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DRESDEN NUCLEAR POWER STATION
UNITS 1, 2 and 3

Annual Radiological
Environmental Operating Report

1 January through 31 December 2018

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I. Summary and Conclusions

This report on the Radiological Environmental Monitoring Program conducted for the Dresden Nuclear Power Station (DNPS) of Exelon covers the period 1 January 2018 through 31 December 2018. During that time period 2,044 analyses were performed on 1,919 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.

In 2018, the Dresden Nuclear Power Station released to the environment through the radioactive effluent liquid and gaseous pathways approximately 8.10E+01 curies of fission and activation gasses, 2.93E+01 curies of Carbon-14 (C-14) and approximately 2.36E+01 curies of tritium. The dose from both liquid and gaseous effluents was conservatively calculated for the Maximum Exposed Member of the Public. The results of those calculations and their comparison to the allowable limits are excerpted from the Dresden Generating Station 2018 Annual Radioactive Effluent Release Report (Radiological Impact on Man, starting at page 80):

1. Doses to a Member of the Public due to Liquid Releases in 2018 (from 01/01/2018 to 12/31/2018):

   UNITS 1, 2, 3
   Total Body: 5.67E-07 mrem
   Organ: 5.67E-07 mrem

   UNIT 1
   Total Body: 1.81E-07 mrem
   Organ: 1.81E-07 mrem

   UNIT 2
   Total Body: 1.93E-07 mrem
   Organ: 1.93E-07 mrem

   UNIT 3
   Total Body: 1.93E-07 mrem
   Organ: 1.93E-07 mrem

   The above annual liquid dose values are reported per Dresden-site (UNITS 1,2,3) as well as per each individual reactor unit (UNIT 1, UNIT 2, UNIT 3). Regulatory annual liquid dose limits are listed on page 1 section 1.d.3) and section 1.d.4), of the 2018 Annual Radioactive Effluent Release Report as well as in Dresden ODCM. The above annual liquid dose values are well below any regulatory limits.

2. Doses to a Member of the Public due to Gaseous Releases in 2018 (from 01/01/2018 to 12/31/2018):

UNITS 1, 2, 3
Gamma air (fission and activation gases): 2.54E-03 mrad
Beta air (fission and activation gases): 1.31E-04 mrad
Total Body (noble gases): 1.69E-03 mrem
Skin (noble gases): 2.89E-03 mrem
Organ - bone (radioiodines/tritium/particulates): 9.02E-02 mrem

UNIT 1
Gamma air (fission and activation gases): N/A
Beta air (fission and activation gases): N/A
Total Body (noble gases): N/A
Skin (noble gases): N/A
Organ - bone (radioiodines/tritium/particulates): 2.71E-03 mrem

UNIT 2
Gamma air (fission and activation gases): 1.61E-03 mrad
Beta air (fission and activation gases): 8.45E-05 mrad
Total Body (noble gases): 1.07E-03 mrem
Skin (noble gases): 1.83E-03 mrem
Organ - bone (radioiodines/tritium/particulates): 4.53E-02 mrem

UNIT 3
Gamma air (fission and activation gases): 9.31E-04 mrad
Beta air (fission and activation gases): 4.66E-05 mrad
Total Body (noble gases): 6.19E-04 mrem
Skin (noble gases): 1.06E-03 mrem
Organ - bone (radioiodines/tritium/particulates): 4.44E-02 mrem

The above annual gaseous dose values are reported per Dresden-site (UNITS 1,2,3) as well as per each individual reactor unit (UNIT 1, UNIT 2, UNIT 3). Regulatory annual gaseous dose limits are listed on page 1 section 1.a. and section 1.b.c., of the 2018 Annual Radioactive Effluent Release Report as well as in Dresden ODCM. The above annual gaseous dose values are well below any regulatory limits.

3. Doses to a Member of the Public due to Direct Radiation in 2018 (from 01/01/2018 to 12/31/2018):

UNITS 1, 2, 3
Total Body (skyshine): 8.85E+00 mrem

UNIT 1
Total Body (skyshine): N/A

UNIT 2
Total Body (skyshine): 4.58E+00 mrem

UNIT 3
Total Body (skyshine): 4.27E+00 mrem

The above annual direct dose values are reported per Dresden-site (UNITS 1,2,3) as well as per each individual reactor unit (UNIT 1, UNIT 2, UNIT 3). These numbers are calculated per ODCM methodologies, and are used to demonstrate compliance with 40CFR190 total dose limit requirements listed on page 1 section 1.e, of the 2018 Annual Radioactive Effluent Release Report as well as in Dresden ODCM.

4. Total body doses to the population and average doses to individuals in the population from all receiving-water-related-pathways are not applicable to Dresden Station. No downstream drinking water pathway exist within the specified distance of 10 kilometers (6.2 miles).

5. Total body doses to the population and average doses to individuals in the population from gaseous effluents to a distance of 50 miles from the site are not applicable to Dresden Station.

6. Doses from liquid and gaseous effluent to members of the public due to their activities inside the site boundary for the report period are not applicable to Dresden Station. Any member of the public who is onsite for a significant period of time is issued an Optical Stimulated Luminescent Dosimeter (OSLD) to monitor direct radiation exposure.

7. 40 CFR 190 / 10 CFR 72 Compliance:

   The General Electric Hitachi Nuclear Energy Morris Operation (GEH Morris Operation) facility is physically located near Dresden Station, hence it is considered in the evaluation of the uranium fuel cycle on members of the public in the general environment.

   Dresden decommissioning activities (Unit 1) and operations (Units 2 and 3) resulted in a maximum 9.02E-02 mrem organ dose and 8.85E+00 mrem total body dose. The Radiological Environmental Monitoring Program (REMP) direct radiation monitoring at or near the site boundary demonstrates that total body dose calculations to account for skyshine as found in the ODCM are conservative.

   No effluents were released from the Dresden Independent Spent Fuel Storage Installations (ISFSIs) during 2018. REMP direct radiation monitoring at or near the site boundary demonstrates that the ISFSIs do not result in measurable dose to the public.

   According to the 2018 GEH Morris Operation 10 CFR 72.44(d)(3) report, dated 2/21/2019, for the 2018 calendar year, the maximum

dose at their site boundary from direct radiation exposure was 2.73E-01 mrem. The maximum organ dose from site activities was 9.80E-06 mrem for 2018.

Maximum combined total body dose from Dresden Station and GEH Morris Operation activities was 9.12E+00 mrem during 2018, which was 36.48% of the 40 CFR 190 limit of 25 mrem.

Maximum combined organ dose from Dresden and GEH Morris Operation activities was 9.02E-02 mrem during 2018. This was 0.36 % of the 40 CFR 190 limit of 25 mrem to any organ. The combined thyroid dose was 8.68E-02 mrem. This was 0.12% of the 40 CFR 190 limit of 75 mrem.

Surface water samples were analyzed for concentrations of gross beta, tritium and gamma-emitting nuclides. Ground water samples were analyzed for concentrations of tritium 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.

Cow milk samples were analyzed for concentrations of I-131 and gamma-emitting nuclides. All I-131 results were less than the minimum detectable activity. No fission or activation products were detected. 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.

II. Introduction

The Dresden Nuclear Power Station (DNPS), consisting of one retired reactor and two operating boiling water reactors owned and operated by Exelon Corporation, 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 2018 through 31 December 2018.

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 Nuclear 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 2018. 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 or more frequently from two well water locations (D-23 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, smallmouth buffalo and common carp 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

Milk (M) samples are typically collected biweekly at one control location (D-25) from May through October and monthly from November through April. Other than D-25, there are no additional milking animals within 10 km (6.2 miles) of the site. All milk samples from D-25 were collected in new unused two gallon plastic bottles from the bulk tank, preserved with

sodium bisulfite and shipped promptly to the laboratory. Food products (FL) were collected annually in August at five locations (D-Control, D-Quad 1, D-Quad 2, D-Quad 3 and D-Quad 4). The control location was D-Control. 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 2018. 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, milk, fish, sediment and vegetation.

3. Concentrations of tritium in ground and surface water.

4. Concentrations of I-131 in air and milk.

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 2018 the DNPS REMP had a sample recovery rate greater than 97% (1,875 of 1,919 samples collected). Sample anomalies and missed samples are listed in the tables below:

Table D-1 LISTING OF SAMPLE ANOMALIES

Sample Type	Location Code	Collection Date	Reason
SW	D-31	01/12/18	No sample; lake frozen. Collector will check each week during quarter. NOTE: Sample obtained 01/26/18.
AP/AI	D-07	01/12/18	Low timer reading of 105.3 hours possibly due to power outage; timer operating correctly
AP/AI	D-45	01/12/18	Low timer reading of 132.1 hours possibly due to power outage; timer operating correctly
AP/AI	D-45	01/19/18	Low timer reading of 152 hours possibly due to power outage; timer operating correctly
AP/AI	D-45	02/07/18	Low timer reading of 163.2 hours possibly due to power outage; timer operating correctly
AP/AI	D-01	03/02/18	Low timer reading of 158.7 hours possibly due to power outage; timer operating correctly
SW	D-21	03/16/18	Station requested resample from compositor location
AP/AI	D-08	04/06/18	Low timer reading of 139.2 hours possibly due to power outage; timer operating correctly
AP/AI	D-53	04/13/18	Collector found power out to sampler; low reading of 700.7 hours; POC notified. Unable to perform pump field check
M	D-25	05/02/18	Farmer resting cows; grass sample substituted
M	D-25	05/17/18	Farmer resting cows; grass sample substituted
AP/AI	D-53	06/08/18	Low reading of 70 cfh due to the recent power restoration
M	D-25	06/27/18	Farmer resting cows; grass sample substituted
AP/AI	D-56	08/24/18	Timer stopped on 160.2; new timer installed. Reading calculated from the previous week.

Table D-1 LISTING OF SAMPLE ANOMALIES (Cont'd)

Sample Type	Location Code	Collection Date	Reason
AP/AI	D-56	08/31/18	Low timer reading of 155.5 hours possibly due to power outage; timer OK
AP/AI	D-04	10/12/18	Low reading of 118.5 hours due to power outage
AP/AI	D-12	10/12/18	Low reading of 147.4 hours possibly due to power outage; timer OK
AP/AI	D-04	10/19/18	Low reading of 67.5 hours due to power outage
AP/AI	D-01	11/09/18	Lower reading for no apparent reason; timer working OK

Table D-2 LISTING OF MISSED SAMPLES

Sample Type	Location Code	Collection Date	Reason
SW	D-52	01/05/18	No sample; water frozen
GR	#1, 2, 3	01/05/18	Not available to winter conditions
SW	D-57	01/05/18 01/12/18 01/19/18 01/26/18	Compositor down, collector unable to obtain grab sample; river frozen
GW	D-23	ALL 2018	Home vacant; water turned off (12 samples)
SW	D-52	01/12/18 01/19/18	No sample; water frozen
SW	D-52 D-57	02/02/18 02/09/18 02/16/18	No sample; water frozen
AP/AI	D-103-2	03/30/18	OSLD found missing during quarterly exchange; collector placed new 2nd quarter OSLD
AP/AI	D-53	04/20/18 04/27/18 05/04/18 05/11/18 05/18/18 05/25/18 06/01/18	No sample; no power at station
AP/AI	D-114-2 D-205-1 & 2	06/29/18	OSLD's found missing during quarterly exchange; collector placed new 3rd quarter OSLD's

Table D-2 LISTING OF MISSED SAMPLES (Cont'd)

Sample Type	Location Code	Collection Date	Reason
SW	D-57	11/30/18	Compositor down, collector unable to obtain grab sample; river frozen
AP/AI	D-07	11/30/18 12/07/18 12/14/18	No sample; no power at location
VE	Dresden Garden	12/07/18	Not available due to winter condition
AP/AI	D-07	12/21/18	No sample; power restored only a few hours before the collection time. Sample to be exchanged during the next scheduled collection

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 2018.

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 35 of 37 samples. The values ranged from 3.1 to 16.8 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). Two samples at indicator station D-21 was positive for tritium with concentrations of 256 and 450 pCi/L. All 4 samples at control station D-57 were positive for tritium. The values ranged from 571 to 1,150 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 or more frequent grab samples were collected at location D-35. No samples were available from location D-23 in 2018. The location was vacant and the water was shut off. These locations could be affected by Dresden's effluent releases and by sources upstream on the Kankakee River. The following analyses were performed:

Tritium

Samples from Location D-35 were analyzed for tritium activity (Table C–II.1, Appendix C). Tritium was not detected in any of the 4 samples. Concentrations detected were consistent with those detected in previous years (Figure C–7, Appendix C).

Gamma Spectrometry

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

3. Fish

Fish samples comprised of largemouth bass, smallmouth buffalo, and common carp 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 the 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 6E-3 to 44E-3 pCi/m^3 with a mean of 18E-3 pCi/m^3. The results from the Near-Field locations ranged from 6E-3 to 42E-3 pCi/m^3 with a mean of 18E-3 pCi/m^3. The results from the Far-Field locations ranged from 5E-3 to 44E-3 pCi/m^3 with a mean of 17E–3 pCi/m^3. The results from the Control location ranged from 7E-3 to 38E-3 pCi/m^3 with a mean of 18E-3 pCi/m^3. Comparison of the 2018 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 2018 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 (Table C–VI.1, Appendix C). All results were less than the MDC for I-131.

2. Terrestrial

a. Milk

Milk (M) samples are typically collected biweekly at one control location (D-25) from May through October and monthly from November through April. Other than D-25, there are no additional milking animals within 10 kilometers (6.2 miles) of the site. No milk samples were available for 3 weeks in 2018, so substitute grass samples were taken for the gamma analysis. The following analyses were

performed:

Iodine-131

Milk samples from location D-25 were analyzed for concentrations of I-131. (Table C–VII.1, Appendix C) No I-131 was detected and the LLD was met.

Gamma Spectrometry

Milk samples from location D-25 were analyzed for concentrations of gamma-emitting nuclides. (Table C–VII.2, Appendix C) Only naturally-occurring nuclides (not shown on the tables) were found in all samples. No other gamma-emitting nuclides were detected and all required LLDs were met.

b. Food Products

Food product samples were collected at six locations (D-Control, D-Quad 1, D-Quad 2, D-Quad 3 D-Quad 4, and SECTOR N) when available. Four locations, (D-Quad 1, D-Quad 2, D-Quad 3 and D-Quad 4) 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 Tables C–IX.1 to C–IX.3, Appendix C.

Most OSLD measurements were below 26 mrem/quarter, with a range of 11.4 to 25.7 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-12-01 and D-12-02) were comparable.

D. Land Use Survey

A Land Use Survey conducted on September 13, 2018 around the Dresden Nuclear Power Station (DNPS) was performed by EIML for Exelon Nuclear 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. The survey indicated a change in Sector J (S) where the dairy closed on 07/01/18. There were no changes required to the DNPS REMP as a result of this survey. The results of this survey are summarized below:

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	5.8	-
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	-	16.0
K SSW	3.3	-	-
L SW	3.6	-	11.4
M WSW	5.8	-	-
N W	3.5	0.5	-
P WNW	3.2	0.5	-
Q NW	2.2	0.5	-
R NNW	0.8	1.0	-

E. Errata Data

In 2017, The REMP AREOR indicated 42 missed samples. However, one week of all APT/API samples were lost in transit, which account for 28 missed samples. This is not clearly identified in the 2017 annual report and indicates a 97.9% recovery rate which is less than the reported 99% sample recovery rate. (Appendix E, Errata Data).

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, 166 out of 172 analyses performed met the specified acceptance criteria. Six analyses did not meet the specified acceptance criteria for the following reasons and were addressed through the TBE Corrective Action Program.

1. TBE was unable to report the February 2018 DOE MAPEP vegetation Sr-90 result due to QC failure and limited sample amount. (NCR 18-09)

2. The Analytics September 2017 milk Fe-59 result was evaluated as *Not Acceptable* (Ratio of TBE to known result at 132%). The reported value was 158 ± 17.6 pCi/L and the known value was 119 ± 19.9 pCi/L. No cause for the failure could be determined. TBE has passed 24 of the previous 27 milk cross-check results since 2012. This sample was run in duplicate on a different detector with comparable results (162 +/- 16 pCi/L). *NOTE: TBE's 4th Qtr result passed at 105%* (NCR 18-20)

3. The Analytics September milk I-131 result was evaluated as *Not Acceptable* (Ratio of TBE to known result at 143%). Due to a personnel change in the gamma prep lab, the sample was not prepped/counted in a timely manner such as to accommodate the I-131 8-day half-life. Analysts have been made aware of the urgency for this analysis and it will be monitored more closely by QA. *NOTE: TBE's 4th Qtr result passed at 101%* (NCR 18-24)

4. The Analytics September soil Cr-51 result was evaluated as *Not Acceptable* (Ratio of TBE to known result at 131%). As with #3 above, the sample was not prepped/counted in a timely manner such as to accommodate the Cr-51 27-day half-life. The same corrective action applies here as in #3. (NCR 18-21)

5. The MAPEP November vegetation Sr-90 result of 0.338 Bq/sample was evaluated as Not Acceptable (Lower acceptable range was 0.554 Bq/sample). It appears that there has been incomplete dissolution of Sr-90 due to the composition of the MAPEP vegetation "matrix". To resolve this issue, the TBE-2018 procedure has been modified to add H_2O_2 to assist in breaking down the organic material that comprises this "matrix". This corrective action will be monitored closely by QA. (NCR 18-25).

