL-4	250196	FILTER	11/26/2025	12/10/2025	Gross alpha	1.25E-03	pCi/m3	5.26E-04	5.26E-04		Sampler not running, GFCI reset. Low sample volume, possibly related to known power outage in area on 12/22/25.		N
PNL-4	250201	FILTER	12/10/2025	12/23/2025	Gross alpha	3.47E-04	pCi/m3	4.27E-04	4.27E-04	U			N
PNL-4	250076	FILTER	12/23/2024	01/08/2025	Gross beta	8.26E-03	pCi/m3	9.75E-04	9.77E-04				N
PNL-4	250081	FILTER	01/08/2025	01/22/2025	Gross beta	1.73E-02	pCi/m3	1.46E-03	1.46E-03				N
PNL-4	250086	FILTER	01/22/2025	02/05/2025	Gross beta	2.87E-02	pCi/m3	1.87E-03	1.89E-03		Totalizer #43344 expiring 2/23/25 was replaced on 2/19/25 with totalizer #43554, expires 9/1/25.		N
PNL-4	250091	FILTER	02/05/2025	02/19/2025	Gross beta	2.65E-02	pCi/m3	1.81E-03	1.82E-03				N
PNL-4	250096	FILTER	02/19/2025	03/05/2025	Gross beta	6.22E-03	pCi/m3	7.88E-04	7.89E-04				N
PNL-4	250101	FILTER	03/05/2025	03/19/2025	Gross beta	4.63E-03	pCi/m3	6.94E-04	6.94E-04				N
PNL-4	250106	FILTER	03/19/2025	04/02/2025	Gross beta	5.48E-03	pCi/m3	8.99E-04	8.99E-04		Upon arrival, power was off to station, reset GFCI power restored; total volume (993 m3) sufficient for analyses.		N
PNL-4	250111	FILTER	04/02/2025	04/16/2025	Gross beta	6.64E-03	pCi/m3	7.34E-04	7.35E-04		Total volume 1619m3 high. Totalizer #43554 expiring 09/11/25 was replaced on 04/16/25 with totalizer #43344, expires 03/07/26.		N
PNL-4	250116	FILTER	04/16/2025	04/30/2025	Gross beta	1.13E-02	pCi/m3	1.17E-03	1.17E-03				N
PNL-4	250121	FILTER	04/30/2025	05/14/2025	Gross beta	1.15E-02	pCi/m3	1.20E-03	1.20E-03				N
PNL-4	250126	FILTER	05/14/2025	05/28/2025	Gross beta	9.34E-03	pCi/m3	1.10E-03	1.10E-03				N
PNL-4	250131	FILTER	05/28/2025	06/11/2025	Gross beta	9.85E-03	pCi/m3	1.11E-03	1.11E-03				N
PNL-4	250136	FILTER	06/11/2025	06/25/2025	Gross beta	9.20E-03	pCi/m3	1.08E-03	1.09E-03				N
PNL-4	250141	FILTER	06/25/2025	07/09/2025	Gross beta	9.88E-03	pCi/m3	1.09E-03	1.09E-03				N
PNL-4	250146	FILTER	07/09/2025	07/23/2025	Gross beta	9.77E-03	pCi/m3	1.09E-03	1.09E-03				N
PNL-4	250151	FILTER	07/23/2025	08/06/2025	Gross beta	1.32E-02	pCi/m3	1.23E-03	1.23E-03	O			N
PNL-4	250156	FILTER	08/06/2025	08/20/2025	Gross beta	7.29E-03	pCi/m3	9.39E-04	9.40E-04				N
PNL-4	250161	FILTER	08/20/2025	09/03/2025	Gross beta	2.40E-02	pCi/m3	1.64E-03	1.64E-03				N
PNL-4	250166	FILTER	09/03/2025	09/17/2025	Gross beta	1.87E-02	pCi/m3	1.45E-03	1.46E-03				N

Location ID	Field Sample ID	Sample Matrix	Start Date	Sample Date	Parameter Name	Result	Units	Counting Error	Total Error	Lab Qualifier	Sample Comment	Result Comment	Com- posite
PNL-4	250171	FILTER	09/17/2025	10/01/2025	Gross beta	1.65E-02	pCi/m3	1.37E-03	1.37E-03				N
PNL-4	250176	FILTER	10/01/2025	10/15/2025	Gross beta	1.33E-02	pCi/m3	1.26E-03	1.26E-03				N
PNL-4	250181	FILTER	10/15/2025	10/29/2025	Gross beta	1.16E-02	pCi/m3	1.19E-03	1.19E-03				N
PNL-4	250186	FILTER	10/29/2025	11/12/2025	Gross beta	1.46E-02	pCi/m3	1.33E-03	1.33E-03				N
PNL-4	250191	FILTER	11/12/2025	11/26/2025	Gross beta	1.59E-02	pCi/m3	1.38E-03	1.39E-03				N
