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DRESDEN NUCLEAR POWER STATION
UNITS 1, 2 and 3

Annual Radiological
Environmental Operating Report

1 January Through 31 December 2013

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I. Summary and Conclusions

This report on the Radiological Environmental Monitoring Program conducted for the Dresden Nuclear Power Station (DNPS) by Exelon covers the period 1 January 2013 through 31 December 2013. During that time period 2,023 analyses were performed on 1,885 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 2013, the Dresden Generating Station released to the environment through the radioactive effluent liquid and gaseous pathways approximately 55 curies of fission and activation gasses, 33 curies of Carbon-14 and approximately 24 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 were as follows:

1. Liquid Dose to a Member of the Public for 2013

   Total Body: 1.22E-08 mrem which is 4.07E-07% of the 3 mrem/year limit.
   Organ: 1.22E-08 mrem which is 1.22E-07% of the 10 mrem/year limit.

2. Gaseous Dose to a Member of the Public for 2013

   Total Body: 2.19E-02 mrem which is 2.19E-01% of the 10 mrad/year limit.
   Skin: 5.35E-03 mrem which is 2.68E-02% of the 20 mrad/year limit
   Organ (Particulate/Iodine): 9.22E-02 mrem 6.15E-01% of the 15 mrem/year limit.

3. Direct Radiation Dose to a Member of the Public for 2013

   Total Body: 8.76E+00 mrem which is 3.50E+01% of 40CFR190 Limit of 25 mrem/year (Whole Body and Organ).
   Thyroid dose: 2.30E-02 mrem which is 3.07E-02% of 40CFR190 Limit of 75 mrem/year limit.

The doses as a result of the radiological effluents released from the Dresden Generating Station were a very small percentage of the allowable limits, with the exception of 40CFR190 whole body radiation which was calculated to be 35.0 % of the 25 mrem/yr limit. The largest component of 40CFR190 dose is attributable to BWR skyshine from N-16. This value is conservatively calculated for the hypothetical maximum exposed member of the public.

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 in fish. Cesium-137 was detected in one sediment sample at a concentration consistent with levels observed in previous years. No power station produced fission or activation products were found in sediment.

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 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 below the minimum detectable activity. Concentrations of naturally occurring K-40 were found. No fission or activation products were found.

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). Beginning in 2012, Exelon changed the type of dosimetry used for the Radiological Environmental Monitoring Program (REMP). Optically Stimulated Luminescent Dosimetry were deployed and Thermoluminescent Dosimetry (TLD) were discontinued. This change may result in a step change in readings, up or down, depending on site characteristics. The relative comparison to control locations remains valid. OSLD technology is different than that used in a TLD but has the same purpose (to measure direct radiation).

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 2013 through 31 December 2013.

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 2013. 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 channel catfish, largemouth bass, common carp and freshwater drum 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 were collected biweekly at one control location (D-25) from May through October and monthly from November through April. There are no milking animals within 10 km (6.2 miles) of the site. All samples were collected in new unused two gallon plastic bottles from the

bulk tank at each location, preserved with sodium bisulfite and shipped promptly to the laboratory. Food products (FL) were collected annually in September 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

Beginning in 2012, Exelon changed the type of dosimetry used for the Radiological Environmental Monitoring Program (REMP). Optically Stimulated Luminescent Dosimetry (OSLD) were deployed and Thermoluminescent Dosimetry (TLD) were discontinued. This change may result in a step change in readings, up or down, depending on site characteristics. The relative comparison to control locations remains valid. OSLD technology is different than that used in a TLD but has the same purpose (to measure direct 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 and EIML to analyze the environmental samples for radioactivity for the DNPS REMP in 2013. The analytical procedures used by the laboratories 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 2013 the DNPS REMP had a sample recovery rate greater than 99%. 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
AP/I	D-08	03/01/13	AP filter found damaged; three holes in filter paper.
AP/I	D-10	03/08/13	No apparent reason for low reading of 166.6 hours.
WW	D-23	04/12/13	No sample; homeowner absent.
SW	D-21	04/26/13	Compositor pump pit flooded.
SW	D-57	04/26/13	Supply line from river to compositor missing.
AP/I	D-01	05/24/13	Low reading of 163.6 hours possibly due to power outage from storms.
AP/I	D-02, D-03	05/24/13	Low reading of 163.9 hours possibly due to power outage from storms.

Table D-1 LISTING OF SAMPLE ANOMALIES (continued)

Sample Type	Location Code	Collection Date	Reason
AP/I	D-04	05/24/13	Low reading of 160.5 hours possibly due to power outage from storms.
AP/I	D-07	05/24/13	Low reading of 164.6 hours possibly due to power outage from storms.
AP/I	D-08, D-10	05/24/13	Low reading of 164.7 hours possibly due to power outage from storms.
AP/I	D-56	05/24/13	Low reading of 162.9 hours possibly due to power outage from storms.
AP/I	D-58	05/24/13	Low reading of 152.9 hours possibly due to power outage from storms.
AP/I	D-03	06/21/13	Low reading of 94.2 hours possibly due to power outage from storm; station notified.
AP/I	D-08	06/21/13	Low reading of 60.7 hours due to pump malfunction; electrical connections discolored possibly due to lightning. Collector replaced pump.
AP/I	D-04	06/28/13	No apparent reason for low reading of 145.6 hours.
AP/I	D-04	07/12/13	No apparent reason for low reading of 159.0 hours.
AP/I	D-08	11/15/13	No apparent reason for low reading of 163.5 hours.
AP/I	D-10	11/15/13	No apparent reason for low reading of 163.6 hours.

Table D-2 LISTING OF MISSED SAMPLES

Sample Type	Location Code	Collection Date	Reason
AP/I	D-03	06/28/13 – 07/05/13	No electricity.
AP/I	D-03	07/12/13	No electricity; unable to perform pump field check.
AP/I	D-03	07/19/13 – 08/02/13	No electricity.
AP/I	D-03	08/09/13	No electricity; unable to perform pump field check.
AP/I	D-03	08/16/13 – 08/30/13	No electricity.
AP/I	D-03	09/06/13	No electricity; unable to perform pump field check.
AP/I	D-03	09/13/13	No electricity.
OSLD	D-216-2	09/13/13	OSLD missing field; collector placed spare 1-291553.
AP/I	D-03	09/20/13 – 09/27/13	No electricity.
OSLD	D-202-1	09/27/13	OSLD missing in field during quarterly exchange; collector placed 4th quarter OSLD.
AP/I	D-03	10/04/13	No electricity; unable to perform pump field check.
AP/I	D-03	10/11/13 - 10/25/13	No electricity.
AP/I	D-03	11/01/13	No electricity; unable to perform pump field check.
AP/I	D-03	11/08/13 – 11/22/13	No electricity.
AP/I	D-03	11/29/13	No electricity; unable to perform pump field check.
AP/I	D-03	12/06/13 – 12/20/13	No electricity.
AP/I	D-03	12/27/13	No electricity; unable to perform pump field check.

Each program exception was reviewed to understand the causes of the program exception. Sampling and maintenance errors were reviewed with the personnel involved to prevent recurrence. 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

No program changes in 2013.

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:

<u>Gross Beta</u>

Monthly composites from all locations were analyzed for concentrations of gross beta (Table C–I.1, Appendix C). Gross Beta was detected in all samples. The values ranged from 3.2 to 26.2 pCi/l. Concentrations detected were consistent with those detected in previous years (Figures C-1, C–2 and C–3, Appendix C).

<u>Tritium</u>

Quarterly composites from all locations were analyzed for tritium activity (Table C–I.2, Appendix C). Three samples at indicator station D-21 were positive for tritium. The values ranged from 475 to 687 pCi/L. Four samples at control station D-57 were positive for tritium. The values ranged from 618 to 6550 pCi/L. 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 (Table C–I.3, Appendix C). No nuclides were detected and all required LLDs were met.

