Constellation

Dresden Nuclear Power Station
6500 North Dresden Road
Morris, IL 60450

May 10, 2022

SVPLTR# 22-0012

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Dresden Nuclear Power Station Units 1, 2, and 3
Facility Operation License No. DPR-2
Renewed Facility Operating License Nos. DPR-19 and DPR-25
NRC Docket Nos. 50-010, 50-237, and 50-249

Subject: Dresden Nuclear Power Station 2021 Annual Radiological Environmental Operating Report

Enclosed is the Exelon Dresden Nuclear Power Station 2021 Annual Radiological Environmental Operating Report, submitted in accordance with Section 6.9.A.3 of the Unit 1 Dresden Nuclear Power Station Technical Specifications and Section 5.6.2, "Annual Radiological Environmental Operation Report," of the Units 2 and 3 Technical Specifications. This report provides the results of the radiological environmental monitoring program for the 2021 calendar year.

In addition, Appendix F of the report contains the results of groundwater monitoring conducted in accordance with Exelon's Radiological Groundwater Protection Program, which is a voluntary program implemented in 2006. This information is being reported in accordance with a nuclear industry initiative.

Should you have any questions concerning this letter, please contact Ken Mack, Regulatory Assurance Manager, at (815) 416-2800.

Respectfully,

Patrick J. Boyle
Site Vice President
Dresden Nuclear Power Station

Attachment – 2021 Annual Radiological Environmental Operating Report

cc: Regional Administrator – NRC Region III
NRC Senior Resident – Dresden Nuclear Power Station
SRRS 2C.111

Docket No: 50-010
50-237
50-249

DRESDEN NUCLEAR POWER STATION
UNITS 1, 2 and 3

Annual Radiological
Environmental Operating Report

1 January through 31 December 2021

Prepared By
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Environmental Services

Exelon Generation

Dresden Nuclear Power Station
Morris, IL 60450

May 2022

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I. Summary and Conclusions

There were no regulatory effluent limit exceedances in 2021 and the resultant calculated dose to a member of the public for 2021 due to the uranium fuel cycle was 6.92E+00 mRem, which is 27.7% of the regulatory limit of 25 mRem/year. The annual organ dose from all effluent sources is 7.46E-02 mRem/yr which is 9.95E-02% of the 75 mRem/yr (Thyroid) limit. Additionally, the Annual Radiological Environmental Operating Report (AREOR) supported the effluent dose calculation and indicates that Units 1, 2, and 3 of the Dresden Nuclear Power Station did not result in any adverse environmental impact.

Surface water samples were analyzed for concentrations of gross beta, tritium and gamma emitting nuclides. Ground water samples were analyzed for concentrations of tritium (H-3) and gamma emitting nuclides. No anthropogenic gamma-emitting nuclides were detected. Gross beta and tritium activities detected were consistent with those detected in previous years.

Fish (commercially and recreationally important species), and sediment samples were analyzed for concentrations of gamma-emitting nuclides. No fission or activation products were detected.

Air particulate samples were analyzed for concentrations of gross beta and gamma-emitting nuclides. Gross beta results at the indicator locations were consistent with those at the control location. No fission or activation products were detected.

High sensitivity iodine-131 (I-131) analyses were performed on weekly air samples. All results were less than the minimum detectable activity for I-131.

Food product samples were analyzed for concentrations of gamma-emitting nuclides. No fission or activation products were detected.

Environmental gamma radiation measurements were performed quarterly using Optically Stimulated Luminescent Dosimetry (OSLD). The relative comparison to control locations remains valid.

This report on the Radiological Environmental Monitoring Program conducted for the Dresden Nuclear Power Station (DNPS) of Exelon Generation, LLC covers the period 1 January 2021 through 31 December 2021. During that time period 1,826 analyses were performed on 1,712 samples. In assessing all the data gathered for this report it was concluded that the operation of DNPS had no adverse radiological impact on the environment.

II. Introduction

The Dresden Nuclear Power Station (DNPS), consisting of one retired reactor and two operating boiling water reactors owned and operated by Exelon Generation, LLC, is located in Grundy County, Illinois. Unit No. 1 went critical in 1960 and was retired in 1978. Unit No. 2 went critical on 16 June 1970. Unit No. 3 went critical on 02 November 1971. The site is located in northern Illinois, approximately 12 miles southwest of Joliet, Illinois at the confluence of the Des Plaines and Kankakee Rivers where they form the Illinois River.

This report covers those analyses performed by Teledyne Brown Engineering (TBE) and Landauer on samples collected during the period 1 January 2021 through 31 December 2021.

An assessment of the station's radioactive effluent monitoring results and radiation dose via the principle pathways of exposure resulting from plant emissions of radioactivity including the maximum noble gas gamma and beta air doses in the unrestricted area, an annual summary of meteorological conditions including wind speed, wind direction and atmospheric stability and the result of the 40CFR190 uranium fuel cycle dose analysis for the calendar year are published in the station's Annual Radioactive Effluent Release Report.

A. Objective of the Radiological Environmental Monitoring Program (REMP)

The objectives of the REMP are to:

1. Provide data on measurable levels of radiation and radioactive materials in the site environs.
2. Evaluate the relationship between quantities of radioactive material released from the plant and resultant radiation doses to individuals from principal pathways of exposure.

B. Implementation of the Objectives

The implementation of the objectives is accomplished by:

1. Identifying significant exposure pathways;
2. Establishing baseline radiological data of media within those pathways;
3. Continuously monitoring those media before and during Station operation to assess Station radiological effects (if any) on man and the environment.

III. Program Description

A. Sample Collection

Samples for the DNPS REMP were collected for Exelon Generation, LLC by Environmental Incorporated Midwest Laboratory (EIML). This section describes the general collection methods used by EIML to obtain environmental samples for the DNPS REMP in 2021. Sample locations and descriptions can be found in Appendix B, Table B–1 and Figures B–1 and B-2. The collection methods used by EIML are listed in Table B-2.

Aquatic Environment

The aquatic environment was evaluated by performing radiological analyses on samples of surface water (SW), ground water (GW), fish (FI) and sediment (SS). Samples were collected from three surface water locations (D-21, D-52 and D-57) and composited for analysis. Control locations were D-52 and D-57. Samples were collected quarterly from three well water locations (D-22, D-24 and D-35). All samples were collected in new unused plastic bottles, which were rinsed with source water prior to collection. Fish samples comprising the flesh of largemouth bass, river carpsucker, smallmouth buffalo, common carp and smallmouth bass were collected semiannually at two locations, D-28 and D-46 (Control). Sediment samples composed of recently deposited substrate were collected at one location semiannually, D-27.

Atmospheric Environment

The atmospheric environment was evaluated by performing radiological analyses on samples of air particulate and airborne iodine (AP/AI). Airborne iodine and particulate samples were collected at fourteen locations (D-01, D-02, D-03, D-04, D-07, D-08, D-10, D-12, D-14, D-45, D-53, D-55, D-56 and D-58). The control location was D-12. Airborne iodine and particulate samples were obtained at each location using a vacuum pump with charcoal and glass fiber filters attached. The pumps were run continuously and sampled air at the rate of approximately one cubic foot per minute. The air filters and air iodine samples were replaced weekly and sent to the laboratory for analysis.

Terrestrial Environment

When a milk sample is available within 5 km (3.1 miles) from the Site, samples are collected biweekly from the indicator location and a control location (10 to 30 km from the Site) from May to October typically and monthly November through April. No milk samples were collected in 2021. Broadleaf vegetation samples were collected in lieu of milk.

Food products (FL) were collected July through October at six locations (D-25, D-40, D-41, D-42, D-43 and D-44). The control location was D-25. Various types of samples were collected and placed in new unused plastic

bags and sent to the laboratory for analysis.

Ambient Gamma Radiation

Each location consisted of two OSLD sets. The OSLD locations were placed on and around the DNPS site as follows:

An inner ring consisting of 17 locations (D-58, D-101, D-102, D-103, D-104, D-105, D-106, D-107, D-108, D-109, D-110, D-111, D-112a, D-113, D-114, D-115 and D-116) at or near the site boundary.

An outer ring consisting of 16 locations (D-201, D-202, D-203, D-204, D-205, D-206, D-207, D-208, D-209, D-210, D-211, D-212, D-213, D-214, D-215 and D-216) approximately 5 to 10 km (3.1 to 6.2 miles) from the site.

Other locations consisting of OSLD sets at the 13 air sampler locations (D-01, D-02, D-03, D-04, D-07, D-08, D-10, D-14, D-45, D-53, D-55, D-56 and D-58).

The balance of one location (D-12) represents the control area OSLD set.

The OSLDs were exchanged quarterly and sent to Landauer for analysis.

B. Sample Analysis

This section describes the general analytical methodologies used by TBE to analyze the environmental samples for radioactivity for the DNPS REMP in 2021. The analytical procedures used by the laboratory are listed in Appendix B Table B-2.

In order to achieve the stated objectives, the current program includes the following analyses:

1. Concentrations of beta emitters in surface water and air particulates.
2. Concentrations of gamma emitters in ground and surface water, air particulates, fish, sediment and vegetation.
3. Concentrations of tritium in ground and surface water.
4. Concentrations of I-131 in air.
5. Ambient gamma radiation levels at various site environs.

C. Data Interpretation

For the purpose of this report, Dresden Nuclear Power Station was considered operational at initial criticality. In addition, data were compared to previous years' operational data for consistency and trending. Several factors were important in the interpretation of the data:

1. Lower Limit of Detection and Minimum Detectable Concentration

   The lower limit of detection (LLD) was defined as the smallest concentration of radioactive material in a sample that would yield a net

count (above background) that would be detected with only a 5% probability of falsely concluding that a blank observation represents a "real" signal. The LLD was intended as a before the fact estimate of a system (including instrumentation, procedure and sample type) and not as an after the fact criteria for the presence of activity. All analyses were designed to achieve the required DNPS detection capabilities for environmental sample analysis.

The minimum detectable concentration (MDC) is calculated the same as the LLD with the exception that the measurement is an after the fact estimate of the presence of activity.

2. Net Activity Calculation and Reporting of Results

Net activity for a sample was calculated by subtracting background activity from the sample activity. Since the REMP measures extremely small changes in radioactivity in the environment, background variations may result in sample activity being lower than the background activity effecting a negative number. An MDC was reported in all cases where positive activity was not detected. Gamma spectroscopy results for each type of sample were grouped as follows:

For groundwater, surface water, and vegetation twelve nuclides, Mn-54, Co-58, Fe-59, Co-60, Zn-65, Nb-95, Zr-95, I-131, Cs-134, Cs-137, Ba-140 and La-140 were reported.

For fish, sediment, air particulate and milk eleven nuclides, Mn-54, Co-58, Fe-59, Co-60, Zn-65, Nb-95, Zr-95, Cs-134, Cs-137, Ba-140 and La-140 were reported.

Means and standard deviations of the results were calculated. The standard deviations represent the variability of measured results for different samples rather than single analysis uncertainty.

D. Program Exceptions

For 2021 the DNPS REMP had a sample recovery rate greater than 98% (1,712 of 1,744 samples collected). Sample anomalies and missed samples are listed in the following tables:

Table D-1 LISTING OF SAMPLE ANOMALIES

Sample Type	Location Code	Collection Date	Reason
AP/AI	D-01	02/12/21 02/19/21	Air sample not accessible due to snow accumulation at the gate.
AP/AI	D-02	05/14/21	Sampler found not running due to a blown fuse. Timer indicated 41.6 hours.
AP/AI	D-45	07/09/21	Sampler stopped working after 7 hours due to an electrical problem.
FL	D-40	09/10/21	No broadleaf vegetables obtained. Residents moved and the rental house was demolished.
AP/AI	D-01	10/29/21	The air sample timer indicated 12.33 hours possibly due to a long power outage.

Table D-2 LISTING OF ODCM REQUIRED MISSED SAMPLES

Sample Type	Location Code	Collection Date	Reason
SW	D-57	01/29/21 02/26/21	Surface water sample not obtained due to frozen river conditions.
SW	D-52	02/05/21 02/12/21 02/19/21	Surface water sample not obtained due to frozen river conditions.
AP/AI	D-12	11/12/21 - 12/31/21	Control air sampler lost power and was unable to restore. Troubleshooting indicated a possible short in the underground line.

Each program exception was reviewed to understand the causes of the program exception. No sampling or maintenance errors were identified during the reporting period. Occasional equipment breakdowns and power outages were unavoidable.

The overall sample recovery rate indicates that the appropriate procedures and equipment are in place to assure reliable program implementation.

E. Program Changes

There were no program changes in 2021.

IV. Results and Discussion

A. Aquatic Environment

1. Surface Water

Samples were composited or taken weekly and composited for analysis at three locations (D-21, D-52 and D-57). Of these locations only D-21, located downstream, could be affected by Dresden's effluent releases. The following analyses were performed:

Gross Beta

Monthly composites from all locations were analyzed for concentrations of gross beta (Table C–I.1, Appendix C). Gross Beta was detected in 32 of 34 samples. The values ranged from 3.2 to 14.2 pCi/l. Concentrations detected were consistent with those detected in previous years. (Figures C-1, C–2 and C–3, Appendix C)

Tritium

Quarterly composites from all locations were analyzed for tritium activity (Table C–I.2, Appendix C). One sample at indicator station D-21 was positive for tritium with a concentration of 1,380 pCi/L. Three samples at control station D-57 were positive for tritium with concentrations of 315 to 1980 pCi/L. No samples from station D-52 were positive for tritium. Concentrations detected were consistent with those detected in previous years. (Figures C–4, C–5 and C-6, Appendix C)

Gamma Spectrometry

Monthly composites from all locations were analyzed for gamma-emitting nuclides. No nuclides were detected and all required LLDs were met. (Table C–I.3, Appendix C)

2. Ground Water

Quarterly grab samples were collected at locations D-22, D-24 and D-35. These locations could be affected by Dresden's effluent releases and by sources upstream on the Kankakee River. The following analyses were performed:

Tritium

All were analyzed for tritium activity (Table C–II.1, Appendix C). Tritium was not detected in any sample. Results were consistent with those in previous years. (Figure C–7, Appendix C)

Gamma Spectrometry

All samples were analyzed for gamma-emitting nuclides. No nuclides were detected and all required LLDs were met.
(Table C-II.2, Appendix C)

3. Fish

Fish samples comprised of largemouth bass, river carpsucker, smallmouth buffalo, common carp and smallmouth bass were collected at two locations (D-28 and D-46) semiannually. Location D-28 could be affected by Dresden's effluent releases. The following analysis was performed:

Gamma Spectrometry

The edible portion of fish samples from both locations was analyzed for gamma-emitting nuclides (Table C–III.1, Appendix C). Only naturally-occurring nuclides (not shown on tables) were found at both locations. No fission or activation products were detected.

4. Sediment

Aquatic sediment samples were collected at one location (D-27) semiannually. This downstream location could be affected by Dresden's effluent releases. The following analysis was performed:

Gamma Spectrometry

Sediment samples from the location were analyzed for gamma-emitting nuclides (Table C–IV.1, Appendix C). No fission or activation products were detected.

B. Atmospheric Environment

1. Airborne

a. Air Particulates

Continuous air particulate samples were collected from fourteen locations on a weekly basis. The fourteen locations were separated into four groups: On-site samplers (D-01, D-02 and D-03), Near-field samplers within 3.1 miles of the site (D-04, D-07, D-45, D-53, D-56 and D-58), Far-field samplers between 5 and 10 km (3.1 and 6.2 miles) from the site (D-08, D-10, D-14 and D-55) and the Control sampler between 10 and 30 km (6.2 and 18.6 miles) from the site (D-12). The following analyses were performed:

Gross Beta

Weekly samples were analyzed for concentrations of beta emitters. (Table C–V.1 and C–V.2, Appendix C)

Detectable gross beta activity was observed at all locations. Comparison of results among the four groups aid in determining the effects, if any, resulting from the operation of DNPS. The results from the On-Site locations ranged from 6.49E-3 to 4.27E-2 pCi/m^3 with a mean of 2.00E-2 pCi/m^3. The results from the Near-Field locations ranged from 4.98E-3 to 4.82E-2 pCi/m^3 with a mean of 1.91E-2 pCi/m^3. The results from the Far-Field locations ranged from 5.95E-3 to 4.67E-2 pCi/m^3 with a mean of 1.86E-2 pCi/m^3. The results from the Control location ranged from 9.20E-3 to 3.52E-2 pCi/m^3 with a mean of 1.82E-2 pCi/m^3. Comparison of the 2021 air particulate data with previous year's data indicate no effects from the operation of DNPS. In addition a comparison of the weekly mean values for 2021 indicate no notable differences among the four groups. (Figures C–8 through C-14, Appendix C)

Gamma Spectrometry

Samples were composited quarterly and analyzed for gamma emitting nuclides (Table C–V.3, Appendix C). Only naturally-occurring nuclides (not shown on the tables) were found in these composite samples. No anthropogenic nuclides were detected and all required LLDs were met. These samples were consistent with historical quarterly results. All other nuclides were less than the MDC.

b. Airborne Iodine

Continuous air samples were collected from fourteen locations (D-01, D-02, D-03, D-04, D-07, D-08, D-10, D-12, D-14, D-45, D-53, D-55, D-56 and D-58) and analyzed weekly for I-131. All results were less than the MDC for I-131.
(Table C–VI.1, Appendix C)

2. Terrestrial

a. Milk

No Milk (M) samples were analyzed in 2021.

b. Food Products

Food product samples were collected at six locations (D-25, D-40, D-41, D-42 D-43 and D-44) when available. The Control location is D-25 and the other 5 locations could be affected by Dresden's effluent releases. The following analysis was performed:

Gamma Spectrometry

Samples from six locations were analyzed for gamma-emitting nuclides. No nuclides were detected and all required LLDs were met. (Table C–VIII.1, Appendix C)

C. Ambient Gamma Radiation

Forty-six OSLD locations were established around the site. Results of OSLD measurements are listed in Table C–IX.1, Appendix C.

Most OSLD measurements were below 30 mrem/quarter, with a range of 10.4 to 29.9 mrem/quarter. A comparison of the Inner Ring, Outer Ring and Other locations' data to the Control Location data, indicate that the ambient gamma radiation levels from the Control location (D-12) were comparable.

D. Land Use Survey

A Land Use Survey conducted on August 28, 2021, around the Dresden Nuclear Power Station (DNPS) was performed by EIML for Exelon Generation, LLC to comply with Section 12.6.2 of the Dresden Offsite Dose Calculation Manual (ODCM). The purpose of the survey was to document the nearest resident or industrial facility, milk producing animal, and livestock in each of the sixteen 22 ½ degree sectors within 10 km (6.2 miles) around the site. There were no changes required to the DNPS REMP as a result of this survey. The results are summarized as follows:

Distance in Miles from the DNPS Reactor Buildings				
Sector		Residence Miles	Livestock Miles	Milk Farm Miles
A	N	1.5	1.4	-
B	NNE	0.8	-	-
C	NE	0.8	-	-
D	ENE	0.7	1.7	-
E	E	1.1	-	-
F	ESE	1.0	-	-
G	SE	0.6	-	-
H	SSE	0.5	-	-
J	S	0.5	-	-
K	SSW	3.3	-	-
L	SW	3.6	-	11.4
M	WSW	5.5	-	-
N	W	3.5	0.5	-
P	WNW	3.2	0.5	-
Q	NW	2.2	0.5	-
R	NNW	1.9	1.0	-

E. Errata Data

There was no errata data in 2021.

F. Summary of Results – Inter-Laboratory Comparison Program

The TBE Laboratory analyzed Performance Evaluation (PE) samples of air particulate, air iodine, milk, soil, vegetation, and water matrices for various analytes. The PE samples supplied by Analytics Inc., Environmental Resource Associates (ERA) and Department of Energy (DOE) Mixed Analyte Performance Evaluation Program (MAPEP), were evaluated against the following pre-set acceptance criteria:

A. Analytics Evaluation Criteria

Analytics' evaluation report provides a ratio of TBE's result and Analytics' known value. Since flag values are not assigned by Analytics, TBE evaluates the reported ratios based on internal QC requirements based on the DOE MAPEP criteria.

B. ERA Evaluation Criteria

ERA's evaluation report provides an acceptance range for control and warning limits with associated flag values. ERA's acceptance limits are established per the USEPA, National Environmental Laboratory Accreditation Conference (NELAC), state-specific Performance Testing (PT) program requirements or ERA's SOP for the Generation of Performance Acceptance Limits, as applicable. The acceptance limits are either determined by a regression equation specific to each analyte or a fixed percentage limit promulgated under the appropriate regulatory document.

C. DOE Evaluation Criteria

MAPEP's evaluation report provides an acceptance range with associated flag values. MAPEP defines three levels of performance:

- Acceptable (flag = "A") - result within ± 20% of the reference value
- Acceptable with Warning (flag = "W") - result falls in the ± 20% to ± 30% of the reference value
- Not Acceptable (flag = "N") – bias is greater than 30% of the reference value

Note: The Department of Energy (DOE) Mixed Analyte Performance Evaluation Program (MAPEP) samples are created to mimic conditions found at DOE sites which do not resemble typical environmental samples obtained at commercial nuclear power facilities.

For the TBE laboratory, 146 out of 154 analyses performed met the specified acceptance criteria. Seven analyses did not meet the specified acceptance criteria and were addressed through the TBE Corrective Action Program. *NOTE: One analysis (soil for Tc-99) that did not meet acceptance criteria was performed for TBE information and is not on the list of required ICP analyses.* A summary is found below:

1. The ERA MRAD March 2021 Water Fe-55 result was evaluated as *Not Acceptable*. The reported value for Fe-55 was 579 pCi/L and the known result was 275 pCi/L (acceptance range 162 - 400). When reviewing the original sample data, it was found that the carrier yield was 52.6% (lower than typical water samples). Looking at the etched plate that was counted, it appeared that some loss of sample could have occurred. The sample was logged for reanalysis and used as the workgroup duplicate. The results were acceptable at 197 and 221 respectively. Yields were 97.4% and 105.7% and the plated samples were centered with no apparent loss of sample. The loss of sample during plating resulted in a low yield which produced an artificially high sample result. (NCR 21-01)

2. The MAPEP February 2021 AP Gross Alpha result was evaluated as *Not Acceptable*. The reported value was 0.371 Bq/sample and the known result was 1.77 Bq/sample (acceptance range 0.53 - 3.01). A similar failure had occurred several years prior due to the filter being placed with the wrong side up on the detector. At that time, a small dot was placed on the top of the filter prior to removal from the package to indicate the correct side for counting. The current sample was still in the detector when the result was received (dot side facing the detector). The sample was recounted with a similar result and was flipped and recounted. The flipped result was 0.661 Bq/sample, within the acceptable range. Because TBE cannot rely on receiving correct packaging from the provider, MAPEP AP cross-checks will be counted on both sides going forward. *NOTE: The August sample had the same packaging issue (upside down).* (NCR 21-02)

3. The MAPEP February 2021 soil Ni-63 was evaluated as *Not Acceptable*. The reported value was 310 Bq/kg and the known result was 689 (acceptance range 482 - 896). All workgroup QC was reviewed with no anomalies. The analytical procedure had been revised prior to this analysis to eliminate added interferences. The sample yield was >100%, indicative of incomplete separation from interferences, leading to a lower result. The procedure was again revised after acceptable results were obtained. (NCR 21-03)

4. The ERA October 2021 water Gross Beta result was evaluated as *Not Acceptable*. The reported value was 63.0 pCi/L and the known was 55.7 (acceptance range 38.1 - 62.6) or 113% of the known. The 2-sigma

error was 6.8, placing the reported result well within the acceptable range. All QA was reviewed with no anomalies. A follow-up Quick Response cross-check was analyzed with a 120% ratio (see item 7). (NCR 21-10)

5. The ERA October 2021 water Tritium result was evaluated as *Not Acceptable*. The reported value was 13,800 pCi/L and the known was 17,200 (acceptance range 15,000 - 18,900). The 2-sigma error was 1,430, placing the result within the acceptable range. TBE's internal QC acceptance is 70% - 130%, while ERA's for this sample was 87% - 110%. All QA was reviewed with no anomalies. A Quick Response follow-up cross-check was analyzed with a result of 17,500 pCi/L (known 17,800 pCi/L). (NCR 21-11)

6. The MAPEP August 2021 soil Ni-63 result was evaluated as *Not Acceptable*. The reported value was 546 Bq/kg and the known result was 1,280 Bq/kg (acceptance range 896 - 1,664). All QC was reviewed and no anomalies found. The procedure revision to remove added MAPAP interferences was ineffective for this sample. No client soil matrix samples were analyzed for Ni-63 in 2020 or 2021. The root cause investigation is still ongoing at this time. (NCR 21-13)

7. The ERA December 2021 Quick Response water Gross Beta result was evaluated as *Not Acceptable*. The reported value was 47.6 pCi/L and the known was 39.8 pCi/L or 120% of the known (acceptance range of 26.4 - 47.3). The 2-sigma error was 6.1, placing the reported result well within the acceptable range. All QA was reviewed with no anomalies. The original sample was recounted on a different detector with a result of 40.3 ± 6.27 pCi/L. The "failure" of this sample and the RAD-127 was due to the narrow upper acceptance ranges assigned (119% and 112%) (NCR 21-14)

The Inter-Laboratory Comparison Program provides evidence of "in control" counting systems and methods, and that the laboratories are producing accurate and reliable data.