PNL-4	250196	FILTER	11/26/2025	12/10/2025	Gross beta	2.22E-02	pCi/m3	1.60E-03	1.61E-03		Sampler not running, GFCI reset. Low sample volume, possibly related to known power outage in area on 12/22/25.		N
PNL-4	250201	FILTER	12/10/2025	12/23/2025	Gross beta	1.17E-02	pCi/m3	1.83E-03	1.84E-03				N
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Gross alpha (Comp)	1.85E-03	pCi/m3	4.70E-04	4.73E-04			Lab Result exceeded Project Control Limit (0.0025 pCi/m3).	Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Gross alpha (Comp)	5.20E-03	pCi/m3	8.55E-04	8.66E-04				Y
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Gross beta (Comp)	1.46E-02	pCi/m3	8.46E-04	8.75E-04				Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Gross beta (Comp)	2.01E-02	pCi/m3	1.06E-03	1.11E-03				Y
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Antimony-125	4.13E-05	pCi/m3	7.39E-05	7.63E-05	U			Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Antimony-125	9.27E-05	pCi/m3	1.57E-04	1.63E-04	U			Y
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Beryllium-7	2.89E-02	pCi/m3	1.35E-03	3.14E-03				Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Beryllium-7	2.33E-02	pCi/m3	3.45E-03	4.11E-03				Y
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Cesium-134	1.21E-05	pCi/m3	3.52E-05	3.57E-05	U			Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Cesium-134	4.89E-05	pCi/m3	7.82E-05	8.14E-05				Y
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Cesium-137	5.33E-06	pCi/m3	3.09E-05	3.10E-05	U			Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Cesium-137	4.24E-06	pCi/m3	7.12E-05	7.13E-05	U			Y
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Cobalt-60	2.98E-05	pCi/m3	3.92E-05	4.16E-05	U			Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Cobalt-60	-1.80E-05	pCi/m3	7.40E-05	7.45E-05	U			Y
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Europium-152	-7.09E-06	pCi/m3	7.87E-05	7.88E-05	U			Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Europium-152	3.61E-05	pCi/m3	1.82E-04	1.83E-04	U			Y
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Europium-154	-1.15E-04	pCi/m3	1.02E-04	1.15E-04	U			Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Europium-154	-7.67E-05	pCi/m3	1.90E-04	1.94E-04	U			Y
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Europium-155	-3.31E-05	pCi/m3	6.41E-05	6.59E-05	U			Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Europium-155	1.07E-04	pCi/m3	1.24E-04	1.33E-04	U			Y
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Potassium-40	9.72E-04	pCi/m3	1.09E-03	1.09E-03	U		Results are considered a false positive due to no valid peak.	Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Potassium-40	1.87E-03	pCi/m3	1.82E-03	1.83E-03	X			Y
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Ruthenium-106	-9.19E-05	pCi/m3	2.89E-04	2.92E-04	U			Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Ruthenium-106	-1.73E-04	pCi/m3	6.48E-04	6.53E-04	U			Y

Location ID	Field Sample ID	Sample Matrix	Start Date	Sample Date	Parameter Name	Result	Units	Counting Error	Total Error	Lab Qualifier	Sample Comment	Result Comment	Com- posite