2. Ground Water

Quarterly or more frequent grab samples were collected at two locations (D-23 and D-35). These locations could be affected by Dresden's effluent releases and by sources upstream on the Kankakee River. The following analyses were performed:

Tritium

All samples were analyzed for tritium activity (Table C–II.1, Appendix C). Tritium was detected in twelve of sixteen samples. The concentrations ranged from 218 to 414 pCi/l. 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 channel catfish, largemouth bass, common carp and freshwater drum 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). Naturally occurring K-40 was 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). Cesium-137 was detected in one sample at a concentration of 187 pCi/kg dry. The activity detected was consistent with those detected in previous years and is likely due to fallout from above-ground nuclear weapons testing. No other 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 7 to 57 E-3 pCi/m^3 with a mean of 20 E-3 pCi/m^3. The results from the Near-Field locations ranged from 5 to 54 E-3 pCi/m^3 with a mean of 20 E-3 pCi/m^3. The results from

the Far-Field locations ranged from 6 to 53 E-3 pCi/m^3 with a mean of 21 E–3 pCi/m^3. The results from the Control location ranged from 5 to 52 E-3 pCi/m^3 with a mean of 21 E-3 pCi/m^3. Comparison of the 2013 air particulate data with previous years data indicate no effects from the operation of DNPS. In addition a comparison of the weekly mean values for 2013 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). Naturally occurring Be-7 due to cosmic ray activity was detected in 53 of 54 samples and ranged from 37.5 to 110 E-3 pCi/m^3. Naturally occurring K-40 was detected in one of 54 samples at a concentration of 24.7 E-3 pCi/m^3. 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

There are no indicator locations within 10 kilometers of the station. Samples were collected from one control location (D-25) biweekly May through October and monthly November through April. The following analyses were performed:

Iodine-131

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

Gamma Spectrometry

Each milk sample was analyzed for concentrations of gamma emitting nuclides (Table C–VII.2, Appendix C).

Naturally occurring K-40 activity was found in all samples. No other nuclides were detected and all required LLDs were met.

b. Food Products

Food product samples were collected at five locations (D-Control, D-Quad 1, D-Quad 2, D-Quad 3 and D-Quad 4) 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 all locations were analyzed for gamma emitting nuclides (Table C–VIII.1, Appendix C). No nuclides were detected and all required LLDs were met.

C. Ambient Gamma Radiation

Beginning in 2012, Exelon changed the type of dosimetry used for the Radiological Environmental Monitoring Program (REMP). Optically Stimulated Luminescent Dosimetry (OSLD) were deployed and Thermoluminescent Dosimetry (TLD) were discontinued. This change may result in a step change in readings, up or down, depending on site characteristics. The relative comparison to control locations remains valid. OSLD technology is different than that used in a TLD but has the same purpose (to measure direct 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 30 mR/quarter, with a range of 22.6 to 38.7 mR/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-12-01and D-12-02) were comparable.

D. Land Use Survey

A Land Use Survey conducted on August 28, 2013 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. 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	6.0	-
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	-	11.3
M WSW	5.8	-	-
N W	3.5	0.5	-
P WNW	3.7	0.5	-
Q NW	2.6	0.5	-
R NNW	0.8	1.0	-

E. Errata Data

Teledyne Brown Engineering (TBE) provides data results [activity, uncertainty and minimum detectable concentration (MDC)]. We are required to calculate the MDC using a multiplier of 4.66.

$$MDA = \frac{4.66\sqrt{\frac{\beta}{\Delta t}}}{2.22\,(v)(y)\,(a)(\varepsilon)}$$

Where:

Δt = counting time for sample (minutes)

β = background rate of instrument blank (cpm)

2.22 = dpm/pCi or : 2.22×10^6 dpm/μCi

v = volume or mass of sample analyzed

y = chemical yield

ε = efficiency of the counter

The formulas for calculating the activity, uncertainty and MDC are contained in the software of the counting equipment. For the gamma system, when the new detector number 08 was added to the system in January 2012, the default value of 3.29 was used to calculated the MDCs on detector 08. The activity and uncertainty were not affected. The multiplier has been changed from 3.29 to the required 4.66.

When the MDCs are recalculated using 4.66, the MDC values will increase by 41.6%. The greatest impact will be on the short-lived nuclides which have an LLD requirement, e.g. I-131, Ba-140 and La-140. Which means there could be some missed LLDs which will be identified in the Errata Data Appendix table of the 2013 annual report. This is not a reportable issue for the NRC. There is also the possibility that naturally produced nuclides that were detected would become a non-detect, e.g. Th-228, Th-230, etc.

F. Summary of Results – Inter-Laboratory Comparison Program

The primary laboratory analyzed Performance Evaluation (PE) samples of air particulate, air iodine, milk, soil, vegetation and water matrices (Appendix D). The PE samples, supplied by Analytics Inc., Environmental Resource Associates (ERA) and DOE's Mixed Analyte Performance Evaluation Program (MAPEP), were evaluated against the following pre-set acceptance criteria:

1. Analytics Evaluation Criteria

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

2. 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, NELAC, state specific 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.

3. DOE Evaluation Criteria

MAPEP's evaluation report provides an acceptance range with associated flag values.

The MAPEP defines three levels of performance: Acceptable (flag = "A"), Acceptable with Warning (flag = "W"), and Not Acceptable (flag = "N"). Performance is considered acceptable when a mean result for the specified analyte is ± 20% of the reference value. Performance is acceptable with warning when a mean result falls in the range from ±20% to ±30% of the reference value (i.e., 20% < bias < 30%). If the bias is greater than 30%, the results are deemed not acceptable.

For the TBE laboratory, 178 out of 185 analyses performed met the specified acceptance criteria. Seven analyses (Sr-89 and Sr-90 in milk, Co-57, Zn-65 and Sr-90 in soil, Cs-134 in air particulate and Sr-90 in vegetation [two low warning in a row]) did not meet the specified acceptance criteria or internal QA requirements for the following reason:

1. Teledyne Brown Engineering's Analytics September 2013 Sr-89 in milk result of 63.9 pCi/L was lower than the known value of 96.0 pCi/L. The failure was a result of analyst error and was specific to the Analytics sample. Client samples for the associated time period were evaluated and no client samples were affected by this failure. NCR 13-15

2. Teledyne Brown Engineering's Analytics September 2013 Sr-90 in milk result of 8.88 pCi/L was lower than the known value of 13.2 pCi/L. The failure was a result of analyst error and was specific to the Analytics sample. Client samples for the associated time period were evaluated and no client samples were affected by this failure. NCR 13-15

3. & 4. Teledyne Brown Engineering's MAPEP September 2013 Co-57 and Zn-65 in soil were evaluated as failing the false positive test. While MAPEP evaluated the results as failures, the gamma software listed the results as non identified nuclides. The two nuclides would never have been reported as detected nuclides to a client. MAPEP does not allow laboratories to put in qualifiers for

the submitted data nor "less than" results. MAPEP evaluates results based on the relationship between the activity and the uncertainty. MAPEP spiked the soil sample with an extremely large concentration of Eu-152, which was identified by the gamma software as an interfering nuclide, resulting in forced activity results that were evaluated by MAPEP as detected Co-57 and Zn-65. No client samples were affected by these failures. NCR 13-14

5. Teledyne Brown Engineering's MAPEP September 2013 Sr-90 in soil result of 664 Bq/kg was higher than the known value of 460 Bq/kg, exceeding the upper control limit of 598 Bq/kg. An incorrect Sr-90 result was entered into the MAPEP database. The correct Sr-90 activity of 322 Bq/kg would have been evaluated as acceptable with warning. No client samples were affected by this failure. NCR 13-14

6. Teledyne Brown Engineering's MAPEP September 2013 Cs-134 in air particulate activity of -0.570 Bq/sample was evaluated as a failed false positive test, based on MAPEP's evaluation of the result as a significant negative value at 3 standard deviations. A negative number would never have been reported as a detected nuclide to a client, therefore no client samples were affected by this failure. NCR 13-14

7. Teledyne Brown Engineering's MAPEP September 2013 Sr-90 in vegetation result was investigated due to two low warnings in a row. It appears the September sample was double spiked with carrier, resulting in a low activity. With a recovery of around 50% lower, the Sr-90 result would have fallen within the acceptance range. No client samples were affected by this issue. NCR 13-14

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, 2013

NAME OF FACILITY: DRESDEN
LOCATION OF FACILITY: MORRIS IL

DOCKET NUMBER: 50-010 50-237 & 50-249
REPORTING PERIOD: ANNUAL 2013

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) RANGE	CONTROL LOCATION MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M) MEAN (M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SURFACE WATER (PCI/LITER)	GR-B	36	4	8.5 (12/12) (5.0/18.4)	8.5 (23/24) (3.2/26.2)	8.6 (12/12) (4.2/12.0)	D-52 CONTROL DESPLAINES RIVER - UPSTREAM 1.1 MILES ESE OF SITE	0
	H-3	12	2000	608 (3/4) (475/687)	2567 (4/8) (618/6550)	2567 (4/4) (618/6550)	D-57 CONTROL KANKAKEE RIVER AT WILL ROAD 2.0 MILES SE OF SITE	0
	GAMMA	36						
	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