6. The ERA October 2018 water Sr-90 sample was evaluated as *Not Acceptable*. TBE's initial reported result of 36.8 pCi/L exceeded the upper acceptance range (22.9 – 36.4 pCi/L). After reviewing the data for this sample, it was discovered that there was a typographical error at the time the results were entered at the ERA website. The correct result in LIMS of 36.2 should have been submitted instead. This result is within ERA's acceptance limits. In addition to the typo error, ERA's very stringent upper acceptance limit of 116% is not a reflection of TBE's ability to successfully perform this analysis. (NCR 18-23)

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, 2018

NAME OF FACILITY: DRESDEN | **DOCKET NUMBER:** 50-010, 50-237 & 50-249
LOCATION OF FACILITY: MORRIS IL | **REPORTING PERIOD:** 2018

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**	37	**4**	*8.8* *(16/16)* *(3.1 - 16.8)*	*7.3* *(21/23)* *(3.8 - 13.4)*	*9* *(12/12)* *(6.2 - 13.4)*	D-52 CONTROL DESPLAINES RIVER - UPSTREAM 1.1 MILES ESE OF SITE	0
	H-3	12	**2000**	*353* *(2/4)* (256 - 450)	*726* *(4/8)* *(571 - 1150)*	*726* *(4/4)* *(571 - 1150)*	D-57 CONTROL KANKAKEE RIVER AT WILL ROAD(CONTROL) 2.0 MILES SE OF SITE	0
	GAMMA	37						
	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**	4	**2000**	<LLD	*NA*	-		0
	GAMMA	4						
	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, 2018

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LOCATION OF FACILITY: MORRIS IL | **REPORTING PERIOD:** 2018

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**	731	10	17.5 (678/678) *(5.5 - 44.1)*	17.6 (53/53) *(6.9 - 38.4)*	18.5 (53/53) *(7.9 - 44.1)*	D-14 INDICATOR CHANNAHON 3.7 MILES NE 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
	BA-140		*NA*	<LLD	<LLD	-		0
	LA-140		*NA*	<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, 2018

NAME OF FACILITY: DRESDEN | **DOCKET NUMBER:** 50-010, 50-237 & 50-249
LOCATION OF FACILITY: MORRIS IL | **REPORTING PERIOD:** 2018

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
AIR IODINE	**GAMMA**	731						
(E-3 PCI/CU.M)	*I-131*		**70**	<LLD	<LLD	-		0
MILK/GRASS	**I-131 (LOW LVL)**	16	**1**	NA	<LLD	-		0
(PCI/LITER)								
	GAMMA	19						
	MN-54		*NA*	NA	<LLD	-		0
	CO-58		*NA*	NA	<LLD	-		0
	FE-59		*NA*	NA	<LLD	-		0
	CO-60		*NA*	NA	<LLD	-		0
	ZN-65		*NA*	NA	<LLD	-		0
	NB-95		*NA*	NA	<LLD	-		0
	ZR-95		*NA*	NA	<LLD	-		0
	CS-134		**15**	NA	<LLD	-		0
	CS-137		**18**	NA	<LLD	-		0
	BA-140		**60**	NA	<LLD	-		0
	LA-140		**15**	NA	<LLD	-		0
VEGETATION	**GAMMA**	23						
(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**	364	*NA*	19	16.5	24.4	D-110-3 INDICATOR	0
(MILLI-ROENTGEN/QTR.)				(356/356)	(8/8)	(4/4)		
				(11.4 - 25.7)	*(12.6 - 18.9)*	*(21.7 - 25.7)*	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, 2018

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-23[(1)]	Thorsen Well, Dresden Road (indicator)	0.7 miles S
D-35	Dresden Lock and Dam (indicator)	0.8 miles NW
C.	Milk - bi-weekly / monthly	
D-25	Biros Farm (control)	11.4 miles SW
D.	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
E.	Fish	
D-28	Dresden Pool of Illinois River, Downstream (indicator)	0.9 miles NNW
D-46	DesPlaines River, Upstream (control)	1.2 miles ESE
F.	Sediment	
D-27	Illinois River at Dresden Lock and Dam, Downstream (indicator)	0.8 miles NW
G.	Vegetation	
Quadrant 1	26726 & 26819 McKinley Woods Road	1.7 miles ENE
Quadrant 2	3985 N. Will Road	2.1 miles SSE
Quadrant 3	3250 Perch Court	2.5 miles SSW
Quadrant 4	4740 Cemetery Road	2.1 miles W
Control	2035 Old Mazon Road	11 miles SW
Sector N	Dresden Garden	

(1) Sample was not taken due to vacancy. The water was cut off to the well.

TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Dresden Nuclear Power Station, 2018

Location	Location Description	Distance & Direction From Site
H.	Environmental Dosimetry - OSLD	
Inner Ring		
D-58-1 and -2		1.1 miles ESE
D-101-1 and -2		1.0 miles N
D-102-1 and -2		1.3 miles NNE
D-103-1 and -2		1.2 miles NE
D-104-1 and -2		1.7 miles ENE
D-105-1 and -2		1.5 miles E
D-106-1 and -2		1.1 miles ESE
D-107-1 and -2		1.4 miles SE
D-108-1 and -2		1.9 miles SSE
D-109-1 and -2		0.8 miles S
D-110-3 and -4		0.9 miles SSW
D-111-1 and -2		0.6 miles SW
D-112A-1 and -2		0.7 miles WSW
D-113-1 and -2		0.9 miles W
D-114-1 and -2		0.9 miles WNW
D-115-1 and -2		0.8 miles NW
D-116-1 and -2		1.0 miles NNW
Outer Ring		
D-201-1 and -2		4.8 miles N
D-202-1 and -2		5.1 miles NNE
D-203-1 and -2		4.7 miles NE
D-204-1 and -2		5.0 miles ENE
D-205-1 and -2		4.0 miles E
D-206-1 and -2		3.5 miles ESE
D-207-1 and -2		4.2 miles SE
D-208-1 and -2		4.9 miles SSE
D-209-1 and -2		4.1 miles S
D-210-1 and -2		4.9 miles SSW
D-211-1 and -2		4.8 miles SW
D-212-3 and -4		6.0 miles WSW
D-213-1 and -2		4.5 miles W
D-214-1 and -2		5.0 miles WNW
D-215-1 and -2		4.8 miles NW
D-216-1 and -2		4.9 miles NNW
Other Locations		
D-01-1 and -2	Onsite 1	0.8 miles NW
D-02-1 and -2	Onsite 2	0.3 miles NNE
D-03-1 and -2	Onsite 3	0.4 miles S
D-04-1 and -2	Collins Road, on Station property	0.8 miles W
D-07-1 and -2	Clay Products, Dresden Road	2.6 miles S
D-08-1 and -2	Jugtown Road, Prairie Parks	3.8 miles SW
D-10-1 and -2	Goose Lake Road, Goose Lake Village	3.5 miles SSW
D-14-1 and -2	Center Street, Channahon	3.7 miles NE
D-45-1 and -2	McKinley Woods Road, Channahon	1.7 miles ENE
D-53-1 and -2	Will Road, Hollyhock	2.1 miles SSE
D-55-1 and -2	Ridge Road, Minooka	4.3 miles N
D-56-1 and -2	Will Road, Wildfeather	1.7 miles SE
D-58-1 and -2	Will Road, Marina	1.1 miles ESE
Control		
D-12-1 and -2	Lisbon	10.5 miles NW

TABLE B-2: Radiological Environmental Monitoring Program – Summary of Sample Collection and Analytical Methods, Dresden Nuclear Power Station, 2018

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, 2018

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
Milk	I-131	Bi-weekly grab sample May through October. Monthly all other times	EIML-SPM-1, Environmental Incorporated Midwest Laboratory Sampling Procedures Manual	2 gallon	TBE, TBE-2012 Radioiodine in various matrices
Milk	Gamma Spectroscopy	Bi-weekly grab sample May through October. Monthly all other times	EIML-SPM-1, Environmental Incorporated Midwest Laboratory Sampling Procedures Manual	2 gallon	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

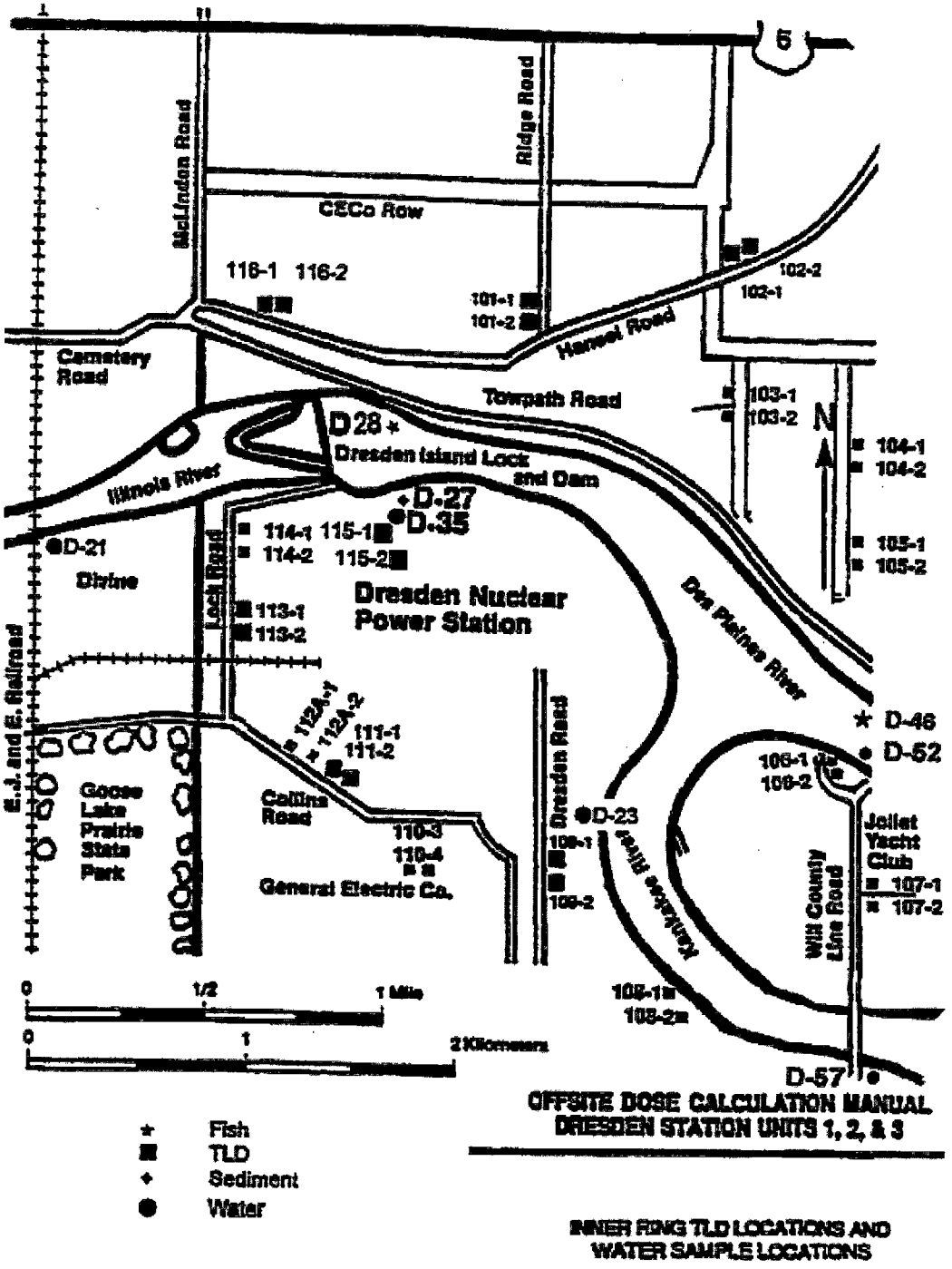

Figure B-1
Dresden Station Inner Ring OSLD Locations, Fish, Water, and Sediment Location, 2018

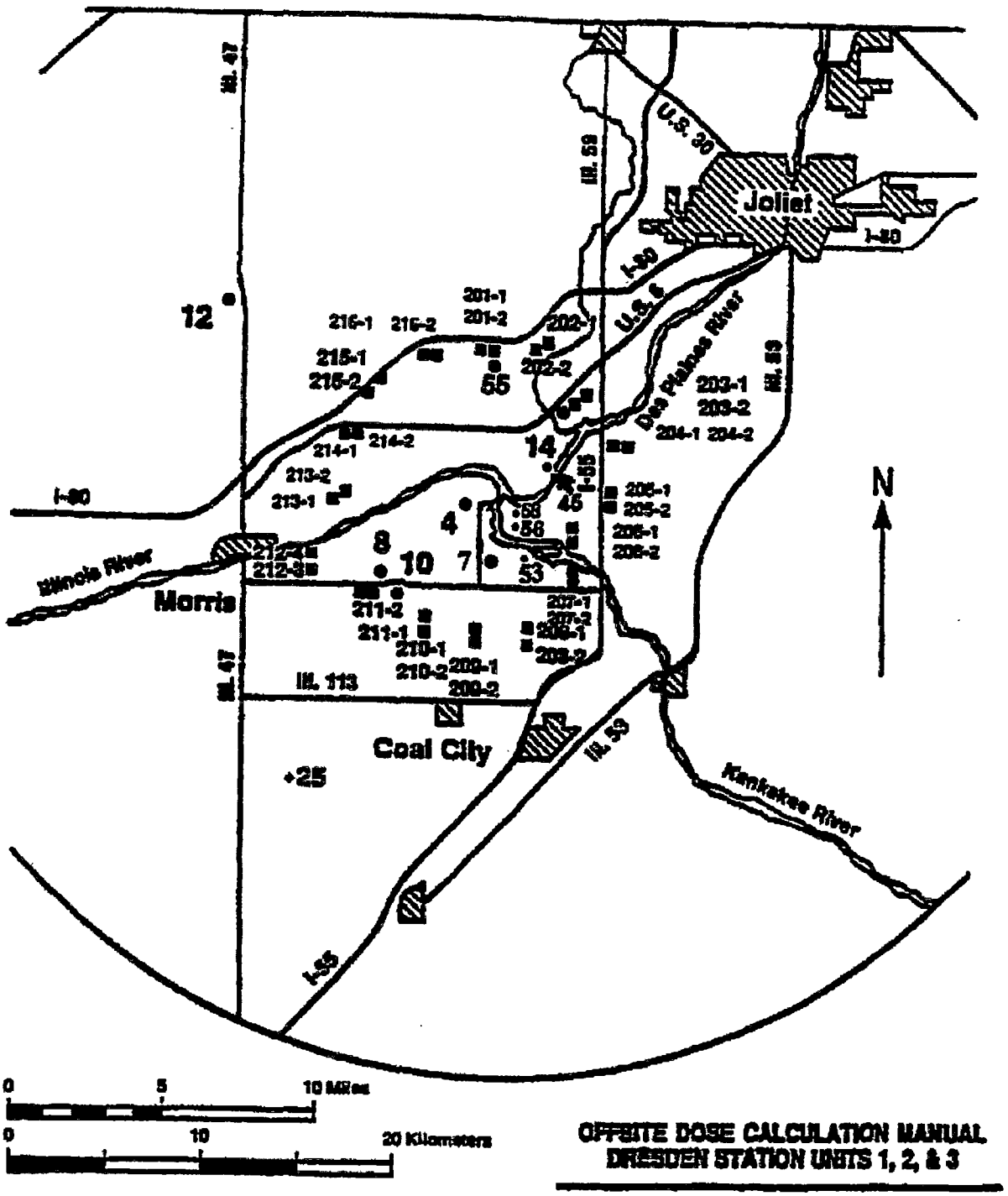

Figure B-2
Dresden Station Fixed Air Sampling and
OSLD Sites, Outer Ring OSLD Locations and Milk Location, 2018

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, 2018**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	D-21	D-52	D-57
12/29/17 - 01/26/18	7.1 ± 2.4	11.0 ± 2.8	*(1)*
01/26/18 - 02/23/18	16.8 ± 2.7	7.4 ± 2.3	7.6 ± 2.0
02/23/18 - 03/16/18	10.6 ± 3.6		
02/23/18 - 03/31/18	7.5 ± 2.2	8.3 ± 2.5	5.1 ± 1.8
04/06/18 - 04/27/18	5.5 ± 2.4	13.4 ± 3.3	5.4 ± 2.1
04/27/18 - 05/25/18	8.5 ± 2.5		
04/27/18 - 05/25/18	6.0 ± 2.3	10.1 ± 2.7	4.1 ± 2.0
05/25/18 - 06/29/18	3.1 ± 2.0	8.3 ± 2.5	< 2.7
06/29/18 - 07/27/18	9.4 ± 2.4	7.9 ± 2.3	5.2 ± 2.0
07/27/18 - 08/31/18	8.2 ± 2.3	9.9 ± 2.5	4.0 ± 1.9
08/24/18 - 09/28/18	7.0 ± 2.2	6.2 ± 2.1	3.8 ± 1.8
09/28/18 - 10/26/18	8.9 ± 2.3	9.7 ± 2.3	5.1 ± 1.8
10/26/18 - 11/30/18	7.8 ± 2.4	8.0 ± 2.4	5.8 ± 2.0
11/30/18 - 12/28/18	7.8 ± 2.5	7.1 ± 2.4	< 2.8
MEAN ± 2 STD DEV	8.2 ± 6.2	9.0 ± 4.0	5.1 ± 2.3

Table C-I.2 **CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2018**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	D-21	D-52	D-57
01/26/18 - 03/31/18	256 ± 125	< 186	578 ± 141
03/31/18 - 06/29/18	< 194	< 192	606 ± 146
07/06/18 - 09/28/18	450 ± 139	< 196	1150 ± 185
09/28/18 - 12/28/18	< 189	< 188	571 ± 144
MEAN ± 2 STD DEV	353 ± 274	-	726 ± 566

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION
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, 2018

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	12/29/17 - 01/26/18	< 8	< 7	< 15	< 8	< 19	< 9	< 13	< 15	< 9	< 8	< 41	< 9
	01/26/18 - 02/23/18	< 8	< 8	< 19	< 7	< 16	< 8	< 11	< 11	< 7	< 9	< 34	< 11
	02/23/18 - 03/16/18	< 3	< 3	< 7	< 3	< 6	< 3	< 6	< 6	< 3	< 3	< 15	< 4
	03/16/18 - 03/30/18	< 9	< 8	< 14	< 7	< 13	< 8	< 10	< 13	< 6	< 8	< 29	< 6
	03/30/18 - 04/27/18	< 5	< 6	< 12	< 7	< 14	< 6	< 10	< 14	< 7	< 7	< 35	< 9
	04/27/18 - 05/18/18	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 8	< 2	< 2	< 15	< 5
	04/27/18 - 05/25/18	< 5	< 5	< 12	< 6	< 14	< 7	< 11	< 14	< 5	< 5	< 28	< 13
	05/25/18 - 06/29/18	< 5	< 5	< 13	< 7	< 10	< 6	< 11	< 11	< 6	< 6	< 30	< 11
	06/29/18 - 07/27/18	< 3	< 3	< 7	< 4	< 5	< 4	< 5	< 10	< 3	< 3	< 18	< 6
	07/27/18 - 08/24/18	< 6	< 6	< 16	< 7	< 13	< 5	< 13	< 10	< 6	< 8	< 25	< 11
	08/24/18 - 09/28/18	< 6	< 7	< 16	< 6	< 15	< 7	< 13	< 15	< 6	< 6	< 35	< 9
	09/28/18 - 10/26/18	< 5	< 5	< 11	< 5	< 8	< 5	< 8	< 11	< 5	< 4	< 28	< 10
	10/26/18 - 11/30/18	< 7	< 8	< 16	< 8	< 15	< 10	< 13	< 9	< 7	< 7	< 29	< 6
	11/30/18 - 12/28/18	< 7	< 7	< 12	< 7	< 18	< 9	< 12	< 12	< 9	< 7	< 29	< 10
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-52	01/26/18 - 01/26/18	< 9	< 9	< 18	< 7	< 18	< 9	< 12	< 12	< 9	< 7	< 39	< 15
	02/23/18 - 02/23/18	< 8	< 8	< 14	< 9	< 19	< 8	< 14	< 13	< 9	< 9	< 37	< 11
	03/02/18 - 03/31/18	< 6	< 5	< 11	< 7	< 9	< 6	< 10	< 12	< 6	< 7	< 29	< 9
	04/06/18 - 04/27/18	< 6	< 5	< 13	< 6	< 12	< 6	< 12	< 14	< 6	< 5	< 31	< 11
	05/04/18 - 05/25/18	< 5	< 5	< 11	< 5	< 8	< 5	< 9	< 10	< 5	< 5	< 30	< 10
	06/01/18 - 06/29/18	< 5	< 5	< 12	< 10	< 13	< 7	< 12	< 13	< 5	< 6	< 33	< 14
	07/06/18 - 07/27/18	< 3	< 3	< 6	< 3	< 6	< 3	< 6	< 8	< 3	< 3	< 17	< 6
	08/03/18 - 08/31/18	< 8	< 8	< 15	< 9	< 12	< 9	< 17	< 14	< 11	< 8	< 39	< 14
	09/07/18 - 09/28/18	< 5	< 6	< 10	< 6	< 11	< 7	< 9	< 14	< 6	< 6	< 31	< 9
	10/05/18 - 10/26/18	< 5	< 4	< 10	< 5	< 11	< 6	< 9	< 12	< 5	< 5	< 31	< 8
	11/02/18 - 11/30/18	< 7	< 7	< 13	< 8	< 17	< 7	< 13	< 12	< 7	< 6	< 29	< 11
	12/07/18 - 12/28/18	< 4	< 6	< 16	< 7	< 14	< 7	< 10	< 10	< 6	< 7	< 26	< 14
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-57	12/29/17 - 01/26/18 *(1)*												
	02/17/18 - 02/23/18	< 8	< 6	< 15	< 8	< 15	< 7	< 11	< 12	< 8	< 7	< 33	< 8
	02/23/18 - 03/31/18	< 7	< 7	< 14	< 8	< 15	< 6	< 12	< 10	< 9	< 7	< 29	< 9
	03/31/18 - 04/27/18	< 5	< 5	< 11	< 5	< 10	< 6	< 10	< 13	< 6	< 6	< 24	< 12
	04/27/18 - 05/25/18	< 6	< 6	< 13	< 6	< 16	< 6	< 11	< 13	< 5	< 6	< 32	< 14
	05/25/18 - 06/29/18	< 6	< 5	< 13	< 7	< 16	< 6	< 12	< 12	< 6	< 6	< 29	< 12
	06/29/18 - 07/27/18	< 3	< 3	< 7	< 4	< 6	< 3	< 5	< 9	< 3	< 3	< 20	< 6
	07/27/18 - 08/24/18	< 6	< 6	< 16	< 8	< 14	< 5	< 13	< 10	< 6	< 8	< 25	< 11
	08/24/18 - 09/28/18	< 6	< 6	< 13	< 6	< 13	< 6	< 10	< 14	< 6	< 6	< 34	< 14
	09/28/18 - 10/26/18	< 5	< 5	< 10	< 4	< 10	< 6	< 9	< 12	< 5	< 5	< 30	< 12
	10/26/18 - 11/30/18	< 8	< 7	< 10	< 7	< 13	< 5	< 10	< 10	< 6	< 7	< 31	< 9
	11/30/18 - 12/28/18	< 8	< 8	< 16	< 10	< 16	< 7	< 12	< 10	< 9	< 8	< 37	< 13
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-II.1 CONCENTRATIONS OF TRITIUM IN GROUND WATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2018