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APPENDIX A

RADIOLOGICAL ENVIRONMENTAL MONITORING

REPORT SUMMARY

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TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR DRESDEN NUCLEAR POWER STATION, 2021

NAME OF FACILITY:	DRESDEN			DOCKET NUMBER:		50-010, 50-237 & 50-249		
LOCATION OF FACILITY:	MORRIS IL			REPORTING PERIOD:		2021		
MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) RANGE	CONTROL LOCATION MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M) MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M) STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SURFACE WATER (PCI/LITER)	**GR-B**	34	4	7 (12/12) 3.8 -9.4	7.3 (20/22) 3.2 - 14.2	9.1 (12/12) 4.9 - 14.2	D-52 CONTROL DESPLAINES RIVER AT WILL ROAD (CONTROL) 1.1 MILES ESE OF SITE	0
	H-3	12	2000	1380 (1/4)	1085 (3/8) 315 - 1980	1380 (1/4)	D-21 INDICATOR IL RIVER AT EJ&E BRIDGE 1.4 MILES WNW OF SITE	0
	GAMMA	34						
	MN-54		15	<LLD	<LLD	-		0
	CO-58		15	<LLD	<LLD	-		0
	FE-59		30	<LLD	<LLD	-		0
	CO-60		15	<LLD	<LLD	-		0
	ZN-65		30	<LLD	<LLD	-		0
	NB-95		15	<LLD	<LLD	-		0
	ZR-95		30	<LLD	<LLD	-		0
	I-131		15	<LLD	<LLD	-		0
	CS-134		15	<LLD	<LLD	-		0
	CS-137		18	<LLD	<LLD	-		0
	BA-140		60	<LLD	<LLD	-		0
	LA-140		15	<LLD	<LLD	-		0
GROUND WATER (PCI/LITER)	**H-3**	12	2000	*NA*	*NA*	*NA*		0
	GAMMA	12						
	MN-54		15	<LLD	*NA*	-		0
	CO-58		15	<LLD	*NA*	-		0
	FE-59		30	<LLD	*NA*	-		0
	CO-60		15	<LLD	*NA*	-		0
	ZN-65		30	<LLD	*NA*	-		0
	NB-95		15	<LLD	*NA*	-		0
	ZR-95		30	<LLD	*NA*	-		0
	I-131		15	<LLD	*NA*	-		0
	CS-134		15	<LLD	*NA*	-		0
	CS-137		18	<LLD	*NA*	-		0
	BA-140		60	<LLD	*NA*	-		0
	LA-140		15	<LLD	*NA*	-		0

(M) *The Mean Values are calculated using the positive values.* ***(F)*** *Fraction of detectable measurement are indicated in parentheses*

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR DRESDEN NUCLEAR POWER STATION, 2021

NAME OF FACILITY: DRESDEN | **DOCKET NUMBER:** 50-010, 50-237 & 50-249
LOCATION OF FACILITY: MORRIS IL | **REPORTING PERIOD:** 2021

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) RANGE	CONTROL LOCATION MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M) MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M) STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
FISH	**GAMMA**	8						
(PCI/KG WET)	*MN-54*		130	<LLD	*NA*	-		0
	CO-58		130	<LLD	*NA*	-		0
	FE-59		260	<LLD	*NA*	-		0
	CO-60		130	<LLD	*NA*	-		0
	ZN-65		260	<LLD	*NA*	-		0
	NB-95		*NA*	<LLD	*NA*	-		0
	ZR-95		*NA*	<LLD	*NA*	-		0
	CS-134		130	<LLD	*NA*	-		0
	CS-137		150	<LLD	*NA*	-		0
	BA-140		*NA*	<LLD	*NA*	-		0
	LA-140		*NA*	<LLD	*NA*	-		0
SEDIMENT	**GAMMA**	2						
(PCI/KG DRY)	*MN-54*		*NA*	<LLD	*NA*	-		0
	CO-58		*NA*	<LLD	*NA*	-		0
	FE-59		*NA*	<LLD	*NA*	-		0
	CO-60		*NA*	<LLD	*NA*	-		0
	ZN-65		*NA*	<LLD	*NA*	-		0
	NB-95		*NA*	<LLD	*NA*	-		0
	ZR-95		*NA*	<LLD	*NA*	-		0
	CS-134		150	<LLD	*NA*	-		0
	CS-137		180	<LLD	*NA*	-		0
	BA-140		*NA*	<LLD	*NA*	-		0
	LA-140		*NA*	<LLD	*NA*	-		0
AIR PARTICULATE	**GR-B**	714	10	19.1 (670/671) *5 - 48*	18.2 (43/43) *9 - 35*	22.5 (51/52) *7 - 43*	D-02 INDICATOR ONSITE 2 0.3 MILES NNE OF SITE	0
(E-3 PCI/CU.M)	**GAMMA**	56						
	MN-54		*NA*	<LLD	<LLD	-		0
	CO-58		*NA*	<LLD	<LLD	-		0
	FE-59		*NA*	<LLD	<LLD	-		0
	CO-60		*NA*	<LLD	<LLD	-		0
	ZN-65		*NA*	<LLD	<LLD	-		0
	NB-95		*NA*	<LLD	<LLD	-		0
	ZR-95		*NA*	<LLD	<LLD	-		0
	CS-134		50	<LLD	<LLD	-		0
	CS-137		60	<LLD	<LLD	-		0

(M) *The Mean Values are calculated using the positive values.* ***(F)*** *Fraction of detectable measurement are indicated in parentheses*

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR DRESDEN NUCLEAR POWER STATION, 2021

NAME OF FACILITY:	DRESDEN			DOCKET NUMBER:		50-010, 50-237 & 50-249		
LOCATION OF FACILITY:	MORRIS IL			REPORTING PERIOD:		2021		
MEDIUM OR PATHWAY SAMPLED *(UNIT OF MEASUREMENT)*	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) *RANGE*	CONTROL LOCATION MEAN (M) (F) *RANGE*	LOCATION WITH HIGHEST ANNUAL MEAN (M) MEAN (M) (F) *RANGE*	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	BA-140		*NA*	<LLD	<LLD	-		0
	LA-140		*NA*	<LLD	<LLD	-		0
AIR IODINE	**GAMMA**	713						
(E-3 PCI/CU.M)	*I-131*		**70**	<LLD	<LLD	-		0
VEGETATION	**GAMMA**	45						
(PCI/KG WET)	*MN-54*		*NA*	<LLD	<LLD	-		0
	CO-58		*NA*	<LLD	<LLD	-		0
	FE-59		*NA*	<LLD	<LLD	-		0
	CO-60		*NA*	<LLD	<LLD	-		0
	ZN-65		*NA*	<LLD	<LLD	-		0
	NB-95		*NA*	<LLD	<LLD	-		0
	ZR-95		*NA*	<LLD	<LLD	-		0
	I-131		**60**	<LLD	<LLD	-		0
	CS-134		**60**	<LLD	<LLD	-		0
	CS-137		**80**	<LLD	<LLD	-		0
	BA-140		*NA*	<LLD	<LLD	-		0
	LA-140		*NA*	<LLD	<LLD	-		0
DIRECT RADIATION	**OSLD-QUARTERLY**	184	*NA*	20.8	20.4	24.2	D-110 INDICATOR	0
(MILLI-ROENTGEN/QTR.)				(180/180)	(4/4)	(4/4)		
				10.4 - 29.9	*14.1 - 23.8*	*18.7 - 29.9*	0.9 MILES SSW	

(M) *The Mean Values are calculated using the positive values.* ***(F)*** *Fraction of detectable measurement are indicated in parentheses*

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APPENDIX B

LOCATION DESIGNATION, DISTANCE & DIRECTION

AND

SAMPLE COLLECTION & ANALYTICAL METHODS

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TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Dresden Nuclear Power Station, 2021

Location	Location Description	Distance & Direction From Site
A.	Surface Water	
D-21	Illinois River at EJ&E Bridge (indicator)	1.4 miles WNW
D-52	DesPlaines River at Will Road, Upstream (control)	1.1 miles ESE
D-57	Kankakee River at Will Road (control)	2.0 miles SE
B.	Ground/Well Water	
D-22	8150 N. Thorsen Road (indicator)	0.8 miles SSE
D-24	8177 N. Thorsen Road (indicator)	0.6 miles SSE
D-35	Dresden Lock & Dam Morris, IL (indicator)	0.8 miles NW
C.	Air Particulates / Air Iodine	
D-01	Onsite Station 1 (indicator)	0.8 miles NW
D-02	Onsite Station 2 (indicator)	0.3 miles NNE
D-03	Onsite Station 3 (indicator)	0.4 miles S
D-04	Collins Road, on Station property(indicator)	0.8 miles W
D-07	Clay Products, Dresden Road (indicator)	2.6 miles S
D-08	Jugtown Road, Prairie Parks (indicator)	3.8 miles SW
D-10	Goose Lake Road, Goose Lake Village (indicator)	3.5 miles SSW
D-12	Quarry Road, Lisbon (control)	10.5 miles NW
D-14	Center Street, Channahon (indicator)	3.7 miles NE
D-45	McKinley Woods Road, Channahon (indicator)	1.7 miles ENE
D-53	Will Road, Hollyhock (indicator)	2.1 miles SSE
D-55	Ridge Road, Minooka (indicator)	4.3 miles N
D-56	Will Road, Wildfeather (indicator)	1.7 miles SE
D-58	Will Road, Marina (indicator)	1.1 miles ESE
D.	Fish	
D-28	Dresden Pool of Illinois River, Downstream (indicator)	0.9 miles NNW
D-46	DesPlaines River, Upstream (control)	1.2 miles ESE
E.	Sediment	
D-27	Illinois River at Dresden Lock and Dam, Downstream (indicator)	0.8 miles NW
F.	Broadleaf Vegetation	
D-25	Vince Biros Farm, Reed Road	11.3 miles SW
D-40	7715 E Hansel Road	0.9 miles NNW
D-41	8100 E Blanchard Circle	0.5 miles SSE
D-42	Dresden Site Garden	0.4 miles N
D-43	25158 W Elm St	3.3 miles NE
D-44	9980 Ridge Road	3.0 miles N

TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Dresden Nuclear Power Station, 2021

Location	Location Description	Distance & Direction From Site
G.	Environmental Dosimetry - OSLD	
Inner Ring		
D-58		1.1 miles ESE
D-101		1.0 miles N
D-102		1.3 miles NNE
D-103		1.2 miles NE
D-104		1.7 miles ENE
D-105		1.5 miles E
D-106		1.1 miles ESE
D-107		1.4 miles SE
D-108		1.9 miles SSE
D-109		0.8 miles S
D-110		0.9 miles SSW
D-111		0.6 miles SW
D-112		0.7 miles WSW
D-113		0.9 miles W
D-114		0.9 miles WNW
D-115		0.8 miles NW
D-116		1.0 miles NNW
Outer Ring		
D-201		4.8 miles N
D-202		5.1 miles NNE
D-203		4.7 miles NE
D-204		5.0 miles ENE
D-205		4.0 miles E
D-206		3.5 miles ESE
D-207		4.2 miles SE
D-208		4.9 miles SSE
D-209		4.1 miles S
D-210		4.9 miles SSW
D-211		4.8 miles SW
D-212		6.0 miles WSW
D-213		4.5 miles W
D-214		5.0 miles WNW
D-215		4.8 miles NW
D-216		4.9 miles NNW
Other Locations		
D-01	Onsite 1	0.8 miles NW
D-02	Onsite 2	0.3 miles NNE
D-03	Onsite 3	0.4 miles S
D-04	Collins Road, on Station property	0.8 miles W
D-07	Clay Products, Dresden Road	2.6 miles S
D-08	Jugtown Road, Prairie Parks	3.8 miles SW
D-10	Goose Lake Road, Goose Lake Village	3.5 miles SSW
D-14	Center Street, Channahon	3.7 miles NE
D-45	McKinley Woods Road, Channahon	1.7 miles ENE
D-53	Will Road, Hollyhock	2.1 miles SSE
D-55	Ridge Road, Minooka	4.3 miles N
D-56	Will Road, Wildfeather	1.7 miles SE
Control		
D-12	Lisbon	10.5 miles NW

TABLE B-2: Radiological Environmental Monitoring Program – Summary of Sample Collection and Analytical Methods, Dresden Nuclear Power Station, 2021

Sample Medium	Analysis	Sampling Method	Collection Procedure Number	Sample Size	Analytical Procedure Number
Surface Water	Gamma Spectroscopy	Monthly composite sample or monthly composite from weekly grab samples	EIML-SPM-1, Environmental Incorporated Midwest Laboratory Sampling Procedures Manual TBE, TBE-2023 Compositing of samples EIML-COMP-01 procedure for compositing water and milk samples	2 gallon	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
Surface Water	Gross Beta	Monthly composite sample or monthly composite from weekly grab samples	EIML-SPM-1, Environmental Incorporated Midwest Laboratory Sampling Procedures Manual TBE, TBE-2023 Compositing of samples EIML-COMP-01 procedure for compositing water and milk samples	2 gallon	TBE, TBE-2008 Gross Alpha and/or Gross Beta Activity in Various Matrices
Surface Water	Tritium	Quarterly composite of monthly composite samples	EIML-SPM-1, Environmental Incorporated Midwest Laboratory Sampling Procedures Manual TBE, TBE-2023 Compositing of samples EIML-COMP-01 procedure for compositing water and milk samples	500 ml	TBE, TBE-2011 Tritium Analysis in Drinking Water by Liquid Scintillation
Ground Water	Gamma Spectroscopy	Quarterly grab samples	EIML-SPM-1, Environmental Incorporated Midwest Laboratory Sampling Procedures Manual	2 gallon	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
Ground Water	Tritium	Quarterly grab samples	EIML-SPM-1, Environmental Incorporated Midwest Laboratory Sampling Procedures Manual	500 ml	TBE, TBE-2011 Tritium Analysis in Drinking Water by Liquid Scintillation
Fish	Gamma Spectroscopy	Samples collected twice annually via electroshocking or other techniques	EIML-SPM-1, Environmental Incorporated Midwest Laboratory Sampling Procedures Manual	1000 grams (wet)	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
Sediment	Gamma Spectroscopy	Semi-annual grab samples	EIML-SPM-1, Environmental Incorporated Midwest Laboratory Sampling Procedures Manual	500 grams (dry)	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis

TABLE B-2: Radiological Environmental Monitoring Program – Summary of Sample Collection and Analytical Methods, Dresden Nuclear Power Station, 2021

Sample Medium	Analysis	Sampling Method	Collection Procedure Number	Sample Size	Analytical Procedure Number
Dredging Spoils	Gamma Spectroscopy	Annual grab samples if dredging occurred within 1 mile of Dresden Station during the year.	EIML-SPM-1, Environmental Incorporated Midwest Laboratory Sampling Procedures Manual	500 grams (dry)	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
Air Particulates	Gross Beta	One-week of continuous air sampling through glass fiber filter paper	EIML-SPM-1, Environmental Incorporated Midwest Laboratory Sampling Procedures Manual	1 filter (approximately 280 cubic meters weekly)	TBE, TBE-2008 Gross Alpha and/or Gross Beta Activity in Various Matrices
Air Particulates	Gamma Spectroscopy	Quarterly composite of each station	TBE, TBE-2023 Compositing of samples Env. Inc., AP-03 Procedure for compositing air particulate filters for gamma spectroscopic analysis	13 filters	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
Air Iodine	Gamma Spectroscopy	One- or two-week composite of continuous air sampling through charcoal filter	EIML-SPM-1, Environmental Incorporated Midwest Laboratory Sampling Procedures Manual	1 filter (approximately 280 cubic meters weekly)	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
Broadleaf Vegetation (in lieu of milk)	Gamma Spectroscopy	Grab samples July through October;	EIML-SPM-1, Environmental Incorporated Midwest Laboratory Sampling Procedures Manual	1000 grams	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
Food Products	Gamma Spectroscopy	Annual grab samples.	EIML-SPM-1, Environmental Incorporated Midwest Laboratory Sampling Procedures Manual	1000 grams	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
OSLD	Optically Stimulated Luminescence Dosimetry	Quarterly OSLDs comprised of two Al_2O_3:C Landauer Incorporated elements.	EIML-SPM-1, Environmental Incorporated Midwest Laboratory Sampling Procedures Manual	2 dosimeters at each location	Landauer Incorporated

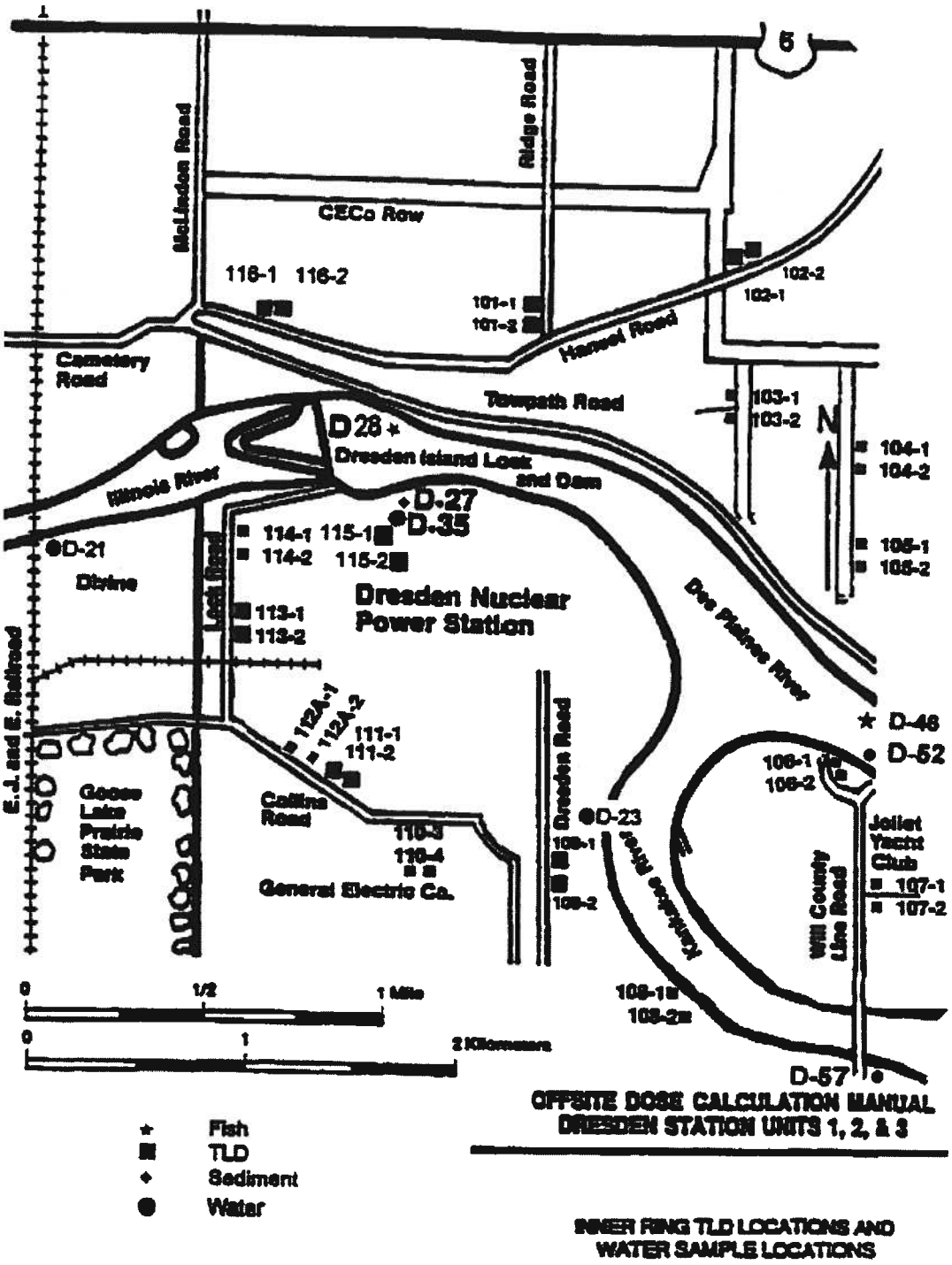

Figure B-1
Dresden Station Inner Ring OSLD Locations, Fish, Water, and Sediment Location, 2021

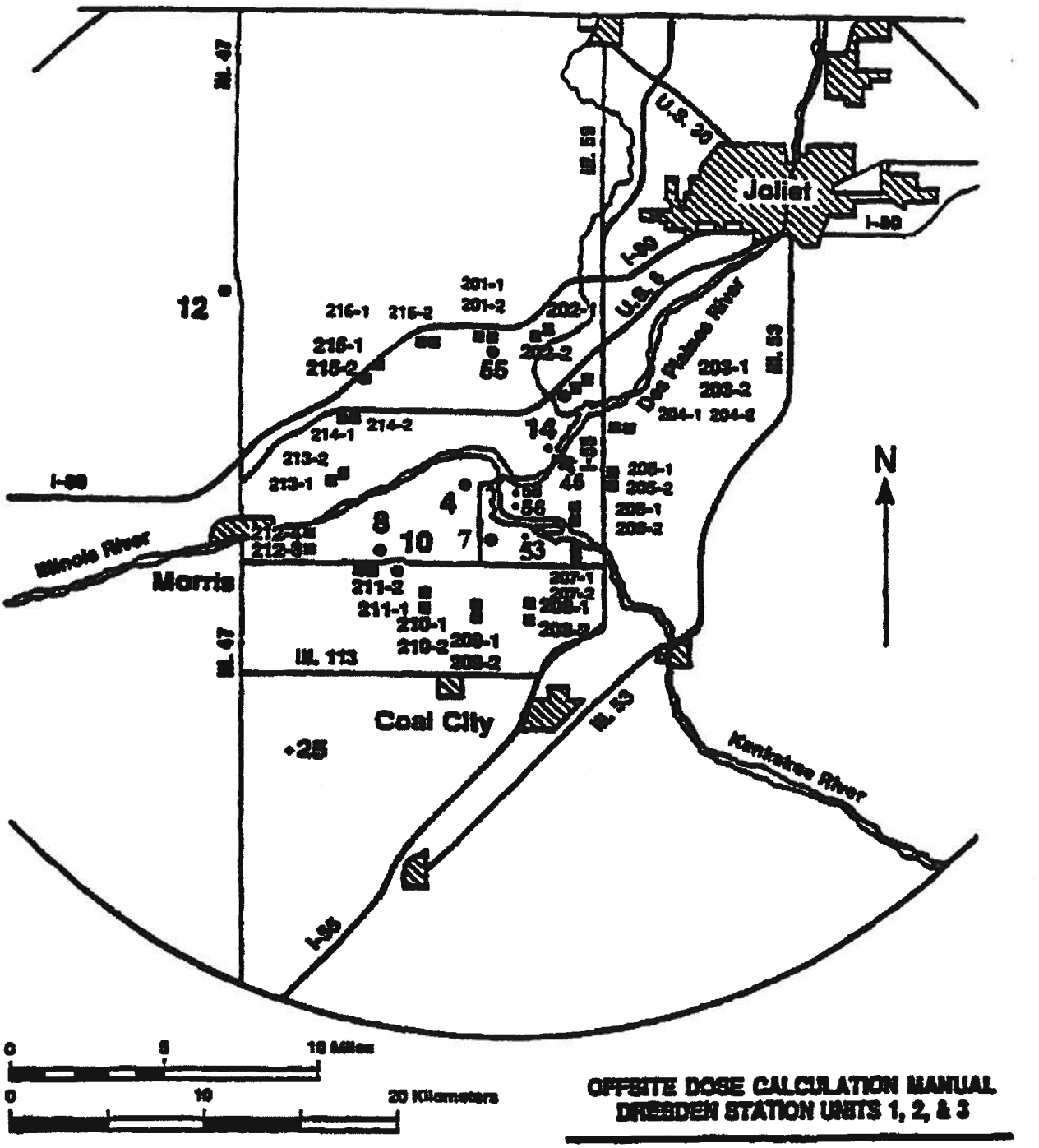

Figure B-2
Dresden Station Fixed Air Sampling and
OSLD Sites, Outer Ring OSLD Locations, 2021

APPENDIX C

DATA TABLES AND FIGURES

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Table C-I.1 **CONCENTRATIONS OF GROSS BETA IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	D-21	D-52	D-57
12/24/20 - 01/29/21	3.8 ± 2.4	8.6 ± 2.9	*(1)*
01/29/21 - 02/26/21	7.6 ± 2.6	9.6 ± 2.8	*(1)*
02/26/21 - 03/26/21	5.1 ± 2.0	6.3 ± 2.4	5.4 ± 2.0
03/26/21 - 04/30/21	8.5 ± 2.5	14.2 ± 3.2	4.3 ± 2.0
04/30/21 - 05/28/21	7.4 ± 2.3	11.2 ± 2.6	< 2.6
05/28/21 - 06/25/21	6.7 ± 2.2	8.1 ± 2.3	3.5 ± 1.9
06/25/21 - 07/30/21	5.1 ± 2.2	9.3 ± 2.7	3.3 ± 2.0
07/30/21 - 08/27/21	7.7 ± 2.3	4.9 ± 2.2	< 2.8
08/27/21 - 09/24/21	6.5 ± 2.2	10.7 ± 2.7	4.0 ± 2.2
09/24/21 - 10/29/21	9.4 ± 2.1	7.1 ± 2.2	8.4 ± 2.1
10/29/21 - 11/27/21	7.3 ± 2.3	5.5 ± 2.1	3.2 ± 2.0
11/27/21 - 12/31/21	8.7 ± 2.6	14.0 ± 2.9	5.2 ± 2.1
MEAN ± 2 STD DEV	7.0 ± 3.3	9.1 ± 6.1	4.7 ± 3.4

Table C-I.2 **CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	D-21	D-52	D-57
01/02/21 - 03/26/21	1380 ± 207	< 182	1980 ± 263
04/02/21 - 06/25/21	< 179	< 181	315 ± 122
07/02/21 - 09/24/21	< 182	< 186	960 ± 171
10/01/21 - 12/31/21	< 196	< 191	< 191
MEAN ± 2 STD DEV	1380 ± 0	-	1085 ± 1679