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FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F)

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SURFACE WATER (PCI/LITER)	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	16	2000	312 (12/16) (218/414)	NA	312 (12/12) (218/414)	D-23 INDICATOR THORSEN WELL 0.7 MILES S OF SITE	0
	GAMMA	16						
	MN-54		15	<LLD	NA	-		0

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GROUND WATER (PCI/LITER)	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

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GROUND WATER (PCI/LITER)	CS-137		18	<LLD	NA	-		0
	BA-140		60	<LLD	NA	-		0
	LA-140		15	<LLD	NA	-		0
FISH (PCI/KG WET)	GAMMA	8						
	MN-54		130	<LLD	<LLD	-		0
	CO-58		130	<LLD	<LLD	-		0
	FE-59		260	<LLD	<LLD	-		0
	CO-60		130	<LLD	<LLD	-		0
	ZN-65		260	<LLD	<LLD	-		0

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FISH (PCI/KG WET)	NB-95		NA	<LLD	<LLD	-		0
	ZR-95		NA	<LLD	<LLD	-		0
	CS-134		130	<LLD	<LLD	-		0
	CS-137		150	<LLD	<LLD	-		0
	BA-140		NA	<LLD	<LLD	-		0
	LA-140		NA	<LLD	<LLD	-		0
SEDIMENT (PCI/KG DRY)	GAMMA	2						
	MN-54		NA	<LLD	NA	-		0
	CO-58		NA	<LLD	NA	-		0

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SEDIMENT (PCI/KG DRY)	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	187 (1/2)	NA	187 (1/2)	D-27 INDICATOR DRESDEN LOCK AND DAM - DOWNSTREAM 0.8 MILES NW OF SITE	0
	BA-140		NA	<LLD	NA	-		0
	LA-140		NA	<LLD	NA	-		0

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AIR PARTICULATE (E-3 PCI/CU.METER)	GR-B	714	10	20 (660/661) (5/57)	21 (53/53) (5/52)	21 (53/53) (7/52)	D-08 INDICATOR PRAIRIE PARK 3.8 MILES SW OF SITE	0
	GAMMA	54						
	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

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AIR PARTICULATE (E-3 PCI/CU.METER)	CS-134		50	<LLD	<LLD	-		0
	CS-137		60	<LLD	<LLD	-		0
	BA-140		NA	<LLD	<LLD	-		0
	LA-140		NA	<LLD	<LLD	-		0
AIR IODINE (E-3 PCI/CU.METER)	GAMMA I-131	714	70	<LLD	<LLD	-		0
MILK (PCI/LITER)	I-131	20	1	NA	<LLD	-		0
	GAMMA MN-54	20	NA	NA	<LLD	-		0
	CO-58		NA	NA	<LLD	-		0

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MILK (PCI/LITER)	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

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VEGETATION (PCI/KG WET)	GAMMA	10						
	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

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VEGETATION (PCI/KG WET)	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 (MILLI-ROENTGEN/QTR.)	OSLD-QUARTERLY	365	NA	30.2 (357/357) (22.6/38.7)	28.1 (8/8) (24.6/33.1)	35.5 (4/4) (32.1/38.1)	D-110-4 INDICATOR 0.9 MILES SSW	0

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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, 2013

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	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	Chris Lockner	2.8 miles NE
Quadrant 2	Robert Pagliano	3.2 miles SSE
Quadrant 3	Jim Bloom	3.9 miles SSW
Quadrant 4	J.D. Carmichael	1.6 miles NNW
Control	Glasscock Farm	12.8 miles ENE

TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Dresden Nuclear Power Station, 2013

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, 2013

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, 2013

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 sampling	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 dosimeters	EIML-SPM-1, Environmental Incorporated Midwest Laboratory Sampling Procedures Manual	2 dosimeters at each location	Landauer Incorporated

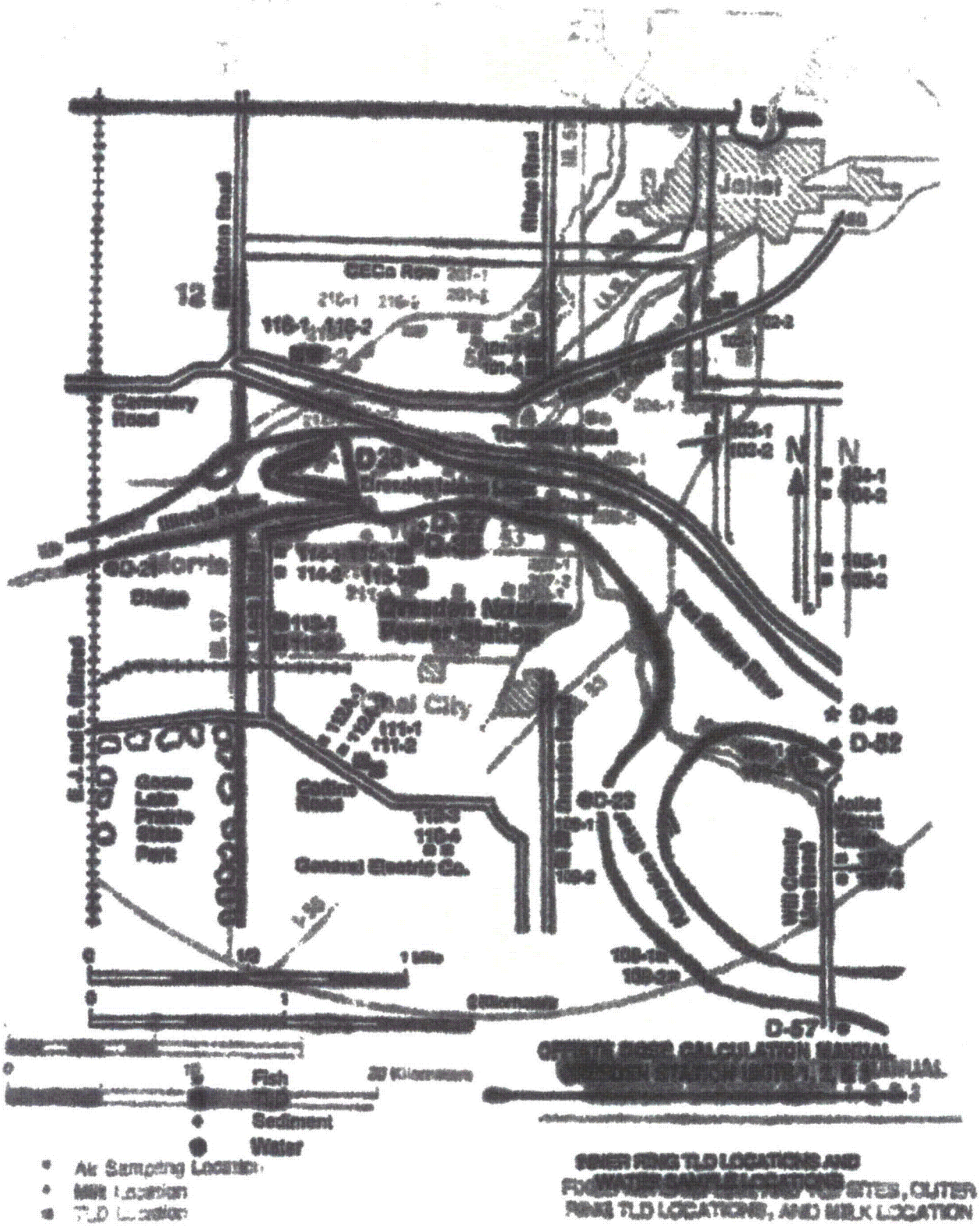

Figure B-1
Dresden Station Inner Ring OSLD Locations, Fish, Water, and Sediment Location, 2013