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	D-35
01/12/18 - 01/12/18	< 192
04/13/18 - 04/13/18	< 194
07/13/18 - 07/13/18	< 187
10/12/18 - 10/12/18	< 180
MEAN	-

Tables C-II.2

CONCENTRATIONS OF GAMMA EMITTERS IN GROUND WATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2018

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-35	01/12/18 - 01/12/18	< 5	< 5	< 11	< 6	< 12	< 6	< 9	< 15	< 7	< 5	< 34	< 10
	04/13/18 - 04/13/18	< 5	< 5	< 10	< 6	< 9	< 5	< 8	< 6	< 6	< 5	< 25	< 6
	07/13/18 - 07/13/18	< 7	< 7	< 18	< 7	< 14	< 7	< 12	< 11	< 7	< 7	< 29	< 8
	10/12/18 - 10/12/18	< 8	< 9	< 14	< 10	< 18	< 7	< 14	< 13	< 10	< 8	< 36	< 10
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-III.1

CONCENTRATIONS OF GAMMA EMITTERS IN FISH SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2018

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	05/07/18	< 73	< 69	< 164	< 41	< 104	< 77	< 128	< 80	< 74	< 634	< 160
Largemouth Bass	10/18/18	< 86	< 81	< 207	< 85	< 185	< 95	< 154	< 97	< 84	< 592	< 70
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-28	*BOTTOM FEEDER*											
Smallmouth Buffalo	05/07/18	< 58	< 68	< 186	< 64	< 154	< 70	< 118	< 69	< 68	< 595	< 133
Common Carp	10/18/18	< 55	< 70	< 125	< 73	< 127	< 66	< 109	< 61	< 60	< 410	< 147
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-46	*PREDATOR*											
Largemouth Bass	10/18/18	< 62	< 91	< 185	< 66	< 189	< 68	< 143	< 89	< 77	< 533	< 68
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-46	*BOTTOM FEEDER*											
Common Carp	05/07/18	< 44	< 53	< 110	< 46	< 115	< 46	< 91	< 44	< 46	< 363	< 109
Smallmouth Buffalo	05/07/18	< 55	< 57	< 131	< 37	< 152	< 56	< 108	< 64	< 44	< 453	< 120
Common Carp	10/18/18	< 40	< 62	< 129	< 45	< 124	< 51	< 129	< 56	< 71	< 383	< 141
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-IV.1

CONCENTRATIONS OF GAMMA EMITTERS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2018

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	05/16/18	< 76	< 78	< 159	< 76	< 154	< 88	< 116	< 89	< 96	< 392	< 121
	10/16/18	< 88	< 77	< 227	< 98	< 208	< 90	< 171	< 114	< 127	< 431	< 152
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-V.1

CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2018

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
12/29/17 - 01/05/18	34 ± 5	33 ± 6	30 ± 6	33 ± 5	34 ± 5	30 ± 5	35 ± 5	30 ± 5	38 ± 6
01/05/18 - 01/12/18	16 ± 5	17 ± 5	15 ± 5	15 ± 5	17 ± 4	11 ± 6	15 ± 5	14 ± 5	16 ± 5
01/12/18 - 01/19/18	18 ± 5	14 ± 4	15 ± 5	13 ± 4	15 ± 5	18 ± 5	18 ± 5	14 ± 4	21 ± 5
01/19/18 - 01/26/18	17 ± 4	13 ± 4	18 ± 4	14 ± 4	20 ± 4	16 ± 4	22 ± 4	18 ± 4	17 ± 4
01/26/18 - 02/02/18	17 ± 4	17 ± 4	18 ± 4	17 ± 4	17 ± 4	18 ± 4	18 ± 4	17 ± 4	18 ± 4
02/02/18 - 02/09/18	21 ± 4	19 ± 4	15 ± 4	17 ± 4	16 ± 4	18 ± 4	18 ± 4	17 ± 4	20 ± 5
02/09/18 - 02/16/18	23 ± 5	28 ± 5	24 ± 5	26 ± 5	17 ± 4	24 ± 4	23 ± 4	31 ± 5	27 ± 5
02/16/18 - 02/23/18	15 ± 4	14 ± 4	15 ± 4	11 ± 4	14 ± 4	12 ± 4	14 ± 4	10 ± 3	15 ± 4
02/23/18 - 03/02/18	15 ± 4	14 ± 4	16 ± 4	16 ± 4	19 ± 4	18 ± 4	17 ± 4	15 ± 4	17 ± 4
03/02/18 - 03/09/18	13 ± 4	9 ± 4	13 ± 4	12 ± 4	15 ± 4	14 ± 4	13 ± 4	13 ± 4	15 ± 4
03/09/18 - 03/16/18	20 ± 4	18 ± 4	20 ± 4	20 ± 4	17 ± 4	21 ± 4	23 ± 5	18 ± 4	18 ± 4
03/16/18 - 03/23/18	13 ± 4	15 ± 4	14 ± 4	15 ± 4	13 ± 4	17 ± 4	19 ± 4	16 ± 4	13 ± 4
03/23/18 - 03/31/18	11 ± 4	15 ± 4	12 ± 4	12 ± 4	14 ± 4	12 ± 4	16 ± 4	15 ± 4	15 ± 4
03/30/18 - 04/06/18	16 ± 4	18 ± 4	18 ± 4	17 ± 4	20 ± 5	19 ± 5	22 ± 5	20 ± 5	23 ± 5
04/06/18 - 04/13/18	15 ± 4	18 ± 4	14 ± 4	14 ± 4	17 ± 4	17 ± 4	19 ± 8	15 ± 4	17 ± 4
04/13/18 - 04/20/18	10 ± 3	6 ± 3	8 ± 3	8 ± 3	10 ± 3	8 ± 3	*(1)*	8 ± 3	7 ± 3
04/20/18 - 04/27/18	15 ± 4	15 ± 4	15 ± 4	13 ± 4	13 ± 4	15 ± 4	*(1)*	16 ± 4	12 ± 4
04/27/18 - 05/04/18	18 ± 4	17 ± 4	15 ± 4	17 ± 4	17 ± 4	18 ± 4	*(1)*	16 ± 4	15 ± 4
05/04/18 - 05/11/18	15 ± 4	15 ± 4	16 ± 4	13 ± 4	15 ± 4	13 ± 4	*(1)*	15 ± 4	14 ± 4
05/11/18 - 05/18/18	12 ± 4	13 ± 3	16 ± 4	14 ± 4	9 ± 4	12 ± 4	*(1)*	11 ± 4	16 ± 5
05/18/18 - 05/25/18	14 ± 4	13 ± 2	12 ± 4	13 ± 4	18 ± 4	15 ± 4	*(1)*	18 ± 4	15 ± 4
05/25/18 - 06/01/18	21 ± 4	20 ± 3	20 ± 4	21 ± 4	25 ± 5	23 ± 5	*(1)*	24 ± 5	23 ± 5
06/01/18 - 06/08/18	7 ± 3	13 ± 4	12 ± 3	12 ± 3	11 ± 3	11 ± 3	19 ± 8	10 ± 3	13 ± 4
06/08/18 - 06/15/18	17 ± 4	15 ± 4	16 ± 4	12 ± 4	17 ± 4	16 ± 4	16 ± 4	12 ± 4	13 ± 4
06/15/18 - 06/22/18	15 ± 4	16 ± 4	16 ± 4	16 ± 4	13 ± 4	17 ± 4	16 ± 4	13 ± 4	15 ± 4
06/22/18 - 06/29/18	14 ± 4	17 ± 4	11 ± 3	16 ± 4	16 ± 4	13 ± 3	13 ± 4	13 ± 4	16 ± 4
06/29/18 - 07/06/18	13 ± 4	17 ± 4	16 ± 4	14 ± 4	14 ± 4	13 ± 4	16 ± 4	16 ± 4	14 ± 4
07/06/18 - 07/13/18	17 ± 4	17 ± 4	14 ± 4	16 ± 4	17 ± 4	19 ± 5	16 ± 4	19 ± 4	18 ± 4
07/13/18 - 07/20/18	16 ± 4	18 ± 5	16 ± 4	11 ± 4	15 ± 4	15 ± 4	14 ± 4	18 ± 4	16 ± 4
07/20/18 - 07/27/18	15 ± 4	17 ± 4	15 ± 4	16 ± 4	10 ± 3	14 ± 4	17 ± 4	17 ± 4	13 ± 4
07/27/18 - 08/03/18	22 ± 4	26 ± 5	21 ± 4	24 ± 4	21 ± 4	21 ± 4	21 ± 4	20 ± 4	20 ± 4
08/03/18 - 08/10/18	28 ± 5	31 ± 5	23 ± 5	29 ± 5	24 ± 5	31 ± 5	28 ± 5	24 ± 5	27 ± 5
08/10/18 - 08/17/18	18 ± 5	17 ± 4	19 ± 5	9 ± 4	18 ± 5	18 ± 5	18 ± 4	25 ± 5	6 ± 3
08/17/18 - 08/24/18	20 ± 4	17 ± 4	20 ± 4	18 ± 4	22 ± 4	18 ± 4	20 ± 4	20 ± 4	19 ± 4
08/24/18 - 08/31/18	23 ± 4	18 ± 4	21 ± 4	23 ± 5	18 ± 4	17 ± 4	21 ± 4	19 ± 4	19 ± 4
08/31/18 - 09/07/18	11 ± 4	14 ± 4	9 ± 4	12 ± 4	15 ± 4	13 ± 4	15 ± 4	13 ± 4	12 ± 4
09/07/18 - 09/14/18	14 ± 4	11 ± 4	15 ± 4	18 ± 4	12 ± 4	15 ± 4	15 ± 4	17 ± 4	16 ± 5
09/14/18 - 09/21/18	16 ± 4	15 ± 4	17 ± 4	18 ± 4	19 ± 5	17 ± 4	15 ± 4	20 ± 5	15 ± 4
09/21/18 - 09/28/18	12 ± 4	15 ± 4	9 ± 4	11 ± 4	14 ± 4	12 ± 4	11 ± 4	12 ± 4	12 ± 4
09/28/18 - 10/05/18	15 ± 4	15 ± 4	14 ± 4	13 ± 4	16 ± 4	13 ± 4	15 ± 4	15 ± 4	15 ± 4
10/05/18 - 10/12/18	12 ± 4	12 ± 4	15 ± 4	16 ± 5	15 ± 4	14 ± 4	11 ± 4	12 ± 4	11 ± 4
10/12/18 - 10/19/18	11 ± 4	13 ± 4	17 ± 4	16 ± 8	15 ± 4	16 ± 4	17 ± 4	16 ± 4	17 ± 4
10/19/18 - 10/26/18	13 ± 4	11 ± 4	12 ± 4	10 ± 4	12 ± 4	10 ± 4	9 ± 4	8 ± 3	15 ± 4
10/26/18 - 11/02/18	21 ± 4	24 ± 4	23 ± 4	19 ± 4	27 ± 5	21 ± 4	18 ± 4	19 ± 4	21 ± 4
11/02/18 - 11/09/18	14 ± 4	14 ± 4	15 ± 4	12 ± 4	15 ± 4	13 ± 4	14 ± 4	15 ± 4	12 ± 4
11/09/18 - 11/16/18	19 ± 4	20 ± 4	22 ± 5	25 ± 5	24 ± 5	18 ± 4	20 ± 4	22 ± 5	19 ± 4
11/16/18 - 11/23/18	20 ± 4	29 ± 5	26 ± 5	27 ± 5	31 ± 5	23 ± 5	22 ± 4	22 ± 4	22 ± 5
11/23/18 - 11/30/18	25 ± 5	35 ± 5	32 ± 5	35 ± 5	*(1)*	30 ± 5	26 ± 5	29 ± 5	30 ± 5
11/30/18 - 12/07/18	13 ± 4	23 ± 5	16 ± 4	21 ± 5	*(1)*	15 ± 4	16 ± 4	15 ± 4	14 ± 4
12/07/18 - 12/14/18	43 ± 6	38 ± 6	44 ± 6	42 ± 6	*(1)*	37 ± 6	33 ± 5	38 ± 6	37 ± 6
12/14/18 - 12/21/18	21 ± 4	26 ± 5	25 ± 5	31 ± 5	*(1)*	23 ± 4	21 ± 4	21 ± 4	24 ± 5
12/21/18 - 12/28/18	21 ± 4	21 ± 4	25 ± 5	24 ± 5	22 ± 5	19 ± 5	19 ± 4	20 ± 5	18 ± 4
12/28/18 - 01/04/19	20 ± 4	27 ± 5	23 ± 5	26 ± 5	20 ± 5	20 ± 5	17 ± 4	22 ± 5	20 ± 5
MEAN ± 2 STD DEV	17 ± 12	18 ± 13	18 ± 12	18 ± 14	17 ± 10	17 ± 11	18 ± 10	18 ± 12	18 ± 12

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, 2018

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
12/29/17 - 01/05/18	33 ± 5	28 ± 5	33 ± 5	34 ± 5	36 ± 5
01/05/18 - 01/12/18	15 ± 5	14 ± 5	10 ± 5	9 ± 5	20 ± 5
01/12/18 - 01/19/18	19 ± 5	14 ± 4	14 ± 4	18 ± 5	17 ± 5
01/19/18 - 01/26/18	19 ± 4	18 ± 4	23 ± 5	21 ± 4	15 ± 4
01/26/18 - 02/02/18	15 ± 4	17 ± 4	20 ± 4	16 ± 4	19 ± 4
02/02/18 - 02/09/18	21 ± 5	22 ± 4	21 ± 5	18 ± 4	21 ± 4
02/09/18 - 02/16/18	24 ± 5	28 ± 5	22 ± 4	23 ± 5	21 ± 4
02/16/18 - 02/23/18	13 ± 4	15 ± 4	18 ± 4	14 ± 4	11 ± 4
02/23/18 - 03/02/18	17 ± 4	13 ± 4	17 ± 4	14 ± 4	17 ± 4
03/02/18 - 03/09/18	13 ± 4	14 ± 4	15 ± 4	14 ± 4	13 ± 4
03/09/18 - 03/16/18	20 ± 4	18 ± 4	18 ± 4	17 ± 4	19 ± 4
03/16/18 - 03/23/18	12 ± 4	13 ± 4	16 ± 4	16 ± 4	15 ± 4
03/23/18 - 03/31/18	14 ± 4	14 ± 3	14 ± 4	14 ± 4	14 ± 4
03/30/18 - 04/06/18	21 ± 5	21 ± 5	26 ± 5	17 ± 5	23 ± 5
04/06/18 - 04/13/18	17 ± 4	18 ± 4	20 ± 4	19 ± 4	16 ± 4
04/13/18 - 04/20/18	6 ± 3	5 ± 3	8 ± 3	8 ± 3	7 ± 3
04/20/18 - 04/27/18	9 ± 4	17 ± 4	14 ± 4	14 ± 4	16 ± 4
04/27/18 - 05/04/18	14 ± 4	18 ± 4	18 ± 4	17 ± 4	17 ± 4
05/04/18 - 05/11/18	16 ± 4	12 ± 4	14 ± 4	13 ± 4	13 ± 4
05/11/18 - 05/18/18	15 ± 4	12 ± 4	8 ± 4	15 ± 4	14 ± 4
05/18/18 - 05/25/18	19 ± 4	11 ± 3	16 ± 4	12 ± 4	12 ± 4
05/25/18 - 06/01/18	22 ± 4	27 ± 5	26 ± 5	25 ± 5	18 ± 4
06/01/18 - 06/08/18	11 ± 3	13 ± 3	14 ± 4	13 ± 3	14 ± 4
06/08/18 - 06/15/18	14 ± 4	11 ± 4	15 ± 4	15 ± 4	12 ± 4
06/15/18 - 06/22/18	15 ± 4	14 ± 4	14 ± 4	14 ± 4	13 ± 4
06/22/18 - 06/29/18	15 ± 4	18 ± 4	14 ± 4	13 ± 4	14 ± 4
06/29/18 - 07/06/18	15 ± 4	14 ± 4	18 ± 4	10 ± 3	15 ± 4
07/06/18 - 07/13/18	18 ± 4	20 ± 4	20 ± 4	21 ± 5	18 ± 5
07/13/18 - 07/20/18	15 ± 4	16 ± 5	18 ± 4	16 ± 4	18 ± 5
07/20/18 - 07/27/18	15 ± 4	14 ± 4	15 ± 4	17 ± 4	14 ± 4
07/27/18 - 08/03/18	22 ± 4	20 ± 4	28 ± 5	25 ± 4	19 ± 4
08/03/18 - 08/10/18	6 ± 3	30 ± 5	30 ± 5	26 ± 5	32 ± 5
08/10/18 - 08/17/18	20 ± 5	18 ± 5	17 ± 4	19 ± 5	27 ± 5
08/17/18 - 08/24/18	19 ± 4	20 ± 4	18 ± 4	19 ± 4	19 ± 4
08/24/18 - 08/31/18	19 ± 4	18 ± 4	18 ± 4	24 ± 4	21 ± 5
08/31/18 - 09/07/18	13 ± 4	7 ± 3	10 ± 4	14 ± 4	13 ± 4
09/07/18 - 09/14/18	12 ± 4	12 ± 4	15 ± 4	14 ± 4	14 ± 4
09/14/18 - 09/21/18	15 ± 4	16 ± 4	13 ± 4	16 ± 4	20 ± 5
09/21/18 - 09/28/18	11 ± 4	10 ± 4	11 ± 4	12 ± 4	11 ± 4
09/28/18 - 10/05/18	15 ± 4	14 ± 4	15 ± 4	14 ± 4	8 ± 4
10/05/18 - 10/12/18	11 ± 4	10 ± 4	11 ± 4	10 ± 4	12 ± 4
10/12/18 - 10/19/18	15 ± 4	14 ± 4	14 ± 4	12 ± 4	13 ± 4
10/19/18 - 10/26/18	13 ± 4	9 ± 3	13 ± 4	11 ± 4	16 ± 4
10/26/18 - 11/02/18	20 ± 4	18 ± 4	21 ± 4	19 ± 4	19 ± 4
11/02/18 - 11/09/18	11 ± 4	15 ± 4	14 ± 4	8 ± 3	11 ± 4
11/09/18 - 11/16/18	18 ± 4	19 ± 4	21 ± 4	22 ± 5	21 ± 4
11/16/18 - 11/23/18	21 ± 4	25 ± 5	27 ± 5	20 ± 4	22 ± 4
11/23/18 - 11/30/18	32 ± 5	24 ± 4	27 ± 5	28 ± 5	26 ± 5
11/30/18 - 12/07/18	14 ± 4	11 ± 4	21 ± 5	15 ± 4	15 ± 4
12/07/18 - 12/14/18	38 ± 6	31 ± 5	44 ± 6	39 ± 6	38 ± 6
12/14/18 - 12/21/18	24 ± 5	21 ± 4	25 ± 5	24 ± 4	21 ± 4
12/21/18 - 12/28/18	18 ± 4	19 ± 4	25 ± 5	20 ± 5	20 ± 5
12/28/18 - 01/04/19	19 ± 4	16 ± 4	26 ± 5	21 ± 4	22 ± 5
MEAN ± 2 STD DEV	17 ± 12	17 ± 11	18 ± 13	17 ± 12	18 ± 12