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Americium-241	1.65E-06	pCi/m3	9.70E-06	9.70E-06	U			Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Americium-241	1.60E-06	pCi/m3	1.04E-05	1.04E-05	U			Y
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Americium-243	1.72E-12	pCi/m3	1.26E-05	1.26E-05	U			Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Americium-243	-8.18E-06	pCi/m3	1.70E-05	1.70E-05	U			Y
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Curium-243/244	-6.55E-06	pCi/m3	7.86E-06	7.86E-06	U			Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Curium-243/244	-1.11E-05	pCi/m3	9.35E-06	9.35E-06	U			Y
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Plutonium-238	-3.45E-06	pCi/m3	8.14E-06	8.14E-06	U			Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Plutonium-238	3.58E-06	pCi/m3	1.21E-05	1.21E-05	U			Y
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Plutonium-239/240	3.45E-06	pCi/m3	7.48E-06	7.48E-06	U			Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Plutonium-239/240	3.57E-06	pCi/m3	1.21E-05	1.21E-05	U			Y
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Uranium-233/234	2.86E-05	pCi/m3	3.39E-05	3.42E-05	U			Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Uranium-233/234	2.87E-05	pCi/m3	3.97E-05	4.00E-05	U			Y
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Uranium-235	-2.98E-06	pCi/m3	1.32E-05	1.32E-05	U			Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Uranium-235	-2.22E-06	pCi/m3	1.91E-05	1.92E-05	U			Y
PNL-4	250208	FILTER	12/23/2024	06/25/2025	Uranium-238	1.28E-05	pCi/m3	2.29E-05	2.29E-05	U			Y
PNL-4	250214	FILTER	06/25/2025	12/23/2025	Uranium-238	5.98E-05	pCi/m3	4.41E-05	4.49E-05	U			Y
PNL-5	250077	FILTER	12/23/2024	01/08/2025	Gross alpha	5.45E-04	pCi/m3	3.63E-04	3.63E-04				N
PNL-5	250082	FILTER	01/08/2025	01/22/2025	Gross alpha	3.59E-04	pCi/m3	3.34E-04	3.34E-04	U			N
PNL-5	250087	FILTER	01/22/2025	02/05/2025	Gross alpha	1.28E-03	pCi/m3	6.08E-04	6.09E-04				N
PNL-5	250092	FILTER	02/05/2025	02/19/2025	Gross alpha	9.84E-04	pCi/m3	4.87E-04	4.87E-04				N
PNL-5	250097	FILTER	02/19/2025	03/05/2025	Gross alpha	3.40E-04	pCi/m3	3.45E-04	3.45E-04	U	Totalizer #43345 expiring 03/19/25 was replaced on 3/5/25 with totalizer #24966, expires 09/09/25.		N
PNL-5	250102	FILTER	03/05/2025	03/19/2025	Gross alpha	2.50E-04	pCi/m3	3.25E-04	3.25E-04	U			N
PNL-5	250107	FILTER	03/19/2025	04/02/2025	Gross alpha	7.54E-05	pCi/m3	1.94E-04	1.94E-04	U			N
PNL-5	250112	FILTER	04/02/2025	04/16/2025	Gross alpha	4.96E-04	pCi/m3	3.71E-04	3.71E-04				N
PNL-5	250117	FILTER	04/16/2025	04/30/2025	Gross alpha	8.39E-04	pCi/m3	4.96E-04	4.96E-04				N
PNL-5	250122	FILTER	04/30/2025	05/14/2025	Gross alpha	4.20E-04	pCi/m3	3.70E-04	3.70E-04	U			N
PNL-5	250127	FILTER	05/14/2025	05/28/2025	Gross alpha	7.75E-04	pCi/m3	4.57E-04	4.57E-04				N
PNL-5	250132	FILTER	05/28/2025	06/11/2025	Gross alpha	--	--	--	--	--	No Sample. Do not save for composite. Total volume low; pump not running, replaced.		N