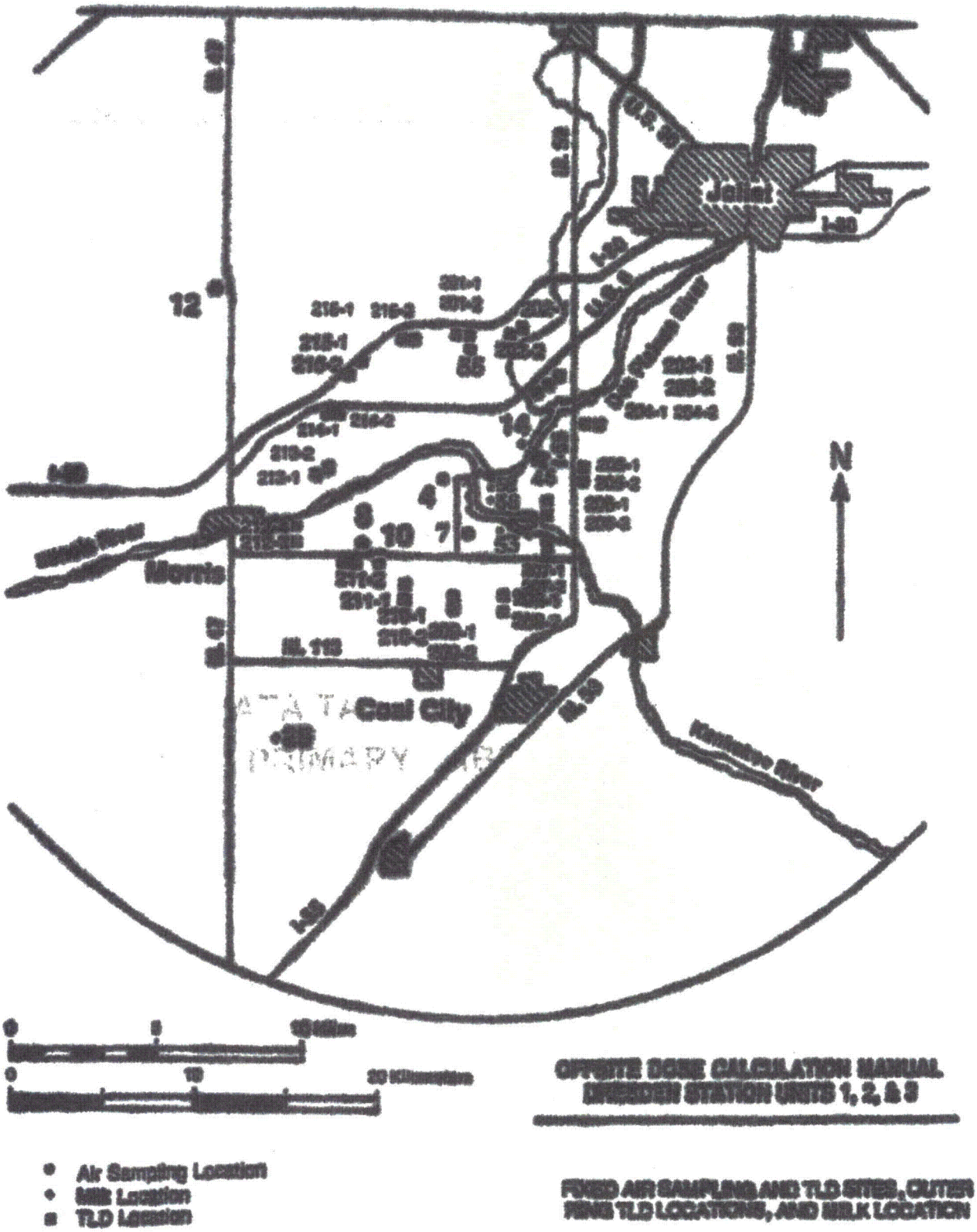

Figure B-2
Dresden Station Fixed Air Sampling and
OSLD Sites, Outer Ring OSLD Locations and Milk Location, 2013

APPENDIX C

DATA TABLES AND FIGURES
PRIMARY LABORATORY

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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, 2013**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	D-21	D-52	D-57
01/04/13 - 01/25/13	10.5 ± 2.2	12.0 ± 2.2	6.8 ± 1.9
02/01/13 - 02/22/13	7.1 ± 1.7	7.6 ± 1.7	13.5 ± 2.2
03/01/13 - 03/29/13	5.0 ± 1.8	8.9 ± 2.1	3.2 ± 1.6
04/05/13 - 04/26/13	7.4 ± 1.6 (1)	9.6 ± 1.8	6.4 ± 1.7 (1)
05/03/13 - 05/31/13	18.4 ± 2.5	9.0 ± 2.2	3.5 ± 1.8
06/07/13 - 06/28/13	7.5 ± 1.6	9.2 ± 1.7	26.2 ± 2.9
07/05/13 - 07/26/13	7.4 ± 1.7	9.2 ± 1.8	7.5 ± 1.7
08/02/13 - 08/30/13	8.3 ± 1.8	8.9 ± 2.0	5.2 ± 1.8
09/06/13 - 09/27/13	5.2 ± 1.8	4.2 ± 1.6	< 2.6
10/04/13 - 10/25/13	9.9 ± 1.8	6.4 ± 1.6	5.7 ± 1.5
11/01/13 - 11/29/13	7.1 ± 1.5	8.2 ± 1.6	7.0 ± 1.5
12/06/13 - 12/27/13	7.9 ± 1.7	10.2 ± 1.9	6.8 ± 1.6
MEAN	8.5 ± 7.0	8.6 ± 3.9	8.3 ± 13.0

Table C-I.2 **CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	D-21	D-52	D-57
01/04/13 - 03/29/13	687 ± 159	< 199	1100 ± 183
04/05/13 - 06/28/13	< 193	< 194	618 ± 153
07/05/13 - 09/27/13	663 ± 138	< 165	6550 ± 696
10/04/13 - 12/27/13	475 ± 139	< 180	2000 ± 249
MEAN	608 ± 232	-	2567 ± 5433

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES
(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-I.3

CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013

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	12/28/12 - 01/25/13	< 4	< 5	< 11	< 4	< 10	< 5	< 8	< 15	< 4	< 5	< 33	< 11
	01/25/13 - 02/22/13	< 4	< 3	< 7	< 3	< 7	< 4	< 7	< 9	< 3	< 4	< 22	< 7
	02/22/13 - 03/29/13	< 5	< 5	< 12	< 5	< 11	< 6	< 10	< 13	< 4	< 6	< 31	< 11
	03/29/13 - 04/26/13	< 5	< 4	< 12	< 5	< 10	< 4	< 7	< 13	< 4	< 5	< 32	< 8
	04/26/13 - 05/31/13	< 5	< 6	< 10	< 5	< 11	< 7	< 11	< 13	< 5	< 5	< 37	< 10
	05/31/13 - 06/28/13	< 4	< 4	< 7	< 4	< 8	< 4	< 8	< 9	< 4	< 4	< 19	< 8
	06/28/13 - 07/26/13	< 5	< 6	< 13	< 4	< 11	< 5	< 10	< 13	< 6	< 6	< 32	< 10
	07/26/13 - 08/30/13	< 6	< 6	< 13	< 5	< 11	< 6	< 11	< 13	< 5	< 5	< 33	< 12
	08/30/13 - 09/27/13	< 5	< 4	< 10	< 5	< 10	< 6	< 7	< 15	< 4	< 5	< 31	< 10
	09/27/13 - 10/25/13	< 6	< 4	< 11	< 5	< 9	< 5	< 10	< 13	< 5	< 5	< 29	< 10
	10/25/13 - 11/29/13	< 5	< 5	< 11	< 5	< 11	< 5	< 9	< 14	< 5	< 5	< 32	< 12
	11/29/13 - 12/27/13	< 3	< 3	< 7	< 3	< 7	< 4	< 6	< 14	< 3	< 3	< 27	< 9
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-52	01/04/13 - 01/25/13	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 6	< 2	< 2	< 12	< 3
	02/01/13 - 02/22/13	< 3	< 3	< 6	< 3	< 5	< 3	< 5	< 9	< 3	< 3	< 18	< 5
	03/01/13 - 03/29/13	< 4	< 4	< 8	< 3	< 8	< 4	< 7	< 11	< 4	< 4	< 24	< 5
	04/05/13 - 04/26/13	< 6	< 6	< 12	< 5	< 12	< 7	< 9	< 14	< 6	< 6	< 32	< 9
	05/03/13 - 05/31/13	< 5	< 5	< 10	< 5	< 8	< 5	< 9	< 14	< 5	< 5	< 29	< 8
	06/07/13 - 06/28/13	< 4	< 4	< 9	< 4	< 9	< 4	< 8	< 10	< 4	< 4	< 23	< 8
	07/05/13 - 07/26/13	< 6	< 5	< 13	< 6	< 10	< 6	< 12	< 14	< 5	< 6	< 30	< 13
	08/02/13 - 08/30/13	< 3	< 5	< 8	< 4	< 7	< 5	< 9	< 11	< 4	< 4	< 24	< 10
	09/06/13 - 09/27/13	< 4	< 5	< 9	< 5	< 10	< 5	< 10	< 12	< 4	< 5	< 28	< 10
	10/04/13 - 10/25/13	< 7	< 6	< 15	< 7	< 13	< 6	< 9	< 15	< 5	< 5	< 34	< 13
	11/01/13 - 11/29/13	< 4	< 5	< 9	< 4	< 8	< 5	< 9	< 14	< 4	< 5	< 27	< 9
	12/06/13 - 12/27/13	< 3	< 4	< 8	< 3	< 6	< 4	< 6	< 14	< 3	< 3	< 28	< 9
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-I.3

CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013

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-57	12/28/12 - 01/25/13	< 4	< 4	< 11	< 5	< 8	< 5	< 8	< 13	< 4	< 5	< 26	< 9
	01/25/13 - 02/22/13	< 4	< 4	< 8	< 4	< 7	< 4	< 7	< 9	< 4	< 4	< 24	< 8
	02/22/13 - 03/29/13	< 4	< 4	< 8	< 3	< 9	< 4	< 9	< 11	< 4	< 4	< 24	< 8
	03/29/13 - 04/26/13	< 5	< 5	< 8	< 5	< 10	< 5	< 10	< 13	< 5	< 5	< 31	< 11
	04/26/13 - 05/31/13	< 6	< 5	< 12	< 5	< 12	< 6	< 9	< 13	< 5	< 6	< 33	< 11
	05/31/13 - 06/28/13	< 3	< 4	< 7	< 3	< 7	< 3	< 6	< 9	< 3	< 3	< 21	< 6
	06/28/13 - 07/26/13	< 5	< 5	< 10	< 5	< 11	< 5	< 10	< 12	< 4	< 6	< 36	< 9
	07/26/13 - 08/30/13	< 4	< 5	< 11	< 5	< 10	< 5	< 9	< 13	< 4	< 5	< 30	< 10
	08/30/13 - 09/27/13	< 4	< 5	< 11	< 6	< 9	< 5	< 9	< 14	< 5	< 4	< 35	< 10
	09/27/13 - 10/25/13	< 5	< 5	< 11	< 4	< 11	< 6	< 8	< 13	< 5	< 5	< 28	< 11
	10/25/13 - 11/29/13	< 4	< 4	< 10	< 4	< 8	< 4	< 7	< 11	< 3	< 4	< 27	< 10
	11/29/13 - 12/27/13	< 3	< 4	< 10	< 4	< 7	< 4	< 8	< 14	< 3	< 4	< 27	< 9
	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, 2013**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD		D-23	D-35
01/11/13 - 01/11/13		218 ± 125	< 185
02/07/13 - 02/07/13		414 ± 120	
03/08/13 - 03/08/13		250 ± 116	
04/19/13 - 04/19/13	(1)	255 ± 118	< 176
05/10/13 - 05/10/13		385 ± 123	
06/14/13 - 06/14/13		311 ± 129	
07/12/13 - 07/12/13		223 ± 134	< 194
08/09/13 - 08/09/13		362 ± 116	
09/13/13 - 09/13/13		289 ± 134	
10/11/13 - 10/11/13		351 ± 135	< 182
11/08/13 - 11/08/13		321 ± 115	
12/13/13 - 12/13/13		365 ± 141	
MEAN		312 ± 131	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Tables C-II.2

CONCENTRATIONS OF GAMMA EMITTERS IN GROUND WATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013

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-23	01/11/13 - 01/11/13	< 5	< 4	< 11	< 4	< 9	< 5	< 9	< 14	< 4	< 4	< 30	< 8
	02/07/13 - 02/07/13	< 3	< 3	< 7	< 3	< 7	< 3	< 6	< 9	< 3	< 3	< 23	< 6
	03/08/13 - 03/08/13	< 3	< 3	< 8	< 4	< 7	< 4	< 6	< 9	< 3	< 4	< 21	< 7
	04/19/13 - 04/19/13	(1) < 6	< 6	< 14	< 6	< 11	< 6	< 10	< 14	< 6	< 5	< 32	< 10
	05/10/13 - 05/10/13	< 3	< 3	< 8	< 3	< 6	< 3	< 6	< 8	< 3	< 3	< 20	< 7
	06/14/13 - 06/14/13	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 7	< 3	< 3	< 18	< 6
	07/12/13 - 07/12/13	< 6	< 5	< 15	< 5	< 11	< 6	< 11	< 14	< 5	< 5	< 41	< 9
	08/09/13 - 08/09/13	< 5	< 6	< 13	< 6	< 11	< 6	< 11	< 14	< 5	< 5	< 33	< 13
	09/13/13 - 09/13/13	< 4	< 4	< 10	< 4	< 9	< 5	< 7	< 14	< 4	< 4	< 27	< 10
	10/11/13 - 10/11/13	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 11	< 2	< 2	< 19	< 6
	11/08/13 - 11/08/13	< 6	< 6	< 13	< 6	< 11	< 6	< 10	< 14	< 5	< 6	< 34	< 9
	12/13/13 - 12/13/13	< 7	< 8	< 16	< 6	< 12	< 7	< 13	< 10	< 6	< 7	< 31	< 12
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-35	01/11/13 - 01/11/13	< 6	< 5	< 12	< 6	< 11	< 6	< 9	< 14	< 5	< 5	< 32	< 10
	04/12/13 - 04/12/13	< 3	< 3	< 8	< 3	< 6	< 3	< 6	< 14	< 3	< 3	< 26	< 10
	07/12/13 - 07/12/13	< 5	< 5	< 10	< 4	< 12	< 6	< 8	< 12	< 5	< 4	< 31	< 14
	10/11/13 - 10/11/13	< 2	< 2	< 5	< 2	< 3	< 2	< 4	< 11	< 2	< 2	< 19	< 6
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-III.1

CONCENTRATIONS OF GAMMA EMITTERS IN FISH SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013

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												
Freshwater Drum	05/01/13	< 65	< 66	< 149	< 59	< 119	< 85	< 130	< 61	< 70	< 1196	< 122
Largemouth Bass	05/01/13	< 75	< 96	< 248	< 72	< 175	< 105	< 168	< 74	< 84	< 1260	< 440
Common Carp	10/02/13	< 50	< 57	< 145	< 50	< 110	< 45	< 101	< 43	< 44	< 480	< 150
Largemouth Bass	10/02/13	< 52	< 59	< 135	< 54	< 125	< 76	< 141	< 58	< 72	< 548	< 166
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-46												
Channel Catfish	05/01/13	< 35	< 41	< 114	< 35	< 73	< 46	< 76	< 35	< 36	< 520	< 249
Common Carp	05/01/13	< 75	< 93	< 190	< 68	< 140	< 86	< 175	< 74	< 76	< 1154	< 264
Common Carp	10/02/13	< 61	< 58	< 148	< 61	< 117	< 64	< 114	< 57	< 62	< 594	< 153
Largemouth Bass	10/02/13	< 67	< 67	< 147	< 70	< 147	< 62	< 132	< 68	< 64	< 667	< 182
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-IV.1

CONCENTRATIONS OF GAMMA EMITTERS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013

RESULTS IN UNITS OF PC/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	05/10/13	< 57	< 62	< 150	< 58	< 134	< 71	< 89	< 49	< 52	< 533	< 213
	10/04/13	< 94	< 92	< 226	< 128	< 184	< 121	< 170	< 87	187 ± 104	< 778	< 279
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-V.1 **CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013**