THE MEAN AND 2 STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES

Table C-I.3

CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021

RESULTS IN UNITS OF PCI/LITER + 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
D-21	12/24/20 - 01/29/21	< 6	< 6	< 15	< 8	< 12	< 7	< 12	< 10	< 9	< 8	< 32	< 12
	01/29/21 - 02/26/21	< 7	< 3	< 12	< 7	< 9	< 6	< 10	< 9	< 7	< 6	< 26	< 9
	02/26/21 - 03/26/21	< 5	< 7	< 11	< 7	< 14	< 5	< 8	< 7	< 7	< 6	< 21	< 10
	03/26/21 - 04/30/21	< 6	< 5	< 11	< 8	< 13	< 6	< 15	< 8	< 7	< 5	< 31	< 8
	04/30/21 - 05/28/21	< 5	< 7	< 14	< 6	< 13	< 5	< 9	< 11	< 7	< 7	< 29	< 11
	05/28/21 - 06/25/21	< 8	< 8	< 11	< 8	< 13	< 8	< 12	< 10	< 7	< 6	< 30	< 10
	06/25/21 - 07/30/21	< 4	< 4	< 12	< 5	< 10	< 5	< 8	< 8	< 6	< 6	< 23	< 7
	07/30/21 - 08/27/21	< 7	< 7	< 13	< 7	< 17	< 6	< 11	< 10	< 9	< 5	< 30	< 8
	08/27/21 - 09/24/21	< 6	< 6	< 11	< 7	< 13	< 8	< 10	< 10	< 7	< 6	< 27	< 10
	09/24/21 - 10/29/21	< 7	< 7	< 12	< 7	< 15	< 7	< 10	< 9	< 6	< 7	< 24	< 9
	10/29/21 - 11/27/21	< 8	< 5	< 14	< 6	< 12	< 6	< 10	< 10	< 9	< 9	< 34	< 8
	11/27/21 - 12/31/21	< 4	< 6	< 17	< 9	< 12	< 9	< 11	< 13	< 10	< 9	< 36	< 9
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-52	01/02/21 - 01/29/21	< 7	< 7	< 18	< 7	< 12	< 6	< 12	< 9	< 8	< 9	< 26	< 10
	02/26/21 - 02/26/21	< 8	< 9	< 12	< 8	< 14	< 6	< 12	< 11	< 7	< 8	< 36	< 8
	03/05/21 - 03/26/21	< 7	< 6	< 10	< 4	< 12	< 6	< 13	< 10	< 9	< 8	< 32	< 9
	04/02/21 - 04/30/21	< 4	< 7	< 17	< 8	< 15	< 6	< 11	< 11	< 9	< 7	< 29	< 12
	05/07/21 - 05/28/21	< 8	< 7	< 17	< 9	< 17	< 7	< 13	< 13	< 8	< 7	< 38	< 8
	06/04/21 - 06/25/21	< 6	< 8	< 10	< 6	< 12	< 6	< 10	< 10	< 6	< 8	< 28	< 11
	07/02/21 - 07/30/21	< 5	< 4	< 10	< 5	< 9	< 5	< 6	< 7	< 4	< 4	< 18	< 8
	08/06/21 - 08/27/21	< 6	< 7	< 10	< 7	< 16	< 6	< 10	< 8	< 8	< 5	< 25	< 11
	09/03/21 - 09/24/21	< 5	< 5	< 11	< 5	< 9	< 6	< 9	< 7	< 6	< 5	< 20	< 7
	10/01/21 - 10/29/21	< 7	< 7	< 16	< 9	< 14	< 6	< 14	< 10	< 7	< 6	< 25	< 12
	11/05/21 - 11/27/21	< 5	< 5	< 13	< 7	< 9	< 5	< 10	< 9	< 6	< 7	< 27	< 9
	12/03/21 - 12/31/21	< 7	< 7	< 17	< 8	< 15	< 6	< 13	< 11	< 8	< 8	< 31	< 12
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-57	01/02/21 - 01/29/21 *(1)*												
	02/26/21 - 02/26/21 *(1)*												
	03/26/21 - 03/26/21	< 6	< 6	< 13	< 6	< 11	< 6	< 11	< 9	< 7	< 5	< 26	< 10
	04/30/21 - 04/30/21	< 5	< 6	< 6	< 5	< 11	< 6	< 10	< 9	< 6	< 7	< 20	< 7
	05/28/21 - 05/28/21	< 7	< 6	< 14	< 5	< 16	< 5	< 11	< 13	< 8	< 6	< 27	< 13
	06/25/21 - 06/25/21	< 7	< 7	< 13	< 6	< 13	< 6	< 9	< 9	< 8	< 7	< 26	< 11
	07/30/21 - 07/30/21	< 6	< 6	< 12	< 5	< 11	< 6	< 11	< 9	< 5	< 6	< 24	< 9
	08/27/21 - 08/27/21	< 9	< 7	< 9	< 6	< 13	< 7	< 10	< 10	< 8	< 8	< 26	< 7
	09/24/21 - 09/24/21	< 5	< 5	< 9	< 5	< 14	< 8	< 10	< 10	< 7	< 7	< 30	< 10
	10/29/21 - 10/29/21	< 5	< 7	< 15	< 6	< 11	< 7	< 12	< 8	< 7	< 7	< 28	< 9
	11/27/21 - 11/27/21	< 5	< 6	< 12	< 8	< 15	< 7	< 10	< 9	< 8	< 7	< 28	< 7
	12/31/21 - 12/31/21	< 5	< 6	< 13	< 7	< 13	< 7	< 11	< 11	< 7	< 6	< 28	< 11
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-II.1 CONCENTRATIONS OF TRITIUM IN GROUND WATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	D-22	D-24	D-35
01/08/21 - 01/08/21	< 186	< 191	< 192
04/10/21 - 04/10/21	< 186	< 185	< 180
07/09/21 - 07/09/21	< 178	< 175	< 173
10/08/21 - 10/08/21	< 178	< 174	< 183
MEAN	-	-	-

Tables C-II.2

CONCENTRATIONS OF GAMMA EMITTERS IN GROUND WATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
D-22	01/08/21 - 01/08/21	< 5	< 4	< 12	< 6	< 10	< 6	< 8	< 7	< 6	< 6	< 20	< 7
	04/10/21 - 04/10/21	< 8	< 7	< 16	< 9	< 13	< 8	< 10	< 9	< 9	< 7	< 26	< 8
	07/30/21 - 07/30/21	< 5	< 4	< 10	< 5	< 9	< 5	< 10	< 8	< 7	< 6	< 24	< 6
	10/08/21 - 10/08/21	< 7	< 8	< 12	< 7	< 17	< 7	< 13	< 12	< 8	< 8	< 33	< 11
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-24	01/08/21 - 01/08/21	< 5	< 4	< 9	< 5	< 10	< 5	< 8	< 6	< 5	< 5	< 21	< 6
	04/10/21 - 04/10/21	< 5	< 6	< 11	< 6	< 12	< 5	< 12	< 7	< 7	< 8	< 23	< 10
	07/09/21 - 07/09/21	< 7	< 7	< 16	< 9	< 12	< 6	< 15	< 11	< 7	< 8	< 33	< 12
	10/08/21 - 10/08/21	< 7	< 7	< 19	< 9	< 18	< 9	< 13	< 11	< 8	< 7	< 28	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-35	01/08/21 - 01/08/21	< 6	< 7	< 11	< 9	< 12	< 8	< 15	< 10	< 8	< 8	< 39	< 10
	04/10/21 - 04/10/21	< 6	< 6	< 10	< 8	< 11	< 6	< 12	< 8	< 8	< 6	< 26	< 7
	07/09/21 - 07/09/21	< 8	< 7	< 15	< 7	< 14	< 7	< 12	< 11	< 8	< 8	< 24	< 11
	10/08/21 - 10/08/21	< 8	< 7	< 14	< 8	< 13	< 8	< 14	< 10	< 9	< 8	< 29	< 13
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-III.1

CONCENTRATIONS OF GAMMA EMITTERS IN FISH SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021

RESULTS IN UNITS OF PCI/KG WET + 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
D-28	*PREDATOR*											
Largemouth Bass	05/05/21	< 33	< 33	< 71	< 43	< 57	< 32	< 59	< 36	< 34	< 157	< 65
Smallmouth Bass	10/13/21	< 70	< 54	< 136	< 66	< 133	< 77	< 123	< 80	< 77	< 341	< 90
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-28	*BOTTOM FEEDER*											
River Carpsucker	05/05/21	< 60	< 62	< 119	< 67	< 136	< 59	< 102	< 65	< 58	< 269	< 94
Common Carp	10/13/21	< 69	< 59	< 173	< 88	< 145	< 68	< 119	< 74	< 83	< 368	< 153
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-46	*PREDATOR*											
Largemouth Bass	10/13/21	< 78	< 75	< 144	< 59	< 121	< 66	< 147	< 92	< 80	< 335	< 134
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-46	*BOTTOM FEEDER*											
Smallmouth Buffalo	05/05/21	< 45	< 39	< 77	< 41	< 102	< 42	< 75	< 48	< 44	< 216	< 57
Common Carp	05/05/21	< 41	< 48	< 131	< 46	< 112	< 32	< 74	< 52	< 50	< 204	< 67
Common Carp	10/13/21	< 59	< 69	< 154	< 70	< 165	< 85	< 137	< 79	< 75	< 315	< 102
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-IV.1

CONCENTRATIONS OF GAMMA EMITTERS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021

RESULTS IN UNITS OF PCI/KG DRY ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
D-27	05/12/21	< 92	< 99	< 201	< 95	< 207	< 111	< 195	< 112	< 106	< 767	< 317
	10/12/21	< 71	< 62	< 165	< 86	< 157	< 83	< 134	< 106	< 110	< 408	< 112
	MEAN	-	-	-	-	-	-	-	-		-	-

Table C-V.1 **CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021**

RESULTS IN UNITS OF E-3 PCI/CU METER ± 2 SIGMA

COLLECTION PERIOD	GROUP I			GROUP II					
	D-01	D-02	D-03	D-04	D-07	D-45	D-53	D-56	D-58
01/02/21 - 01/08/21	13 ± 5	23 ± 5	15 ± 5	18 ± 5	15 ± 5	14 ± 5	16 ± 5	21 ± 5	14 ± 5
01/08/21 - 01/15/21	26 ± 5	31 ± 5	24 ± 5	30 ± 5	26 ± 5	19 ± 4	18 ± 4	30 ± 5	20 ± 4
01/15/21 - 01/22/21	15 ± 4	19 ± 5	15 ± 4	16 ± 4	19 ± 5	13 ± 4	15 ± 4	17 ± 4	14 ± 4
01/22/21 - 01/29/21	17 ± 4	17 ± 4	14 ± 4	16 ± 4	12 ± 4	12 ± 4	11 ± 4	18 ± 4	9 ± 4
01/29/21 - 02/05/21	15 ± 4	20 ± 4	16 ± 4	22 ± 4	19 ± 4	14 ± 4	14 ± 4	21 ± 4	12 ± 4
02/05/21 - 02/12/21	25 ± 2	43 ± 6	36 ± 6	40 ± 6	28 ± 5	33 ± 6	30 ± 6	38 ± 6	26 ± 5
02/12/21 - 02/19/21	*(1)*	26 ± 5	20 ± 4	25 ± 5	21 ± 4	17 ± 4	20 ± 4	27 ± 5	20 ± 4
02/19/21 - 02/26/21	*(1)*	35 ± 5	31 ± 5	30 ± 5	28 ± 5	24 ± 5	24 ± 5	32 ± 5	21 ± 5
02/26/21 - 03/05/21	20 ± 5	25 ± 5	20 ± 5	20 ± 5	21 ± 5	21 ± 5	18 ± 4	25 ± 5	13 ± 4
03/05/21 - 03/12/21	16 ± 4	17 ± 4	16 ± 4	15 ± 4	14 ± 4	11 ± 4	11 ± 4	17 ± 4	8 ± 3
03/12/21 - 03/19/21	21 ± 4	26 ± 5	22 ± 4	21 ± 4	19 ± 4	17 ± 4	16 ± 4	21 ± 4	12 ± 4
03/19/21 - 03/26/21	20 ± 4	22 ± 4	17 ± 4	17 ± 4	17 ± 4	17 ± 4	17 ± 4	20 ± 4	15 ± 4
03/26/21 - 04/02/21	22 ± 5	24 ± 5	16 ± 4	18 ± 4	18 ± 4	16 ± 4	13 ± 4	21 ± 4	16 ± 4
04/02/21 - 04/10/21	19 ± 4	22 ± 4	14 ± 4	18 ± 4	18 ± 4	13 ± 4	14 ± 4	19 ± 4	16 ± 4
04/10/21 - 04/16/21	9 ± 4	11 ± 4	9 ± 4	8 ± 4	8 ± 4	12 ± 5	9 ± 4	8 ± 4	12 ± 4
04/16/21 - 04/23/21	13 ± 4	22 ± 5	14 ± 4	15 ± 4	16 ± 4	12 ± 4	12 ± 4	13 ± 4	17 ± 4
04/23/21 - 04/30/21	24 ± 5	29 ± 5	18 ± 4	19 ± 4	23 ± 4	20 ± 4	20 ± 4	21 ± 4	18 ± 4
04/30/21 - 05/07/21	8 ± 4	14 ± 4	11 ± 4	9 ± 4	12 ± 4	13 ± 4	13 ± 4	17 ± 4	13 ± 4
05/07/21 - 05/14/21	8 ± 4	< 18	9 ± 4	9 ± 4	9 ± 4	7 ± 3	7 ± 3	14 ± 4	8 ± 4
05/14/21 - 05/21/21	19 ± 4	29 ± 5	23 ± 5	19 ± 5	20 ± 5	15 ± 4	19 ± 5	33 ± 5	16 ± 4
05/21/21 - 05/28/21	17 ± 4	19 ± 4	13 ± 4	15 ± 4	15 ± 4	12 ± 4	12 ± 4	26 ± 5	17 ± 4
05/28/21 - 06/04/21	25 ± 5	29 ± 5	19 ± 4	16 ± 4	20 ± 4	23 ± 5	22 ± 4	36 ± 5	21 ± 4
06/04/21 - 06/11/21	16 ± 4	18 ± 4	11 ± 4	11 ± 4	12 ± 4	16 ± 4	17 ± 4	11 ± 4	14 ± 4
06/11/21 - 06/18/21	24 ± 5	22 ± 5	16 ± 4	17 ± 4	16 ± 4	16 ± 4	17 ± 4	15 ± 4	16 ± 4
06/18/21 - 06/25/21	20 ± 5	14 ± 4	12 ± 4	14 ± 4	15 ± 4	17 ± 5	16 ± 4	12 ± 4	14 ± 4
06/25/21 - 07/02/21	10 ± 3	14 ± 4	9 ± 3	7 ± 3	8 ± 3	10 ± 4	9 ± 4	6 ± 3	10 ± 3
07/02/21 - 07/09/21	18 ± 4	24 ± 5	17 ± 4	17 ± 4	20 ± 4	*(1)*	18 ± 4	20 ± 4	21 ± 4
07/09/21 - 07/16/21	19 ± 4	22 ± 5	16 ± 4	14 ± 4	16 ± 4	*(1)*	17 ± 4	16 ± 4	9 ± 3
07/16/21 - 07/24/21	17 ± 4	24 ± 4	18 ± 4	15 ± 4	19 ± 4	19 ± 4	17 ± 4	20 ± 4	15 ± 4
07/24/21 - 07/30/21	24 ± 5	31 ± 6	21 ± 5	17 ± 5	22 ± 5	25 ± 5	25 ± 6	24 ± 5	27 ± 6
07/30/21 - 08/06/21	20 ± 5	23 ± 5	12 ± 4	16 ± 4	18 ± 4	16 ± 4	14 ± 4	13 ± 4	18 ± 4
08/06/21 - 08/13/21	20 ± 4	25 ± 4	13 ± 4	16 ± 4	18 ± 4	19 ± 4	20 ± 4	17 ± 4	21 ± 4
08/13/21 - 08/20/21	14 ± 4	20 ± 5	14 ± 4	16 ± 4	16 ± 4	12 ± 4	16 ± 4	17 ± 4	22 ± 5
08/20/21 - 08/27/21	26 ± 5	26 ± 5	20 ± 4	15 ± 4	17 ± 4	20 ± 5	22 ± 5	19 ± 4	24 ± 5
08/27/21 - 09/03/21	16 ± 4	28 ± 5	15 ± 4	19 ± 4	15 ± 4	16 ± 4	15 ± 4	15 ± 4	22 ± 4
09/03/21 - 09/10/21	16 ± 4	22 ± 4	14 ± 4	22 ± 4	14 ± 4	17 ± 4	10 ± 3	17 ± 4	21 ± 4
09/10/21 - 09/17/21	28 ± 6	35 ± 6	25 ± 5	25 ± 5	27 ± 5	29 ± 5	25 ± 5	25 ± 5	29 ± 6
09/17/21 - 09/24/21	14 ± 5	21 ± 5	13 ± 4	15 ± 4	18 ± 4	15 ± 4	18 ± 5	20 ± 5	19 ± 5
09/24/21 - 10/01/21	29 ± 5	32 ± 5	28 ± 5	27 ± 5	29 ± 5	27 ± 5	25 ± 5	30 ± 5	32 ± 5
10/01/21 - 10/08/21	18 ± 5	23 ± 5	13 ± 4	17 ± 5	15 ± 4	17 ± 5	20 ± 5	21 ± 5	22 ± 5
10/08/21 - 10/15/21	20 ± 5	19 ± 5	9 ± 4	16 ± 4	19 ± 5	19 ± 5	18 ± 5	23 ± 5	27 ± 5
10/15/21 - 10/22/21	19 ± 4	23 ± 5	15 ± 4	32 ± 5	18 ± 4	18 ± 4	19 ± 4	28 ± 5	23 ± 5
10/22/21 - 10/29/21	*(1)*	6 ± 3	7 ± 4	8 ± 4	5 ± 3	7 ± 4	13 ± 4	10 ± 4	9 ± 4
10/29/21 - 11/05/21	20 ± 5	16 ± 5	22 ± 5	21 ± 5	9 ± 4	14 ± 4	22 ± 5	19 ± 5	16 ± 5
11/05/21 - 11/12/21	32 ± 5	30 ± 5	32 ± 5	36 ± 6	37 ± 6	31 ± 5	39 ± 6	35 ± 6	27 ± 5
11/12/21 - 11/20/21	15 ± 4	14 ± 3	13 ± 3	17 ± 4	16 ± 4	15 ± 4	16 ± 4	17 ± 4	12 ± 3
11/20/21 - 11/27/21	22 ± 5	18 ± 5	19 ± 5	21 ± 5	24 ± 5	19 ± 5	25 ± 5	15 ± 4	23 ± 5
11/27/21 - 12/03/21	26 ± 6	20 ± 5	23 ± 6	29 ± 6	29 ± 6	21 ± 5	31 ± 6	24 ± 5	27 ± 6
12/03/21 - 12/10/21	19 ± 5	12 ± 4	20 ± 5	26 ± 5	23 ± 5	27 ± 5	16 ± 5	20 ± 5	22 ± 5
12/10/21 - 12/17/21	23 ± 5	13 ± 4	22 ± 5	31 ± 5	23 ± 5	19 ± 5	25 ± 5	23 ± 5	17 ± 4
12/17/21 - 12/24/21	30 ± 5	29 ± 5	27 ± 5	38 ± 6	32 ± 5	25 ± 5	41 ± 6	25 ± 5	36 ± 6
12/24/21 - 12/31/21	38 ± 6	25 ± 5	37 ± 5	48 ± 6	35 ± 5	35 ± 5	43 ± 6	29 ± 5	40 ± 6
MEAN ± 2 STD DEV	20 ± 12	23 ± 14	18 ± 13	20 ± 17	19 ± 13	18 ± 12	19 ± 15	21 ± 14	19 ± 14

THE MEAN AND 2 STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-V.1

CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021

RESULTS IN UNITS OF E-3 PCI/CU METER ± 2 SIGMA

COLLECTION PERIOD	GROUP III				GROUP IV
	D-08	D-10	D-14	D-55	D-12
01/02/21 - 01/08/21	18 ± 5	16 ± 5	18 ± 5	13 ± 5	17 ± 5
01/08/21 - 01/15/21	26 ± 5	25 ± 5	20 ± 4	23 ± 5	25 ± 5
01/15/21 - 01/22/21	16 ± 4	16 ± 4	11 ± 4	16 ± 4	16 ± 4
01/22/21 - 01/29/21	17 ± 4	14 ± 4	10 ± 4	14 ± 4	15 ± 4
01/29/21 - 02/05/21	20 ± 4	20 ± 4	16 ± 4	14 ± 4	15 ± 4
02/05/21 - 02/12/21	37 ± 6	30 ± 5	31 ± 6	28 ± 5	35 ± 7
02/12/21 - 02/19/21	29 ± 5	24 ± 5	22 ± 5	22 ± 4	28 ± 5
02/19/21 - 02/26/21	32 ± 5	25 ± 5	30 ± 5	19 ± 4	27 ± 5
02/26/21 - 03/05/21	19 ± 4	17 ± 4	17 ± 4	16 ± 4	14 ± 4
03/05/21 - 03/12/21	17 ± 4	8 ± 3	14 ± 4	13 ± 4	14 ± 4
03/12/21 - 03/19/21	19 ± 4	17 ± 4	19 ± 4	14 ± 4	20 ± 4
03/19/21 - 03/26/21	24 ± 4	14 ± 4	16 ± 4	12 ± 4	19 ± 4
03/26/21 - 04/02/21	19 ± 4	17 ± 4	18 ± 4	16 ± 4	19 ± 4
04/02/21 - 04/10/21	19 ± 4	10 ± 4	17 ± 4	17 ± 4	18 ± 4
04/10/21 - 04/16/21	12 ± 5	7 ± 4	9 ± 4	7 ± 4	10 ± 4
04/16/21 - 04/23/21	17 ± 4	11 ± 4	12 ± 4	13 ± 4	15 ± 4
04/23/21 - 04/30/21	20 ± 4	18 ± 4	22 ± 4	21 ± 4	26 ± 5
04/30/21 - 05/07/21	7 ± 4	11 ± 3	10 ± 4	12 ± 4	15 ± 4
05/07/21 - 05/14/21	9 ± 4	7 ± 3	6 ± 3	11 ± 4	10 ± 4
05/14/21 - 05/21/21	26 ± 5	17 ± 4	22 ± 5	20 ± 5	21 ± 5
05/21/21 - 05/28/21	17 ± 4	15 ± 4	14 ± 4	14 ± 4	17 ± 4
05/28/21 - 06/04/21	21 ± 4	17 ± 4	22 ± 5	22 ± 5	23 ± 5
06/04/21 - 06/11/21	15 ± 4	13 ± 4	16 ± 4	19 ± 4	16 ± 4
06/11/21 - 06/18/21	18 ± 4	17 ± 4	18 ± 4	19 ± 4	17 ± 4
06/18/21 - 06/25/21	20 ± 5	12 ± 4	15 ± 4	19 ± 4	15 ± 4
06/25/21 - 07/02/21	10 ± 3	8 ± 3	9 ± 4	11 ± 3	10 ± 3
07/02/21 - 07/09/21	16 ± 4	14 ± 4	17 ± 4	17 ± 4	22 ± 5
07/09/21 - 07/16/21	15 ± 4	12 ± 4	17 ± 4	19 ± 4	17 ± 4
07/16/21 - 07/24/21	19 ± 4	25 ± 4	21 ± 4	20 ± 4	17 ± 4
07/24/21 - 07/30/21	26 ± 6	21 ± 5	28 ± 6	25 ± 6	23 ± 5
07/30/21 - 08/06/21	20 ± 5	14 ± 4	15 ± 4	15 ± 4	15 ± 4
08/06/21 - 08/13/21	18 ± 4	14 ± 4	23 ± 4	18 ± 4	16 ± 4
08/13/21 - 08/20/21	17 ± 4	14 ± 4	21 ± 5	14 ± 4	16 ± 4
08/20/21 - 08/27/21	25 ± 5	16 ± 4	20 ± 5	21 ± 5	20 ± 4
08/27/21 - 09/03/21	18 ± 4	15 ± 4	21 ± 4	17 ± 4	17 ± 4
09/03/21 - 09/10/21	19 ± 4	14 ± 4	20 ± 4	17 ± 4	19 ± 4
09/10/21 - 09/17/21	28 ± 5	20 ± 5	28 ± 5	25 ± 5	26 ± 5
09/17/21 - 09/24/21	18 ± 5	15 ± 4	19 ± 5	18 ± 4	14 ± 4
09/24/21 - 10/01/21	33 ± 6	19 ± 5	28 ± 5	30 ± 5	25 ± 5
10/01/21 - 10/08/21	26 ± 5	10 ± 4	21 ± 5	21 ± 5	16 ± 4
10/08/21 - 10/15/21	20 ± 5	15 ± 4	18 ± 4	24 ± 5	14 ± 4
10/15/21 - 10/22/21	22 ± 5	16 ± 4	18 ± 4	25 ± 5	21 ± 4
10/22/21 - 10/29/21	9 ± 5	6 ± 3	7 ± 4	12 ± 4	9 ± 4
10/29/21 - 11/05/21	13 ± 4	12 ± 4	17 ± 5	16 ± 5	*(1)*
11/05/21 - 11/12/21	27 ± 5	24 ± 5	31 ± 5	23 ± 5	*(1)*
11/12/21 - 11/20/21	17 ± 4	9 ± 3	13 ± 4	14 ± 4	*(1)*
11/20/21 - 11/27/21	18 ± 5	13 ± 4	17 ± 4	14 ± 4	*(1)*
11/27/21 - 12/03/21	18 ± 5	28 ± 6	18 ± 5	20 ± 5	*(1)*
12/03/21 - 12/10/21	20 ± 5	24 ± 5	20 ± 5	22 ± 5	*(1)*
12/10/21 - 12/17/21	27 ± 5	23 ± 5	18 ± 5	22 ± 5	*(1)*
12/17/21 - 12/24/21	24 ± 5	39 ± 6	30 ± 5	34 ± 5	*(1)*
12/24/21 - 12/31/21	29 ± 5	47 ± 6	30 ± 5	35 ± 5	*(1)*
MEAN ± 2 STD DEV	20 ± 12	17 ± 15	19 ± 12	19 ± 11	18 ± 11