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

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, 2018

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
12/29/17 - 02/02/18	13	34	19 ± 14	12/29/17 - 02/02/18	11	38	20 ± 15	12/29/17 - 02/02/18	9	34	19 ± 15	12/29/17 - 02/02/18	15	36	21 ± 17
02/02/18 - 03/02/18	14	28	18 ± 10	02/02/18 - 03/02/18	10	31	18 ± 10	02/02/18 - 03/02/18	13	28	19 ± 9	02/02/18 - 03/02/18	11	21	18 ± 9
03/02/18 - 03/30/18	9	20	14 ± 7	03/02/18 - 03/31/18	12	23	16 ± 6	03/02/18 - 03/31/18	12	20	15 ± 4	03/02/18 - 03/31/18	13	19	15 ± 5
03/30/18 - 05/04/18	6	18	15 ± 7	03/30/18 - 05/04/18	7	23	15 ± 8	03/31/18 - 05/04/18	5	26	15 ± 11	03/31/18 - 05/04/18	7	23	16 ± 11
05/04/18 - 06/01/18	12	21	15 ± 6	05/04/18 - 06/01/18	9	25	16 ± 9	05/04/18 - 06/01/18	8	27	16 ± 11	05/04/18 - 06/01/18	12	18	14 ± 5
06/01/18 - 06/29/18	7	17	14 ± 5	06/01/18 - 06/29/18	10	19	14 ± 4	06/01/18 - 06/29/18	11	18	14 ± 3	06/01/18 - 06/29/18	12	14	13 ± 1
06/29/18 - 08/03/18	13	26	17 ± 7	06/29/18 - 08/03/18	10	24	16 ± 6	06/29/18 - 08/03/18	10	28	18 ± 8	06/29/18 - 08/03/18	14	19	17 ± 5
08/03/18 - 08/31/18	17	31	21 ± 9	08/03/18 - 08/31/18	6	31	20 ± 11	08/03/18 - 08/31/18	6	30	20 ± 11	08/03/18 - 08/31/18	19	32	25 ± 12
08/31/18 - 09/28/18	9	17	13 ± 5	08/31/18 - 09/28/18	11	20	15 ± 5	08/31/18 - 09/28/18	7	16	13 ± 5	08/31/18 - 09/28/18	11	20	15 ± 8
09/28/18 - 11/02/18	11	24	15 ± 8	09/28/18 - 11/02/18	8	27	15 ± 8	09/28/18 - 11/02/18	9	21	14 ± 7	09/28/18 - 11/02/18	8	19	14 ± 8
11/02/18 - 11/30/18	14	35	23 ± 14	11/02/18 - 11/30/18	12	35	22 ± 13	11/02/18 - 11/30/18	8	32	21 ± 13	11/02/18 - 11/30/18	11	26	20 ± 13
11/30/18 - 01/04/19	13	44	26 ± 18	11/30/18 - 01/04/19	14	42	24 ± 16	11/30/18 - 01/04/19	11	44	23 ± 17	11/30/18 - 01/04/19	15	38	23 ± 18
12/29/17 - 01/04/19	6	44	18 ± 12	12/29/17 - 01/04/19	6	42	18 ± 12	12/29/17 - 01/04/19	5	44	17 ± 12	12/29/17 - 01/04/19	7	38	18 ± 12

Table C-V.3

CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2018

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	12/29/17 - 03/30/18	< 2	< 2	< 3	< 3	< 4	< 2	< 3	< 2	< 1	< 15	< 7
	03/30/18 - 06/29/18	< 3	< 3	< 5	< 2	< 7	< 3	< 4	< 2	< 3	< 20	< 6
	06/29/18 - 09/28/18	< 3	< 2	< 7	< 2	< 7	< 3	< 4	< 2	< 3	< 38	< 16
	09/28/18 - 01/04/19	< 2	< 3	< 5	< 2	< 7	< 2	< 4	< 2	< 2	< 19	< 6
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-02	12/30/17 - 03/30/18	< 3	< 3	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 16	< 9
	03/30/18 - 06/29/18	< 3	< 3	< 8	< 4	< 8	< 4	< 6	< 3	< 3	< 24	< 9
	06/29/18 - 09/28/18	< 2	< 3	< 11	< 2	< 6	< 4	< 5	< 4	< 2	< 34	< 28
	09/28/18 - 01/04/19	< 1	< 2	< 7	< 2	< 5	< 2	< 4	< 2	< 2	< 19	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-03	12/30/17 - 03/30/18	< 2	< 3	< 6	< 3	< 6	< 2	< 4	< 2	< 2	< 21	< 9
	03/30/18 - 06/29/18	< 2	< 3	< 5	< 3	< 5	< 3	< 5	< 3	< 2	< 20	< 9
	06/29/18 - 09/28/18	< 4	< 4	< 7	< 3	< 8	< 4	< 5	< 3	< 2	< 48	< 16
	09/28/18 - 01/04/19	< 2	< 2	< 5	< 3	< 6	< 2	< 3	< 2	< 2	< 18	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-04	12/29/17 - 03/30/18	< 3	< 4	< 9	< 5	< 8	< 4	< 6	< 4	< 4	< 30	< 11
	03/30/18 - 06/29/18	< 4	< 4	< 8	< 4	< 8	< 4	< 6	< 4	< 3	< 31	< 12
	06/29/18 - 09/28/18	< 3	< 3	< 9	< 3	< 7	< 5	< 6	< 3	< 2	< 36	< 16
	09/28/18 - 01/04/19	< 2	< 3	< 7	< 2	< 6	< 3	< 5	< 2	< 3	< 19	< 10
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-07	12/29/17 - 03/31/18	< 2	< 2	< 6	< 2	< 5	< 2	< 5	< 2	< 2	< 18	< 7
	03/31/18 - 06/29/18	< 2	< 2	< 3	< 2	< 3	< 2	< 3	< 2	< 2	< 15	< 5
	06/29/18 - 09/28/18	< 3	< 3	< 11	< 2	< 7	< 3	< 7	< 2	< 2	< 31	< 16
	09/28/18 - 01/04/19	< 3	< 3	< 7	< 4	< 8	< 3	< 6	< 4	< 3	< 29	< 13
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-08	12/29/17 - 03/31/18	< 2	< 3	< 6	< 2	< 4	< 3	< 5	< 3	< 3	< 21	< 9
	03/31/18 - 06/29/18	< 2	< 3	< 7	< 3	< 5	< 2	< 5	< 2	< 2	< 18	< 8
	06/29/18 - 09/28/18	< 2	< 4	< 10	< 4	< 8	< 3	< 6	< 2	< 2	< 37	< 26
	09/28/18 - 01/04/19	< 3	< 3	< 7	< 3	< 7	< 3	< 5	< 3	< 2	< 24	< 10
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-10	12/29/17 - 03/31/18	< 3	< 4	< 8	< 4	< 7	< 3	< 8	< 3	< 3	< 29	< 9
	03/31/18 - 06/29/18	< 3	< 2	< 6	< 3	< 5	< 2	< 4	< 2	< 2	< 20	< 6
	06/29/18 - 09/28/18	< 2	< 4	< 5	< 3	< 8	< 4	< 6	< 4	< 3	< 54	< 13
	09/28/18 - 01/04/19	< 2	< 3	< 4	< 1	< 4	< 3	< 4	< 2	< 2	< 18	< 8
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-V.3

CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2018

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	12/29/17 - 03/31/18	< 2	< 2	< 4	< 1	< 4	< 3	< 4	< 2	< 2	< 15	< 6
	03/31/18 - 06/29/18	< 2	< 2	< 5	< 1	< 4	< 3	< 4	< 2	< 3	< 19	< 5
	06/29/18 - 09/28/18	< 3	< 4	< 13	< 2	< 9	< 4	< 6	< 3	< 4	< 49	< 14
	09/28/18 - 01/04/19	< 2	< 2	< 5	< 3	< 4	< 2	< 4	< 3	< 2	< 19	< 3
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-14	12/29/17 - 03/31/18	< 2	< 3	< 5	< 3	< 5	< 2	< 4	< 2	< 2	< 15	< 9
	03/31/18 - 06/29/18	< 2	< 3	< 6	< 3	< 6	< 3	< 3	< 3	< 2	< 16	< 9
	06/29/18 - 09/28/18	< 3	< 3	< 10	< 2	< 6	< 3	< 6	< 3	< 3	< 35	< 20
	09/28/18 - 01/04/19	< 2	< 2	< 7	< 2	< 4	< 2	< 3	< 2	< 2	< 19	< 5
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-45	12/29/17 - 03/31/18	< 3	< 3	< 7	< 3	< 4	< 2	< 4	< 3	< 2	< 17	< 10
	03/31/18 - 06/29/18	< 2	< 3	< 5	< 4	< 6	< 3	< 5	< 2	< 3	< 24	< 4
	06/29/18 - 09/28/18	< 3	< 4	< 6	< 3	< 7	< 4	< 6	< 3	< 3	< 49	< 17
	09/28/18 - 01/04/19	< 2	< 3	< 6	< 2	< 5	< 3	< 4	< 2	< 2	< 18	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-53	12/29/17 - 03/31/18	< 3	< 4	< 8	< 2	< 9	< 3	< 6	< 4	< 4	< 29	< 7
	03/31/18 - 06/29/18	< 6	< 6	< 11	< 6	< 13	< 7	< 11	< 5	< 5	< 52	< 24
	06/29/18 - 09/28/18	< 3	< 4	< 9	< 4	< 9	< 2	< 6	< 3	< 2	< 53	< 16
	09/28/18 - 01/04/19	< 3	< 3	< 6	< 3	< 6	< 3	< 4	< 3	< 2	< 23	< 6
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-55	12/29/17 - 03/31/18	< 2	< 2	< 6	< 2	< 5	< 3	< 4	< 2	< 2	< 19	< 6
	03/31/18 - 06/29/18	< 2	< 2	< 7	< 2	< 6	< 3	< 4	< 2	< 2	< 16	< 13
	06/29/18 - 09/28/18	< 2	< 3	< 10	< 3	< 5	< 4	< 5	< 3	< 2	< 42	< 20
	09/28/18 - 01/04/19	< 1	< 2	< 4	< 3	< 4	< 2	< 3	< 2	< 2	< 16	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-56	12/29/17 - 03/31/18	< 2	< 3	< 7	< 3	< 5	< 3	< 3	< 3	< 2	< 17	< 9
	03/31/18 - 06/29/18	< 3	< 4	< 8	< 3	< 8	< 4	< 7	< 4	< 4	< 28	< 11
	06/29/18 - 09/28/18	< 3	< 4	< 9	< 2	< 6	< 4	< 7	< 2	< 3	< 46	< 23
	09/28/18 - 01/04/19	< 2	< 3	< 5	< 2	< 4	< 2	< 3	< 2	< 2	< 17	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-58	12/29/17 - 03/31/18	< 3	< 4	< 9	< 4	< 6	< 4	< 6	< 3	< 4	< 26	< 7
	03/31/18 - 06/29/18	< 2	< 2	< 4	< 2	< 5	< 2	< 4	< 2	< 2	< 19	< 6
	06/29/18 - 09/28/18	< 3	< 4	< 7	< 3	< 7	< 4	< 6	< 3	< 3	< 44	< 18
	09/28/18 - 01/04/19	< 3	< 4	< 6	< 4	< 6	< 3	< 5	< 3	< 2	< 25	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-VI.1

CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2018

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
12/29/17 - 01/05/18	< 20	< 50	< 52	< 48	< 47	< 30	< 43	< 44	< 45
01/05/18 - 01/12/18	< 48	< 49	< 49	< 47	< 65	< 70	< 61	< 62	< 59
01/12/18 - 01/19/18	< 21	< 37	< 38	< 38	< 38	< 47	< 48	< 46	< 47
01/19/18 - 01/26/18	< 14	< 34	< 35	< 34	< 34	< 21	< 31	< 30	< 32
01/26/18 - 02/02/18	< 21	< 26	< 26	< 25	< 25	< 39	< 38	< 20	< 38
02/02/18 - 02/09/18	< 18	< 44	< 44	< 45	< 45	< 52	< 49	< 26	< 52
02/09/18 - 02/16/18	< 21	< 50	< 51	< 49	< 49	< 21	< 50	< 52	< 51
02/16/18 - 02/23/18	< 15	< 35	< 35	< 36	< 36	< 24	< 37	< 16	< 38
02/23/18 - 03/02/18	< 23	< 39	< 39	< 39	< 38	< 17	< 39	< 39	< 40
03/02/18 - 03/09/18	< 18	< 44	< 44	< 44	< 44	< 43	< 18	< 41	< 43
03/09/18 - 03/16/18	< 20	< 49	< 48	< 47	< 49	< 36	< 36	< 15	< 36
03/16/18 - 03/23/18	< 19	< 45	< 43	< 45	< 45	< 43	< 42	< 45	< 42
03/23/18 - 03/31/18	< 17	< 42	< 42	< 41	< 33	< 35	< 13	< 33	< 33
03/30/18 - 04/06/18	< 16	< 38	< 38	< 38	< 44	< 61	< 58	< 56	< 60
04/06/18 - 04/13/18	< 17	< 44	< 44	< 45	< 45	< 30	< 69	< 12	< 31
04/13/18 - 04/20/18	< 16	< 38	< 39	< 38	< 38	< 52	(1)	< 52	< 52
04/20/18 - 04/27/18	< 20	< 49	< 47	< 47	< 48	< 30	(1)	< 34	< 36
04/27/18 - 05/04/18	< 28	< 68	< 69	< 68	< 68	< 69	(1)	< 27	< 67
05/04/18 - 05/11/18	< 17	< 42	< 42	< 41	< 42	< 16	(1)	< 29	< 30
05/11/18 - 05/18/18	< 30	< 15	< 30	< 30	< 39	< 39	(1)	< 35	< 37
05/18/18 - 05/25/18	< 19	< 8	< 19	< 19	< 19	< 65	(1)	< 63	< 67
05/25/18 - 06/01/18	< 42	< 22	< 42	< 42	< 49	< 27	(1)	< 39	< 37
06/01/18 - 06/08/18	< 17	< 17	< 17	< 17	< 27	< 11	< 69	< 27	< 28
06/08/18 - 06/15/18	< 26	< 26	< 25	< 25	< 25	< 25	< 25	< 20	< 25
06/15/18 - 06/22/18	< 16	< 30	< 29	< 29	< 29	< 36	< 38	< 40	< 39
06/22/18 - 06/29/18	< 49	< 50	< 39	< 50	< 49	< 63	< 60	< 58	< 62
06/29/18 - 07/06/18	< 21	< 27	< 26	< 25	< 26	< 46	< 32	< 32	< 32
07/06/18 - 07/13/18	< 21	< 50	< 49	< 49	< 49	< 39	< 30	< 36	< 38
07/13/18 - 07/20/18	< 25	< 61	< 60	< 59	< 59	< 38	< 47	< 48	< 48
07/20/18 - 07/27/18	< 20	< 48	< 47	< 47	< 46	< 52	< 31	< 30	< 34
07/27/18 - 08/03/18	< 24	< 30	< 29	< 29	< 29	< 68	< 43	< 42	< 44
08/03/18 - 08/10/18	< 18	< 44	< 44	< 44	< 43	< 55	< 31	< 31	< 32
08/10/18 - 08/17/18	< 50	< 49	< 49	< 20	< 49	< 40	< 50	< 52	< 54
08/17/18 - 08/24/18	< 25	< 31	< 30	< 30	< 31	< 54	< 44	< 44	< 44
08/24/18 - 08/31/18	< 35	< 35	< 14	< 35	< 35	< 45	< 38	< 37	< 39
08/31/18 - 09/07/18	< 13	< 22	< 17	< 17	< 17	< 46	< 65	< 66	< 66
09/07/18 - 09/14/18	< 17	< 21	< 21	< 21	< 21	< 25	< 14	< 13	< 14
09/14/18 - 09/21/18	< 35	< 36	< 36	< 36	< 21	< 41	< 38	< 39	< 38
09/21/18 - 09/28/18	< 13	< 31	< 31	< 32	< 32	< 47	< 25	< 25	< 26
09/28/18 - 10/05/18	< 36	< 36	< 36	< 36	< 27	< 66	< 62	< 63	< 63
10/05/18 - 10/12/18	< 16	< 36	< 36	< 51	< 37	< 44	< 46	< 46	< 47
10/12/18 - 10/19/18	< 21	< 22	< 22	< 54	< 26	< 32	< 31	< 31	< 32
10/19/18 - 10/26/18	< 26	< 62	< 62	< 62	< 63	< 50	< 33	< 33	< 33
10/26/18 - 11/02/18	< 25	< 26	< 26	< 26	< 18	< 44	< 17	< 40	< 41
11/02/18 - 11/09/18	< 22	< 21	< 21	< 21	< 13	< 45	< 43	< 43	< 44
11/09/18 - 11/16/18	< 33	< 41	< 41	< 41	< 41	< 36	< 64	< 66	< 68
11/16/18 - 11/23/18	< 28	< 28	< 28	< 28	< 22	< 33	< 31	< 31	< 32
11/23/18 - 11/30/18	< 29	< 29	< 29	< 29	*(1)*	< 43	< 48	< 47	< 49
11/30/18 - 12/07/18	< 19	< 24	< 24	< 24	*(1)*	< 53	< 23	< 23	< 23
12/07/18 - 12/14/18	< 55	< 55	< 55	< 55	*(1)*	< 24	< 55	< 56	< 58
12/14/18 - 12/21/18	< 21	< 50	< 49	< 49	*(1)*	< 31	< 44	< 44	< 46
12/21/18 - 12/28/18	< 16	< 45	< 45	< 46	< 46	< 41	< 27	< 28	< 27
12/28/18 - 01/04/19	< 33	< 35	< 35	< 35	< 12	< 33	< 31	< 32	< 32
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, 2018