PNL-5	250137	FILTER	06/11/2025	06/25/2025	Gross alpha	3.70E-04	pCi/m3	3.18E-04	3.18E-04				N
PNL-5	250142	FILTER	06/25/2025	07/09/2025	Gross alpha	4.90E-04	pCi/m3	4.00E-04	4.00E-04				N
PNL-5	250147	FILTER	07/09/2025	07/23/2025	Gross alpha	1.29E-03	pCi/m3	6.10E-04	6.10E-04				N

Location ID	Field Sample ID	Sample Matrix	Start Date	Sample Date	Parameter Name	Result	Units	Counting Error	Total Error	Lab Qualifier	Sample Comment	Result Comment	Com-posite
PNL-5	250152	FILTER	07/23/2025	08/06/2025	Gross alpha	8.01E-04	pCi/m3	4.81E-04	4.81E-04				N
PNL-5	250157	FILTER	08/06/2025	08/20/2025	Gross alpha	5.69E-04	pCi/m3	4.26E-04	4.26E-04		Totalizer #24966 expiring 09/09/25 was replaced on 08/20/25 with totalizer #41499, expires 08/04/26.		N
PNL-5	250162	FILTER	08/20/2025	09/03/2025	Gross alpha	7.77E-04	pCi/m3	4.56E-04	4.56E-04				N
PNL-5	250167	FILTER	09/03/2025	09/17/2025	Gross alpha	7.58E-04	pCi/m3	4.59E-04	4.59E-04				N
PNL-5	250172	FILTER	09/17/2025	10/01/2025	Gross alpha	3.51E-04	pCi/m3	3.24E-04	3.24E-04	U			N
PNL-5	250177	FILTER	10/01/2025	10/15/2025	Gross alpha	5.76E-04	pCi/m3	4.05E-04	4.05E-04				N
PNL-5	250182	FILTER	10/15/2025	10/29/2025	Gross alpha	4.65E-04	pCi/m3	3.67E-04	3.67E-04				N
PNL-5	250187	FILTER	10/29/2025	11/12/2025	Gross alpha	6.05E-04	pCi/m3	4.20E-04	4.20E-04				N
PNL-5	250192	FILTER	11/12/2025	11/26/2025	Gross alpha	1.06E-03	pCi/m3	5.13E-04	5.13E-04				N
PNL-5	250197	FILTER	11/26/2025	12/10/2025	Gross alpha	1.65E-03	pCi/m3	6.75E-04	6.76E-04				N
PNL-5	250202	FILTER	12/10/2025	12/23/2025	Gross alpha	3.53E-04	pCi/m3	3.60E-04	3.60E-04	U			N
PNL-5	250077	FILTER	12/23/2024	01/08/2025	Gross beta	7.88E-03	pCi/m3	1.01E-03	1.02E-03				N
PNL-5	250082	FILTER	01/08/2025	01/22/2025	Gross beta	1.58E-02	pCi/m3	1.48E-03	1.48E-03				N
PNL-5	250087	FILTER	01/22/2025	02/05/2025	Gross beta	2.75E-02	pCi/m3	1.95E-03	1.96E-03				N
PNL-5	250092	FILTER	02/05/2025	02/19/2025	Gross beta	2.76E-02	pCi/m3	1.99E-03	2.00E-03				N
PNL-5	250097	FILTER	02/19/2025	03/05/2025	Gross beta	9.86E-03	pCi/m3	1.21E-03	1.22E-03		Totalizer #43345 expiring 03/19/25 was replaced on 3/5/25 with totalizer #24966, expires 09/09/25.		N
PNL-5	250102	FILTER	03/05/2025	03/19/2025	Gross beta	7.31E-03	pCi/m3	1.16E-03	1.16E-03				N
PNL-5	250107	FILTER	03/19/2025	04/02/2025	Gross beta	6.44E-03	pCi/m3	9.92E-04	9.93E-04				N
PNL-5	250112	FILTER	04/02/2025	04/16/2025	Gross beta	1.21E-02	pCi/m3	1.30E-03	1.31E-03				N
PNL-5	250117	FILTER	04/16/2025	04/30/2025	Gross beta	1.08E-02	pCi/m3	1.26E-03	1.27E-03				N
PNL-5	250122	FILTER	04/30/2025	05/14/2025	Gross beta	1.34E-02	pCi/m3	1.40E-03	1.40E-03				N
PNL-5	250127	FILTER	05/14/2025	05/28/2025	Gross beta	9.38E-03	pCi/m3	1.17E-03	1.17E-03		No Sample. Do not save for composite. Total volume low; pump not running, replaced.		N
PNL-5	250132	FILTER	05/28/2025	06/11/2025	Gross beta	--	--	--	--	--			N
PNL-5	250137	FILTER	06/11/2025	06/25/2025	Gross beta	1.13E-02	pCi/m3	1.36E-03	1.37E-03				N
PNL-5	250142	FILTER	06/25/2025	07/09/2025	Gross beta	1.10E-02	pCi/m3	1.28E-03	1.28E-03				N