THE MEAN AND 2 STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-V.2

MONTHLY AND YEARLY MEAN VALUES OF GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021

RESULTS IN UNITS OF E-3 PCI/CU METER ± 2 SIGMA

GROUP I - ON-SITE LOCATIONS				GROUP II - NEAR-FIELD LOCATIONS				GROUP III - FAR-FIELD LOCATIONS				GROUP IV - CONTROL LOCATION			
COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD	COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD	COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD	COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD
01/02/21 - 01/29/21	13	31	19 ± 11	01/02/21 - 01/29/21	9	30	17 ± 11	01/02/21 - 01/29/21	10	26	17 ± 9	01/02/21 - 01/29/21	15	25	18 ± 9
01/29/21 - 02/26/21	15	43	27 ± 18	01/29/21 - 02/26/21	12	40	24 ± 14	01/29/21 - 02/26/21	14	37	25 ± 13	01/29/21 - 02/26/21	15	35	26 ± 17
02/26/21 - 04/02/21	16	26	20 ± 7	02/26/21 - 04/02/21	8	25	17 ± 7	02/26/21 - 04/02/21	8	24	16 ± 6	02/26/21 - 04/02/21	14	20	17 ± 6
04/02/21 - 04/30/21	9	29	17 ± 13	04/02/21 - 04/30/21	8	23	15 ± 9	04/02/21 - 04/30/21	7	22	14 ± 10	04/02/21 - 04/30/21	10	26	17 ± 13
04/30/21 - 06/04/21	8	29	17 ± 14	04/30/21 - 06/04/21	7	36	16 ± 14	04/30/21 - 06/04/21	6	26	15 ± 12	04/30/21 - 06/04/21	10	23	17 ± 10
06/04/21 - 07/02/21	9	24	15 ± 9	06/04/21 - 07/02/21	6	17	13 ± 7	06/04/21 - 07/02/21	8	20	15 ± 8	06/04/21 - 07/02/21	10	17	14 ± 7
07/02/21 - 07/30/21	16	31	21 ± 9	07/02/21 - 07/30/21	9	27	19 ± 8	07/02/21 - 07/30/21	12	28	19 ± 9	07/02/21 - 07/30/21	17	23	20 ± 6
07/30/21 - 09/03/21	12	28	19 ± 10	07/30/21 - 09/03/21	12	24	17 ± 6	07/30/21 - 09/03/21	14	25	18 ± 7	07/30/21 - 09/03/21	15	20	17 ± 4
09/03/21 - 10/01/21	13	35	23 ± 15	09/03/21 - 10/01/21	10	32	22 ± 12	09/03/21 - 10/01/21	14	33	22 ± 12	09/03/21 - 10/01/21	14	26	21 ± 11
10/01/21 - 10/29/21	6	23	16 ± 12	10/01/21 - 10/29/21	5	32	18 ± 13	10/01/21 - 10/29/21	6	26	17 ± 13	10/01/21 - 10/29/21	9	21	15 ± 10
10/29/21 - 12/03/21	13	32	21 ± 12	10/29/21 - 12/03/21	9	39	23 ± 16	10/29/21 - 12/03/21	9	31	18 ± 12	*(1)*			
12/03/21 - 12/31/21	12	38	24 ± 16	12/03/21 - 12/31/21	16	48	29 ± 18	12/03/21 - 12/31/21	18	47	28 ± 16	*(1)*			
01/02/21 - 12/31/21	6	43	20 ± 14	01/02/21 - 12/31/21	5	48	19 ± 14	01/02/21 - 12/31/21	6	47	19 ± 13	01/02/21 - 10/29/21	9	35	18 ± 11

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-V.3

CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021

RESULTS IN UNITS OF E-3 PCI/CU METER ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
D-01	01/02/21 - 04/02/21	< 3	< 4	< 6	< 4	< 8	< 3	< 5	< 3	< 3	< 14	< 6
	04/02/21 - 07/02/21	< 2	< 2	< 5	< 2	< 6	< 3	< 5	< 3	< 2	< 15	< 4
	07/02/21 - 10/01/21	< 2	< 3	< 5	< 2	< 5	< 3	< 5	< 3	< 3	< 15	< 5
	10/01/21 - 12/31/21	< 3	< 2	< 5	< 4	< 7	< 3	< 4	< 2	< 3	< 14	< 6
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-02	01/02/21 - 04/02/21	< 2	< 2	< 5	< 2	< 5	< 2	< 4	< 2	< 1	< 11	< 4
	04/02/21 - 07/02/21	< 2	< 2	< 5	< 2	< 5	< 2	< 3	< 2	< 2	< 10	< 4
	07/02/21 - 10/01/21	< 3	< 4	< 6	< 3	< 6	< 4	< 6	< 4	< 3	< 18	< 7
	10/01/21 - 12/31/21	< 2	< 2	< 4	< 2	< 5	< 2	< 3	< 2	< 2	< 9	< 3
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-03	01/02/21 - 04/02/21	< 2	< 2	< 5	< 2	< 5	< 2	< 3	< 2	< 2	< 11	< 2
	04/02/21 - 07/02/21	< 2	< 2	< 4	< 2	< 6	< 2	< 3	< 1	< 2	< 7	< 3
	07/02/21 - 10/01/21	< 2	< 2	< 3	< 3	< 4	< 2	< 2	< 1	< 2	< 9	< 4
	10/01/21 - 12/31/21	< 2	< 2	< 4	< 3	< 5	< 2	< 3	< 2	< 1	< 11	< 6
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-04	01/02/21 - 04/02/21	< 3	< 2	< 3	< 3	< 5	< 2	< 5	< 2	< 2	< 12	< 4
	04/02/21 - 07/02/21	< 2	< 1	< 5	< 2	< 5	< 2	< 4	< 2	< 2	< 9	< 5
	07/02/21 - 10/01/21	< 2	< 2	< 4	< 2	< 4	< 2	< 2	< 2	< 2	< 12	< 6
	10/01/21 - 12/31/21	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 2	< 2	< 10	< 4
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-07	01/02/21 - 04/02/21	< 2	< 2	< 4	< 3	< 4	< 2	< 3	< 2	< 2	< 7	< 5
	04/02/21 - 07/02/21	< 3	< 3	< 6	< 3	< 7	< 3	< 5	< 3	< 2	< 14	< 5
	07/02/21 - 10/01/21	< 2	< 2	< 6	< 2	< 5	< 3	< 5	< 3	< 3	< 14	< 5
	10/01/21 - 12/31/21	< 3	< 3	< 8	< 3	< 8	< 4	< 5	< 3	< 3	< 20	< 10
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-08	01/02/21 - 04/02/21	< 3	< 3	< 6	< 4	< 7	< 3	< 5	< 3	< 3	< 16	< 5
	04/02/21 - 07/02/21	< 2	< 3	< 4	< 2	< 4	< 2	< 4	< 2	< 2	< 9	< 5
	07/02/21 - 10/01/21	< 3	< 3	< 8	< 4	< 10	< 4	< 6	< 3	< 3	< 14	< 9
	10/01/21 - 12/31/21	< 2	< 2	< 5	< 3	< 5	< 2	< 4	< 2	< 2	< 10	< 5
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-10	01/02/21 - 04/02/21	< 3	< 3	< 7	< 3	< 6	< 3	< 5	< 3	< 3	< 15	< 4
	04/02/21 - 07/02/21	< 2	< 1	< 4	< 2	< 5	< 2	< 4	< 2	< 1	< 9	< 5
	07/02/21 - 10/01/21	< 2	< 2	< 5	< 2	< 5	< 2	< 4	< 3	< 2	< 11	< 6
	10/01/21 - 12/31/21	< 3	< 3	< 7	< 5	< 7	< 3	< 5	< 3	< 4	< 20	< 7
	MEAN			-	-	-	-	-	-	-	-	-

Table C-V.3

CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021

RESULTS IN UNITS OF E-3 PCI/CU METER ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
D-12	01/02/21 - 04/02/21	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 2	< 2	< 10	< 4
	04/02/21 - 07/02/21	< 2	< 3	< 5	< 3	< 6	< 2	< 4	< 2	< 3	< 15	< 3
	07/02/21 - 10/01/21	< 2	< 2	< 5	< 2	< 3	< 2	< 3	< 2	< 2	< 10	< 3
	10/01/21 - 10/29/21	< 5	< 9	< 28	< 5	< 13	< 10	< 14	< 5	< 4	< 765	< 301
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-14	01/02/21 - 04/02/21	< 2	< 2	< 5	< 2	< 6	< 2	< 5	< 2	< 2	< 10	< 4
	04/02/21 - 07/02/21	< 2	< 2	< 5	< 3	< 5	< 2	< 4	< 2	< 2	< 10	< 6
	07/02/21 - 10/01/21	< 2	< 2	< 3	< 3	< 5	< 2	< 3	< 2	< 2	< 10	< 4
	10/01/21 - 12/31/21	< 2	< 2	< 4	< 3	< 6	< 2	< 4	< 2	< 2	< 12	< 6
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-45	01/02/21 - 04/02/21	< 2	< 3	< 5	< 3	< 7	< 3	< 5	< 2	< 2	< 13	< 4
	04/02/21 - 07/02/21	< 2	< 2	< 6	< 2	< 6	< 3	< 5	< 3	< 2	< 16	< 5
	07/16/21 - 10/01/21	< 2	< 2	< 7	< 3	< 5	< 3	< 5	< 3	< 2	< 18	< 6
	10/01/21 - 12/31/21	< 2	< 2	< 6	< 2	< 5	< 2	< 4	< 2	< 2	< 13	< 5
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-53	01/02/21 - 04/02/21	< 2	< 2	< 4	< 2	< 5	< 2	< 4	< 2	< 2	< 8	< 5
	04/02/21 - 07/02/21	< 4	< 4	< 5	< 4	< 8	< 4	< 7	< 3	< 3	< 17	< 8
	07/02/21 - 10/01/21	< 3	< 4	< 6	< 4	< 7	< 3	< 5	< 4	< 3	< 16	< 4
	10/01/21 - 12/31/21	< 3	< 2	< 5	< 2	< 7	< 3	< 4	< 2	< 2	< 16	< 8
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-55	01/02/21 - 04/02/21	< 3	< 2	< 6	< 2	< 7	< 2	< 6	< 3	< 3	< 13	< 4
	04/02/21 - 07/02/21	< 1	< 2	< 4	< 3	< 4	< 2	< 3	< 2	< 2	< 10	< 5
	07/02/21 - 10/01/21	< 2	< 1	< 3	< 2	< 4	< 2	< 3	< 1	< 1	< 8	< 4
	10/01/21 - 12/31/21	< 2	< 2	< 4	< 3	< 8	< 2	< 3	< 2	< 2	< 12	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-56	01/02/21 - 04/02/21	< 3	< 3	< 6	< 4	< 7	< 4	< 6	< 4	< 3	< 17	< 7
	04/02/21 - 07/02/21	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 2	< 2	< 10	< 4
	07/02/21 - 10/01/21	< 2	< 2	< 3	< 3	< 4	< 1	< 3	< 2	< 2	< 8	< 5
	10/01/21 - 12/31/21	< 2	< 2	< 6	< 2	< 5	< 2	< 3	< 2	< 2	< 10	< 5
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-58	01/02/21 - 04/02/21	< 2	< 2	< 5	< 3	< 7	< 2	< 4	< 3	< 2	< 10	< 4
	04/02/21 - 07/02/21	< 2	< 2	< 4	< 2	< 5	< 2	< 4	< 2	< 2	< 11	< 4
	07/02/21 - 10/01/21	< 2	< 3	< 6	< 3	< 5	< 2	< 5	< 3	< 2	< 14	< 4
	10/01/21 - 12/31/21	< 2	< 3	< 6	< 3	< 8	< 3	< 5	< 2	< 2	< 13	< 5
	MEAN			-	-	-	-	-	-	-	-	-

Table C-VI.1 **CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES**
COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021
RESULTS IN UNITS OF E-3 PCI/CU METER + 2 SIGMA

COLLECTION PERIOD	GROUP I			GROUP II					
	D-01	D-02	D-03	D-04	D-07	D-45	D-53	D-56	D-58
01/02/21 - 01/08/21	< 52	< 51	< 51	< 22	< 52	< 23	< 49	< 49	< 49
01/08/21 - 01/15/21	< 31	< 31	< 15	< 31	< 31	< 14	< 13	< 25	< 25
01/15/21 - 01/22/21	< 29	< 29	< 29	< 29	< 41	< 20	< 19	< 19	< 19
01/22/21 - 01/29/21	< 53	< 54	< 53	< 53	< 21	< 16	< 29	< 29	< 29
01/29/21 - 02/05/21	< 50	< 50	< 50	< 50	< 33	< 18	< 35	< 33	< 33
02/05/21 - 02/12/21	< 5	< 27	< 60	< 60	< 60	< 69	< 66	< 57	< 57
02/12/21 - 02/19/21	*(1)*	< 51	< 60	< 60	< 60	< 31	< 57	< 66	< 66
02/19/21 - 02/26/21	*(1)*	< 30	< 30	< 30	< 30	< 31	< 51	< 48	< 48
02/26/21 - 03/05/21	< 22	< 22	< 22	< 22	< 23	< 13	< 49	< 48	< 48
03/05/21 - 03/12/21	< 31	< 31	< 31	< 14	< 31	< 26	< 36	< 36	< 36
03/12/21 - 03/19/21	< 33	< 33	< 33	< 33	< 17	< 19	< 34	< 35	< 35
03/19/21 - 03/26/21	< 17	< 42	< 42	< 42	< 33	< 41	< 40	< 18	< 38
03/26/21 - 04/02/21	< 44	< 43	< 43	< 18	< 44	< 19	< 34	< 33	< 33
04/02/21 - 04/10/21	< 24	< 25	< 25	< 24	< 28	< 27	< 26	< 24	< 24
04/10/21 - 04/16/21	< 22	< 44	< 44	< 44	< 44	< 19	< 25	< 26	< 26
04/16/21 - 04/23/21	< 22	< 53	< 53	< 52	< 53	< 19	< 35	< 34	< 34
04/23/21 - 04/30/21	< 42	< 42	< 42	< 42	< 18	< 17	< 28	< 28	< 28
04/30/21 - 05/07/21	< 41	< 41	< 41	< 41	< 17	< 18	< 39	< 40	< 40
05/07/21 - 05/14/21	< 27	< 56	< 27	< 27	< 27	< 14	< 28	< 28	< 27
05/14/21 - 05/21/21	< 29	< 29	< 25	< 29	< 29	< 37	< 39	< 38	< 38
05/21/21 - 05/28/21	< 42	< 42	< 42	< 42	< 29	< 26	< 29	< 29	< 29
05/28/21 - 06/04/21	< 32	< 32	< 32	< 32	< 17	< 18	< 32	< 32	< 32
06/04/21 - 06/11/21	< 33	< 33	< 33	< 33	< 14	< 11	< 23	< 22	< 22
06/11/21 - 06/18/21	< 29	< 30	< 29	< 30	< 14	< 29	< 30	< 30	< 30
06/18/21 - 06/25/21	< 50	< 50	< 50	< 50	< 32	< 14	< 29	< 28	< 28
06/25/21 - 07/02/21	< 28	< 28	< 28	< 28	< 33	< 42	< 18	< 41	< 41
07/02/21 - 07/09/21	< 51	< 22	< 52	< 52	< 53	*(1)*	< 50	< 22	< 22
07/09/21 - 07/16/21	< 18	< 43	< 43	< 43	< 43	*(1)*	< 17	< 29	< 29
07/16/21 - 07/24/21	< 24	< 12	< 24	< 24	< 24	< 14	< 30	< 31	< 15
07/24/21 - 07/30/21	< 56	< 57	< 57	< 57	< 24	< 36	< 49	< 48	< 48
07/30/21 - 08/06/21	< 17	< 41	< 41	< 41	< 41	< 21	< 46	< 45	< 45
08/06/21 - 08/13/21	< 23	< 23	< 23	< 23	< 43	< 33	< 33	< 33	< 27
08/13/21 - 08/20/21	< 35	< 35	< 35	< 35	< 41	< 32	< 32	< 15	< 32
08/20/21 - 08/27/21	< 29	< 29	< 29	< 29	< 51	< 60	< 60	< 25	< 59
08/27/21 - 09/03/21	< 32	< 14	< 32	< 32	< 32	< 41	< 50	< 50	< 50
09/03/21 - 09/10/21	< 26	< 26	< 31	< 26	< 31	< 45	< 29	< 28	< 28
09/10/21 - 09/17/21	< 31	< 32	< 32	< 37	< 32	< 39	< 37	< 37	< 37
09/17/21 - 09/24/21	< 37	< 33	< 33	< 33	< 21	< 49	< 49	< 48	< 20
09/24/21 - 10/01/21	< 44	< 44	< 44	< 19	< 45	< 43	< 38	< 38	< 38
10/01/21 - 10/08/21	< 46	< 47	< 47	< 46	< 14	< 33	< 32	< 21	< 32
10/08/21 - 10/15/21	< 27	< 27	< 27	< 23	< 27	< 26	< 28	< 28	< 28
10/15/21 - 10/22/21	< 37	< 37	< 37	< 37	< 25	< 52	< 51	< 51	< 21
10/22/21 - 10/29/21	*(1)*	< 20	< 20	< 20	< 43	< 33	< 32	< 27	< 32
10/29/21 - 11/05/21	< 52	< 22	< 52	< 52	< 52	< 32	< 36	< 35	< 35
11/05/21 - 11/12/21	< 17	< 33	< 32	< 32	< 32	< 19	< 11	< 11	< 11
11/12/21 - 11/20/21	< 37	< 37	< 36	< 37	< 16	< 25	< 24	< 24	< 20
11/20/21 - 11/27/21	< 32	< 32	< 32	< 15	< 32	< 25	< 21	< 21	< 21
11/27/21 - 12/03/21	< 56	< 56	< 24	< 9	< 9	< 10	< 8	< 9	< 9
12/03/21 - 12/10/21	< 32	< 32	< 17	< 32	< 32	< 32	< 26	< 26	< 26
12/10/21 - 12/17/21	< 33	< 22	< 32	< 33	< 33	< 36	< 35	< 25	< 25
12/17/21 - 12/24/21	< 47	< 47	< 47	< 20	< 47	< 36	< 23	< 31	< 31
12/24/21 - 12/31/21	< 28	< 28	< 28	< 27	< 27	< 37	< 36	< 17	< 36
MEAN	-	-	-	-	-	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-VI.1 **CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES**
COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021
RESULTS IN UNITS OF E-3 PCI/CU METER + 2 SIGMA

COLLECTION PERIOD	GROUP III				GROUP IV
	D-08	D-10	D-14	D-55	D-12
01/02/21 - 01/08/21	< 51	< 51	< 54	< 50	< 51
01/08/21 - 01/15/21	< 30	< 30	< 30	< 26	< 30
01/15/21 - 01/22/21	< 41	< 41	< 18	< 20	< 41
01/22/21 - 01/29/21	< 22	< 22	< 13	< 30	< 22
01/29/21 - 02/05/21	< 33	< 33	< 18	< 34	< 33
02/05/21 - 02/12/21	< 60	< 63	< 67	< 57	< 41
02/12/21 - 02/19/21	< 61	< 56	< 60	< 67	< 57
02/19/21 - 02/26/21	< 30	< 30	< 15	< 49	< 30
02/26/21 - 03/05/21	< 28	< 28	< 29	< 50	< 28
03/05/21 - 03/12/21	< 25	< 25	< 12	< 36	< 25
03/12/21 - 03/19/21	< 37	< 37	< 38	< 36	< 37
03/19/21 - 03/26/21	< 33	< 33	< 29	< 39	< 33
03/26/21 - 04/02/21	< 37	< 37	< 39	< 33	< 37
04/02/21 - 04/10/21	< 27	< 27	< 25	< 12	< 28
04/10/21 - 04/16/21	< 37	< 37	< 38	< 26	< 37
04/16/21 - 04/23/21	< 35	< 35	< 37	< 34	< 35
04/23/21 - 04/30/21	< 34	< 34	< 36	< 29	< 34
04/30/21 - 05/07/21	< 40	< 40	< 42	< 41	< 40
05/07/21 - 05/14/21	< 30	< 30	< 31	< 28	< 31
05/14/21 - 05/21/21	< 34	< 34	< 17	< 38	< 34
05/21/21 - 05/28/21	< 29	< 29	< 14	< 29	< 29
05/28/21 - 06/04/21	< 40	< 40	< 41	< 33	< 40
06/04/21 - 06/11/21	< 23	< 23	< 25	< 23	< 23
06/11/21 - 06/18/21	< 33	< 33	< 34	< 31	< 33
06/18/21 - 06/25/21	< 32	< 32	< 15	< 29	< 32
06/25/21 - 07/02/21	< 34	< 33	< 24	< 41	< 34
07/02/21 - 07/09/21	< 53	< 53	< 23	< 23	< 53
07/09/21 - 07/16/21	< 35	< 35	< 35	< 30	< 35
07/16/21 - 07/24/21	< 27	< 27	< 27	< 31	< 27
07/24/21 - 07/30/21	< 37	< 37	< 31	< 49	< 37
07/30/21 - 08/06/21	< 47	< 47	< 48	< 46	< 47
08/06/21 - 08/13/21	< 43	< 43	< 44	< 33	< 18
08/13/21 - 08/20/21	< 17	< 41	< 41	< 32	< 41
08/20/21 - 08/27/21	< 51	< 51	< 52	< 60	< 22
08/27/21 - 09/03/21	< 40	< 40	< 34	< 51	< 40
09/03/21 - 09/10/21	< 45	< 51	< 19	< 36	< 45
09/10/21 - 09/17/21	< 39	< 39	< 18	< 33	< 39
09/17/21 - 09/24/21	< 50	< 50	< 50	< 48	< 50
09/24/21 - 10/01/21	< 42	< 42	< 18	< 38	< 42
10/01/21 - 10/08/21	< 30	< 31	< 31	< 33	< 31
10/08/21 - 10/15/21	< 13	< 26	< 26	< 28	< 26
10/15/21 - 10/22/21	< 26	< 25	< 11	< 52	< 26
10/22/21 - 10/29/21	< 26	< 43	< 43	< 33	< 43
10/29/21 - 11/05/21	< 31	< 31	< 32	< 37	*(1)*
11/05/21 - 11/12/21	< 46	< 46	< 44	< 10	*(1)*
11/12/21 - 11/20/21	*(1)*	< 24	< 25	< 25	*(1)*
11/20/21 - 11/27/21	< 25	< 25	< 25	< 21	*(1)*
11/27/21 - 12/03/21	< 9	< 9	< 9	< 10	*(1)*
12/03/21 - 12/10/21	< 32	< 32	< 32	< 27	*(1)*
12/10/21 - 12/17/21	< 16	< 35	< 36	< 25	*(1)*
12/17/21 - 12/24/21	< 35	< 35	< 36	< 14	*(1)*
12/24/21 - 12/31/21	< 12	< 27	< 27	< 37	*(1)*
MEAN	-	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-VII.1

CONCENTRATIONS OF GAMMA EMITTERS IN VEGETATION SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
D-25													
Spinach	07/09/21	< 42	< 33	< 69	< 44	< 66	< 28	< 56	< 40	< 37	< 29	< 121	< 45
Collard green	07/09/21	< 46	< 36	< 77	< 38	< 79	< 38	< 65	< 46	< 41	< 42	< 166	< 40
Lettuce	07/09/21	< 34	< 25	< 62	< 30	< 72	< 27	< 57	< 39	< 33	< 35	< 127	< 23
Collard greens	08/13/21	< 30	< 20	< 62	< 31	< 56	< 28	< 48	< 38	< 30	< 28	< 120	< 30
Swiss Chard	08/13/21	< 28	< 25	< 79	< 26	< 70	< 28	< 50	< 39	< 36	< 28	< 134	< 52
Lettuce	08/13/21	< 22	< 23	< 63	< 32	< 67	< 31	< 50	< 37	< 25	< 31	< 126	< 38
Collard greens	09/10/21	< 25	< 30	< 56	< 31	< 40	< 29	< 52	< 33	< 31	< 22	< 127	< 37
Swiss Chard	09/10/21	< 26	< 24	< 58	< 25	< 53	< 29	< 47	< 37	< 32	< 28	< 107	< 28
Collard	10/08/21	< 30	< 31	< 53	< 32	< 52	< 26	< 45	< 35	< 29	< 29	< 122	< 36
Swiss Chard	10/08/21	< 29	< 27	< 53	< 20	< 68	< 33	< 45	< 33	< 32	< 29	< 112	< 35
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-40													
Mustard green	07/09/21	< 31	< 31	< 47	< 40	< 82	< 33	< 56	< 36	< 32	< 29	< 123	< 33
Collard Greens	07/09/21	< 36	< 34	< 59	< 27	< 89	< 29	< 54	< 43	< 31	< 36	< 111	< 36
Collard greens	08/13/21	< 29	< 33	< 53	< 29	< 72	< 33	< 55	< 41	< 34	< 33	< 141	< 20
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-41													
Swiss Chard	08/13/21	< 16	< 17	< 35	< 19	< 36	< 18	< 30	< 22	< 18	< 17	< 71	< 23
Swiss Chard	09/10/21	< 44	< 31	< 78	< 37	< 80	< 40	< 67	< 54	< 40	< 41	< 144	< 34
Swiss Chard	10/08/21	< 37	< 34	< 77	< 35	< 86	< 35	< 67	< 56	< 41	< 47	< 165	< 39
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-42													
Cabbage	07/09/21	< 20	< 22	< 41	< 25	< 31	< 23	< 39	< 33	< 20	< 20	< 100	< 28
Turnip	07/09/21	< 29	< 23	< 60	< 39	< 58	< 28	< 50	< 45	< 29	< 33	< 108	< 35
Kale	07/09/21	< 33	< 33	< 50	< 33	< 70	< 36	< 70	< 37	< 32	< 34	< 117	< 26
Kohlrabi	08/13/21	< 25	< 29	< 61	< 39	< 62	< 26	< 52	< 43	< 31	< 33	< 142	< 39
Cabbage	08/13/21	< 16	< 16	< 34	< 20	< 33	< 15	< 29	< 21	< 17	< 20	< 62	< 16
Kale	08/13/21	< 26	< 21	< 66	< 28	< 56	< 28	< 38	< 38	< 27	< 29	< 125	< 29
Kale	09/11/21	< 30	< 33	< 52	< 31	< 74	< 29	< 63	< 32	< 39	< 39	< 81	< 42
Collard greens	09/11/21	< 27	< 31	< 58	< 43	< 72	< 35	< 31	< 35	< 32	< 39	< 101	< 37
Cabbage	09/11/21	< 24	< 23	< 46	< 32	< 55	< 26	< 51	< 38	< 29	< 27	< 119	< 25
Collard	10/08/21	< 33	< 34	< 77	< 38	< 61	< 32	< 60	< 35	< 28	< 36	< 131	< 52
Cabbage	10/08/21	< 19	< 15	< 38	< 18	< 37	< 19	< 31	< 23	< 20	< 22	< 61	< 21
Kale	10/08/21	< 29	< 28	< 72	< 35	< 83	< 35	< 57	< 41	< 25	< 34	< 115	< 44
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-VII.1