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
12/29/17 - 01/05/18	< 37	< 36	< 38	< 46	< 37
01/05/18 - 01/12/18	< 53	< 21	< 57	< 63	< 56
01/12/18 - 01/19/18	< 16	< 43	< 45	< 49	< 44
01/19/18 - 01/26/18	< 18	< 22	< 22	< 32	< 22
01/26/18 - 02/02/18	< 41	< 40	< 41	< 40	< 42
02/02/18 - 02/09/18	< 53	< 52	< 54	< 52	< 52
02/09/18 - 02/16/18	< 27	< 26	< 27	< 55	< 27
02/16/18 - 02/23/18	< 19	< 22	< 23	< 39	< 24
02/23/18 - 03/02/18	< 44	< 44	< 47	< 41	< 46
03/02/18 - 03/09/18	< 32	< 31	< 32	< 43	< 32
03/09/18 - 03/16/18	< 33	< 32	< 34	< 37	< 34
03/16/18 - 03/23/18	< 16	< 43	< 44	< 43	< 44
03/23/18 - 03/31/18	< 25	< 24	< 25	< 34	< 25
03/30/18 - 04/06/18	< 23	< 61	< 63	< 63	< 63
04/06/18 - 04/13/18	< 24	< 24	< 23	< 31	< 24
04/13/18 - 04/20/18	< 31	< 29	< 29	< 55	< 30
04/20/18 - 04/27/18	< 25	< 58	< 61	< 36	< 60
04/27/18 - 05/04/18	< 30	< 37	< 37	< 68	< 38
05/04/18 - 05/11/18	< 21	< 46	< 48	< 31	< 48
05/11/18 - 05/18/18	< 42	< 40	< 41	< 37	< 41
05/18/18 - 05/25/18	< 30	< 27	< 30	< 67	< 29
05/25/18 - 06/01/18	< 50	< 48	< 27	< 38	< 26
06/01/18 - 06/08/18	< 27	< 27	< 12	< 27	< 28
06/08/18 - 06/15/18	< 64	< 62	< 63	< 24	< 64
06/15/18 - 06/22/18	< 19	< 35	< 35	< 39	< 36
06/22/18 - 06/29/18	< 28	< 64	< 67	< 61	< 69
06/29/18 - 07/06/18	< 19	< 45	< 45	< 33	< 48
07/06/18 - 07/13/18	< 31	< 30	< 30	< 38	< 32
07/13/18 - 07/20/18	< 38	< 38	< 20	< 50	< 38
07/20/18 - 07/27/18	< 20	< 48	< 49	< 32	< 50
07/27/18 - 08/03/18	< 66	< 26	< 65	< 46	< 67
08/03/18 - 08/10/18	< 28	< 56	< 54	< 30	< 56
08/10/18 - 08/17/18	< 16	< 39	< 39	< 52	< 41
08/17/18 - 08/24/18	< 21	< 53	< 54	< 45	< 52
08/24/18 - 08/31/18	< 19	< 45	< 45	< 38	< 47
08/31/18 - 09/07/18	< 36	< 45	< 45	< 68	< 44
09/07/18 - 09/14/18	< 11	< 24	< 25	< 14	< 26
09/14/18 - 09/21/18	< 50	< 51	< 51	< 16	< 52
09/21/18 - 09/28/18	< 18	< 42	< 46	< 25	< 47
09/28/18 - 10/05/18	< 64	< 64	< 64	< 26	< 64
10/05/18 - 10/12/18	< 15	< 44	< 45	< 50	< 51
10/12/18 - 10/19/18	< 61	< 61	< 62	< 13	< 65
10/19/18 - 10/26/18	< 20	< 47	< 49	< 33	< 49
10/26/18 - 11/02/18	< 42	< 42	< 43	< 41	< 43
11/02/18 - 11/09/18	< 32	< 32	< 32	< 18	< 32
11/09/18 - 11/16/18	< 29	< 35	< 35	< 68	< 34
11/16/18 - 11/23/18	< 53	< 52	< 53	< 25	< 52
11/23/18 - 11/30/18	< 28	< 27	< 29	< 49	< 29
11/30/18 - 12/07/18	< 23	< 52	< 53	< 24	< 50
12/07/18 - 12/14/18	< 41	< 39	< 39	< 56	< 39
12/14/18 - 12/21/18	< 51	< 30	< 31	< 44	< 31
12/21/18 - 12/28/18	< 32	< 38	< 39	< 28	< 39
12/28/18 - 01/04/19	< 34	< 33	< 34	< 17	< 35
MEAN	-	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-VII.1 CONCENTRATIONS OF I-131 IN MILK SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2018

RESULTS IN UNITS OF PCI/LITER + 2 SIGMA

COLLECTION PERIOD	CONTROL FARM D-25
01/04/18	< 0.8
02/01/18	< 0.3
02/28/18	< 0.5
04/05/18	< 0.8
05/02/18	*(1)*
05/17/18	*(1)*
05/31/18	< 0.9
06/14/18	< 0.4
06/27/18	*(1)*
07/11/18	< 1.0
07/26/18	< 0.8
08/09/18	< 0.9
08/23/18	< 0.9
09/05/18	< 0.6
09/20/18	< 0.9
10/04/18	< 0.7
10/18/18	< 0.4
10/31/18	< 0.7
12/05/18	< 1.0
MEAN	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-VII.2

CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2018

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	Cs-134	Cs-137	Ba-140	La-140
D-25	01/04/18	< 7	< 7	< 18	< 8	< 21	< 8	< 13	< 10	< 9	< 37	< 12
	02/01/18	< 5	< 6	< 15	< 8	< 13	< 5	< 10	< 6	< 7	< 26	< 7
	02/28/18	< 7	< 8	< 17	< 10	< 17	< 8	< 13	< 10	< 8	< 41	< 12
	04/05/18	< 6	< 5	< 11	< 7	< 14	< 6	< 11	< 6	< 5	< 27	< 8
	05/31/18	< 6	< 6	< 10	< 5	< 13	< 6	< 9	< 6	< 5	< 25	< 9
	06/14/18	< 8	< 9	< 21	< 9	< 19	< 10	< 16	< 10	< 10	< 43	< 15
	07/11/18	< 6	< 8	< 15	< 7	< 13	< 7	< 13	< 8	< 7	< 36	< 8
	07/26/18	< 6	< 7	< 12	< 9	< 16	< 7	< 13	< 8	< 6	< 32	< 9
	08/09/18	< 9	< 8	< 20	< 10	< 20	< 10	< 15	< 9	< 9	< 38	< 11
	08/23/18	< 6	< 8	< 20	< 6	< 18	< 8	< 13	< 8	< 8	< 40	< 9
	09/05/18	< 9	< 8	< 20	< 9	< 18	< 7	< 14	< 8	< 8	< 45	< 9
	09/20/18	< 6	< 7	< 17	< 6	< 13	< 8	< 12	< 7	< 7	< 31	< 6
	10/04/18	< 6	< 7	< 16	< 6	< 15	< 7	< 10	< 5	< 6	< 39	< 14
	10/18/18	< 5	< 7	< 14	< 8	< 16	< 5	< 9	< 5	< 6	< 26	< 7
	10/31/18	< 7	< 7	< 16	< 7	< 15	< 8	< 14	< 8	< 7	< 40	< 12
	12/05/18	< 6	< 7	< 15	< 8	< 14	< 6	< 12	< 5	< 7	< 29	< 10
	MEAN	-	-	-	-	-	-	-	-	-	-	-
Biros[1]	05/02/18	< 22	< 23	< 51	< 26	< 55	< 25	< 40	< 28	< 24	< 115	< 31
(Grass)[2]	05/17/18	< 18	< 19	< 41	< 20	< 42	< 17	< 30	< 19	< 17	< 84	< 25
	06/27/18	< 43	< 48	< 100	< 50	< 101	< 48	< 81	< 52	< 49	< 255	< 71

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

(2) Grass is listed as a substitute to broadleaf in Dresden ODCM, Revison 14.

Table C-VIII.1

CONCENTRATIONS OF GAMMA EMITTERS IN VEGETATION SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2018

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-CONTROL													
Cabbage	07/26/18	< 24	< 22	< 47	< 30	< 49	< 19	< 33	< 42	< 30	< 21	< 90	< 28
Cucumber	07/26/18	< 29	< 30	< 65	< 40	< 66	< 31	< 49	< 44	< 30	< 27	< 127	< 40
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-QUAD 1													
Brussels Sprouts	09/14/18	< 14	< 14	< 32	< 15	< 33	< 15	< 24	< 24	< 16	< 15	< 69	< 21
Carrots/Radishes/ Mini-Potatoes	09/14/18	< 33	< 32	< 61	< 33	< 59	< 32	< 52	< 52	< 34	< 34	< 146	< 33
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-QUAD 2													
Cabbage	07/27/18	< 12	< 13	< 29	< 12	< 23	< 11	< 23	< 16	< 14	< 14	< 54	< 17
Horseradish	07/27/18	< 25	< 24	< 54	< 23	< 65	< 23	< 47	< 35	< 28	< 24	< 112	< 37
Kohlrabi	07/27/18	< 21	< 22	< 45	< 19	< 43	< 24	< 38	< 32	< 28	< 22	< 97	< 21
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-QUAD 3													
Onions	07/27/18	< 25	< 26	< 52	< 26	< 53	< 26	< 43	< 38	< 28	< 26	< 111	< 32
Broccoli Leaves	08/17/18	< 21	< 21	< 45	< 23	< 43	< 24	< 40	< 45	< 24	< 22	< 124	< 32
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-QUAD 4													
Broccoli	08/10/18	< 37	< 37	< 76	< 36	< 71	< 37	< 78	< 59	< 42	< 40	< 150	< 51
Rutabaga	08/10/18	< 19	< 20	< 42	< 21	< 41	< 19	< 36	< 30	< 22	< 20	< 88	< 29
Rutabaga Leaves	08/10/18	< 32	< 27	< 60	< 26	< 59	< 28	< 51	< 39	< 36	< 26	< 118	< 35
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
SECTOR N													
Cabbage	09/25/18	< 10	< 11	< 18	< 9	< 22	< 11	< 17	< 15	< 12	< 9	< 48	< 19
Kale	09/25/18	< 19	< 21	< 51	< 15	< 46	< 25	< 50	< 47	< 26	< 33	< 126	< 32
Cabbage	10/05/18	< 27	< 26	< 51	< 24	< 47	< 21	< 41	< 33	< 25	< 26	< 102	< 29
Kale	10/05/18	< 41	< 39	< 87	< 47	< 92	< 39	< 74	< 57	< 53	< 44	< 171	< 53
Cabbage	10/19/18	< 19	< 24	< 51	< 22	< 51	< 25	< 40	< 50	< 21	< 19	< 123	< 38
Cauliflower Leaves	10/19/18	< 10	< 11	< 26	< 11	< 23	< 11	< 20	< 27	< 12	< 11	< 65	< 21
Kale	10/19/18	< 15	< 15	< 35	< 15	< 35	< 17	< 27	< 36	< 17	< 15	< 89	< 25
Cabbage	11/02/18	< 24	< 19	< 54	< 23	< 45	< 22	< 41	< 53	< 30	< 28	< 117	< 49
Kale	11/02/18	< 15	< 15	< 33	< 16	< 31	< 16	< 24	< 36	< 16	< 14	< 78	< 22
Kale	11/02/18	< 20	< 23	< 42	< 26	< 48	< 23	< 40	< 54	< 22	< 20	< 130	< 36
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-IX.1 **QUARTERLY OSLD RESULTS FOR DRESDEN NUCLEAR POWER STATION, 2018**

RESULTS IN UNITS OF MREM/QUARTER ± 2 STANDARD DEVIATIONS

STATION CODE	MEAN ± 2 S.D.	JAN - MAR	APR - JUN	JUL - SEP	OCT - DEC
D-01-1	20.3 ± 5.1	21.2	22.2	16.5	21.1
D-01-2	19.9 ± 6.5	21.0	22.9	15.3	20.5
D-02-1	21.5 ± 4.2	22.5	23.3	18.5	22.0
D-02-2	20.7 ± 5.1	22.5	20.5	17.2	22.7
D-03-1	16.7 ± 5.2	17.4	18.3	12.8	18.1
D-03-2	16.6 ± 5.5	17.4	18.8	12.6	17.4
D-04-1	20.8 ± 5.5	22.6	22.2	16.7	21.7
D-04-2	20.3 ± 5.0	20.9	23.3	17.2	19.9
D-07-1	19.2 ± 3.4	19.3	20.3	16.8	20.5
D-07-2	18.8 ± 3.7	19.5	20.0	16.0	19.6
D-08-1	20.2 ± 4.4	20.7	20.9	17.1	22.2
D-08-2	20.2 ± 3.3	21.0	21.8	18.1	19.7
D-10-1	20.1 ± 3.4	19.9	21.3	17.8	21.4
D-10-2	19.6 ± 4.3	19.9	20.9	16.5	21.1
D-12-1	16.9 ± 6.0	18.9	18.9	12.6	17.4
D-12-2	16.0 ± 4.8	18.0	17.4	12.6	16.1
D-14-1	16.6 ± 1.8	17.1	16.9	15.3	17.1
D-14-2	18.3 ± 5.0	19.7	19.3	14.6	19.7
D-45-1	18.7 ± 4.9	17.0	21.1	16.2	20.5
D-45-2	18.9 ± 5.3	19.0	21.7	15.4	19.5
D-53-1	16.7 ± 4.2	16.3	17.7	14.0	*18.9*
D-53-2	16.2 ± 5.4	18.1	17.9	12.3	16.7
D-55-1	19.2 ± 5.4	19.4	19.8	15.6	22.1
D-55-2	18.3 ± 5.2	19.5	19.2	14.5	20.1
D-56-1	17.6 ± 4.7	19.3	18.4	14.2	18.7
D-56-2	17.3 ± 3.6	17.2	18.8	14.8	18.3
D-58-1	15.5 ± 5.7	17.8	17.1	11.4	16.0
D-58-2	15.6 ± 3.3	16.9	16.5	13.2	15.7
D-101-1	20.2 ± 4.3	22.1	20.5	17.2	21.0
D-101-2	20.0 ± 3.6	19.5	19.7	18.4	22.6
D-102-1	22.9 ± 1.8	22.6	23.7	21.8	23.7
D-102-2	21.6 ± 4.5	21.5	23.2	18.4	23.2
D-103-1	19.0 ± 3.5	18.8	20.8	16.7	19.6
D-103-2	18.9 ± 5.1	*(1)*	20.9	16.0	19.7
D-104-1	21.9 ± 4.2	23.0	23.1	18.8	22.9
D-104-2	21.2 ± 3.9	22.4	22.1	18.3	22.1
D-105-1	19.7 ± 5.5	20.8	19.1	16.2	22.6
D-105-2	20.9 ± 3.2	20.4	21.5	18.9	22.7
D-106-1	18.0 ± 4.5	19.9	18.1	14.8	19.1
D-106-2	17.0 ± 3.1	18.5	17.3	14.8	17.5
D-107-1	16.2 ± 3.8	17.6	16.8	13.4	16.9
D-107-2	16.1 ± 4.8	18.0	16.8	12.6	17.0
D-108-1	19.6 ± 4.8	22.0	20.4	16.4	19.5
D-108-2	18.5 ± 2.2	19.2	18.4	17.0	19.5
D-109-1	19.5 ± 6.7	18.0	23.4	15.8	21.0
D-109-2	18.7 ± 5.1	19.8	21.6	15.8	17.8
D-110-3	24.4 ± 3.7	25.2	25.1	21.7	25.7
D-110-4	23.8 ± 3.8	25.4	23.5	21.2	25.0
D-111-1	21.7 ± 4.2	22.7	21.0	19.2	24.1
D-111-2	22.0 ± 4.4	23.4	22.9	18.8	23.2
D-112A-1	17.8 ± 3.8	19.0	18.9	15.0	18.5
D-112A-2	17.7 ± 4.3	17.1	19.9	15.0	18.9
D-113-1	16.5 ± 3.1	17.6	16.5	14.3	17.5
D-113-2	17.3 ± 5.0	18.6	19.5	13.8	17.4

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-IX.1 **QUARTERLY OSLD RESULTS FOR DRESDEN NUCLEAR POWER STATION, 2018**

RESULTS IN UNITS OF MREM/QUARTER ± 2 STANDARD DEVIATIONS

STATION CODE	MEAN ± 2 S.D.	JAN - MAR	APR - JUN	JUL - SEP	OCT - DEC
D-114-1	16.9 ± 5.5	17.4	17.4	13.1	19.6
D-114-2	17.3 ± 5.1	19.9	*(1)*	14.8	17.3
D-115-1	19.0 ± 4.6	21.2	19.4	15.8	19.5
D-115-2	19.3 ± 4.2	18.7	21.8	16.9	20.0
D-116-1	21.8 ± 4.4	22.1	23.4	18.6	23.1
D-116-2	21.3 ± 2.9	21.3	23.2	19.6	21.0
D-201-1	21.7 ± 6.1	22.0	25.4	17.9	21.4
D-201-2	22.4 ± 4.2	23.3	24.5	19.6	22.1
D-202-1	20.8 ± 5.7	21.1	23.2	16.7	22.2
D-202-2	19.6 ± 3.6	20.8	19.8	17.0	20.8
D-203-1	19.9 ± 6.3	18.3	21.6	16.3	23.3
D-203-2	18.4 ± 2.5	18.0	18.4	17.2	20.1
D-204-1	16.7 ± 4.2	16.3	18.5	14.0	18.2
D-204-2	16.4 ± 3.9	16.6	18.0	13.6	17.3
D-205-1	18.0 ± 4.1	18.5	*(1)*	15.8	19.8
D-205-2	18.3 ± 5.5	19.5	*(1)*	15.2	20.3
D-206-1	18.5 ± 3.6	18.5	20.5	16.2	18.8
D-206-2	19.7 ± 3.1	20.6	20.4	17.4	20.5
D-207-1	17.3 ± 4.7	18.7	17.2	14.0	19.3
D-207-2	17.0 ± 7.0	18.6	20.3	12.2	17.1
D-208-1	15.4 ± 4.0	15.3	18.0	13.1	15.3
D-208-2	15.7 ± 4.3	15.0	17.2	13.0	17.7
D-209-1	15.3 ± 2.9	15.9	15.9	13.2	16.3
D-209-2	15.5 ± 3.7	16.6	16.2	12.7	16.4
D-210-1	19.0 ± 4.8	21.1	19.2	15.6	20.0
D-210-2	19.3 ± 4.7	20.1	21.5	16.0	19.5
D-211-1	20.2 ± 4.8	19.8	21.8	17.0	22.2
D-211-2	20.2 ± 4.0	20.8	21.4	17.2	21.3
D-212-3	16.8 ± 4.6	19.2	17.6	13.7	16.9
D-212-4	17.0 ± 5.0	17.3	18.6	13.4	18.7
D-213-1	15.6 ± 2.8	16.1	16.8	13.6	15.8
D-213-2	15.6 ± 5.5	17.1	17.5	11.6	16.3
D-214-1	22.7 ± 6.9	19.5	25.7	19.9	25.7
D-214-2	22.3 ± 4.2	23.6	24.6	20.6	20.5
D-215-1	22.2 ± 5.3	21.1	25.6	19.4	22.7
D-215-2	21.2 ± 3.4	21.2	21.9	18.8	22.8
D-216-1	19.8 ± 2.7	21.0	20.7	18.1	19.5
D-216-2	20.3 ± 3.7	21.9	21.1	17.7	20.4