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
12/26/12 - 01/04/13	56 ± 7	45 ± 6	57 ± 7	53 ± 7	54 ± 7	45 ± 6	49 ± 6	48 ± 6	52 ± 6
01/04/13 - 01/11/13	40 ± 6	37 ± 6	38 ± 6	38 ± 6	46 ± 6	39 ± 6	41 ± 6	33 ± 6	40 ± 6
01/11/13 - 01/18/13	25 ± 5	22 ± 5	30 ± 5	25 ± 5	24 ± 5	23 ± 5	26 ± 5	27 ± 5	22 ± 5
01/18/13 - 01/25/13	16 ± 4	18 ± 5	17 ± 5	21 ± 5	21 ± 5	13 ± 4	17 ± 5	18 ± 5	17 ± 5
01/25/13 - 02/01/13	33 ± 5	30 ± 5	36 ± 5	36 ± 5	27 ± 5	27 ± 5	23 ± 4	31 ± 5	31 ± 5
02/01/13 - 02/08/13	31 ± 5	31 ± 5	26 ± 5	26 ± 5	36 ± 6	23 ± 5	24 ± 5	33 ± 5	34 ± 5
02/08/13 - 02/15/13	15 ± 4	21 ± 5	22 ± 5	18 ± 5	18 ± 4	20 ± 5	20 ± 5	19 ± 5	20 ± 5
02/15/13 - 02/22/13	20 ± 4	16 ± 4	19 ± 4	19 ± 4	16 ± 4	17 ± 4	19 ± 4	19 ± 4	18 ± 4
02/22/13 - 03/01/13	15 ± 4	13 ± 4	14 ± 4	16 ± 4	11 ± 4	10 ± 4	15 ± 4	10 ± 4	12 ± 4
03/01/13 - 03/08/13	12 ± 4	9 ± 4	10 ± 4	14 ± 4	9 ± 4	8 ± 4	12 ± 4	15 ± 4	13 ± 4
03/08/13 - 03/15/13	18 ± 5	17 ± 5	16 ± 5	15 ± 5	17 ± 5	17 ± 5	11 ± 5	15 ± 5	13 ± 5
03/15/13 - 03/22/13	20 ± 5	18 ± 4	17 ± 4	17 ± 4	18 ± 4	18 ± 4	17 ± 4	20 ± 5	17 ± 4
03/22/13 - 03/29/13	8 ± 4	7 ± 4	8 ± 4	11 ± 4	< 5	8 ± 4	8 ± 4	6 ± 4	9 ± 4
03/29/13 - 04/05/13	22 ± 5	20 ± 4	20 ± 5	17 ± 4	15 ± 4	24 ± 5	20 ± 4	16 ± 4	14 ± 4
04/05/13 - 04/12/13	11 ± 4	13 ± 4	12 ± 4	11 ± 4	13 ± 4	12 ± 4	13 ± 4	14 ± 4	13 ± 4
04/12/13 - 04/19/13	8 ± 4	8 ± 4	8 ± 4	6 ± 4	8 ± 4	12 ± 4	8 ± 4	5 ± 3	8 ± 4
04/19/13 - 04/26/13	13 ± 5	11 ± 4	13 ± 5	17 ± 5	20 ± 5	15 ± 5	11 ± 4	15 ± 5	14 ± 5
04/26/13 - 05/03/13	13 ± 4	22 ± 5	24 ± 5	22 ± 5	15 ± 4	21 ± 5	24 ± 5	18 ± 4	18 ± 4
05/03/13 - 05/10/13	13 ± 4	11 ± 4	17 ± 4	12 ± 4	13 ± 4	18 ± 4	14 ± 4	12 ± 4	12 ± 4
05/10/13 - 05/17/13	15 ± 4	18 ± 4	19 ± 4	19 ± 4	13 ± 4	16 ± 4	17 ± 4	15 ± 4	13 ± 4
05/17/13 - 05/24/13	(1) 17 ± 4	(1) 15 ± 4	(1) 17 ± 4	(1) 17 ± 4	(1) 14 ± 4	17 ± 4	10 ± 4	(1) 13 ± 4	(1) 16 ± 4
05/24/13 - 05/31/13	13 ± 5	14 ± 5	11 ± 4	14 ± 5	11 ± 4	15 ± 5	13 ± 4	9 ± 4	13 ± 4
05/31/13 - 06/07/13	9 ± 4	8 ± 4	10 ± 4	9 ± 4	12 ± 4	10 ± 4	11 ± 4	10 ± 4	14 ± 4
06/07/13 - 06/14/13	16 ± 4	16 ± 4	18 ± 4	16 ± 4	19 ± 4	17 ± 4	16 ± 4	17 ± 4	16 ± 4
06/14/13 - 06/21/13	13 ± 4	15 ± 4	(1) 14 ± 7	12 ± 4	16 ± 4	14 ± 4	11 ± 4	14 ± 4	10 ± 4
06/21/13 - 06/28/13	17 ± 4	14 ± 4	(1)	(1) 14 ± 5	12 ± 4	10 ± 4	14 ± 4	12 ± 4	12 ± 4
06/28/13 - 07/05/13	13 ± 4	12 ± 4	(1)	9 ± 4	10 ± 4	11 ± 4	11 ± 4	12 ± 4	14 ± 4
07/05/13 - 07/12/13	14 ± 4	19 ± 5	(1)	(1) 19 ± 5	15 ± 5	19 ± 5	17 ± 5	16 ± 5	16 ± 4
07/12/13 - 07/19/13	11 ± 4	10 ± 4	(1)	8 ± 4	13 ± 4	9 ± 4	10 ± 4	10 ± 4	11 ± 4
07/19/13 - 07/26/13	16 ± 4	14 ± 4	(1)	19 ± 4	15 ± 4	15 ± 4	14 ± 4	16 ± 4	14 ± 4
07/26/13 - 08/02/13	18 ± 4	14 ± 4	(1)	20 ± 4	19 ± 4	17 ± 4	16 ± 4	16 ± 4	17 ± 4
08/02/13 - 08/09/13	16 ± 4	16 ± 4	(1)	18 ± 4	14 ± 4	14 ± 4	15 ± 4	14 ± 4	16 ± 4
08/09/13 - 08/16/13	17 ± 4	17 ± 4	(1)	19 ± 4	18 ± 4	19 ± 4	18 ± 4	16 ± 4	15 ± 4
08/16/13 - 08/23/13	27 ± 5	29 ± 5	(1)	29 ± 5	29 ± 5	30 ± 5	28 ± 5	29 ± 5	27 ± 5
08/23/13 - 08/30/13	27 ± 5	28 ± 5	(1)	24 ± 5	27 ± 5	23 ± 5	25 ± 5	28 ± 5	26 ± 5
08/30/13 - 09/06/13	13 ± 4	14 ± 4	(1)	15 ± 4	15 ± 4	10 ± 4	11 ± 4	16 ± 4	14 ± 4
09/06/13 - 09/13/13	34 ± 5	43 ± 6	(1)	34 ± 5	36 ± 5	33 ± 5	38 ± 5	32 ± 5	36 ± 5
09/13/13 - 09/20/13	20 ± 4	20 ± 4	(1)	20 ± 4	16 ± 4	18 ± 4	20 ± 4	18 ± 4	14 ± 4
09/20/13 - 09/27/13	17 ± 4	15 ± 4	(1)	17 ± 4	15 ± 4	16 ± 4	19 ± 4	15 ± 4	18 ± 4
09/27/13 - 10/04/13	23 ± 5	24 ± 5	(1)	23 ± 5	24 ± 5	18 ± 4	20 ± 5	20 ± 5	20 ± 5
10/04/13 - 10/11/13	21 ± 4	18 ± 4	(1)	21 ± 4	23 ± 5	21 ± 4	22 ± 5	24 ± 5	20 ± 4
10/11/13 - 10/18/13	21 ± 4	22 ± 5	(1)	24 ± 5	26 ± 5	24 ± 5	21 ± 4	24 ± 5	23 ± 5
10/18/13 - 10/25/13	16 ± 4	16 ± 4	(1)	16 ± 4	18 ± 4	16 ± 4	15 ± 4	18 ± 4	16 ± 4
10/25/13 - 11/01/13	21 ± 5	28 ± 5	(1)	21 ± 5	26 ± 5	23 ± 5	22 ± 5	21 ± 5	25 ± 5
11/01/13 - 11/08/13	22 ± 4	21 ± 4	(1)	22 ± 4	27 ± 5	22 ± 4	25 ± 5	24 ± 5	25 ± 5
11/08/13 - 11/15/13	20 ± 5	17 ± 4	(1)	18 ± 4	17 ± 4	16 ± 4	21 ± 5	16 ± 4	17 ± 4
11/15/13 - 11/22/13	16 ± 4	17 ± 4	(1)	18 ± 5	21 ± 5	13 ± 4	18 ± 5	19 ± 5	21 ± 5
11/22/13 - 11/29/13	20 ± 4	18 ± 4	(1)	23 ± 5	21 ± 4	22 ± 5	17 ± 4	20 ± 4	24 ± 5
11/29/13 - 12/06/13	38 ± 6	40 ± 6	(1)	44 ± 6	38 ± 6	42 ± 6	41 ± 6	43 ± 6	39 ± 6
12/06/13 - 12/13/13	37 ± 5	29 ± 5	(1)	42 ± 5	39 ± 5	39 ± 5	36 ± 5	38 ± 5	38 ± 5
12/13/13 - 12/20/13	28 ± 5	30 ± 5	(1)	31 ± 5	32 ± 5	26 ± 5	29 ± 5	30 ± 5	28 ± 5
12/20/13 - 12/27/13	24 ± 5	23 ± 5	(1)	26 ± 5	24 ± 5	20 ± 5	24 ± 5	25 ± 5	25 ± 5
12/27/13 - 01/03/14	29 ± 5	25 ± 5	(1)	30 ± 5	22 ± 5	20 ± 5	25 ± 5	23 ± 5	26 ± 5
MEAN	20 ± 18	20 ± 17	20 ± 22	21 ± 19	21 ± 19	19 ± 17	20 ± 18	20 ± 18	20 ± 18