CONCENTRATIONS OF GAMMA EMITTERS IN VEGETATION SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
D-43													
Swiss Chard	07/09/21	< 37	< 37	< 69	< 36	< 83	< 35	< 68	< 45	< 45	< 38	< 135	< 36
Collard greens	08/13/21	< 22	< 29	< 71	< 25	< 72	< 26	< 51	< 38	< 37	< 34	< 104	< 34
Swiss Chard	08/13/21	< 28	< 26	< 63	< 44	< 66	< 27	< 59	< 35	< 35	< 34	< 123	< 25
Lettuce	08/13/21	< 41	< 30	< 65	< 39	< 64	< 42	< 60	< 51	< 45	< 40	< 153	< 50
Collard greens	09/10/21	< 27	< 22	< 62	< 27	< 59	< 24	< 53	< 32	< 20	< 25	< 95	< 34
Swiss Chard	09/10/21	< 19	< 25	< 44	< 25	< 42	< 22	< 32	< 28	< 22	< 21	< 104	< 20
Lettuce	09/10/21	< 26	< 25	< 53	< 35	< 90	< 27	< 54	< 41	< 31	< 36	< 150	< 33
Swiss Chard	10/08/21	< 29	< 39	< 52	< 37	< 78	< 39	< 43	< 36	< 40	< 30	< 128	< 38
Collard Greens	10/08/21	< 34	< 26	< 67	< 36	< 80	< 34	< 70	< 40	< 33	< 27	< 126	< 24
Lettuce	10/08/21	< 33	< 28	< 70	< 42	< 76	< 27	< 53	< 47	< 40	< 32	< 135	< 54
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-44													
Kale	07/09/21	< 28	< 32	< 46	< 34	< 68	< 34	< 58	< 47	< 39	< 37	< 144	< 54
Mustard green	07/09/21	< 45	< 37	< 80	< 43	< 104	< 42	< 64	< 57	< 42	< 51	< 168	< 53
Collard greens	08/13/21	< 41	< 35	< 64	< 39	< 89	< 37	< 76	< 52	< 37	< 39	< 136	< 33
Collard greens	09/10/21	< 31	< 33	< 65	< 24	< 59	< 26	< 58	< 34	< 24	< 24	< 113	< 32
Turnip greens	09/10/21	< 21	< 23	< 46	< 25	< 45	< 22	< 31	< 30	< 22	< 20	< 91	< 26
Lettuce	09/10/21	< 35	< 34	< 80	< 48	< 73	< 32	< 54	< 47	< 43	< 39	< 121	< 52
Collard	10/08/21	< 30	< 31	< 58	< 28	< 69	< 28	< 52	< 34	< 31	< 33	< 108	< 33
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

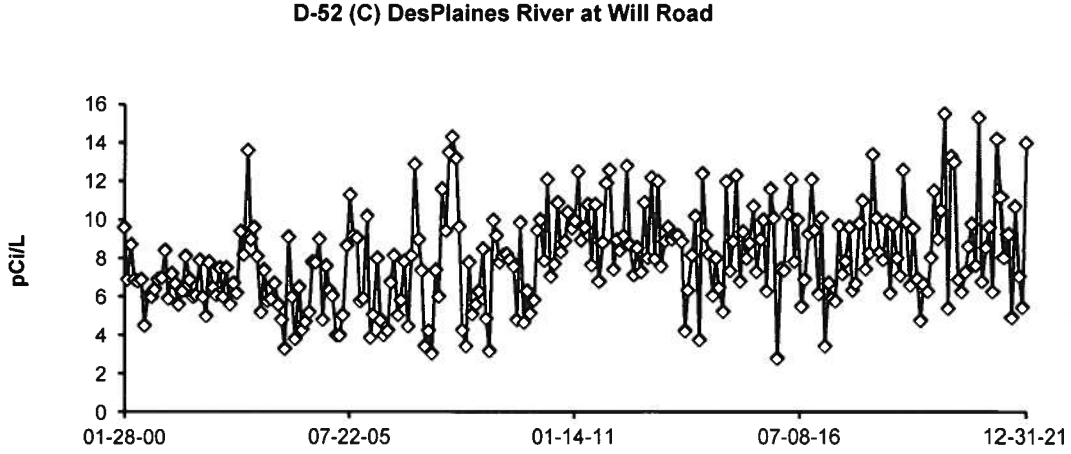
Table C-V111.1 QUARTERLY DLR RESULTS FOR DRESDEN NUCLEAR POWER STATION, 2021

Location	Location Qtrly Baseline, B_Q (mrem)	B_Q + MDD_Q (mrem)	Normalized Net Dose, M_{QX} (mrem/std. Qtr.)				Annual Baseline, B_A[1] (mrem)	B_A + MDD_A[2] (mrem)	Normalized Dose, M_A (mrem/yr)	Annual Facility Dose, F_A (mrem)
			1	2	3	4				
D-01	27.7	40.5	15	22	24	27	111	155	88	ND
D-02	28.8	41.6	15	21	21	24	115	160	82	ND
D-03	23.9	36.7	14	21	21	24	96	140	80	ND
D-04	27.4	40.2	16	21	24	25	110	154	85	ND
D-07	26.7	39.5	16	23	25	26	107	151	90	ND
D-08	24.4	37.2	15	21	23	27	98	142	86	ND
D-10	28.6	41.4	16	22	24	23	115	159	84	ND
D-12	23.7	36.5	14	21	23	24	90	135	81	ND
D-14	23.5	36.3	14	21	19	23	94	138	77	ND
D-45	23.2	36.0	17	24	25	29	93	137	94	ND
D-53	27.5	40.3	15	20	21	23	110	154	79	ND
D-55	27.2	40.0	15	22	23	26	109	153	87	ND
D-56	25.3	38.1	12	18	19	22	101	146	70	ND
D-58	26.5	39.3	10	17	18	21	106	150	66	ND
D-101	26.6	39.4	16	23	24	26	107	151	89	ND
D-102	28.6	41.4	19	24	25	28	114	159	97	ND
D-103	26.4	39.2	15	23	23	26	106	150	86	ND
D-104	28.3	41.1	17	22	25	27	107	152	92	ND
D-105	27.1	39.9	18	22	24	26	109	153	90	ND
D-106	24.1	36.9	11	16	19	20	92	136	65	ND
D-107	23.8	36.6	11	17	18	21	95	140	67	ND
D-108	26.8	39.6	14	20	24	24	107	152	81	ND
D-109	27.0	39.8	15	22	24	25	108	153	85	ND
D-110	31.1	43.9	19	25	27	30	125	169	101	ND
D-111	28.6	41.4	17	23	25	27	103	148	93	ND
D-112A	25.3	38.1	14	19	22	21	101	146	75	ND
D-113	25.1	37.9	15	20	23	25	96	140	83	ND
D-114	24.6	37.4	14	19	21	22	98	143	76	ND
D-115	27.5	40.3	16	21	23	25	110	155	85	ND
D-116	29.4	42.2	18	22	27	29	118	162	95	ND
D-201	30.8	43.6	17	24	26	29	111	155	97	ND
D-202	27.6	40.4	17	21	25	26	105	149	89	ND
D-203	26.2	39.0	14	18	22	22	94	139	77	ND
D-204	24.4	37.2	13	18	20	23	98	142	75	ND
D-205	23.3	36.1	18	21	23	26	93	138	88	ND
D-206	26.6	39.4	14	22	22	24	101	146	82	ND
D-207	24.8	37.6	13	19	19	24	99	144	75	ND
D-208	23.0	35.8	12	17	18	21	92	136	68	ND
D-209	23.1	35.9	12	17	17	21	92	137	67	ND
D-210	26.1	38.9	15	21	21	26	105	149	83	ND
D-211	27.7	40.5	17	23	25	26	111	155	91	ND
D-212	24.5	37.3	13	18	19	23	98	142	73	ND
D-213	23.1	35.9	12	18	19	21	93	137	70	ND
D-214	31.0	43.8	16	22	25	26	124	168	90	ND
D-215	29.9	42.7	18	23	28	28	120	164	97	ND
D-216	28.0	40.8	16	22	22	28	106	151	88	ND

[1] **Baseline background dose (BB_A):** The estimated mean background radiation dose at each field monitoring location annually based on historical measurements, excluding any dose contribution from the monitored facility

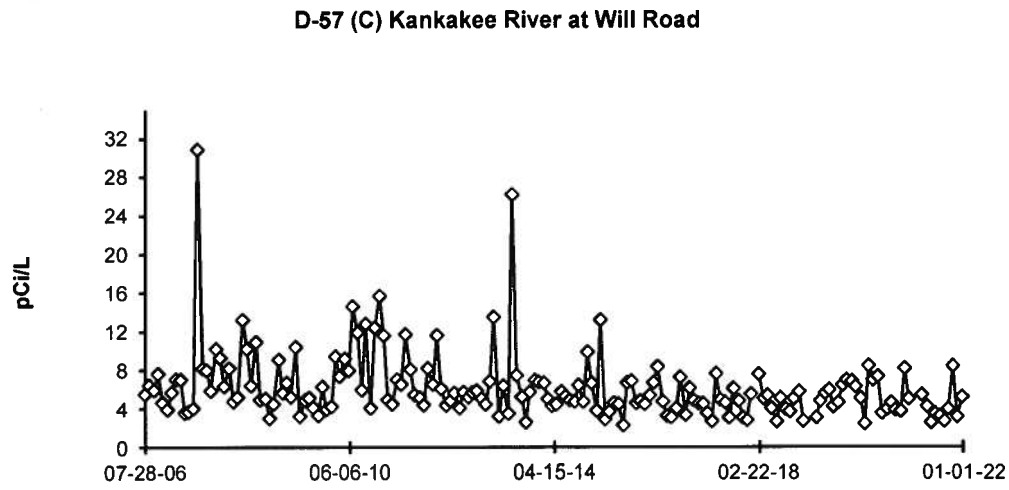
[2] **Minimum differential dose (MDD_A):** The smallest amount of facility related dose at each monitored location annually above the baseline background dose that can be reliably detected by an environmental dosimetry system

FIGURE C-1
SURFACE WATER - GROSS BETA - STATION D-52 (C)
COLLECTED IN THE VICINITY OF DNPS, 2000 - 2021



DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005 AND MDC VALUES AFTER JULY 2005

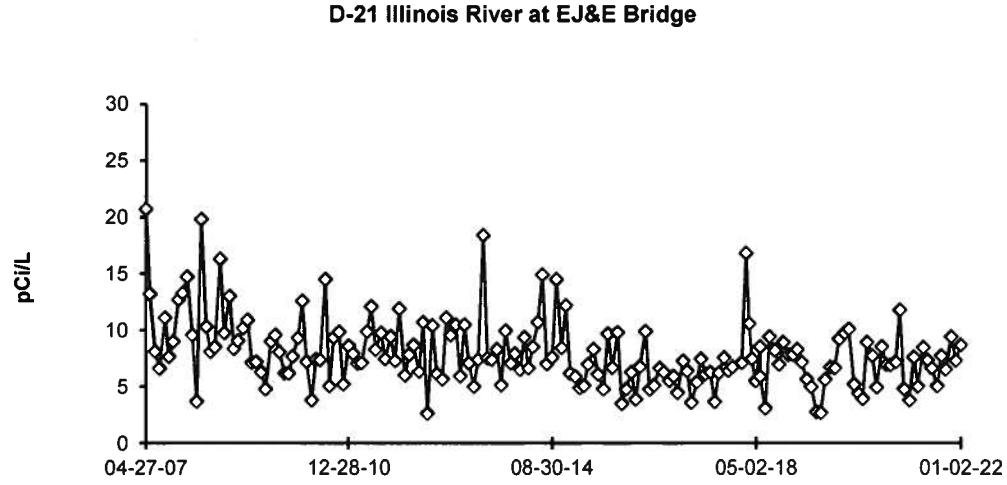
FIGURE C-2
SURFACE WATER - GROSS BETA - STATION D-57 (C)
COLLECTED IN THE VICINITY OF DNPS, 2006 - 2021



DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005 AND MDC VALUES AFTER JULY 2005

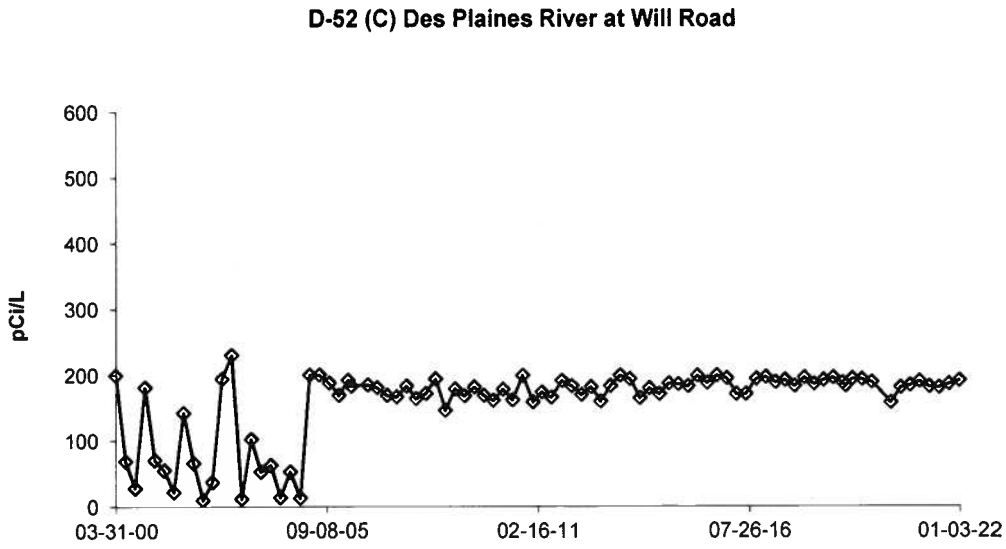
D-54 LOCATION REMOVED FROM PROGRAM JUNE 28, 2007 AND REPLACED WITH D-57

FIGURE C-3
SURFACE WATER - GROSS BETA - STATION D-21
COLLECTED IN THE VICINITY OF DNPS, 2000 - 2021



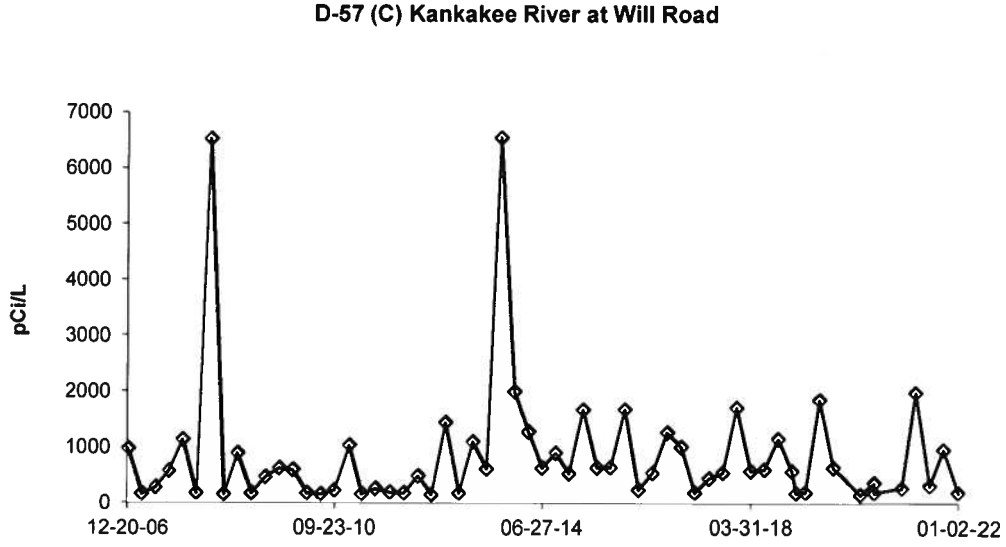
D-21 PLACED INTO SERVICE ON MARCH 30, 2007, REPLACED D-51

FIGURE C-4
SURFACE WATER - TRITIUM - STATION D-52 (C)
COLLECTED IN THE VICINITY OF DNPS, 2000 - 2021



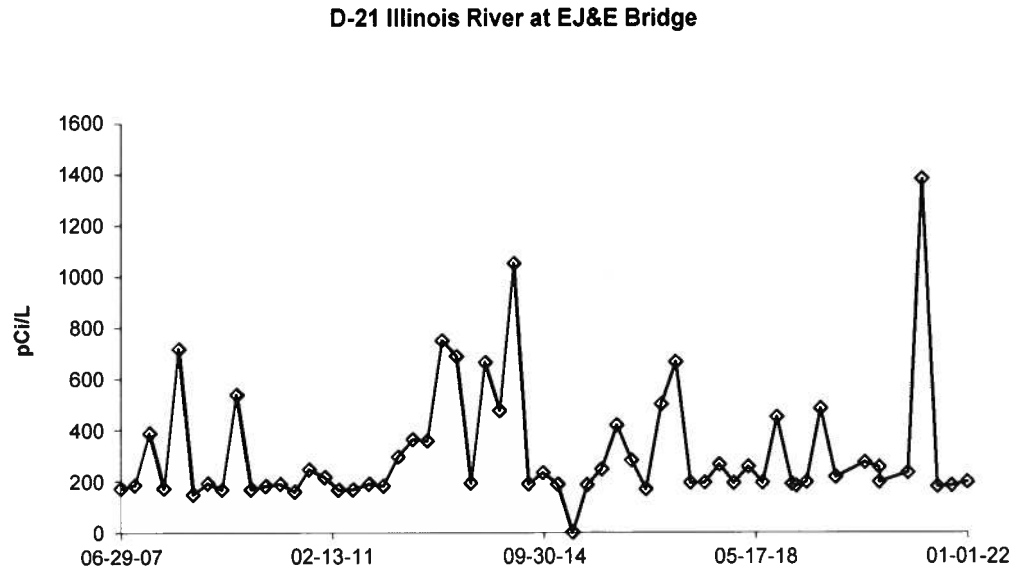
DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005 AND MDC VALUES AFTER JULY 2005

FIGURE C-5
SURFACE WATER - TRITIUM - STATION D-57 (C)
COLLECTED IN THE VICINITY OF DNPS, 2006 - 2021



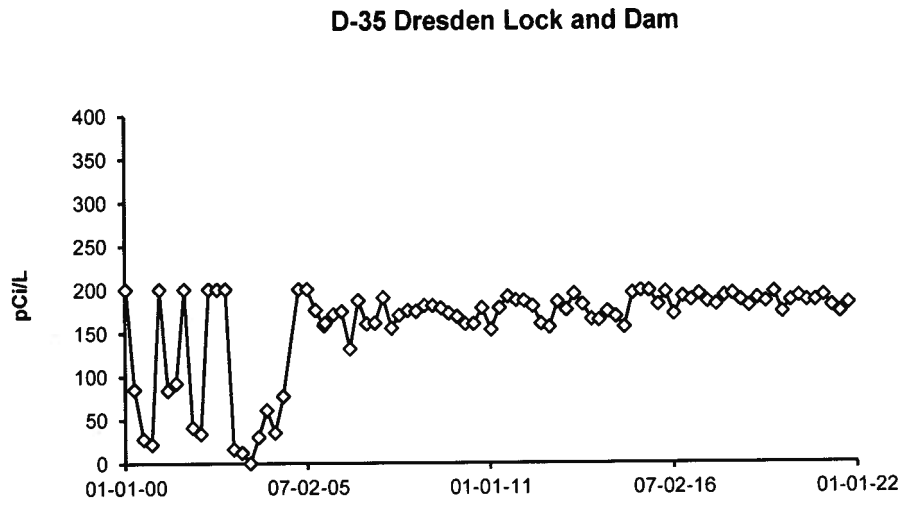
DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005 AND MDC VALUES AFTER JULY 2005

FIGURE C-6
SURFACE WATER - TRITIUM - STATION D-21
COLLECTED IN THE VICINITY OF DNPS, 2007 - 2021



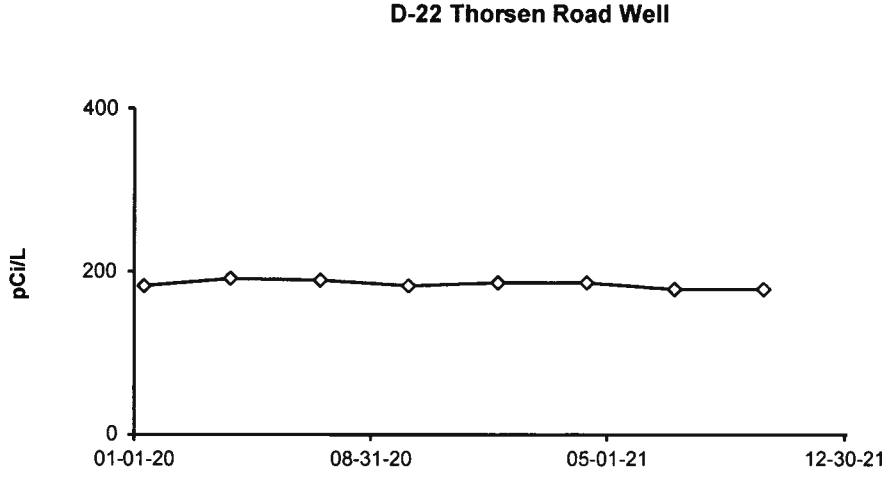
D-21 REPLACED D-51 JUNE 29, 2007

FIGURE C-7
GROUND WATER - TRITIUM - STATION D-35
COLLECTED IN THE VICINITY OF DNPS, 2000 - 2021



DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005 AND MCD VALUES AFTER JULY 2005

FIGURE C-8
GROUND WATER - TRITIUM - STATIONS D-22 and D-24
COLLECTED IN THE VICINITY OF DNPS, 2020 - 2021



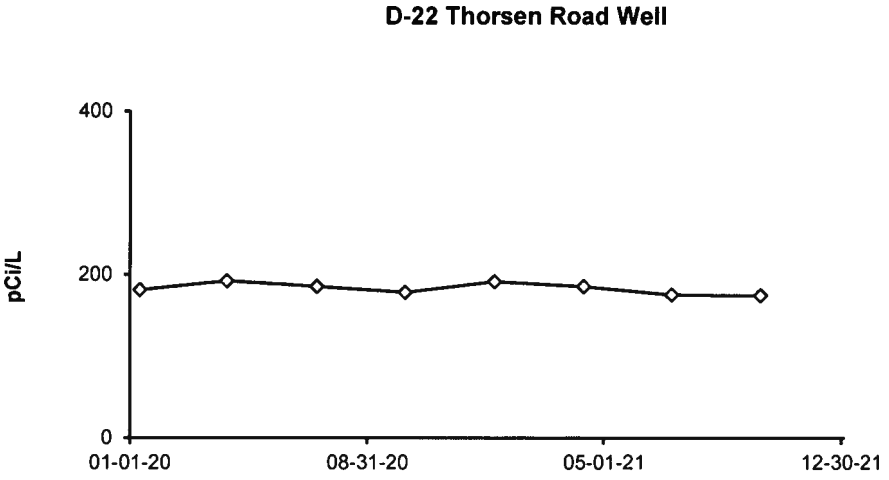
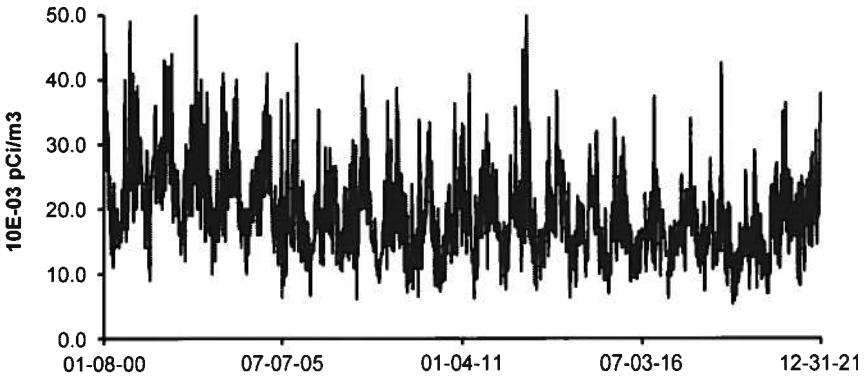
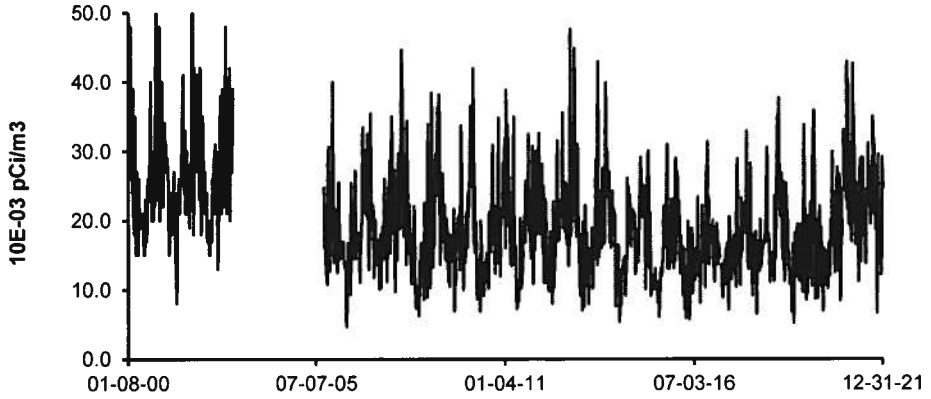


FIGURE C-9
AIR PARTICULATES - GROSS BETA - STATIONS D-01 and D-02
COLLECTED IN THE VICINITY OF DNPS, 2000 - 2021

D-01 Onsite Station 1



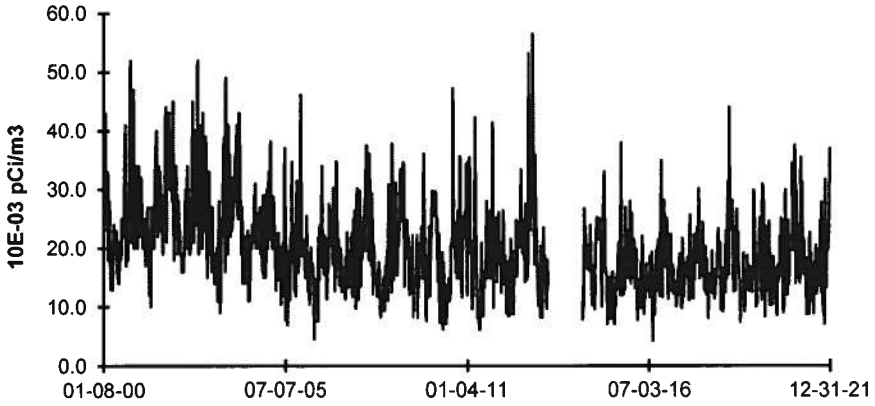
D-02 Onsite Station 2



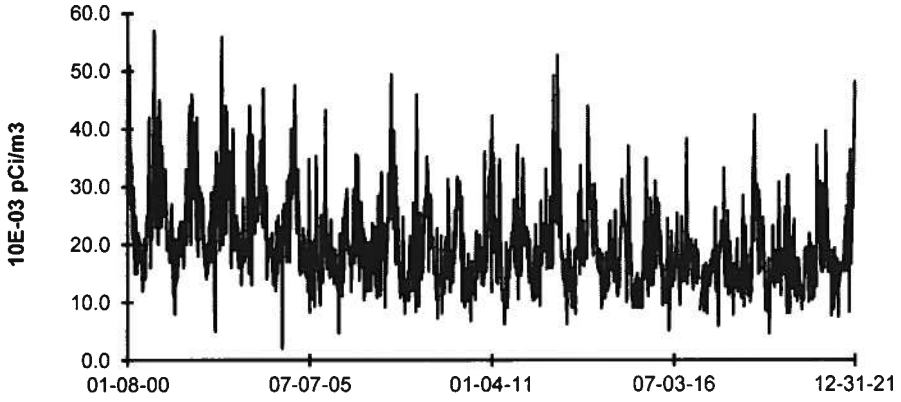
D-02 No samples; power was restored on 09-16-05.