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-IX.2 MEAN QUARTERLY OSLD RESULTS FOR THE INNER RING, OUTER RING, OTHER AND CONTROL LOCATIONS FOR DRESDEN NUCLEAR POWER STATION, 2018

RESULTS IN UNITS OF MREM/QUARTER ± 2 STANDARD DEVIATIONS OF THE STATION DATA

COLLECTION PERIOD	INNER RING ± 2 S.D.	OUTER RING	OTHER	CONTROL
JAN-MAR	20.3 ± 4.6	19.2 ± 4.6	19.5 ± 3.6	18.4 ± 1.3
APR-JUN	20.4 ± 5.0	20.3 ± 5.8	20.3 ± 3.7	18.1 ± 2.1
JUL-SEP	16.6 ± 5.2	15.8 ± 4.9	15.6 ± 3.4	12.6 ± 0.0
OCT-DEC	20.3 ± 5.4	19.6 ± 5.0	20.0 ± 3.4	16.7 ± 1.8

TABLE C-IX.3 SUMMARY OF THE AMBIENT DOSIMETRY PROGRAM FOR DRESDEN NUCLEAR POWER STATION, 2018

RESULTS IN UNITS OF MREM/QUARTER

LOCATION	SAMPLES ANALYZED	PERIOD MINIMUM	PERIOD MAXIMUM	PERIOD MEAN ± 2 S.D.
INNER RING	134	11.4	25.7	19.4 ± 6.0
OUTER RING	126	11.6	25.7	18.7 ± 6.1
OTHER	96	12.3	23.3	18.9 ± 5.1
CONTROL	8	12.6	18.9	16.5 ± 5.1

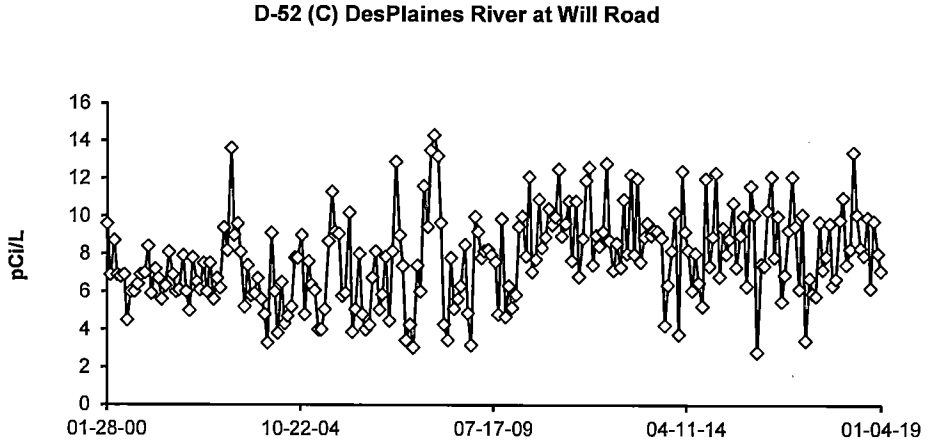
INNER RING STATIONS - D-101-1, D-101-2, D-102-1, D-102-2, D-103-1, D-103-2, D-104-1, D-104-2, D-105-1, D-105-2, D-106-1, D-106-2, D-107-1, D-107-2, D-108-1, D-108-2, D-109-1, D-109-2, D-110-3, D-110-4, D-111-1 D-111-2, D-112A-1, D-112A-2, D-113-1, D-113-2, D-114-1, D-114-2, D-115-1, D-115-2, D-116-1, D-116-2, D-58-1, D-58-2,

OUTER RING STATIONS - D-201-1, D-201-2, D-202-1, D-202-2, D-203-1, D-203-2, D-204-1.D-204-2,D-205-1, D-205-2, D-206-1, D-206-2, D-207-1, D-207-2, D-208-1, D-208-2, D-209-1, D-209-2, D-210-1, D-210-2, D-211-1, D-211-2, D-212-3, D-212-4, D-213-1, D-213-2, D-214-1, D-214-2, D-215-1, D-215-2, D-216-1, D-216-2

OTHER STATIONS - D-01-1, D-01-2, D-02-1, D-02-2, D-03-1, D-03-2, D-04-1, D-04-2, D-07-1,D-07-2,D-08-1 D-08-2, D-10-1, D-10-2, D-14-1, D-14-2, D-45-1, D-45-2, D-53-1, D-53-2, D-55-1, D-55-2, D-56-1, D-56-2

CONTROL STATIONS - D-12-1, D-12-2

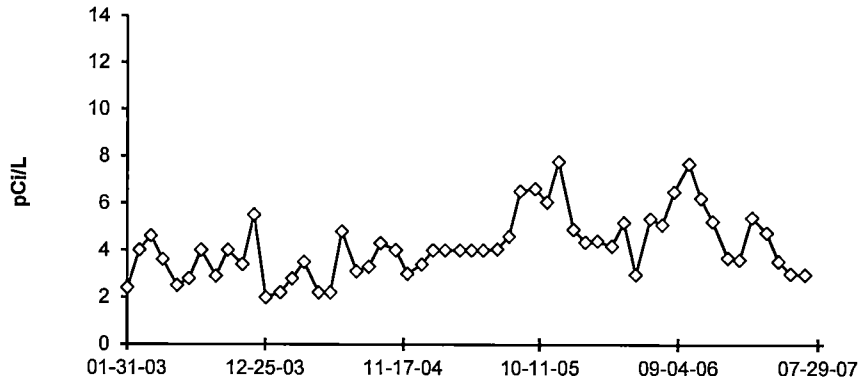
FIGURE C-1
SURFACE WATER - GROSS BETA - STATION
D-52 (C) COLLECTED IN THE VICINITY OF DNPS, 2000 - 2018



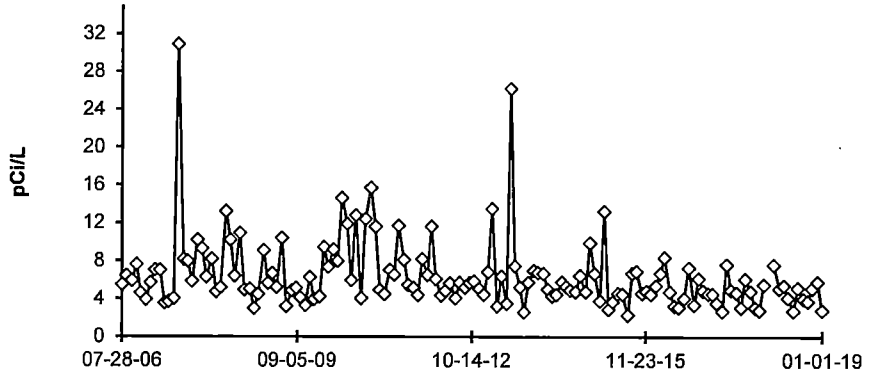
DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005 AND MDC VALUES AFTER JULY 2005

FIGURE C-2
SURFACE WATER - GROSS BETA - STATION D-54 (C) and D-57 (C) COLLECTED IN THE VICINITY OF DNPS, 2003 - 2018

D-54 (C) Kankakee River



D-57 (C) Kankakee River at Will Road

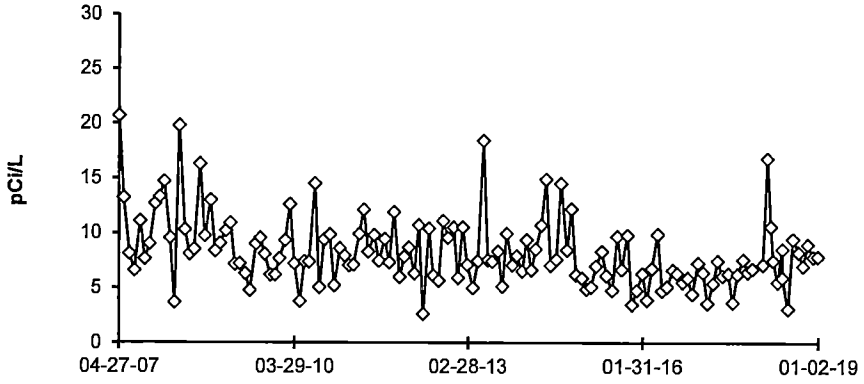


DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005 AND MDC VALUES AFTER JULY 2005

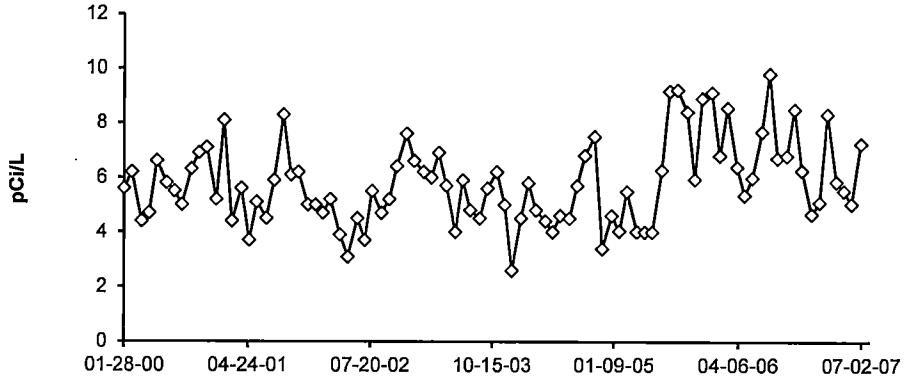
D-54 LOCATION REMOVED FROM PROGRAM JUNE 28, 2007 AND REPLACED WITH D-57

FIGURE C-3
SURFACE WATER - GROSS BETA - STATIONS D-21 and D-51
COLLECTED IN THE VICINITY OF DNPS, 2000 - 2018

D-21 Illinois River at EJ&E Bridge



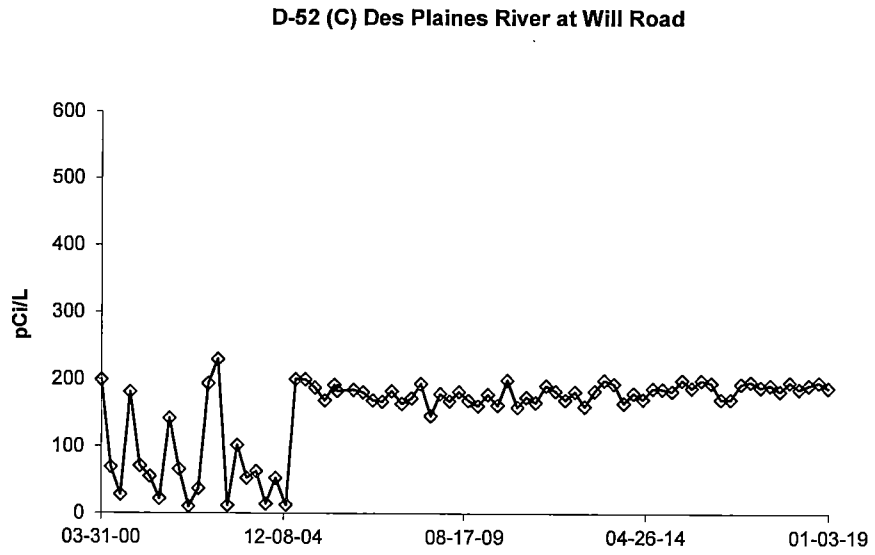
D-51 Dresden Lock & Dam



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

D-51 LOCATION REMOVED FROM PROGRAM JUNE 29, 2007 AND REPLACED WITH D-21

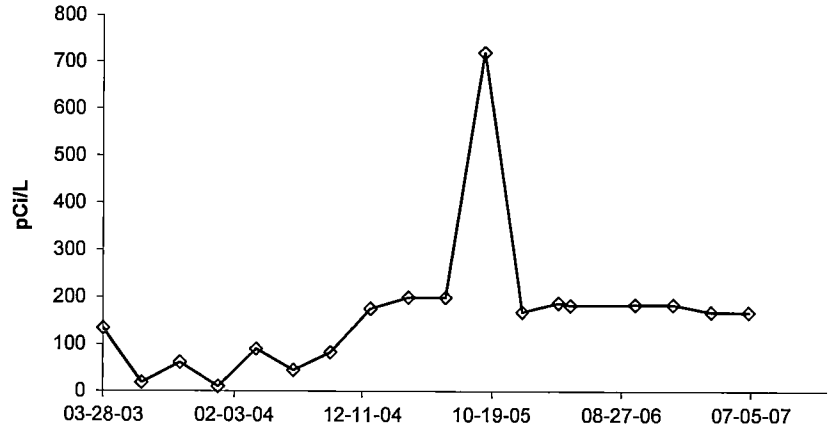
FIGURE C-4
SURFACE WATER - TRITIUM - STATION
D-52 (C) COLLECTED IN THE VICINITY OF DNPS, 2000 - 2018



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

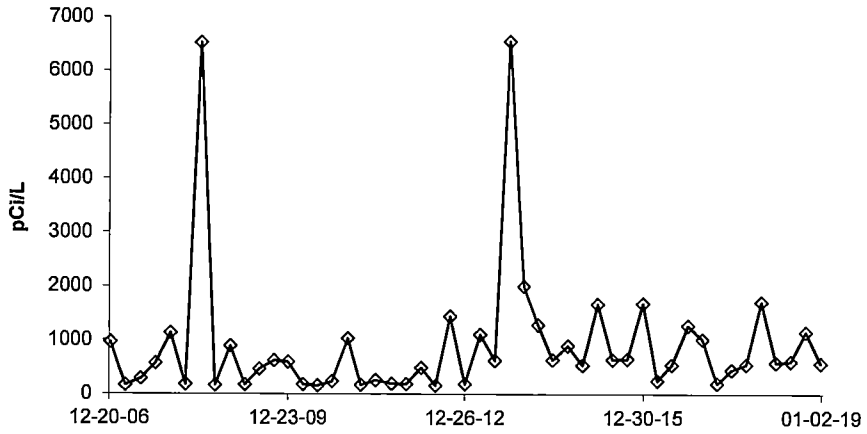
FIGURE C-5
SURFACE WATER - TRITIUM - STATION D-54 (C) AND D-57 (C) COLLECTED IN THE VICINITY OF DNPS, 2003 - 2018

D-54 (C) Kankakee River



Location shared with Braidwood Station (BD-10).

D-57 (C) Kankakee River at Will Road

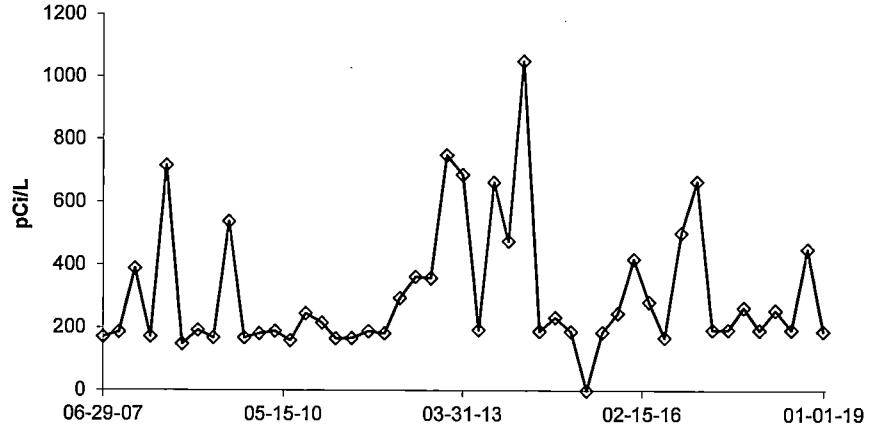


DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005 AND MDC VALUES AFTER JULY 2005

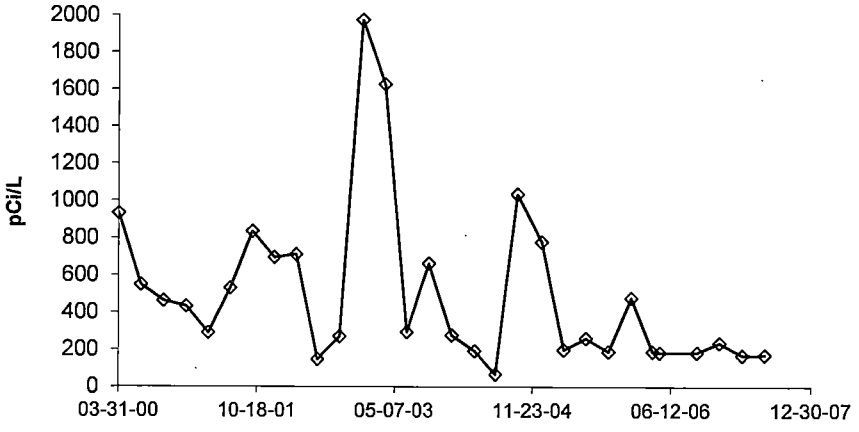
D-57 NEW STATION JULY 24, 2006. REPLACED D-54 ON JUNE 28, 2007