THE MEAN AND TWO 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, 2013**

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
12/28/12 - 01/04/13	52 ± 6	51 ± 6	53 ± 7	52 ± 6	52 ± 7
01/04/13 - 01/11/13	42 ± 6	44 ± 6	40 ± 6	35 ± 6	37 ± 6
01/11/13 - 01/18/13	22 ± 5	24 ± 5	25 ± 5	25 ± 5	22 ± 5
01/18/13 - 01/25/13	17 ± 5	22 ± 5	17 ± 5	15 ± 4	19 ± 5
01/25/13 - 02/01/13	35 ± 5	33 ± 5	28 ± 5	25 ± 5	27 ± 5
02/01/13 - 02/08/13	26 ± 5	33 ± 5	38 ± 6	28 ± 5	34 ± 5
02/08/13 - 02/15/13	18 ± 4	18 ± 4	17 ± 4	17 ± 4	19 ± 5
02/15/13 - 02/22/13	13 ± 4	17 ± 4	17 ± 4	19 ± 4	17 ± 4
02/22/13 - 03/01/13	(1) 9 ± 4	15 ± 4	11 ± 4	12 ± 4	13 ± 4
03/01/13 - 03/08/13	9 ± 4	(1) 11 ± 4	11 ± 4	11 ± 4	10 ± 4
03/08/13 - 03/15/13	17 ± 5	17 ± 5	16 ± 5	17 ± 5	15 ± 5
03/15/13 - 03/22/13	19 ± 5	19 ± 4	20 ± 4	20 ± 5	19 ± 5
03/22/13 - 03/29/13	7 ± 4	8 ± 4	6 ± 4	9 ± 4	7 ± 4
03/29/13 - 04/05/13	20 ± 4	18 ± 4	17 ± 4	20 ± 4	21 ± 4
04/05/13 - 04/12/13	15 ± 4	12 ± 4	13 ± 4	14 ± 4	9 ± 4
04/12/13 - 04/19/13	8 ± 4	10 ± 4	9 ± 4	8 ± 4	5 ± 3
04/19/13 - 04/26/13	20 ± 5	15 ± 5	12 ± 5	14 ± 5	12 ± 5
04/26/13 - 05/03/13	22 ± 5	18 ± 4	21 ± 5	26 ± 5	16 ± 4
05/03/13 - 05/10/13	18 ± 4	12 ± 4	14 ± 4	14 ± 4	14 ± 4
05/10/13 - 05/17/13	17 ± 4	15 ± 4	14 ± 4	16 ± 4	16 ± 4
05/17/13 - 05/24/13	(1) 15 ± 4	(1) 13 ± 4	17 ± 4	16 ± 4	16 ± 4
05/24/13 - 05/31/13	13 ± 4	13 ± 5	12 ± 4	10 ± 4	16 ± 5
05/31/13 - 06/07/13	10 ± 4	11 ± 4	15 ± 4	10 ± 4	15 ± 4
06/07/13 - 06/14/13	21 ± 4	22 ± 4	18 ± 4	17 ± 4	16 ± 4
06/14/13 - 06/21/13	(1) 16 ± 7	13 ± 4	13 ± 4	18 ± 5	14 ± 4
06/21/13 - 06/28/13	17 ± 4	14 ± 4	12 ± 4	13 ± 4	15 ± 4
06/28/13 - 07/05/13	10 ± 4	13 ± 4	14 ± 4	12 ± 4	11 ± 4
07/05/13 - 07/12/13	17 ± 5	18 ± 5	18 ± 5	16 ± 5	21 ± 5
07/12/13 - 07/19/13	9 ± 4	12 ± 4	12 ± 4	9 ± 4	12 ± 4
07/19/13 - 07/26/13	15 ± 4	18 ± 4	17 ± 4	16 ± 4	16 ± 4
07/26/13 - 08/02/13	18 ± 4	17 ± 4	15 ± 4	15 ± 4	17 ± 4
08/02/13 - 08/09/13	14 ± 4	15 ± 4	17 ± 4	14 ± 4	17 ± 4
08/09/13 - 08/16/13	18 ± 4	18 ± 4	16 ± 4	19 ± 4	18 ± 4
08/16/13 - 08/23/13	33 ± 5	27 ± 5	26 ± 5	32 ± 5	32 ± 5
08/23/13 - 08/30/13	28 ± 5	26 ± 5	32 ± 5	24 ± 5	29 ± 5
08/30/13 - 09/06/13	15 ± 4	18 ± 4	11 ± 4	22 ± 5	15 ± 4
09/06/13 - 09/13/13	33 ± 5	34 ± 5	38 ± 5	40 ± 6	36 ± 5
09/13/13 - 09/20/13	23 ± 5	18 ± 4	19 ± 4	20 ± 4	23 ± 5
09/20/13 - 09/27/13	19 ± 4	18 ± 4	15 ± 4	16 ± 4	15 ± 4
09/27/13 - 10/04/13	17 ± 4	20 ± 5	25 ± 5	26 ± 5	21 ± 5
10/04/13 - 10/11/13	23 ± 5	22 ± 5	21 ± 4	21 ± 4	25 ± 5
10/11/13 - 10/18/13	23 ± 5	25 ± 5	27 ± 5	23 ± 5	24 ± 5
10/18/13 - 10/25/13	18 ± 4	15 ± 4	13 ± 4	17 ± 4	17 ± 4
10/25/13 - 11/01/13	26 ± 5	25 ± 5	20 ± 5	18 ± 5	29 ± 5
11/01/13 - 11/08/13	25 ± 5	26 ± 5	19 ± 4	27 ± 5	22 ± 5
11/08/13 - 11/15/13	(1) 17 ± 4	(1) 18 ± 5	19 ± 5	25 ± 5	22 ± 5
11/15/13 - 11/22/13	23 ± 5	20 ± 5	21 ± 5	15 ± 4	15 ± 4
11/22/13 - 11/29/13	21 ± 5	20 ± 4	18 ± 4	20 ± 4	20 ± 4
11/29/13 - 12/06/13	41 ± 6	48 ± 6	42 ± 6	39 ± 6	43 ± 6
12/06/13 - 12/13/13	39 ± 5	38 ± 5	33 ± 5	38 ± 5	39 ± 5
12/13/13 - 12/20/13	31 ± 5	29 ± 5	29 ± 5	26 ± 5	26 ± 5
12/20/13 - 12/27/13	29 ± 5	23 ± 5	23 ± 5	26 ± 5	26 ± 5
12/27/13 - 01/03/14	25 ± 5	21 ± 5	29 ± 5	28 ± 5	24 ± 5
MEAN	21 ± 18	21 ± 19	20 ± 19	20 ± 18	21 ± 18

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES
(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-V.2 **MONTHLY AND YEARLY MEAN VALUES OF GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013**