FIGURE C-10
AIR PARTICULATES - GROSS BETA - STATIONS D-03 and D-04 COLLECTED IN THE VICINITY OF DNPS, 2000 - 2021

D-03 Onsite Station 3



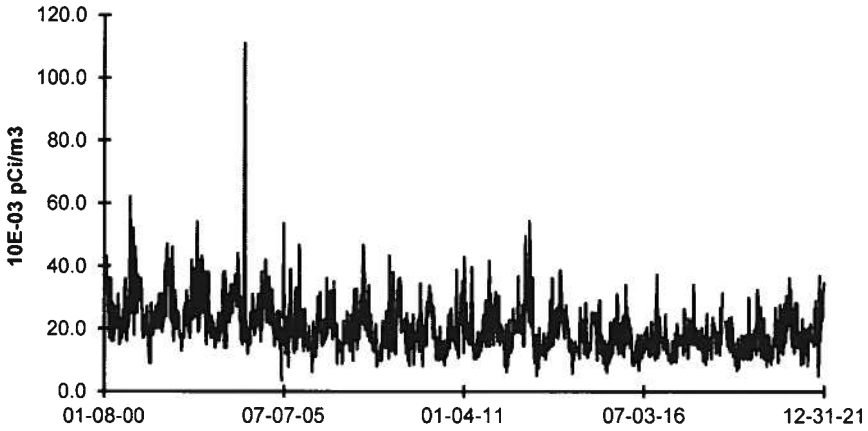
D-04 Collins Road on Station Property



D-03 No samples; power was restored on 07-04-14.

FIGURE C-11
AIR PARTICULATES - GROSS BETA - STATIONS D-07 and D-12 (C) COLLECTED IN THE VICINITY OF DNPS, 2000 - 2021

D-07 Clay Products, Dresden Road



D-12 (C), Quarry Road, Lisbon

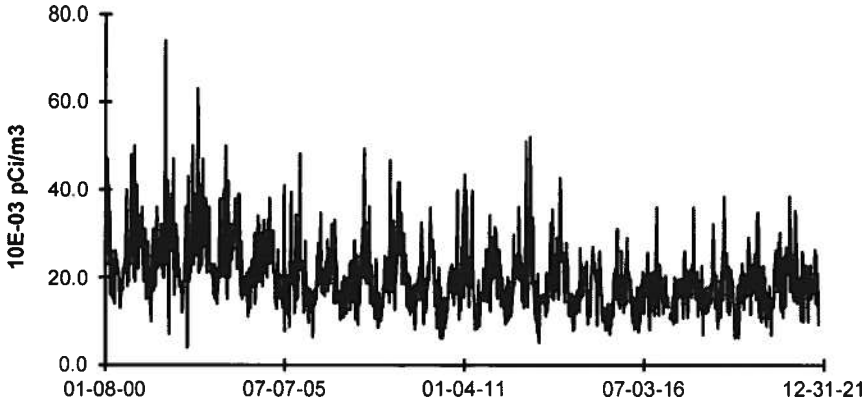
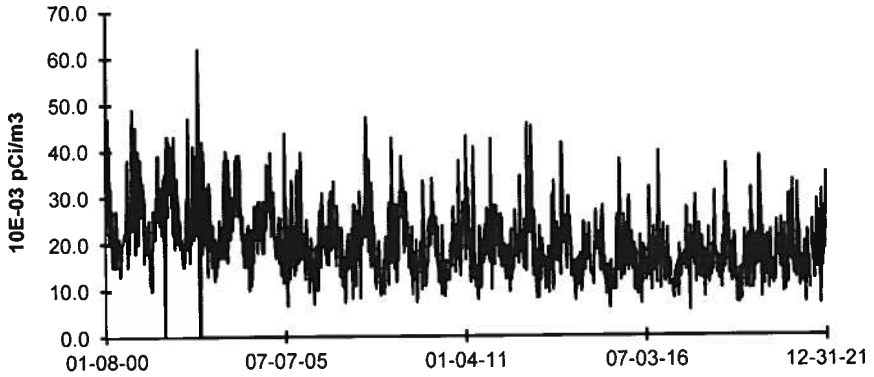


FIGURE C-12
AIR PARTICULATES - GROSS BETA - STATIONS D-45 and D-53 COLLECTED IN THE VICINITY OF DNPS, 2000 - 2021

D-45 McKinley Woods Road, Channahon



D-53 Will Road, Hollyhock

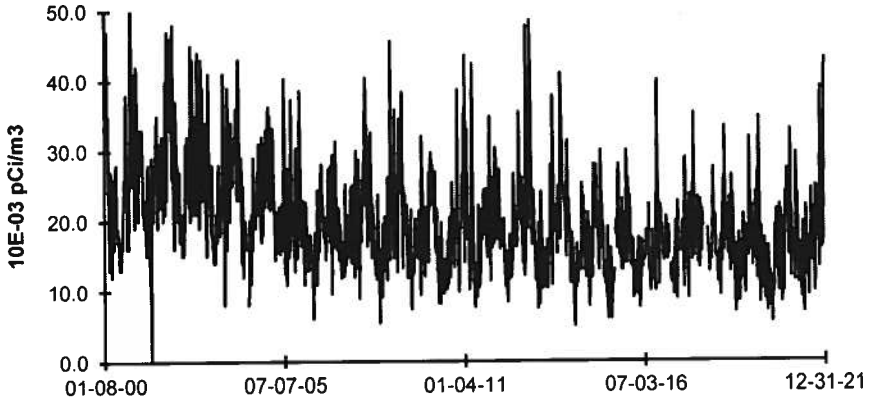
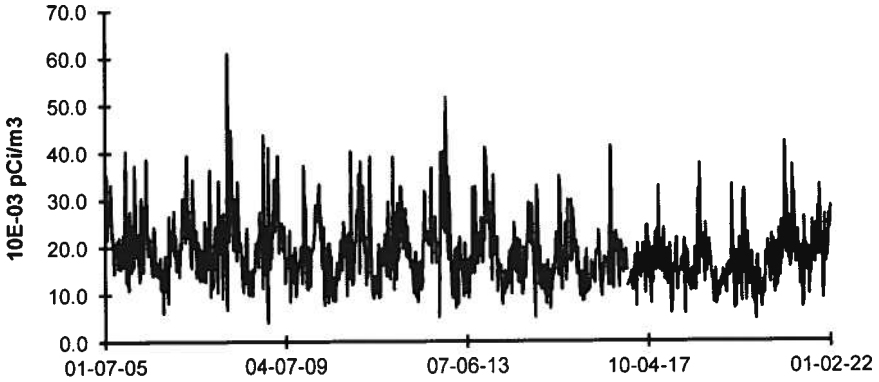


FIGURE C-13
AIR PARTICULATES - GROSS BETA - STATIONS D-08 and D-10 COLLECTED IN THE VICINITY OF DNPS, 2005 - 2021

D-08 Jugtown Road, Prairie Parks



D-10 Goose Lake Road, Goose Lake Village

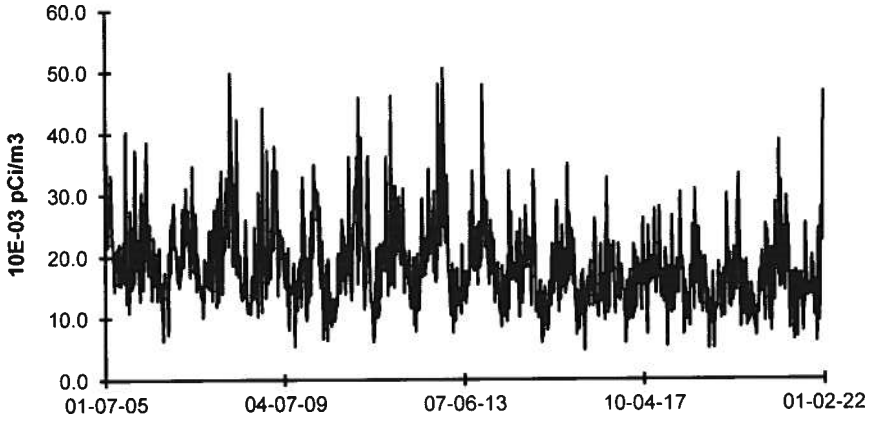


FIGURE C-14
AIR PARTICULATES - GROSS BETA - STATION D-14
COLLECTED IN THE VICINITY OF DNPS, 2005 - 2021

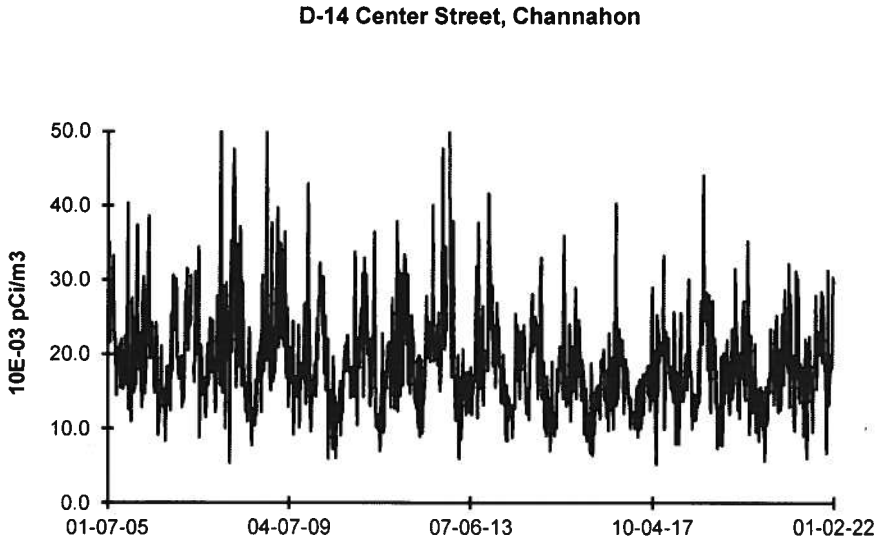
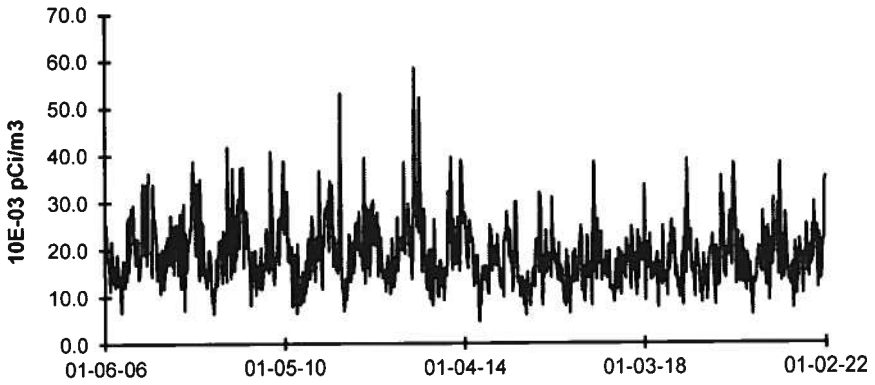
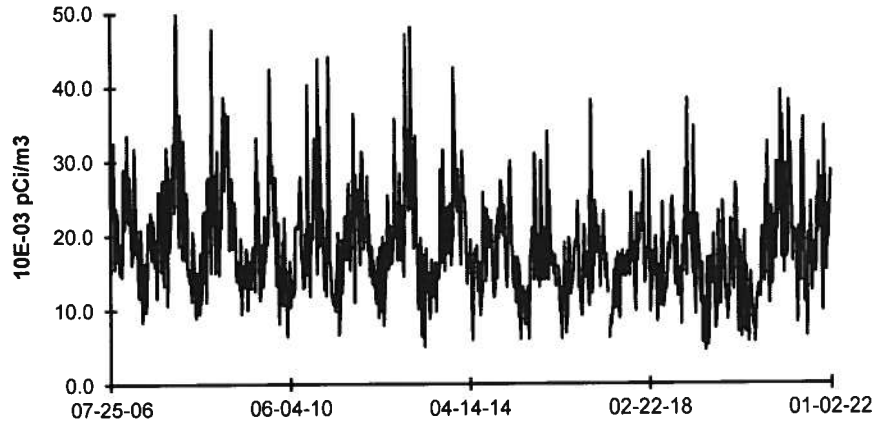


FIGURE C-15
AIR PARTICULATES - GROSS BETA - STATIONS D-55 and D-56 COLLECTED IN THE VICINITY OF DNPS, 2006 - 2021

D-55 Ridge Road, Minooka

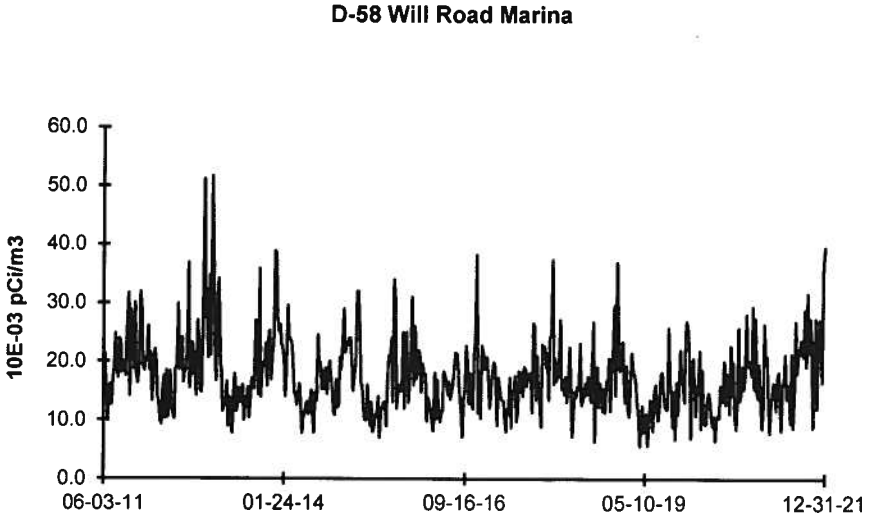


D-56 Will Road, Wildfeather



D-55 NEW STATION DECEMBER 30, 2005 REPLACED D-13 JUNE 29, 2007
D-56 NEW STATION JULY 25, 2006

FIGURE C-16
AIR PARTICULATES - GROSS BETA - STATION D-58
COLLECTED IN THE VICINITY OF DNPS, 2011 - 2022



D-58 NEW STATION IN MAY OF 2011

APPENDIX D

INTER-LABORATORY COMPARISON PROGRAM

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Table D.1 **Analytics Environmental Radioactivity Cross Check Program**
Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [(a)]	Ratio of TBE to Analytics Result	Evaluation [(b)]
March 2021	E13466	Milk	Sr-89	pCi/L	84.6	87.1	0.97	A
			Sr-90	pCi/L	11.5	12.6	0.91	A
	E13467	Milk	Ce-141	pCi/L	111	125	0.89	A
			Co-58	pCi/L	123	128	0.96	A
			Co-60	pCi/L	140	154	0.91	A
			Cr-51	pCi/L	252	242	1.04	A
			Cs-134	pCi/L	130	151	0.86	A
			Cs-137	pCi/L	110	110	1.00	A
			Fe-59	pCi/L	105	109	0.96	A
			I-131	pCi/L	77.6	86.9	0.89	A
			Mn-54	pCi/L	111	112	0.99	A
			Zn-65	pCi/L	200	211	0.95	A
	E13468	Charcoal	I-131	pCi	83.5	88.5	0.94	A
	E13469	AP	Ce-141	pCi	103.0	103	1.00	A
			Co-58	pCi	93.3	105	0.89	A
			Co-60	pCi	136	126	1.08	A
			Cr-51	pCi	213	198	1.07	A
			Cs-134	pCi	123.0	124	0.99	A
			Cs-137	pCi	86.3	90.1	0.96	A
			Fe-59	pCi	81.3	89.6	0.91	A
			Mn-54	pCi	93.5	92.0	1.02	A
			Zn-65	pCi	166	173	0.96	A
	E13470	Soil	Ce-141	pCi/g	0.232	0.262	0.89	A
			Co-58	pCi/g	0.251	0.268	0.94	A
			Co-60	pCi/g	0.306	0.322	0.95	A
			Cr-51	pCi/g	0.517	0.506	1.02	A
			Cs-134	pCi/g	0.263	0.317	0.83	A
			Cs-137	pCi/g	0.278	0.301	0.92	A
			Fe-59	pCi/g	0.228	0.229	1.00	A
			Mn-54	pCi/g	0.221	0.235	0.94	A
			Zn-65	pCi/g	0.448	0.441	1.02	A
	E13471	AP	Sr-89	pCi	92.2	95.5	0.97	A
			Sr-90	pCi	11.7	13.9	0.84	A

(a) The Analytics known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation

(b) Analytics evaluation based on TBE internal QC limits:
A = Acceptable - reported result falls within ratio limits of 0.80-1.20
W = Acceptable with warning - reported result falls within 0.70-0.80 or 1.20-1.30
N = Not Acceptable - reported result falls outside the ratio limits of < 0.70 and > 1.30

Table D.1 **Analytics Environmental Radioactivity Cross Check Program**
Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [(a)]	Ratio of TBE to Analytics Result	Evaluation [(b)]
September 2021	E13472	Milk	Sr-89	pCi/L	66.4	85.4	0.78	W
			Sr-90	pCi/L	11.9	14.0	0.85	A
	E13473	Milk	Ce-141	pCi/L	118	114	1.03	A
			Co-58	pCi/L	116	118	0.98	A
			Co-60	pCi/L	142	145	0.98	A
			Cr-51	pCi/L	244	236	1.03	A
			Cs-134	pCi/L	81	93.1	0.87	A
			Cs-137	pCi/L	105	112	0.94	A
			Fe-59	pCi/L	105	102	1.03	A
			I-131	pCi/L	65.1	85.6	0.76	W
			Mn-54	pCi/L	128	128	1.00	A
			Zn-65	pCi/L	158	153	1.03	A
	E13474	Charcoal	I-131	pCi	85.2	90.9	0.94	A
	E13475	AP	Ce-141	pCi	126	135	0.94	A
			Co-58	pCi	148	139	1.07	A
			Co-60	pCi	183	171	1.07	A
			Cr-51	pCi	322	278	1.16	A
			Cs-134	pCi	118	110	1.08	A
			Cs-137	pCi	147	132	1.12	A
			Fe-59	pCi	131	120	1.09	A
			Mn-54	pCi	161	151	1.06	A
			Zn-65	pCi	202	180	1.12	A
	E13476	Soil	Ce-141	pCi/g	0.215	0.219	0.98	A
			Co-58	pCi/g	0.208	0.226	0.92	A
			Co-60	pCi/g	0.277	0.277	1.00	A
			Cr-51	pCi/g	0.388	0.452	0.86	A
			Cs-134	pCi/g	0.157	0.178	0.88	A
			Cs-137	pCi/g	0.270	0.284	0.95	A
			Fe-59	pCi/g	0.218	0.195	1.12	A
			Mn-54	pCi/g	0.239	0.246	0.97	A
			Zn-65	pCi/g	0.312	0.293	1.06	A
	E13477	AP	Sr-89	pCi	85.6	68.3	1.25	W
			Sr-90	pCi	12.6	11.2	1.13	A

(a) The Analytics known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation

(b) Analytics evaluation based on TBE internal QC limits:

A = Acceptable - reported result falls within ratio limits of 0.80-1.20

W = Acceptable with warning - reported result falls within 0.70-0.80 or 1.20-1.30

N = Not Acceptable - reported result falls outside the ratio limits of < 0.70 and > 1.30

Table D.2 **DOE's Mixed Analyte Performance Evaluation Program (MAPEP)**
Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [a]	Acceptance Range	Evaluation [b]
February 2021	21-GrF44	AP	Gross Alpha	Bq/sample	0.371	1.77	0.53 - 3.01	N[3]
			Gross Beta	Bq/sample	0.731	0.65	0.325 - 0.974	A
	21-MaS44	Soil	Ni-63	Bq/kg	310	689.0	482 - 896	N[4]
			Tc-99	Bq/kg	457	638	447 - 829	W
	21-MaSU44	Urine	Cs-134	Bq/L	2.34	2.73	1.91 - 3.55	A
			Cs-137	Bq/L	2.54	2.71	1.90 - 3.52	A
			Co-57	Bq/L	0.4100		*(1)*	A
			Co-60	Bq/L	2.24	2.44	1.71 - 3.17	A
			Mn-54	Bq/L	2.03	2.03	1.42 - 2.64	A
			K-40	Bq/L	52.8	54.0	38 - 70	A
			U-234	Bq/L	0.108	0.0877	0.0614 - 0.114	W
			U-238	Bq/L	0.101	0.091	0.064 - 0.118	A
			Zn-65	Bq/L	1.06	1.34	*(2)*	A
	21-MaW44	Water	Ni-63	Bq/L	6.7	8.2	5.7 - 10.7	A
			Tc-99	Bq/L	3.850	4.01	2.81 - 5.21	A
	21-RdV44	Vegetation	Cs-134	Bq/sample	3.13	3.60	2.5 - 4.7	A
			Cs-137	Bq/sample	4.64	4.69	3.28 - 6.10	A
			Co-57	Bq/sample	5.25	5.05	3.54 - 6.57	A
			Co-60	Bq/sample	2.86	2.99	2.09 - 3.89	A
			Mn-54	Bq/sample	5.02	5.25	3.68 - 6.83	A
			Sr-90	Bq/sample	0.631	0.673	0.471 - 0.875	A
			Zn-65	Bq/sample	-0.233		*(1)*	A
August 2021	21-GrF45	AP	Gross Alpha	Bq/sample	0.368	0.960	0.288 - 1.632	A
			Gross Beta	Bq/sample	0.595	0.553	0.277 - 0.830	A
	21-MaS45	Soil	Ni-63	Bq/kg	546	1280	896 - 1664	N[5]
			Tc-99	Bq/kg	453	777	544 - 1010	N[6]
	21-MaSU45	Urine	Cs-134	Bq/L	3.10	3.62	2.53 - 4.71	A
			Cs-137	Bq/L	0.083		*(1)*	A
			Co-57	Bq/L	0.844	0.87	0.606 - 1.125	A
			Co-60	Bq/L	0.0535		*(1)*	A
			Mn-54	Bq/L	0.459	0.417	*(2)*	A
			K-40	Bq/L	48.8	54.0	38 - 70	A
			U-234	Bq/L	0.133	0.116	0.081 - 0.151	A
			U-238	Bq/L	0.137	0.121	0.085 - 0.157	A
			Zn-65	Bq/L	0.339	0.420	*(2)*	A
	21-MaW45	Water	Ni-63	Bq/L	33.5	39.5	27.7 - 51.4	A
			Tc-99	Bq/L	3.5	3.7	2.60 - 4.82	A
	21-RdV45	Vegetation	Cs-134	Bq/sample	3.42	4.34	3.04 - 5.64	W
			Cs-137	Bq/sample	2.14	2.21	1.55 - 2.87	A
			Co-57	Bq/sample	4.08	4.66	3.26 - 6.06	A
			Co-60	Bq/sample	2.81	3.51	2.46 - 4.56	A
			Mn-54	Bq/sample	0.035		*(1)*	A
			Sr-90	Bq/sample	1.15	1.320	0.92 - 1.72	A
			Zn-65	Bq/sample	2.05	2.43	1.70 - 3.16	A