FIGURE C-6
SURFACE WATER - TRITIUM - STATIONS D-21 and D-51
COLLECTED IN THE VICINITY OF DNPS, 2000 - 2018

D-21 Illinois River at EJ&E Bridge



D-51 Dresden Lock & Dam

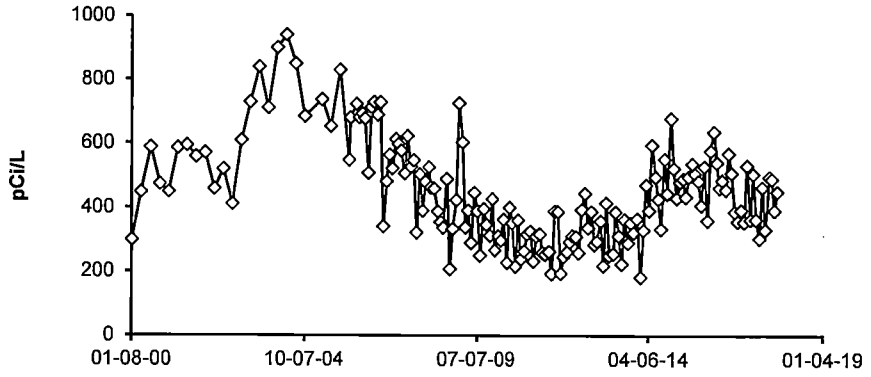


D-21 REPLACED D-51 JUNE 29, 2007

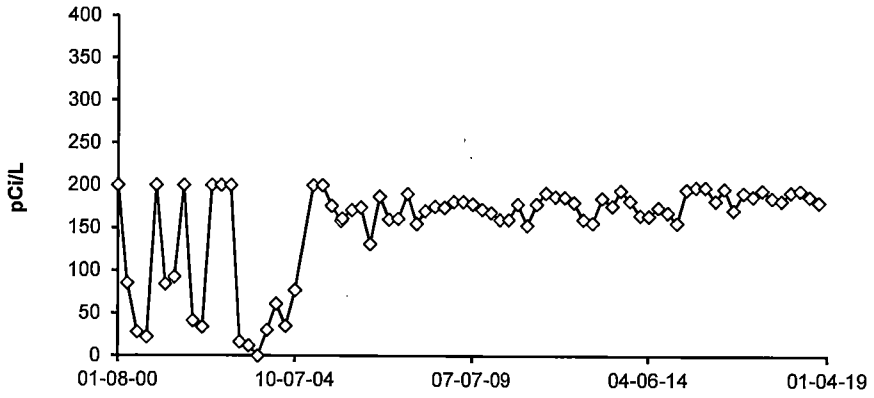
D-51 LOCATION REMOVED FROM PROGRAM JUNE 29, 2007 AND REPLACED WITH D-21

FIGURE C-7
GROUND WATER - TRITIUM - STATIONS D-23 and D-35 COLLECTED IN THE VICINITY OF DNPS, 2000 - 2018

D-23 Thorsen Well



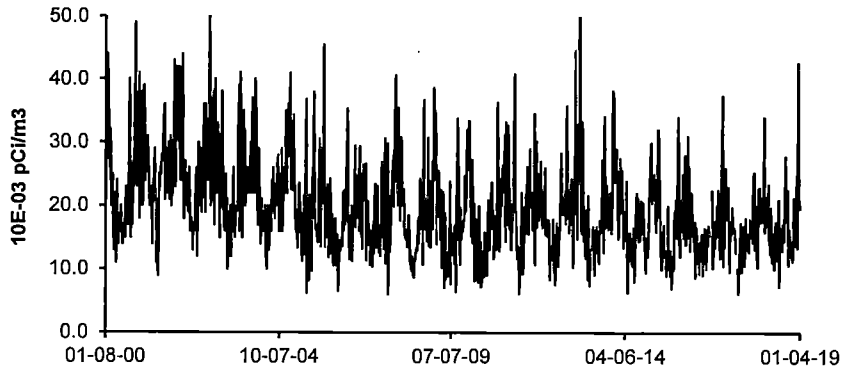
D-35 Dresden Lock and Dam



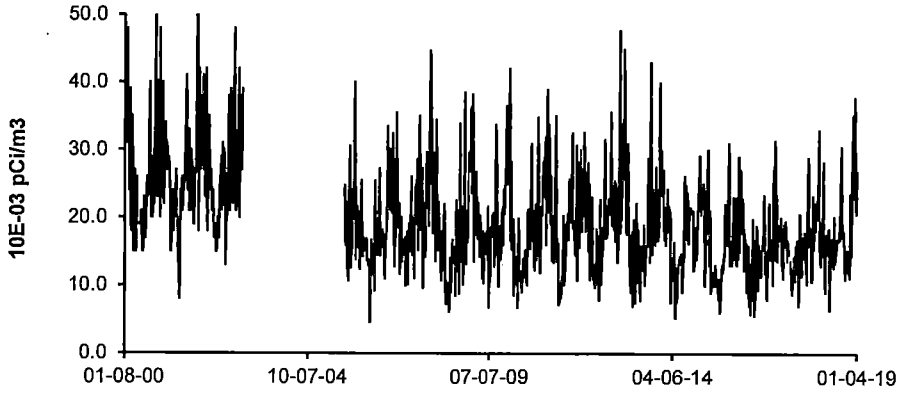
DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005 AND MCD VALUES AFTER JULY 2005

FIGURE C-8
AIR PARTICULATES - GROSS BETA - STATIONS D-01 and D-02 COLLECTED IN THE VICINITY OF DNPS, 2000 - 2018

D-01 Onsite Station 1



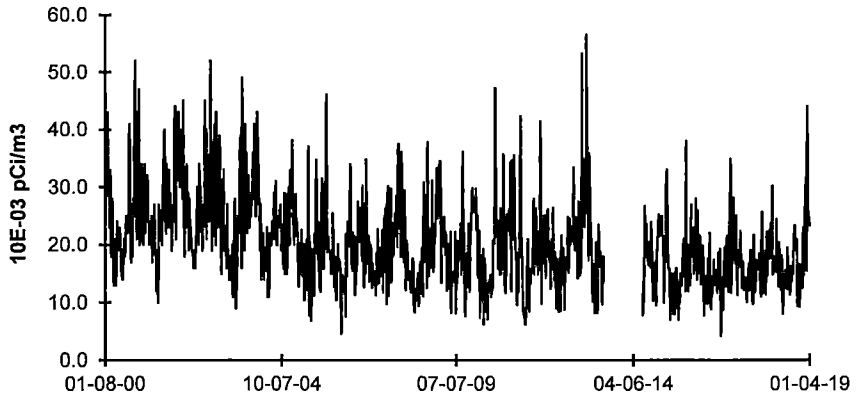
D-02 Onsite Station 2



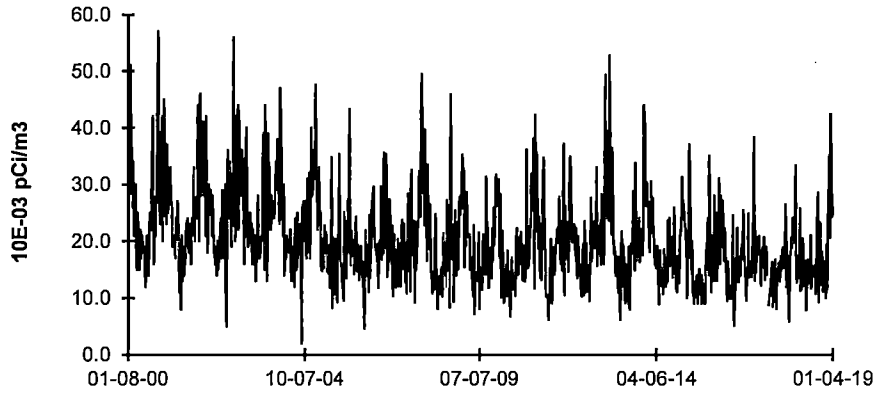
D-02 No samples; power was restored on 09-16-05.

FIGURE C-9
AIR PARTICULATES - GROSS BETA - STATIONS D-03 and D-04 COLLECTED IN THE VICINITY OF DNPS, 2000 - 2018

D-03 Onsite Station 3



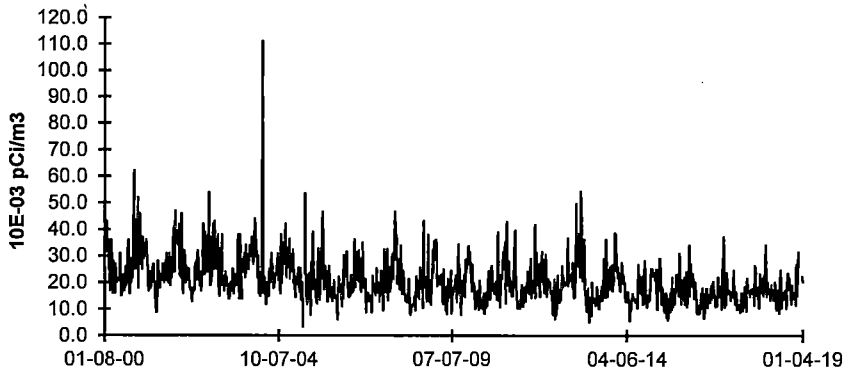
D-04 Collins Road on Station Property



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

FIGURE C-10
AIR PARTICULATES - GROSS BETA - STATIONS D-07 and D-12 (C) COLLECTED IN THE VICINITY OF DNPS, 2000 - 2018

D-07 Clay Products, Dresden Road



D-12 (C), Quarry Road, Lisbon

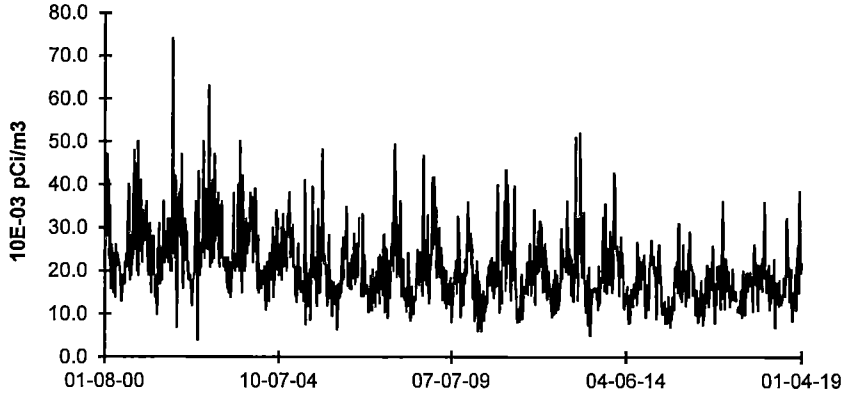
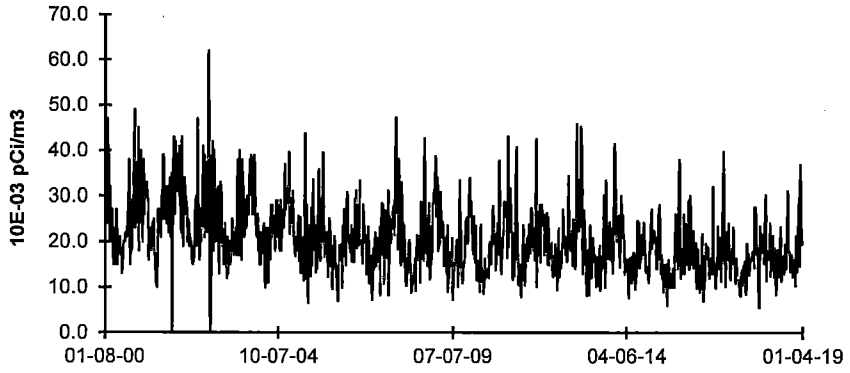


FIGURE C-11
AIR PARTICULATES - GROSS BETA - STATIONS D-45 and D-53 COLLECTED IN THE VICINITY OF DNPS, 2000 - 2018

D-45 McKinley Woods Road, Channahon



D-53 Will Road, Hollyhock

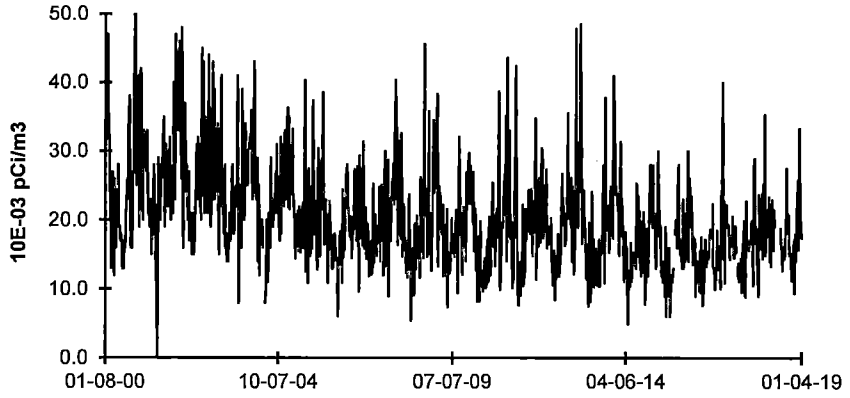
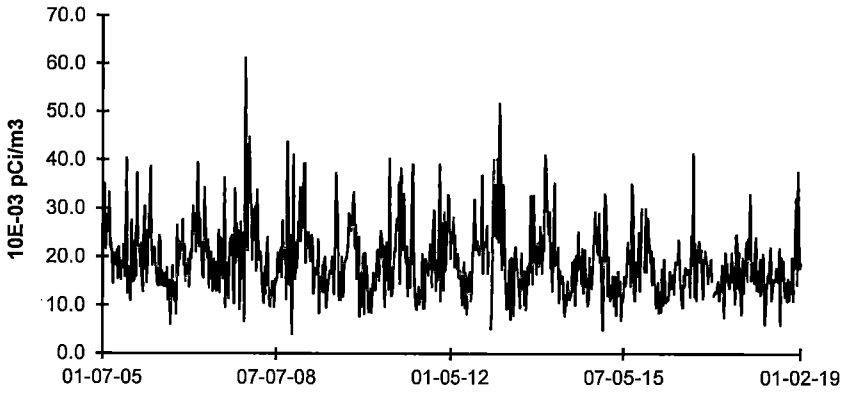


FIGURE C-12
AIR PARTICULATES - GROSS BETA - STATIONS D-08 and D-10 COLLECTED IN THE VICINITY OF DNPS, 2005 - 2018

D-08 Jugtown Road, Prairie Parks



D-10 Goose Lake Road, Goose Lake Village

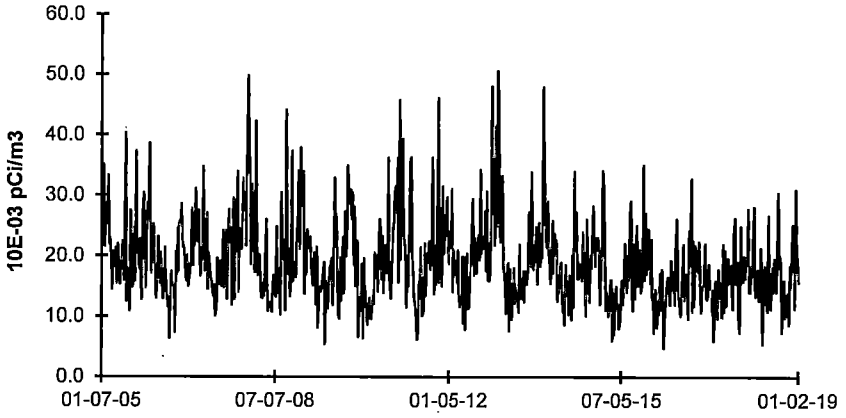
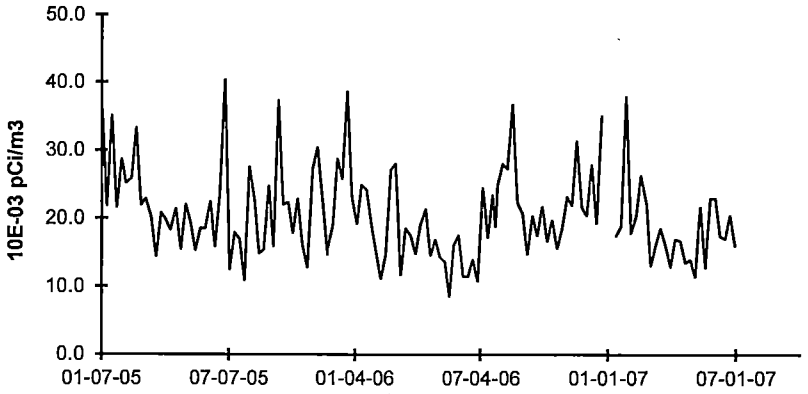
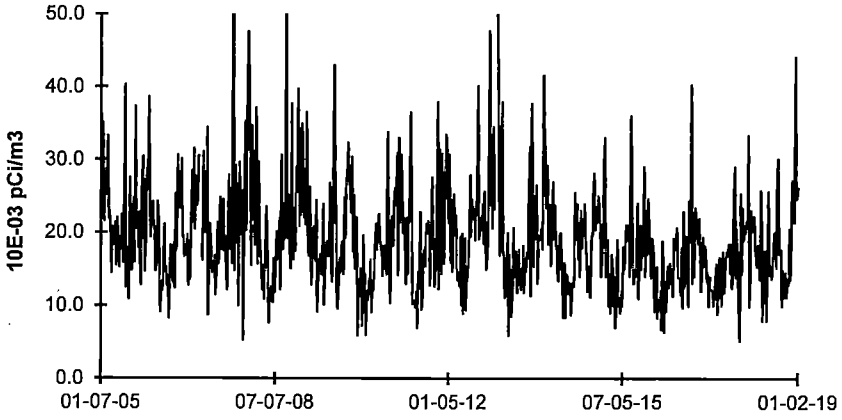


FIGURE C-13
AIR PARTICULATES - GROSS BETA - STATIONS D-13 and D-14 COLLECTED IN THE VICINITY OF DNPS, 2005 - 2018

D-13 Minooka



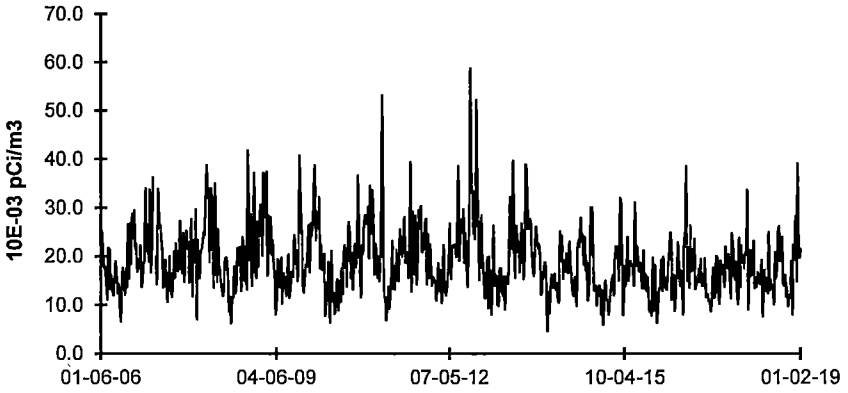
D-14 Center Street, Channahon



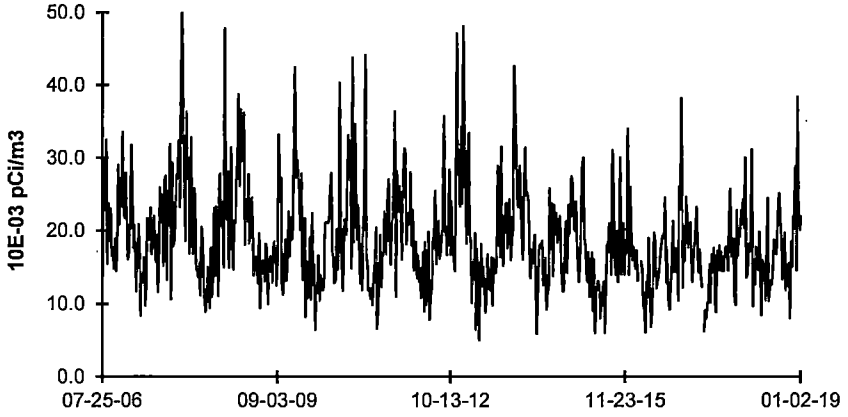
D-13 TAKEN OUT OF SERVICE JUNE 29, 2007 AND REPLACED WITH D-55