PNL-5	250147	FILTER	07/09/2025	07/23/2025	Gross beta	1.12E-02	pCi/m3	1.29E-03	1.29E-03				N
PNL-5	250152	FILTER	07/23/2025	08/06/2025	Gross beta	1.41E-02	pCi/m3	1.42E-03	1.42E-03	O			N
PNL-5	250157	FILTER	08/06/2025	08/20/2025	Gross beta	9.83E-03	pCi/m3	1.22E-03	1.22E-03		Totalizer #24966 expiring 09/09/25 was replaced on 08/20/25 with totalizer #41499, expires 08/04/26.		N
PNL-5	250162	FILTER	08/20/2025	09/03/2025	Gross beta	2.65E-02	pCi/m3	1.82E-03	1.83E-03				N

Location ID	Field Sample ID	Sample Matrix	Start Date	Sample Date	Parameter Name	Result	Units	Counting Error	Total Error	Lab Qualifier	Sample Comment	Result Comment	Com- posite
PNL-5	250167	FILTER	09/03/2025	09/17/2025	Gross beta	2.08E-02	pCi/m3	1.63E-03	1.63E-03				N
PNL-5	250172	FILTER	09/17/2025	10/01/2025	Gross beta	5.10E-03	pCi/m3	8.84E-04	8.85E-04				N
PNL-5	250177	FILTER	10/01/2025	10/15/2025	Gross beta	1.35E-02	pCi/m3	1.33E-03	1.33E-03				N
PNL-5	250182	FILTER	10/15/2025	10/29/2025	Gross beta	1.21E-02	pCi/m3	1.28E-03	1.28E-03				N
PNL-5	250187	FILTER	10/29/2025	11/12/2025	Gross beta	1.36E-02	pCi/m3	1.37E-03	1.37E-03				N
PNL-5	250192	FILTER	11/12/2025	11/26/2025	Gross beta	1.64E-02	pCi/m3	1.47E-03	1.48E-03				N
PNL-5	250197	FILTER	11/26/2025	12/10/2025	Gross beta	2.32E-02	pCi/m3	1.75E-03	1.76E-03				N
PNL-5	250202	FILTER	12/10/2025	12/23/2025	Gross beta	9.41E-03	pCi/m3	1.22E-03	1.22E-03				N
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Gross alpha (Comp)	1.60E-03	pCi/m3	5.03E-04	5.03E-04			Lab Result exceeded Project Control Limit (0.0025 pCi/m3).	Y
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Gross alpha (Comp)	4.52E-03	pCi/m3	8.17E-04	8.19E-04				Y
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Gross beta (Comp)	1.64E-02	pCi/m3	1.03E-03	1.04E-03				Y
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Gross beta (Comp)	1.82E-02	pCi/m3	1.06E-03	1.07E-03				Y
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Antimony-125	-2.33E-05	pCi/m3	9.79E-05	9.85E-05	U			Y
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Antimony-125	1.59E-04	pCi/m3	2.74E-04	2.84E-04	U			Y
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Beryllium-7	3.13E-02	pCi/m3	1.67E-03	3.40E-03				Y
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Beryllium-7	2.42E-02	pCi/m3	2.98E-03	3.75E-03				Y
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Cesium-134	1.93E-05	pCi/m3	4.57E-05	4.65E-05	U			Y
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Cesium-134	3.56E-05	pCi/m3	6.48E-05	6.69E-05	U			Y
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Cesium-137	1.43E-05	pCi/m3	4.23E-05	4.28E-05	U			Y
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Cesium-137	-4.63E-06	pCi/m3	6.82E-05	6.82E-05	U			Y
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Cobalt-60	-2.87E-05	pCi/m3	4.49E-05	4.68E-05	U			Y
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Cobalt-60	2.62E-05	pCi/m3	7.00E-05	7.10E-05	U			Y
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Europium-152	3.18E-05	pCi/m3	1.12E-04	1.13E-04	U			Y