(a) The MAPEP known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation

(b) DOE/MAPEP evaluation:

A = Acceptable - reported result falls within ratio limits of 0.80-1.20

W = Acceptable with warning - reported result falls within 0.70-0.80 or 1.20-1.30

N = Not Acceptable - reported result falls outside the ratio limits of < 0.70 and > 1.30

(1) False positive test

(2) Sensitivity evaluation

*(3) See **NCR 21-02***

*(4) See **NCR 21-03***

*(5) See **NCR 21-13***

(6) Tc-99 cross-checks done for TBE information only - not required

Table D.3 **ERA Environmental Radioactivity Cross Check Program**
Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [a]	Acceptance Limits	Evaluation [b]
March 2021	MRAD-34	Water	Am-241	pCi/L	175	157	108 - 201	A
			Fe-55	pCi/L	579	275	162 - 400	N(1)
			Pu-238	pCi/L	181	171	103 - 222	A
			Pu-239	pCi/L	153	142	87.9 - 175	A
		Soil	Sr-90	pCi/kg	6570	9190	2860 - 14,300	A
		AP	Fe-55	pCi/filter	107	121	44.2 - 193	A
			U-234	pCi/filter	25.99	25.5	18.9 - 29.9	A
			U-238	pCi/filter	24.7	25.3	19.1 - 30.2	A
April 2021	RAD-125	Water	Ba-133	pCi/L	92.3	90.5	76.2 - 99.6	A
			Cs-134	pCi/L	62.9	70.5	57.5 - 77.6	A
			Cs-137	pCi/L	161	168	151 - 187	A
			Co-60	pCi/L	22.5	20.9	17.7 - 25.8	A
			Zn-65	pCi/L	183	177.0	159 - 208	A
			GR-A	pCi/L	30.8	30.2	15.4 - 39.4	A
			GR-B	pCi/L	60.1	67.5	46.8 - 74.2	A
			U-Nat	pCi/L	36.45	36.9	30.0 - 40.8	A
			H-3	pCi/L	13,400	14,600	12,800 - 16,100	A
			Sr-89	pCi/L	64.5	63.5	51.4 - 71.5	A
			Sr-90	pCi/L	22.8	23.0	16.5 - 27.0	A
			I-131	pCi/L	28.2	26.7	22.2 - 31.4	A
September 2021	MRAD-35	Water	Am-241	pCi/L	68	63.7	43.7 - 81.5	A
			Fe-55	pCi/L	179	246	145 - 358	A
			Pu-238	pCi/L	102	114	68.5 - 148	A
			Pu-239	pCi/L	32	34.3	21.2 - 42.3	A
		Soil	Sr-90	pCi/kg	6160	6090	1,900 - 9,490	A
		AP	Fe-55	pCi/filter	493	548	200 - 874	A
			Pu-238	pCi/filter	28	28.5	21.5 - 35.0	A
			Pu-239	pCi/filter	21	21.6	16.1 - 26.1	A
			U-234	pCi/filter	7.95	7.76	5.75 - 9.09	A
			U-238	pCi/filter	8.0	7.69	5.81 - 9.17	A
October 2021	RAD-127	Water	Ba-133	pCi/L	82.8	87.5	73.6 - 96.2	A
			Cs-134	pCi/L	64.0	70.1	57.1 - 77.1	A
			Cs-137	pCi/L	145	156	140 - 174	A
			Co-60	pCi/L	83.2	85.9	77.3 - 96.8	A
			Zn-65	pCi/L	133	145	130 - 171	A
			GR-A	pCi/L	76.0	66.7	35.0 - 82.5	A
			GR-B	pCi/L	63.0	55.7	38.1 - 62.6	N(2)
			U-Nat	pCi/L	52.88	55.5	45.3 - 61.1	A
			H-3	pCi/L	13,800	17,200	15,000 - 18,900	N(3)
			Sr-89	pCi/L	54.9	61.0	49.1 - 68.9	A
			Sr-90	pCi/L	24.8	29.3	21.3 - 34.0	A
			I-131	pCi/L	27.4	26.4	21.9 - 31.1	A
December 2021	QR 120121Y	Water	GR-B	pCi/L	47.6	39.8	26.4 - 47.3	N(4)
			H-3	pCi/L	17,500	17,800	15,600 - 19,600	A

(a) The ERA known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.

(b) ERA evaluation:
A = Acceptable - Reported value falls within the Acceptance Limits
N = Not Acceptable - Reported value falls outside of the Acceptance Limits

*(1) See **NCR 21-01***
*(2) See **NCR 21-10***
*(3) See **NCR 21-11***
*(4) See **NCR 21-14***

APPENDIX E

ERRATA DATA

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There was no errata data for 2021.

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APPENDIX F

ANNUAL RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM REPORT (ARGPPR)

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Docket No: 50-010
50-237
50-249

DRESDEN NUCLEAR POWER STATION
UNITS 1, 2 and 3

Annual Radiological
Groundwater Protection Program Report

1 January through 31 December 2021

Prepared By
Teledyne Brown Engineering
Environmental Services

Exelon Generation

Dresden Nuclear Power Station
Morris, IL 60450

May 2022

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Appendices

I. Summary and Conclusions

Dresden Station is situated on approximately 600 acres of land that borders the Illinois River to the north and the Kankakee River to the east. This land is referred to as the owner-controlled area. The Dresden power plant itself takes up a small parcel of the owner-controlled area and is surrounded by a security fence. The security fence defines what is known as the Protected Area (PA).

The Dresden power plant has experienced leaks from underground lines and spills from systems containing radioactive water over its 50-year history. These incidents have created a number of areas of localized contamination within the PA. The liquid scintillation analyses of groundwater in many of these areas show measurable concentrations of tritium (H-3).

Dresden participated in a fleetwide hydrogeologic investigation in during the summer of 2006 in an effort to characterize groundwater movement at each site. This investigation also compiled a list of the historic spills and leaks as well as a detailed analysis on groundwater hydrology for Dresden Nuclear Generation Station. Combining the tritium concentration in a locally contaminated area with the speed and direction of groundwater in the vicinity can produce a contaminated groundwater plume projection. If the plume of contaminated groundwater passes through the path of a groundwater monitoring well, it can be anticipated that the tritium concentration in this well will increase to some maximum concentration, then decrease over time.

The fleetwide 5-Year Hydrogeologic Investigation Report (HIR) was generated in 2020 by AECOM. It shows that groundwater movement on the Dresden site is very slow. In addition, there is a confining rock layer, the Maquoketa Shale layer, about 55 feet below the surface that impedes groundwater movement below this depth.

Dresden has a domestic water system that is supplied by two deep wells (1500 feet deep) that were installed about 50 years ago south of the PA. Samples taken from domestic water supply have never shown any detectable tritium concentration.

Tritium has a half-life of 12.3 years. This means that 40 years from now 90% of the tritium on site today will have decayed away to more stable elements. Given the limited volume of contaminated groundwater on site, radioactive decay, slow groundwater movement, and dilution effects, the conclusion of the HIR is that the operation of Dresden Nuclear Power Station has no adverse radiological impact on the environment. As a result there is little potential for contaminated groundwater on site to affect off-site drinking water.

II. Introduction

Radiological Groundwater Monitoring Program (RGPP):

Dresden has a Radiological Groundwater Monitoring Program (RGPP) that provides long-term monitoring intended to verify the fleet-wide hydrogeologic study conclusions. Dresden uses developed groundwater wells and surface water sample points in the RGPP.

The Dresden RGPP was established in 2006 and there have been no significant changes to this program. This program does not impact the operation of the plant and is independent of the REMP.

Developed groundwater wells are wells that were installed specifically for monitoring groundwater. These wells are equipped with screens and are properly sealed near the surface to avoid surface water intrusion. The wells were designed in accordance with appropriate codes and developed in accordance with appropriate standards and procedures. Dresden has groundwater monitoring wells identified as "shallow" (depths from 15 to 35 feet), "Intermediate" (depths from 35 to 55 feet) and "deep" (depths beyond 100 feet). All wells installed to a depth greater than 100 feet ("deep" wells) were found to be dry and removed from the RGPP. Surface water sample points are identified sample locations in the station's canals and cooling pond.

There are 96 sampling points in the RGPP:

Dresden has 47 developed groundwater monitoring wells within the Protected Area (PA). Some of these wells form a ring just inside the security fence and the remaining wells were installed near underground plant system piping that contains radioactive water.

Dresden has 30 developed groundwater monitoring wells outside the PA the majority of which form a ring just within the perimeter of the property.

Dresden has 12 surface water monitoring locations on the owner-controlled area sampled as part of the Dresden RGPP. Three of these locations are monitored for level only and have no analyses in the accompanying tables.

Dresden has 8 precipitation water monitoring locations sampled as part of the Dresden RGPP. An additional 4 locations were studied in 2011 through 2012, but 8 locations are currently permanently a part of the RGPP program.

Dresden has 1 sentinel well and 2 CST leak detection valves. These 3 sampling points are not constructed to code or developed to a standard. These sampling points are idle and only used for qualitative troubleshooting.

The Dresden site-specific RGPP procedure identifies the historic 'events' that would affect the individual RGPP sample results. This procedure identifies threshold values for each sample point, which if exceeded, could be an indication of a new spill from an above ground system or a new leak in an underground pipe containing tritiated water.

The RGPP sample points are currently sampled on a frequency determined by the well detection category in accordance with site document EN-DR-408-4160, Dresden RGPP Reference Material. During 2021, there were 405 analyses that were performed on 185 samples from 76 sampling points.

Sentinel Wells, sometimes referred to as "baby wells" are wells that were installed to monitor local shallow groundwater; typically in associated with a historic underground pipe leak. These wells are not constructed to code or developed to a standard. Most sentinel wells are from 6 to 12 feet deep and consist of 2" PVC pipe without screens. These wells are categorized as idle wells and are used only for troubleshooting purposes.

Dresden has two basic storm water runoff sewer systems within the P.A: one storm-system routes to the east, then north and discharges into the Unit 1 intake canal, the second storm-system routes to the west, then north, through a large Oil/Water Separator and discharges to the hot canal. Both the Unit 1 intake canal and the hot canal eventually route to the cooling pond. The Dresden Station RGPP has twelve RGPP surface water sampling points to monitor these systems.

A. Objectives of the RGPP

The Objective of the RGPP is to provide long-term monitoring intended to verify the fleet-wide hydrogeologic study conclusions. The objective of the site-specific RGPP is to provide indication of short-term changes to groundwater tritium concentrations within the PA.

If isotopic results of groundwater samples exceed the thresholds specified in this procedure it could be an indication of a new spill from an above ground system or a new leak in an underground pipe containing tritiated water.

Specific Objectives include:

1. Perform routine water sampling and radiological analysis of water from selected locations.
2. Report new leaks, spills, or other detections with potential radiological significance to stakeholders in a timely manner.
3. Regularly assess analytical results to identify adverse trends.
4. Take necessary corrective actions to protect groundwater resources.

B. Implementation of the Objectives

1. Dresden Nuclear Power Station will continue to perform routine sampling and radiological analysis of water from selected locations.

2. Dresden Nuclear Power Station has implemented procedures to identify and report new leaks, spills, or other detections with potential radiological significance in a timely manner.
3. Dresden Nuclear Power Station staff and consulting hydrogeologist assess analytical results on an ongoing basis to identify adverse trends.
4. If an adverse trend in groundwater monitoring analytical results is identified, further investigation will be undertaken. If the investigation identifies a leak or unidentified spill, corrective actions will be implemented.

C. Program Description

Dresden has a Radiological Groundwater Monitoring Program (RGPP) that provides long-term monitoring intended to verify the fleet-wide hydrogeologic study conclusions. Dresden uses 89 developed groundwater wells and surface water sample points in the RGPP.

Sample locations can be found in Table A–1, Appendix A. Water samples are collected in accordance with the schedule delineated in the Dresden site-specific RGPP procedures. Analytical laboratories are subject to internal quality assurance programs, industry crosscheck programs, as well as nuclear industry audits. Station personnel review and evaluate the analytical results.

D. Characteristics of Tritium (H-3)

Tritium (chemical symbol H-3) is a radioactive isotope of hydrogen. The most common form of tritium is tritium oxide, which is also called "tritiated water." The chemical properties of tritium are essentially those of ordinary hydrogen.

Tritiated water behaves the same as ordinary water in both the environment and the body. Tritium can be taken into the body by drinking water, breathing air, eating food, or absorption through skin. Once tritium enters the body, it disperses quickly and is uniformly distributed throughout the body. Tritium is excreted primarily through urine with a clearance rate characterized by an effective biological half-life of about 14 days. Within one month or so after ingestion, essentially all tritium is cleared. Organically bound tritium (tritium that is incorporated in organic compounds) can remain in the body for a longer period.

Tritium is produced naturally in the upper atmosphere when cosmic rays strike air molecules. Tritium is also produced during nuclear weapons explosions, as a by-product in reactors producing electricity and in special production reactors, where the isotopes lithium-7 and/or boron-10 are activated to produce tritium. Like normal water, tritiated water is

colorless and odorless. Tritiated water behaves chemically and physically like non-tritiated water in the subsurface and therefore tritiated water will travel at the same velocity as the average groundwater velocity.

Tritium has a half-life of approximately 12.3 years. It decays spontaneously to helium-3 (3He). This radioactive decay releases a beta particle (low-energy electron). The radioactive decay of tritium is the source of the health risk from exposure to tritium. Tritium emits very weak radiation and leaves the body relatively quickly. Since tritium is almost always found as water it goes directly into soft tissues and organs. The associated dose to these tissues is generally uniform and is dependent on the water content of the specific tissue.

III. Program Description

A. Sample Analysis

This section describes the general analytical methodologies used by Teledyne Brown Engineering (TBE) to analyze the environmental samples for radioactivity for the Dresden Nuclear Power Station RGPP in 2021.

In order to achieve the stated objectives, the current program includes the following analyses:

1. Concentrations of gamma emitters in groundwater.
2. Concentrations of strontium in groundwater.
3. Concentrations of tritium in groundwater and precipitation water.
4. Concentrations of gross alpha in groundwater.
5. Concentrations of Am-241 in groundwater.
6. Concentrations of Cm-242 and Cm-243/244 in groundwater.
7. Concentrations of Pu-238 and Pu-239/240 in groundwater.
8. Concentrations of U-233/234, U-235 and U-238 in groundwater.
9. Concentrations of Fe-55 in groundwater.
10. Concentrations of Ni-63 in groundwater.

B. Data Interpretation

The radiological data collected prior to Dresden Nuclear Power Station becoming operational were used as a baseline with which these operational data were compared. For the purpose of this report, Dresden Nuclear Power Station was considered operational at initial criticality. Several factors were important in the interpretation of the data:

1. Lower Limit of Detection and Minimum Detectable Concentration

   The Lower Limit of Detection (LLD) is the minimum sensitivity value that must be achieved routinely by the analytical parameter.

2. Laboratory Measurements Uncertainty

   The estimated uncertainty in measurement of tritium in environmental samples is frequently on the order of 50% of the measurement value.

   Statistically, the exact value of a measurement is expressed as a range with a stated level of confidence. The convention is to report results with a 95% level of confidence. The uncertainty comes from calibration standards, sample volume or weight measurements, sampling uncertainty and other factors. Exelon Generation, LLC

reports the uncertainty of a measurement created by statistical process (counting error) as well as all sources of error (Total Propagated Uncertainty or TPU). Each result has two values calculated. Exelon Generation, LLC reports the TPU by following the result with plus or minus ± the estimated sample standard deviation as TPU that is obtained by propagating all sources of analytical uncertainty in measurements.

Analytical uncertainties are reported at the 95% confidence level in this report for reporting consistency with the AREOR.

When required, gamma spectroscopy includes the following 14 nuclides: Be-7, K-40, Mn-54, Co-58, Fe-59, Co-60, Zn-65, Nb-95, Zr-95, I-131, Cs-134, Cs-137, Ba-140 and La-140.

C. Background Analysis

A pre-operational radiological environmental monitoring program (pre-operational REMP) was conducted to establish background radioactivity levels prior to operation of the Station. The environmental media sampled and analyzed during the pre-operational REMP were atmospheric radiation, fall-out, domestic water, surface water, marine life, and food stuffs. The results of the monitoring were detailed in the report entitled, Environmental Radiological Monitoring for Dresden Nuclear Power Nuclear Power Station, Commonwealth Edison Company, Annual Report 1986, May 1987.

1. Background Concentrations of Tritium

The purpose of the following discussion is to summarize background measurements of tritium in various media performed by others. Additional detail may be found by consulting references (CRA 2006).

a. Tritium Production

Tritium is created in the environment from naturally-occurring processes both cosmic and subterranean, as well as from anthropogenic (i.e., man-made) sources. In the upper atmosphere, "Cosmogenic" tritium is produced from the bombardment of stable nuclides and combines with oxygen to form tritiated water, which will then enter the hydrologic cycle. Below ground, "lithogenic" tritium is produced by the bombardment of natural lithium present in crystalline rocks by neutrons produced by the radioactive decay of naturally abundant uranium and thorium. Lithogenic production of tritium is usually negligible compared to other sources due to the limited abundance of lithium in rock. The lithogenic tritium is introduced directly to groundwater.

A major anthropogenic source of tritium and strontium-90 comes from the former atmospheric testing of thermonuclear weapons. Levels of tritium in precipitation increased significantly during the 1950s and early 1960s, and later with additional testing, resulting in the release of significant amounts of tritium to the atmosphere. The Canadian heavy water nuclear power reactors, other commercial power reactors, nuclear research, and weapons production continue to influence tritium concentrations in the environment.

b. Precipitation Data

Precipitation samples are routinely collected at stations around the world for the analysis of tritium and other radionuclides. Two publicly available databases that provide tritium concentrations in precipitation are Global Network of Isotopes in Precipitation (GNIP) and USEPA's RadNet database. GNIP provides tritium precipitation concentration data for samples collected worldwide from 1960 to 2006. RadNet provides tritium precipitation concentration data for samples collected at stations throughout the U.S. from 1960 up to and including 2006. Based on GNIP data for sample stations located in the U.S. Midwest, tritium concentrations peaked around 1963. This peak, which approached 10,000 pCi/L for some stations, coincided with the atmospheric testing of thermonuclear weapons.

Tritium concentrations in surface water showed a sharp decline up until 1975 followed by a gradual decline since that time. Tritium concentrations in Midwest precipitation have typically been below 100 pCi/L since around 1980.

Tritium concentrations in wells may still be above the 200-pCi/L detection limit from the external causes described above. Water from previous years and decades is naturally captured in groundwater, so some well water sources today are affected by the surface water from the 1960s that was elevated in tritium.

c. Surface Water Data

Tritium concentrations are routinely measured in large surface water bodies, including Lake Michigan and the Mississippi River. Illinois surface water data were typically less than 100 pCi/L.

The radio-analytical laboratory counts tritium results to an Exelon Generation, LLC specified LLD of 200 pCi/L. Typically, the lowest positive measurement will be reported within a range of 40 – 240 pCi/L or 140 ± 100 pCi/L. These sample results cannot be distinguished as different from background at this concentration.

IV. Results and Discussion

Dresden Station initiated a Radiological Groundwater Protection Program (RGPP) in 2006.

A. Groundwater Results

Samples were collected from on-site wells throughout the year in accordance with Dresden's RGPP. Analytical results and anomalies are discussed below:

Tritium

Following historic ground tritium-contamination events at Dresden Station routine sampling and analyses continue, both inside and outside the protected area, in accordance with site procedure EN-DR-408-4160, Dresden Station RGPP Reference Material.

Low level tritium was detected from January through December 2021 in several sampling and testing locations (Table B-I.1, Appendix B); however, overall tritium concentrations have been trending down.

The vast majority of these locations showed a range of tritium contamination from LLD to values less than 20,000 pCi/L.

It is important to note that in prior years, wells that exceeded the United States Environmental Agency (USEPA) drinking water standard (and the Nuclear Regulatory Commission Reporting Limit) of 20,000 pCi/L were due to the 2014 2/3B CST Leak. The exceedances are located within Station property, and do not serve as a drinking water source.

Strontium

Samples were collected and analyzed for Sr-89 and Sr-90 activity (Table B-I.1, Appendix B). Sr-89 was not detected in any of the samples. Sr-90 was detected in 2 samples at locations MW-DN-105S and DSP-108. The concentrations ranged from 1.5 to 3.2 pCi/L.

Gross Alpha (dissolved and suspended)

Gross Alpha in the dissolved and suspended fractions were performed on groundwater samples during the second quarter of 2021 (Table B-I.1, Appendix B). Gross Alpha (dissolved) was not detected in any samples. Gross Alpha (suspended) was detected in 7 groundwater locations with concentrations ranging from 0.9 to 6.7 pCi/L. The concentrations of Gross Alpha, which are slightly above detectable levels, are considered to be background and are not the result of plant effluents.

Gamma Emitters

No gamma-emitting nuclides were detected in any sample. (Table B-I.2, Appendix B).

Hard-To-Detects

Hard-To-Detect analyses were performed on 8 groundwater locations. The analyses included Fe-55, Ni-63, Am-241, Cm-242, Cm-243/244, Pu-238, Pu-239/240, U-233/234, U-235 and U-238. Ni-63 was detected in 1 sample taken at MW-DN-119I at a concentration of 11.3 pCi/L. All other hard-to-detect nuclides were not detected at concentrations greater than their respective MDCs. (Table B-I.3, Appendix B).

B. Surface Water Results

No surface water samples were collected in 2021.

C. Precipitation Water Results

Precipitation Water

Samples were collected from 8 precipitation water locations throughout the year in accordance with the station radiological groundwater protection program. Analytical results and anomalies are discussed below.

Tritium

Samples from 4 locations were analyzed for tritium activity. Tritium was detected in 5 of 24 samples taken from 3 locations. The concentrations ranged from 192 to 421 pCi/L. (Table B-II.1, Appendix B)

D. Drinking Water Well Survey

No drinking water well surveys were conducted in 2021.

E. Summary of Results – Inter-Laboratory Comparison Program

Inter-Laboratory Comparison Program results for TBE are presented in the AREOR.

F. Leaks, Spills, and Releases

No leaks, spills, and releases occurred in 2021.

G. Trends

Overall, tritium concentrations are decreasing across the Station. The Station continued to implement the tritium monitoring plan with monthly/quarterly sampling of a subset of shallow and intermediate aquifer wells, sewage treatment plant water, and storm sewer water.

An elevated concentration persists in the area of the Condensate Storage Tanks (Event 20 in EN-DR-408-4160, Revision 6, Attachment 3). As of December 2015, active remediation was implemented. Two remediation wells were installed in August 2015; however, the West remediation well is

capable of enough recharge for active remediation.

H. Investigations

No investigations performed in 2021.

I. Actions Taken

1. Compensatory Actions

   None.

2. Actions to Recover/Reverse Plumes

   None.