FIGURE C-14
AIR PARTICULATES - GROSS BETA - STATIONS D-55 and D-56 COLLECTED IN THE VICINITY OF DNPS, 2006-2018

D-55 Ridge Road, Minooka

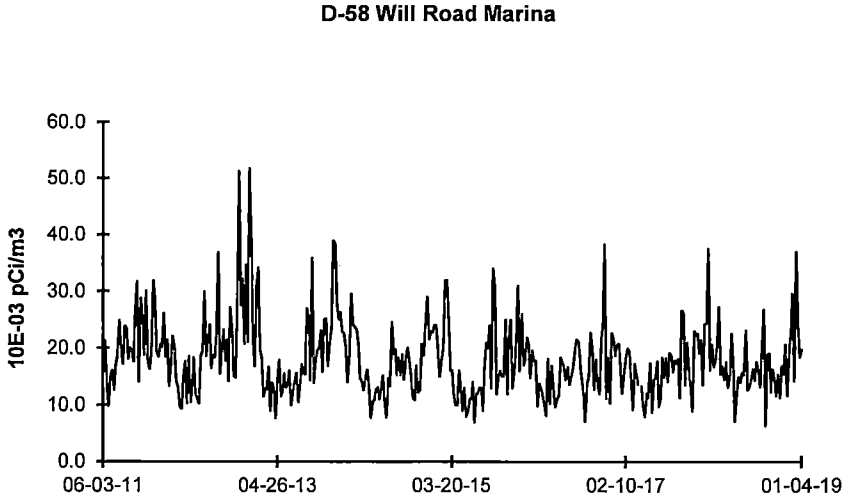


D-56 Will Road, Wildfeather



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

FIGURE C-15
AIR PARTICULATES - GROSS BETA - STATION D-58
COLLECTED IN THE VICINITY OF DNPS, 2011-2018



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 2018	E12133	Milk	Sr-89	pCi/L	76.1	90.1	0.84	A
			Sr-90	pCi/L	12.2	12.5	0.98	A
	E12134	Milk	Ce-141	pCi/L	77.8	77.0	1.01	A
			Co-58	pCi/L	105	114	0.92	A
			Co-60	pCi/L	181	187	0.97	A
			Cr-51	pCi/L	298	326	0.92	A
			Cs-134	pCi/L	150	180	0.84	A
			Cs-137	pCi/L	164	172	0.95	A
			Fe-59	pCi/L	140	139	1.01	A
			I-131	pCi/L	105	108.0	0.97	A
			Mn-54	pCi/L	133	131	1.01	A
			Zn-65	pCi/L	242	244	0.99	A
	E12135	Charcoal	I-131	pCi	93.7	95.4	0.98	A
	E12136	AP	Ce-141	pCi	92.6	85.3	1.09	A
			Co-58	pCi	130	126	1.03	A
			Co-60	pCi	237	207	1.14	A
			Cr-51	pCi	411	361	1.14	A
			Cs-134	pCi	194	199	0.98	A
			Cs-137	pCi	200	191	1.05	A
			Fe-59	pCi	160	154	1.04	A
			Mn-54	pCi	152	145	1.05	A
			Zn-65	pCi	267	271	0.99	A
	E12137	Water	Fe-55	pCi/L	1990	1700	1.17	A
	E12138	Soil	Ce-141	pCi/g	0.148	0.118	1.26	W
			Co-58	pCi/g	0.171	0.174	0.98	A
			Co-60	pCi/g	0.297	0.286	1.04	A
			Cr-51	pCi/g	0.537	0.498	1.08	A
			Cs-134	pCi/g	0.274	0.275	1.00	A
			Cs-137	pCi/g	0.355	0.337	1.05	A
			Fe-59	pCi/g	0.243	0.212	1.15	A
			Mn-54	pCi/g	0.228	0.201	1.14	A
			Zn-65	pCi/g	0.395	0.374	1.06	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]
June 2018	E12205	Milk	Sr-89	pCi/L	74.9	84.6	0.89	A
			Sr-90	pCi/L	10.5	11.4	0.92	A
	E12206	Milk	Ce-141	pCi/L	89.2	82.2	1.08	A
			Co-58	pCi/L	94.8	89	1.07	A
			Co-60	pCi/L	125	113	1.10	A
			Cr-51	pCi/L	256	239	1.07	A
			Cs-134	pCi/L	112	114	0.99	A
			Cs-137	pCi/L	107	98.8	1.08	A
			Fe-59	pCi/L	95.9	86.0	1.12	A
			I-131	pCi/L	69.8	71.9	0.97	A
			Mn-54	pCi/L	138	130	1.06	A
			Zn-65	pCi/L	186	157	1.18	A
	E12207	Charcoal	I-131	pCi	69.6	72.2	0.96	A
	E12208	AP	Ce-141	pCi	151	165	0.92	A
			Co-58	pCi	174	178	0.98	A
			Co-60	pCi	290	227	1.28	W
			Cr-51	pCi	452	478	0.95	A
			Cs-134	pCi	215	227	0.95	A
			Cs-137	pCi	206	198	1.04	A
			Fe-59	pCi	180	172	1.05	A
			Mn-54	pCi	265	260	1.02	A
			Zn-65	pCi	280	315	0.89	A
	E12209	Water	Fe-55	pCi/L	1790	1740	1.03	A
	E12210	AP	Sr-89	pCi	77.8	90.3	0.86	A
			Sr-90	pCi	9.54	12.2	0.78	W

(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 2018	E12271	Milk	Sr-89	pCi/L	79.4	81.7	0.97	A
			Sr-90	pCi/L	12.2	14.8	0.82	A
	E12272	Milk	Ce-141	pCi/L	152	128	1.19	A
			Co-58	pCi/L	161	144	1.12	A
			Co-60	pCi/L	208	190	1.10	A
			Cr-51	pCi/L	244	265	0.92	A
			Cs-134	pCi/L	124	123	1.01	A
			Cs-137	pCi/L	166	147	1.13	A
			Fe-59	pCi/L	158	119	1.32	N(1)
			I-131	pCi/L	83.1	58.2	1.43	N(2)
			Mn-54	pCi/L	191	167	1.14	A
			Zn-65	pCi/L	229	201	1.14	A
	E12273	Charcoal	I-131	pCi	83.0	80.7	1.03	A
	E12274	AP	Ce-141	pCi	101	85.6	1.18	A
			Co-58	pCi	92.7	96.0	0.97	A
			Co-60	pCi	142	127	1.12	A
			Cr-51	pCi	218	177	1.23	W
			Cs-134	pCi	81.2	81.9	0.99	A
			Cs-137	pCi	99.0	98.5	1.01	A
			Fe-59	pCi	93.7	79.7	1.18	A
			Mn-54	pCi	116	112	1.04	A
			Zn-65	pCi	139	134	1.04	A
	E12302	Water	Fe-55	pCi/L	2120	1820	1.17	A
	E12276	Soil	Ce-141	pCi/g	0.259	0.221	1.17	A
			Co-58	pCi/g	0.279	0.248	1.12	A
			Co-60	pCi/g	0.367	0.328	1.12	A
			Cr-51	pCi/g	0.597	0.457	1.31	N (3)
			Cs-134	pCi/g	0.261	0.212	1.23	W
			Cs-137	pCi/g	0.376	0.330	1.14	A
			Fe-59	pCi/g	0.248	0.206	1.20	A
			Mn-54	pCi/g	0.317	0.289	1.10	A
			Zn-65	pCi/g	0.407	0.347	1.17	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

*(1) See **NCR 18-20***

*(2) See **NCR 18-24***

*(3) See **NCR 18-21***

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)]
December 2018	E12313	Milk	Sr-89	pCi/L	71.9	91.9	0.78	W
			Sr-90	pCi/L	12.1	13.3	0.91	A
	E12314	Milk	Ce-141	pCi/L	124	133	0.93	A
			Co-58	pCi/L	110	119	0.93	A
			Co-60	pCi/L	202	212	0.95	A
			Cr-51	pCi/L	292	298	0.98	A
			Cs-134	pCi/L	146	171	0.85	A
			Cs-137	pCi/L	118	121	0.98	A
			Fe-59	pCi/L	120	114	1.05	A
			I-131	pCi/L	94.2	93.3	1.01	A
			Mn-54	pCi/L	151	154	0.98	A
			Zn-65	pCi/L	266	264	1.01	A
	E12315	Charcoal	I-131	pCi	94.8	89.9	1.05	A
	E12316A	AP	Ce-141	pCi	92.3	94.0	0.98	A
			Co-58	pCi	73.4	83.8	0.88	A
			Co-60	pCi	137	150	0.91	A
			Cr-51	pCi	202	210	0.96	A
			Cs-134	pCi	115	121	0.95	A
			Cs-137	pCi	85.0	85.4	1.00	A
			Fe-59	pCi	83.1	80.8	1.03	A
			Mn-54	pCi	104	109	0.96	A
			Zn-65	pCi	168	187	0.90	A
	E12317	Water	Fe-55	pCi/L	2110	1840	1.15	A
	E12318	AP	Sr-89	pCi	81.1	83.0	0.98	A
			Sr-90	pCi	11.4	12.0	0.95	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 2018	18-MaS38	Soil	Ni-63	Bq/kg	9.94		*(1)*	A
			Sr-90	Bq/kg	0.846		*(1)*	A
	18-MaW38	Water	Am-241	Bq/L	0.785	0.709	0.496 - 0.922	A
			Ni-63	Bq/L	12.6	14.0	9.8 - 18.2	A
			Pu-238	Bq/L	0.0214	0.023	*(2)*	A
			Pu-239/240	Bq/L	0.544	0.600	0.420 - 0.780	A
	18-RdF38	AP	U-234/233	Bq/sample	0.111	0.124	0.087 - 0.161	A
			U-238	Bq/sample	0.123	0.128	0.090 - 0.166	A
	18-RdV38	Vegetation	Cs-134	Bq/sample	2.46	3.23	2.26 - 4.20	W
			Cs-137	Bq/sample	3.14	3.67	2.57 - 4.77	A
			Co-57	Bq/sample	4.12	4.42	3.09 - 5.75	A
			Co-60	Bq/sample	1.86	2.29	1.60 - 2.98	A
			Mn-54	Bq/sample	2.21	2.66	1.86 - 3.46	A
			Sr-90	Bq/sample				NR[3]
			Zn-65	Bq/sample	-0.201		*(1)*	A
November 2018	18-MaS39	Soil	Ni-63	Bq/kg	703	765	536 - 995	A
			Sr-90	Bq/kg	137	193	*135 - 251*	W
	18-MaW39	Water	Am-241	Bq/L	0.0363		*(1)*	A
			Ni-63	Bq/L	6.18	7.0	4.9 - 9.1	A
			Pu-238	Bq/L	0.73	0.674	0.472 - 0.876	A
			Pu-239/240	Bq/L	0.89	0.928	0.650 - 1.206	A
	18-RdF39	AP	U-234/233	Bq/sample	0.159	0.152	0.106 - 0.198	A
			U-238	Bq/sample	0.162	0.158	0.111 - 0.205	A
	18-RdV39	Vegetation	Cs-134	Bq/sample	1.85	1.94	1.36 - 2.52	A
			Cs-137	Bq/sample	2.5	2.36	1.65 - 3.07	A
			Co-57	Bq/sample	3.53	3.31	2.32 - 4.30	A
			Co-60	Bq/sample	1.6	1.68	1.18 - 2.18	A
			Mn-54	Bq/sample	2.61	2.53	1.77 - 3.29	A
			Sr-90	Bq/sample	0.338	0.791	0.554 - 1.028	N[4]
			Zn-65	Bq/sample	1.32	1.37	*0.96 - 1.78*	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 18-09***

*(4) See **NCR 18-25***

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 2018	MRAD-28	AP	GR-A	pCi/sample	65.7	43.4	22.7 - 71.5	A
			GR-B	pCi/sample	57.2	52	31.5 - 78.6	A
April 2018	RAD-113	Water	Ba-133	pCi/L	91.2	91.5	77.1 - 101	A
			Cs-134	pCi/L	70.4	75.9	62.0 - 83.5	A
			Cs-137	pCi/L	122	123	111 - 138	A
			Co-60	pCi/L	64.8	64.3	57.9 - 73.2	A
			Zn-65	pCi/L	98.6	86.7	78.0 - 104	A
			GR-A	pCi/L	32.8	28.6	14.6 - 37.5	A
			GR-B	pCi/L	62.9	73.7	51.4 - 81.1	A
			U-Nat	pCi/L	6.7	6.93	5.28 - 8.13	A
			H-3	pCi/L	17100	17200	15000 - 18900	A
			Sr-89	pCi/L	38.6	48.8	38.3 - 56.2	A
			Sr-90	pCi/L	27.1	26.5	19.2 - 30.9	A
			I-131	pCi/L	26.7	24.6	20.4 - 29.1	A
September 2018	MRAD-29	AP	GR-A	pCi/sample	49.7	55.3	28.9 - 91.1	A
		AP	GR-B	pCi/sample	75.3	86.5	52.4 - 131	A
October 2018	RAD-115	Water	Ba-133	pCi/L	15.2	16.3	11.9 - 19.4	A
			Cs-134	pCi/L	85.9	93.0	76.4 - 102	A
			Cs-137	pCi/L	229	235	212 - 260	A
			Co-60	pCi/L	81.9	80.7	72.6 - 91.1	A
			Zn-65	pCi/L	348	336	302 - 392	A
			GR-A	pCi/L	38.9	60.7	31.8 - 75.4	A
			GR-B	pCi/L	36.5	41.8	27.9 - 49.2	A
			U-Nat	pCi/L	17.48	20.9	16.8 - 23.4	A
			H-3	pCi/L	2790	2870	2410 - 3170	A
			I-131	pCi/L	26.9	27.2	22.6 - 32.0	A
			Sr-89	pCi/L	57.2	56.9	45.5 - 64.6	A
			Sr-90	pCi/L	36.8	31.4	22.9- 36.4	N[1]

(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 18-23***

APPENDIX E

ERRATA DATA

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In 2017, the REMP AEROR indicated 23 missed samples. However, one week all APT/API samples were lost in transit, which account for 28 missed samples. This is not clearly identified in the 2017 annual report and indicates a 97.9% recovery rate which is less than the reported 99% sample recovery rate. Please note corrections below:

I. Summary and Conclusions

This report on the Radiological Environmental Monitoring Program conducted for the Dresden Nuclear Power Station (DNPS) of Exelon covers the period 1 January 2017 through 31 December 2017. During that time period 2,020 analyses were performed on 1,883 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.

In 2017, the Dresden Nuclear Power Station released to the environment through the radioactive effluent liquid and gaseous pathways approximately 4.89E+01 curies of fission and activation gasses, 2.90E+01 curies of Carbon-14 (C-14) and approximately 1.23E+01 curies of tritium. The dose from both liquid and gaseous effluents was conservatively calculated for the Maximum Exposed Member of the Public. The results of those calculations and their comparison to the allowable limits are excerpted from the Dresden Generating Station 2017 Annual Radioactive Effluent Release Report (Radiological Impact on Man, starting at page 79):

1. Doses to a Member of the Public due to Liquid Releases in 2017 (from 01/01/2017 to 12/31/2017):

UNITS 1, 2, 3
Total Body: 6.42E-07 mrem
Organ: 6.42E-07 mrem

UNIT 1
Total Body: N/A
Organ: N/A

UNIT 2
Total Body: 3.21E-07 mrem
Organ: 3.21E-07 mrem

UNIT 3
Total Body: 3.21E-07 mrem
Organ: 3.21E-07 mrem

The above annual liquid dose values are reported per Dresden-site (UNITS 1,2,3) as well as per each individual reactor unit (UNIT 1, UNIT 2, UNIT 3). Regulatory annual liquid dose limits are listed on page 1 section 1.d.3) and section 1.d.4), of the 2017 Annual Radioactive Effluent Release Report as well as in Dresden ODCM. The above annual liquid dose values are well below any regulatory limits.

2. Doses to a Member of the Public due to Gaseous Releases in 2017 (from 01/01/2017 to 12/31/2017):

standard deviations represent the variability of measured results for different samples rather than single analysis uncertainty.

D. Program Exceptions

For 2017 the DNPS REMP had a sample recovery rate greater than 97% (1,841 of 1,883 samples collected). Sample anomalies and missed samples are listed in the tables below:

Table D-1 LISTING OF SAMPLE ANOMALIES

Sample Type	Location Code	Collection Date	Reason
SW	D-57	02/24/17	Compositor down; grab sample taken for 02/24/17
MI	D-25	04/06/17	Sample lost in transit, recollected 04/20/17
AP/AI	D-08	05/26/17	No apparent reason for low timer reading of 163.8 hours
AP/AI	D-10	06/23/17	Low reading of 164.9 hours possibly due to power outage from storms
AP/AI	D-01	07/07/17	Collector found power out at sampler; POC notified. Power restored on 07/07/17 at 16:24. Estimated flow rate = 60 CFH.
GW	D-23	07/14/17	No sample, homeowners absent. Collector will obtain next week. NOTE: Sample obtained 07/21/17.
AP/AI	D-14	09/08/17	Collector found power out at sampler due to broken line; POC notified. Power restored by 14:00 hours on 09/08/17.
AP/AI	D-53	09/29/17	Low reading of 141.0 hours due to work on line; station notified. Flow of 60 CFH based on 4 previous weeks.
SW	D-57	09/29/17	Compositor pipe broken by heavy equipment work in area; station notified.
AP/AI	D-53	10/06/17	Low reading of 149.0 hours due to power restoration
AP/AI	D-45	11/17/17	No apparent reason for low timer reading of 164.1 hours
AP/AI	D-45	12/29/17	No apparent reason for low timer reading of 116.9 hours; timer working properly.

Table D-2 LISTING OF MISSED SAMPLES

Sample Type	Location Code	Collection Date	Reason
SW	D-52	01/06/17	No sample; water frozen
SW	D-52	01/13/17	No sample; water frozen
SW	D-52	02/03/17	No sample; water frozen
OSLD	D-111-1	03/31/17	OSLD found missing during quarterly exchange, collector placed new 2nd quarter OSLD
AP/AIs	ALL	04/07/17	All 28 samples lost in transit
OSLD	D-205-2, 207-2	09/29/17	OSLDs missing during quarterly exchange; collector placed new 4th quarter OSLDs
OSLD	D-53-1	10/27/17	OSLD found missing during weekly visual check, collector placed Spare 1 EX000127215
GW	D-23	11/10/17	No sample, house vacant, outside faucet inoperable. Station notified by collector.
GW	D-23	12/08/17	No sample available
SW	D-57	12/15/17	Compositor down, collector unable to obtain grab sample, river frozen
SW	D-52	12/15/17	No sample; water frozen
SW	D-52	12/29/17	No sample; water frozen
SW	D-57	12/29/17	Compositor down, collector unable to obtain grab sample, river frozen
OSLD	D-214-2	12/29/17	OSLD found missing during quarterly exchange; collector placed a new 1st quarter 2018 OSLD.

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.

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APPENDIX F

ANNUAL RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM REPORT (ARGPPR)

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