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Europium-152	-1.39E-05	pCi/m3	1.61E-04	1.61E-04	U			Y
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Europium-154	-9.60E-05	pCi/m3	1.21E-04	1.29E-04	U			Y
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Europium-154	2.98E-05	pCi/m3	2.33E-04	2.33E-04	U			Y
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Europium-155	7.13E-05	pCi/m3	9.12E-05	9.70E-05	U			Y
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Europium-155	-7.80E-06	pCi/m3	1.04E-04	1.04E-04	U			Y
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Potassium-40	1.94E-03	pCi/m3	1.40E-03	1.41E-03				Y
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Potassium-40	1.69E-03	pCi/m3	2.06E-03	2.07E-03	U			Y
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Ruthenium-106	-1.38E-04	pCi/m3	3.89E-04	3.94E-04	U			Y
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Ruthenium-106	-2.03E-04	pCi/m3	6.42E-04	6.48E-04	U			Y
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Americium-241	-1.99E-06	pCi/m3	1.17E-05	1.17E-05	U			Y
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Americium-241	2.05E-06	pCi/m3	1.06E-05	1.06E-05	U			Y
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Americium-243	-1.62E-05	pCi/m3	1.49E-05	1.49E-05	U			Y
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Americium-243	-3.13E-06	pCi/m3	1.23E-05	1.23E-05	U			Y
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Curium-243/244	9.88E-06	pCi/m3	1.60E-05	1.60E-05	U			Y

Location ID	Field Sample ID	Sample Matrix	Start Date	Sample Date	Parameter Name	Result	Units	Counting Error	Total Error	Lab Qualifier	Sample Comment	Result Comment	Com- posite
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Curium-243/244	-2.03E-06	pCi/m3	6.89E-06	6.89E-06	U			Y
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Plutonium-238	1.72E-06	pCi/m3	1.12E-05	1.12E-05	U			Y
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Plutonium-238	6.63E-06	pCi/m3	1.03E-05	1.03E-05	U			Y
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Plutonium-239/240	1.20E-05	pCi/m3	1.21E-05	1.22E-05	U			Y
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Plutonium-239/240	4.97E-06	pCi/m3	9.73E-06	9.74E-06	U			Y
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Uranium-233/234	3.47E-05	pCi/m3	4.20E-05	4.25E-05	U			Y
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Uranium-233/234	5.43E-05	pCi/m3	4.78E-05	4.84E-05	U			Y
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Uranium-235	2.30E-05	pCi/m3	3.66E-05	3.68E-05	U			Y
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Uranium-235	6.47E-06	pCi/m3	2.43E-05	2.43E-05	U			Y
PNL-5	250209	FILTER	12/23/2024	06/25/2025	Uranium-238	5.59E-05	pCi/m3	4.68E-05	4.75E-05				Y
PNL-5	250215	FILTER	06/25/2025	12/23/2025	Uranium-238	5.02E-05	pCi/m3	4.10E-05	4.15E-05				Y

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Pacific Northwest National Laboratory

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