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APPENDIX A

LOCATION DESIGNATIONS

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TABLE A-1: Radiological Groundwater Protection Program - Sampling Locations, Dresden Nuclear Power Station, 2021

Site	Site Type	Location
CBG		
Domestic Water		
DSP-106	Monitoring Well	65 feet east of east wall of EM Shop
DSP-107	Monitoring Well	9 feet east of the east Unit 1 Fuel Pool wall
DSP-108	Monitoring Well	40 ft east of the Unit 1 Sphere
DSP-122	Monitoring Well	50 feet north of the Radwaste Tank Farm
DSP-123	Monitoring Well	Northeast corner of the Unit 1 Off-gas Building
DSP-124	Monitoring Well	9 feet south of Floor Drain Collector Tank
DSP-125	Monitoring Well	Northeast corner of the Unit 2/3A CST
DSP-126	Monitoring Well	21 feet northwest of the northwest bend in road behind Training Building
DSP-147	Monitoring Well	325 feet west of Telemetry Bridge
DSP-148	Monitoring Well	130 feet southeast of the Flow Regulating Station building
DSP-149	Monitoring Well	35 feet south by southwest of the 138 KV yard fence
DSP-150	Monitoring Well	85 feet east of the northeast corner of the Unit 1 Spent Fuel Pool pad
DSP-154	Monitoring Well	33 feet west of the track; 165 feet east of the Security Checkpoint
DSP-159-M	Monitoring Well	250 feet west of the Thorsen house; 450 ft south of the plant access gate
DSP-159-S	Monitoring Well	251 feet west of the Thorsen house; 450 ft south of the plant access gate
ENC-5		
ENC-14		
FW-1	Precipitation	40 feet southwest of Unit 2/3 Off-gas Filter Building access door; north end of guardrail
FW-2	Precipitation	15 feet south of the U 2/3 Intake Canal
FW-3	Precipitation	100 feet north of the security fence, north part of switchyard
FW-4	Precipitation	10 feet east of the U 2/3 Trackway, adjacent to the TB south wall
FW-5	Precipitation	20 feet west of the concrete be on the north side of the gravel before it forks
FW-10	Precipitation	At the fence at the northwest corner of the SBO Building
FW-11	Precipitation	30 feet east of the east wall of the EM shop; at the stanchion for RGPP well DSP-105
FW-12	Precipitation	60 feet southeast of the southwest corner of the Admin Building; on the security fence
MD-11		Piping located between Condensate Storage Tanks.
MW-DN-101-I	Monitoring Well	60 feet north of the Unit 1 Diesel Fuel Storage
MW-DN-101-S	Monitoring Well	60 feet north of the Unit 1 Diesel Fuel Storage
MW-DN-102-S	Monitoring Well	13 feet south of the southeast corner of the MUDS Building
MW-DN-103-I	Monitoring Well	280 feet west of the northwest corner of N-GET Building
MW-DN-103-S	Monitoring Well	281 feet west of the northwest corner of N-GET Building
MW-DN-104-S	Monitoring Well	50 feet north of Radwaste Tank Farm
MW-DN-105-S	Monitoring Well	65 feet north of the northeast corner of the Storeroom
MW-DN-107-S	Monitoring Well	15 feet west by southwest of the Unit 1 CST
MW-DN-109-I	Monitoring Well	8 feet north of Chemistry Building
MW-DN-109-S	Monitoring Well	8 feet north of Chemistry Building
MW-DN-110-S	Monitoring Well	25 feet west of the Waste Water Treatment (WWT) Building
MW-DN-111-S	Monitoring Well	9 feet east of the Floor Drain Collector Tank
MW-DN-112-I	Monitoring Well	100 feet south of the Chemistry Building
MW-DN-112-S	Monitoring Well	100 feet south of the Chemistry Building
MW-DN-113-S	Monitoring Well	91 feet west of the southwest corner of the Administration Building

TABLE A-1: Radiological Groundwater Protection Program - Sampling Locations, Dresden Nuclear Power Station, 2021

Site	Site Type	Location
MW-DN-114-I	Monitoring Well	50 feet east of the Unit 1 Clean Demineralized Water Tank
MW-DN-114-S	Monitoring Well	8 feet southwest of the Radiation protection Dept west access doors
MW-DN-115-I	Monitoring Well	11 feet south of Instrument Maintenance Shop
MW-DN-115-S	Monitoring Well	12 feet south of Instrument Maintenance Shop
MW-DN-116-I	Monitoring Well	75 feet south of the Calgon Building roll-up door
MW-DN-116-S	Monitoring Well	75 feet south of the Calgon Building roll-up door
MW-DN-118-S	Monitoring Well	Southeast corner of the Unit 1 Fuel Pool
MW-DN-119-I	Monitoring Well	20 feet east by northeast of the Unit 1 Sewage Ejector Building
MW-DN-119-S	Monitoring Well	21 feet east by northeast of the Unit 1 Sewage Ejector Building
MW-DN-122-I	Monitoring Well	150 feet north of Collins Road; northeast of the G.E. Fuel Storage Facility
MW-DN-122-S	Monitoring Well	150 feet north of Collins Road; northeast of the G.E. Fuel Storage Facility
MW-DN-124-I	Monitoring Well	10 feet south of the liquid nitrogen inerting tanks
MW-DN-124-S	Monitoring Well	10 feet south of the liquid nitrogen inerting tanks
MW-DN-125-S	Monitoring Well	40 feet east of 2/3 B CST
MW-DN-126-S	Monitoring Well	15 feet south of fence around Unit 2/3 A CST and B CST (outside of fence)
MW-DN-127-S	Monitoring Well	20 feet south of Unit 3 HRSS
MW-DN-134-S	Monitoring Well	20-ft North of Mausoleum Building
MW-DN-135-S	Monitoring Well	20-ft East of Mausoleum Building
MW-DN-136-S	Monitoring Well	14.5-ft South of Mausoleum Building
MW-DN-137-S	Monitoring Well	20-ft West of Mausoleum Building
MW-DN-140-S	Monitoring Well	East of MW-DN-104S at SW corner outside of 2/3 crib house
MW-DN-141-S	Monitoring Well	North of 'A' Waste Tank next to 2/3 main chimney
MW-DN-142-S	Monitoring Well	
MW-DN-143-S	Monitoring Well	
MW-DN-144-S	Monitoring Well	
North Well		
RW-DN-100S		
RW-DN-101S		
TW-DN-128-S		
TW-DN-132-S		
TW-DN-133-S		
U1-1		
U1-12		
Well Water		

APPENDIX B

DATA TABLES

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TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM AND GROSS ALPHA IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)
CBG	05/06/21	1050 ± 174				
CBG	08/10/21	687 ± 147				
CBG	11/09/21	838 ± 161				
DOMESTIC WATER	03/24/21	< 170				
DSP-106	03/08/21	1120 ± 186				
DSP-106	05/05/21	1080 ± 182	< 9.5	< 0.6	< 1.5	< 0.4
DSP-106	08/10/21	1160 ± 183				
DSP-106	11/09/21	1290 ± 207				
DSP-107	03/08/21	1610 ± 230				
DSP-107	05/05/21	1430 ± 214	< 8.4	< 0.9	< 1.4	< 0.4
DSP-107	08/10/21	1520 ± 213				
DSP-107	11/09/21	1740 ± 249				
DSP-108	03/08/21	< 183				
DSP-108	05/05/21	255 ± 126	< 4.7	1.5 ± 0.7	< **4.6**	< 1.8
DSP-108	08/10/21	250 ± 114				
DSP-108	11/09/21	254 ± 132				
DSP-122	03/09/21	816 ± 158				
DSP-122	05/05/21	1030 ± 176	< 5.1	< 0.9	< **3.9**	2.4 ± 0.9
DSP-122	08/12/21	480 ± 126				
DSP-122	11/10/21	622 ± 143				
DSP-123	03/08/21	< 181				
DSP-123	05/05/21	< 184	< 4.3	< 0.9	< **5.3**	< 0.4
DSP-123	08/11/21	< 173				
DSP-123	11/10/21	198 ± 121				
DSP-124	03/10/21	< 181				
DSP-124	05/04/21	242 ± 125	< 6.2	< 0.9	< **3.6**	< 0.9
DSP-124	08/09/21	454 ± 125				
DSP-124	11/08/21	416 ± 136				
DSP-125	03/11/21	< 184				
DSP-125	05/04/21	< 186	< 6.9	< 0.8	< **6.4**	< 1.8
DSP-125	08/10/21	< 172				
DSP-125	11/09/21	< 185				
DSP-126	05/06/21	< 189				
DSP-147	05/07/21	< 188				
DSP-148	05/03/21	< 191				
DSP-149	05/03/21	380 ± 130				
DSP-150	05/05/21	< 184				
DSP-154	05/03/21	< 183				
DSP-159-M	05/04/21	257 ± 125				
DSP-159-S	05/04/21	< 185				
ENC-5	03/24/21	< 171				
ENC-14	03/24/21	< 167				
MD-11	03/11/21	12900 ± 1340				
MD-11	05/04/21	11900 ± 1240	< 8.8	< 1.0	< 1.0	< 0.4
MD-11	08/10/21	9440 ± 995				
MD-11	11/09/21	12300 ± 1290				
MW-DN-101-I	03/08/21	302 ± 124				
MW-DN-101-I	05/05/21	400 ± 131	< 8.8	< 0.8	< **3.1**	< 0.7
MW-DN-101-I	08/11/21	227 ± 117				
MW-DN-101-I	11/10/21	< 181				

***BOLD** values = Unable to meet detection limits due to high solids content*

TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM AND GROSS ALPHA IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)
MW-DN-101-S	03/08/21	< 182				
MW-DN-101-S	05/05/21	< 189	< 8.7	< 0.8	< 1.6	2.1 ± 1.0
MW-DN-101-S	08/11/21	< 174				
MW-DN-101-S	12/20/21	< 163				
MW-DN-102-S	05/04/21	< 191				
MW-DN-103-I	05/06/21	< 187				
MW-DN-103-S	05/06/21	< 192				
MW-DN-104-S	03/09/21	< 181				
MW-DN-104-S	05/05/21	< 178	< 8.2	< 1.0	< **7.6**	< 3.6
MW-DN-104-S	08/12/21	< 172				
MW-DN-104-S	11/10/21	< 188				
MW-DN-105-S	03/08/21	186 ± 120				
MW-DN-105-S	05/05/21	< 197	< 8.1	3.2 ± 0.9	< **6.2**	< 3.6
MW-DN-105-S	08/11/21	< 176				
MW-DN-105-S	11/08/21	< 197				
MW-DN-107-S	03/10/21	< 185				
MW-DN-107-S	05/06/21	< 185	< 9.1	< 0.9	< 0.9	< 0.7
MW-DN-107-S	08/10/21	< 175				
MW-DN-107-S	11/08/21	< 165				
MW-DN-109-I	03/09/21	< 179				
MW-DN-109-I	05/03/21	225 ± 121	< 9.0	< 0.9	< **6.1**	< 3.6
MW-DN-109-I	08/09/21	313 ± 125				
MW-DN-109-I	11/08/21	222 ± 113				
MW-DN-109-S	03/09/21	< 183				
MW-DN-109-S	05/03/21	< 182	< 8.5	< 0.8	< **6.6**	< 3.6
MW-DN-109-S	08/09/21	< 181				
MW-DN-109-S	11/08/21	< 174				
MW-DN-110-S	05/03/21	< 186				
MW-DN-111-S	03/10/21	4900 ± 551				
MW-DN-111-S	05/04/21	5530 ± 618	< 8.3	< 0.9	< 0.8	< 0.5
MW-DN-111-S	08/09/21	2270 ± 286				
MW-DN-111-S	11/08/21	2100 ± 270				
MW-DN-112-I	05/04/21	< 179				
MW-DN-112-I	11/08/21	< 170				
MW-DN-112-S	05/04/21	< 181				
MW-DN-113-S	05/04/21	< 178				
MW-DN-114-I	05/06/21	2140 ± 277				
MW-DN-114-I	11/09/21	2540 ± 312				
MW-DN-114-S	03/10/21	788 ± 156				
MW-DN-114-S	05/06/21	340 ± 127	< 9.6	< 0.9	< 1.1	0.9 ± 0.6
MW-DN-114-S	08/10/21	< 174				
MW-DN-114-S	11/09/21	619 ± 139				
MW-DN-115-I	05/06/21	277 ± 123				
MW-DN-115-I	11/09/21	500 ± 146				
MW-DN-115-S	03/11/21	< 182				
MW-DN-115-S	05/06/21	< 178	< 8.4	< 0.9	< **3.4**	< 1.1
MW-DN-115-S	08/10/21	< 175				
MW-DN-115-S	11/09/21	< 194				
MW-DN-116-I	05/05/21	429 ± 129				
MW-DN-116-S	03/09/21	< 183				

***BOLD** values = Unable to meet detection limits due to high solids content*

TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM AND GROSS ALPHA IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)
MW-DN-116-S	05/05/21	< 181	< 8.8	< 0.9	< 2.0	3.4 ± 1.1
MW-DN-116-S	08/11/21	< 174				
MW-DN-116-S	11/10/21	< 182				
MW-DN-118-S	03/08/21	< 184				
MW-DN-118-S	05/05/21	< 183	< 7.7	< 0.9	< 1.4	1.7 ± 0.8
MW-DN-118-S	08/10/21	< 178				
MW-DN-118-S	11/09/21	< 183				
MW-DN-119-I	03/08/21	< 174				
MW-DN-119-I	05/05/21	< 183	< 7.0	< 0.9	< 2.5	< 0.8
MW-DN-119-I	08/11/21	< 177				
MW-DN-119-I	11/10/21	< 184				
MW-DN-119-S	03/08/21	< 178				
MW-DN-119-S	05/05/21	< 199	< 6.8	< 0.8	< 1.4	4.1 ± 1.3
MW-DN-119-S	08/11/21	< 177				
MW-DN-119-S	11/10/21	< 179				
MW-DN-122-I	05/06/21	< 184				
MW-DN-122-S	05/06/21	< 185				
MW-DN-124-I	03/10/21	15300 ± 1590				
MW-DN-124-I	05/04/21	15000 ± 1550	< 9.1	< 0.9	**< 4.0**	< 4.3
MW-DN-124-I	08/09/21	12900 ± 1350				
MW-DN-124-I	11/08/21	14100 ± 1470				
MW-DN-124-S	03/10/21	223 ± 120				
MW-DN-124-S	05/04/21	429 ± 134	< 7.3	< 0.9	**< 4.3**	< 4.4
MW-DN-124-S	08/09/21	192 ± 114				
MW-DN-124-S	11/08/21	228 ± 114				
MW-DN-125-S	05/04/21	< 183				
MW-DN-125-S	11/08/21	259 ± 128				
MW-DN-126-S	03/10/21	< 172				
MW-DN-126-S	05/04/21	< 183	< 7.9	< 0.8	< 2.5	< 4.5
MW-DN-126-S	08/09/21	< 175				
MW-DN-126-S	11/09/21	203 ± 131				
MW-DN-127-S	05/04/21	< 186				
MW-DN-127-S	11/09/21	345 ± 129				
MW-DN-134-S	05/03/21	< 191				
MW-DN-135-S	05/07/21	< 195				
MW-DN-136-S	03/08/21	< 177				
MW-DN-136-S	05/03/21	< 190	< 6.5	< 0.8	**< 4.2**	< 4.3
MW-DN-136-S	08/09/21	< 170				
MW-DN-136-S	11/10/21	< 185				
MW-DN-137-S	05/03/21	< 197				
MW-DN-140-S	03/09/21	< 173				
MW-DN-140-S	05/05/21	< 182	< 7.4	< 0.8	< 1.1	< 0.9
MW-DN-140-S	08/11/21	< 172				
MW-DN-140-S	11/10/21	222 ± 123				
MW-DN-141-S	03/09/21	1340 ± 201				
MW-DN-141-S	05/03/21	1350 ± 211	< 8.5	< 0.9	< 0.8	< 0.9
MW-DN-141-S	08/11/21	906 ± 166				
MW-DN-142-S	05/06/21	< 177				
MW-DN-143-S	05/06/21	< 184				
MW-DN-144-S	05/06/21	< 178				

***BOLD** values = Unable to meet detection limits due to high solids content*

TABLE B-I.1 CONCENTRATIONS OF TRITIUM, STRONTIUM AND GROSS ALPHA IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)
NORTH WELL	03/24/21	< 177				
RW-DN-100-S	05/04/21	1650 ± 230	< 6.0	< 0.9	< **4.6**	6.7 ± 2.8
RW-DN-100-S	08/10/21	422 ± 124				
RW-DN-100-S	11/09/21	1590 ± 232				
RW-DN-101-S	05/04/21	41000 ± 4140	< 8.1	< 0.8	< 1.5	< 0.9
TW-DN-128-S	05/06/21	< 188				
TW-DN-132-S	05/06/21	205 ± 126				
TW-DN-133-S	05/06/21	1680 ± 241				
U1-1	03/24/21	< 173				
U1-12	03/24/21	< 175				
WELL WATER	03/24/21	< 171				

***BOLD** values = Unable to meet detection limits due to high solids content*

TABLE B-I.2

CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
DSP-106	05/05/21	< 16	< 35	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 5	< 2	< 2	< 11	< 3
DSP-107	05/05/21	< 18	< 18	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 5	< 2	< 2	< 13	< 4
DSP-108	05/05/21	< 17	< 17	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 5	< 2	< 2	< 12	< 4
DSP-122	05/05/21	< 17	36 ± 24	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 4	< 2	< 2	< 11	< 4
DSP-123	05/05/21	< 15	< 15	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 4	< 2	< 2	< 10	< 3
DSP-124	05/04/21	< 23	< 22	< 2	< 2	< 5	< 2	< 5	< 3	< 4	< 5	< 3	< 2	< 14	< 4
DSP-125	05/04/21	< 19	< 37	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 4	< 2	< 2	< 11	< 4
DSP-126	05/06/21	< 14	< 15	< 1	< 2	< 3	< 2	< 3	< 2	< 3	< 4	< 2	< 2	< 10	< 3
DSP-147	05/07/21	< 19	< 20	< 2	< 2	< 5	< 2	< 5	< 2	< 4	< 5	< 2	< 2	< 12	< 4
DSP-148	05/03/21	< 16	< 36	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 4	< 2	< 2	< 10	< 3
DSP-149	05/03/21	< 14	< 24	< 1	< 1	< 3	< 1	< 3	< 2	< 3	< 3	< 1	< 2	< 8	< 3
DSP-150	05/05/21	< 14	< 14	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 4	< 2	< 2	< 10	< 4
DSP-154	05/03/21	< 19	< 19	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 5	< 2	< 2	< 13	< 4
DSP-159-M	05/04/21	< 10	< 18	< 1	< 1	< 2	< 1	< 2	< 1	< 2	< 3	< 1	< 1	< 7	< 2
DSP-159-S	05/04/21	< 17	< 38	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 4	< 2	< 2	< 11	< 3
MD-11	05/04/21	< 17	< 34	< 2	< 2	< 5	< 2	< 4	< 2	< 3	< 5	< 2	< 2	< 12	< 4
MW-DN-101-I	05/05/21	< 17	< 35	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 5	< 2	< 2	< 11	< 4
MW-DN-101-S	05/05/21	< 15	< 17	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 4	< 2	< 2	< 10	< 4
MW-DN-102-S	05/04/21	< 14	< 17	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 4	< 2	< 2	< 10	< 4
MW-DN-103-I	05/06/21	< 18	47 ± 27	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 5	< 2	< 2	< 13	< 4
MW-DN-103-S	05/06/21	< 10	21 ± 14	< 1	< 1	< 2	< 1	< 2	< 1	< 2	< 3	< 1	< 1	< 7	< 3
MW-DN-104-S	05/05/21	< 16	< 16	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 5	< 2	< 2	< 11	< 3
MW-DN-105-S	05/05/21	< 14	< 15	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 4	< 2	< 2	< 10	< 4
MW-DN-107-S	05/06/21	< 17	< 37	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 4	< 2	< 2	< 10	< 3
MW-DN-109-I	05/03/21	< 16	< 16	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 4	< 2	< 2	< 10	< 4
MW-DN-109-S	05/03/21	< 18	< 36	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 4	< 2	< 2	< 12	< 4
MW-DN-110-S	05/03/21	< 18	< 38	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 5	< 2	< 2	< 11	< 4
MW-DN-111-S	05/04/21	< 19	< 17	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 5	< 2	< 2	< 13	< 4
MW-DN-112-I	05/04/21	< 18	237 ± 36	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 5	< 2	< 2	< 11	< 4
MW-DN-112-S	05/04/21	< 18	< 17	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 5	< 2	< 2	< 12	< 3
MW-DN-113-S	05/04/21	< 18	104 ± 29	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 5	< 2	< 2	< 12	< 4
MW-DN-114-I	05/06/21	< 18	< 19	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 4	< 2	< 2	< 9	< 4
MW-DN-114-S	05/06/21	< 19	< 40	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 4	< 2	< 2	< 11	< 4
MW-DN-115-I	05/06/21	< 18	< 33	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 4	< 2	< 2	< 11	< 4
MW-DN-115-S	05/06/21	< 18	659 ± 41	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 4	< 2	< 2	< 11	< 3

TABLE B-I.2

CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
MW-DN-116-I	05/05/21	< 17	< 38	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 5	< 2	< 2	< 11	< 4
MW-DN-116-S	05/05/21	< 18	50 ± 27	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 5	< 2	< 2	< 12	< 4
MW-DN-118-S	05/05/21	< 15	< 16	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 4	< 2	< 2	< 10	< 3
MW-DN-119-I	05/05/21	< 15	< 29	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 4	< 2	< 2	< 11	< 3
MW-DN-119-S	05/05/21	< 19	45 ± 29	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 5	< 2	< 2	< 12	< 3
MW-DN-122-I	05/06/21	< 11	< 11	< 1	< 1	< 2	< 1	< 2	< 1	< 2	< 3	< 1	< 1	< 7	< 2
MW-DN-122-S	05/06/21	< 17	< 16	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 4	< 2	< 2	< 10	< 3
MW-DN-124-I	05/04/21	< 17	64 ± 29	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 5	< 2	< 2	< 12	< 4
MW-DN-124-S	05/04/21	< 17	99 ± 24	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 4	< 2	< 2	< 11	< 4
MW-DN-125-S	05/04/21	< 19	2329 ± 58	< 2	< 2	< 5	< 2	< 5	< 2	< 4	< 5	< 2	< 2	< 12	< 3
MW-DN-126-S	05/04/21	< 17	< 21	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 4	< 2	< 2	< 11	< 4
MW-DN-127-S	05/04/21	< 15	46 ± 19	< 1	< 1	< 2	< 1	< 2	< 1	< 2	< 3	< 1	< 1	< 7	< 2
MW-DN-134-S	05/03/21	< 15	< 16	< 2	< 2	< 3	< 2	< 3	< 2	< 3	< 4	< 2	< 2	< 9	< 3
MW-DN-135-S	05/07/21	< 21	< 19	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 5	< 3	< 2	< 12	< 4
MW-DN-136-S	05/03/21	< 15	< 28	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 4	< 2	< 2	< 10	< 3
MW-DN-137-S	05/03/21	< 15	< 31	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 4	< 2	< 2	< 10	< 3
MW-DN-140-S	05/05/21	< 15	< 16	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 4	< 2	< 2	< 10	< 3
MW-DN-141-S	05/03/21	< 15	< 16	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 4	< 2	< 2	< 9	< 3
MW-DN-142-S	05/06/21	< 14	< 17	< 2	< 2	< 3	< 2	< 3	< 2	< 3	< 4	< 2	< 2	< 10	< 3
MW-DN-143-S	05/06/21	< 15	< 32	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 5	< 2	< 2	< 10	< 3
MW-DN-144-S	05/06/21	< 14	< 14	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 4	< 2	< 2	< 10	< 4
RW-DN-100-S	05/04/21	< 15	< 16	< 2	< 2	< 3	< 2	< 3	< 2	< 3	< 4	< 2	< 2	< 10	< 3
RW-DN-101-S	05/04/21	< 15	< 16	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 4	< 2	< 2	< 10	< 3

TABLE B-I.3

CONCENTRATIONS OF HARD TO DETECTS IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	Am-241	Cm-242	Cm-243/244	Pu-238	Pu-239/240	U-233/234	U-235	U-238	Fe-55	Ni-63
DSP-106	05/05/21									< 122	< 4.7
DSP-107	05/05/21									< 57	< 4.7
DSP-108	05/05/21									< 101	< 5.0
DSP-122	05/05/21									< 75	< 4.3
DSP-123	05/05/21									< 103	< 4.8
DSP-124	05/04/21									< 36	< 4.9
DSP-125	05/04/21									< 180	< 5.0
MD-11	05/04/21	< 0.16	< 0.04	< 0.17	< 0.17	< 0.13	< 0.12	< 0.04	< 0.03	< 54	< 4.4
MW-DN-101-I	05/05/21									< 32	< 5.0
MW-DN-101-S	05/05/21									< 112	< 4.8
MW-DN-104-S	05/05/21									< 28	< 4.6
MW-DN-105-S	05/05/21									< 41	< 4.5
MW-DN-107-S	05/06/21									< 56	< 4.6
MW-DN-109-I	05/03/21									< 118	< 4.7
MW-DN-109-S	05/03/21									< 172	< 4.5
MW-DN-111-S	05/04/21	< 0.13	< 0.02	< 0.06	< 0.11	< 0.15	< 0.04	< 0.17	< 0.07	< 148	< 4.7
MW-DN-114-S	05/06/21									< 140	< 4.5
MW-DN-115-S	05/06/21									< 169	< 4.9
MW-DN-116-S	05/05/21	< 0.16	< 0.02	< 0.12	< 0.04	< 0.11	< 0.07	< 0.09	< 0.07	< 144	< 4.4
MW-DN-118-S	05/05/21									< 152	< 4.5
MW-DN-119-I	05/05/21	< 0.11	< 0.03	< 0.03	< 0.03	< 0.10	< 0.06	< 0.11	< 0.13	< 122	11.3 ± 3.0
MW-DN-119-S	05/05/21									< 157	< 4.6
MW-DN-124-I	05/04/21	< 0.08	< 0.03	< 0.03	< 0.13	< 0.13	< 0.14	< 0.14	< 0.18	< 182	< 4.5
MW-DN-124-S	05/04/21	< 0.14	< 0.03	< 0.07	< 0.10	< 0.03	< 0.18	< 0.18	< 0.15	< 103	< 4.2
MW-DN-126-S	05/04/21									< 190	< 5.0
MW-DN-136-S	05/03/21									< 160	< 4.9
MW-DN-140-S	05/05/21									< 114	< 4.0
MW-DN-141-S	05/03/21									< 184	< 4.3
RW-DN-100-S	05/04/21	< 0.17	< 0.07	< 0.14	< 0.03	< 0.10	< 0.15	< 0.18	< 0.18	< 150	< 4.4
RW-DN-101-S	05/04/21	< 0.08	< 0.04	< 0.14	< 0.18	< 0.16	< 0.05	< 0.12	< 0.05	< 137	< 4.7

TABLE B-II.1 CONCENTRATIONS OF TRITIUM IN PRECIPITATION WATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2021

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3
FW-1	03/09/21	404 ± 127
FW-1	08/12/21	< 177
FW-1	11/10/21	215 ± 123
FW-2	03/11/21	< 184
FW-2	08/11/21	< 176
FW-2	11/09/21	192 ± 121
FW-3	03/11/21	< 182
FW-3	08/11/21	421 ± 126
FW-3	11/09/21	239 ± 127
FW-4	03/11/21	< 180
FW-4	08/12/21	< 176
FW-4	11/08/21	< 193
FW-5	03/11/21	< 182
FW-5	08/10/21	< 169
FW-5	11/08/21	< 177
FW-10	03/08/21	< 187
FW-10	08/11/21	< 161
FW-10	11/09/21	< 186
FW-11	03/08/21	< 182
FW-11	08/10/21	< 169
FW-11	11/09/21	< 181
FW-12	03/11/21	< 186
FW-12	08/12/21	< 173
FW-12	11/09/21	< 187