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
12/28/12 - 02/01/13	16	57	33 ± 26	12/28/12 - 02/01/13	13	54	32 ± 24	12/28/12 - 02/01/13	15	53	33 ± 25	12/28/12 - 02/01/13	19	52	31 ± 27
02/01/13 - 03/01/13	13	31	20 ± 13	02/01/13 - 03/01/13	10	36	20 ± 14	02/01/13 - 03/01/13	9	38	19 ± 16	02/01/13 - 03/01/13	13	34	20 ± 18
03/01/13 - 03/29/13	7	20	13 ± 9	03/01/13 - 03/29/13	6	20	13 ± 8	03/01/13 - 03/29/13	6	20	14 ± 10	03/01/13 - 03/29/13	7	19	13 ± 10
03/29/13 - 05/03/13	8	24	14 ± 11	03/29/13 - 05/03/13	5	24	15 ± 10	03/29/13 - 05/03/13	8	26	16 ± 10	03/29/13 - 05/03/13	5	21	13 ± 12
05/03/13 - 05/31/13	11	19	15 ± 5	05/03/13 - 05/31/13	9	19	14 ± 5	05/03/13 - 05/31/13	10	18	14 ± 4	05/03/13 - 05/31/13	14	18	15 ± 2
05/31/13 - 06/28/13	8	18	13 ± 7	05/31/13 - 06/28/13	9	19	13 ± 5	05/31/13 - 06/28/13	10	22	15 ± 7	05/31/13 - 06/28/13	14	16	15 ± 2
06/28/13 - 08/02/13	10	19	14 ± 6	06/28/13 - 08/02/13	8	20	14 ± 7	06/28/13 - 08/02/13	9	18	15 ± 6	06/28/13 - 08/02/13	11	21	16 ± 8
08/02/13 - 08/30/13	16	29	22 ± 12	08/02/13 - 08/30/13	14	30	22 ± 12	08/02/13 - 08/30/13	14	33	23 ± 13	08/02/13 - 08/30/13	17	32	24 ± 15
08/30/13 - 10/04/13	13	43	22 ± 19	08/30/13 - 10/04/13	10	38	21 ± 16	08/30/13 - 10/04/13	11	40	22 ± 16	08/30/13 - 10/04/13	15	36	22 ± 17
10/04/13 - 11/01/13	16	26	20 ± 8	10/04/13 - 11/01/13	15	28	21 ± 7	10/04/13 - 11/01/13	13	27	21 ± 8	10/04/13 - 11/01/13	17	29	24 ± 10
11/01/13 - 11/29/13	16	22	19 ± 5	11/01/13 - 11/29/13	13	27	20 ± 7	11/01/13 - 11/29/13	15	27	21 ± 7	11/01/13 - 11/29/13	15	22	20 ± 7
11/29/13 - 01/03/14	23	40	30 ± 12	11/29/13 - 01/03/14	20	44	31 ± 15	11/29/13 - 01/03/14	21	46	32 ± 15	11/29/13 - 01/03/14	24	43	31 ± 18
12/28/12 - 01/03/14	7	57	20 ± 18	12/28/12 - 01/03/14	5	54	20 ± 18	12/28/12 - 01/03/14	6	53	21 ± 18	12/28/12 - 01/03/14	5	52	21 ± 18

Table C-V.3 **CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013**

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	12/28/12 - 03/29/13	< 3	< 2	< 9	< 3	< 6	< 4	< 5	< 3	< 3	< 59	< 31
	03/29/13 - 06/28/13	< 2	< 3	< 7	< 2	< 5	< 3	< 5	< 2	< 2	< 50	< 21
	06/28/13 - 10/04/13	< 2	< 4	< 5	< 2	< 7	< 3	< 7	< 3	< 2	< 75	< 36
	10/04/13 - 01/03/14	< 3	< 3	< 8	< 3	< 8	< 3	< 6	< 2	< 3	< 45	< 17
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-02	12/28/12 - 03/29/13	< 3	< 4	< 6	< 4	< 9	< 3	< 6	< 3	< 2	< 66	< 29
	03/29/13 - 06/28/13	< 2	< 3	< 9	< 3	< 5	< 3	< 5	< 2	< 3	< 63	< 21
	06/28/13 - 10/04/13	< 2	< 3	< 4	< 2	< 5	< 3	< 6	< 3	< 2	< 92	< 32
	10/04/13 - 01/03/14	< 3	< 3	< 7	< 3	< 8	< 4	< 6	< 4	< 3	< 48	< 10
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-03	12/28/12 - 03/29/13	< 3	< 4	< 10	< 3	< 6	< 4	< 5	< 3	< 2	< 58	< 20
	03/29/13 - 06/28/13	< 3	< 4	< 8	< 2	< 7	< 4	< 9	< 3	< 3	< 84	< 21
	06/28/13 - 10/04/13 (1)	-	-	-	-	-	-	-	-	-	-	-
	10/04/13 - 01/03/14 (1)	-	-	-	-	-	-	-	-	-	-	-
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-04	12/28/12 - 03/29/13	< 3	< 5	< 8	< 3	< 7	< 4	< 7	< 3	< 3	< 55	< 21
	03/29/13 - 06/28/13	< 4	< 5	< 15	< 5	< 7	< 5	< 7	< 3	< 4	< 80	< 52
	06/28/13 - 10/04/13	< 2	< 3	< 7	< 2	< 6	< 4	< 5	< 2	< 2	< 72	< 39
	10/04/13 - 01/03/14	< 5	< 6	< 14	< 5	< 9	< 4	< 8	< 4	< 4	< 72	< 24
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-07	12/28/12 - 03/29/13	< 3	< 3	< 10	< 3	< 7	< 3	< 6	< 3	< 3	< 56	< 21
	03/29/13 - 06/28/13	< 3	< 3	< 8	< 3	< 5	< 3	< 6	< 2	< 3	< 73	< 23
	06/28/13 - 10/04/13	< 3	< 3	< 10	< 3	< 7	< 4	< 7	< 2	< 3	< 110	< 52
	10/04/13 - 01/03/14	< 3	< 3	< 7	< 3	< 6	< 3	< 6	< 3	< 2	< 46	< 12
	MEAN	-	-	-	-	-	-	-	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-V.3 **CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013**

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-08	12/28/12 - 03/29/13	< 2	< 3	< 12	< 3	< 8	< 4	< 6	< 3	< 3	< 71	< 17
	03/29/13 - 06/28/13	< 3	< 3	< 11	< 3	< 7	< 3	< 7	< 2	< 3	< 58	< 35
	06/28/13 - 10/04/13	< 3	< 3	< 8	< 3	< 6	< 3	< 4	< 2	< 2	< 91	< 28
	10/04/13 - 01/03/14	< 4	< 5	< 14	< 5	< 7	< 5	< 9	< 4	< 4	< 67	< 22
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-10	12/28/12 - 03/29/13	< 2	< 3	< 10	< 2	< 7	< 4	< 7	< 3	< 3	< 60	< 24
	03/29/13 - 06/28/13	< 3	< 4	< 9	< 3	< 6	< 5	< 6	< 3	< 3	< 77	< 31
	06/28/13 - 10/04/13	< 3	< 3	< 12	< 3	< 5	< 3	< 5	< 3	< 2	< 96	< 48
	10/04/13 - 01/03/14	< 3	< 3	< 7	< 3	< 4	< 3	< 6	< 3	< 2	< 43	< 17
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-12	12/28/12 - 03/29/13	< 3	< 4	< 9	< 3	< 7	< 4	< 8	< 3	< 3	< 66	< 34
	03/29/13 - 06/28/13	< 2	< 3	< 5	< 3	< 5	< 3	< 4	< 2	< 2	< 47	< 17
	06/28/13 - 10/04/13	< 2	< 3	< 8	< 2	< 6	< 3	< 5	< 3	< 2	< 72	< 37
	10/04/13 - 01/03/14	< 4	< 5	< 10	< 4	< 9	< 5	< 7	< 4	< 4	< 50	< 27
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-14	12/28/12 - 03/29/13	< 3	< 3	< 10	< 2	< 5	< 4	< 7	< 2	< 2	< 73	< 40
	03/29/13 - 06/28/13	< 2	< 3	< 8	< 2	< 6	< 3	< 5	< 3	< 2	< 57	< 23
	06/28/13 - 10/04/13	< 2	< 3	< 12	< 3	< 5	< 3	< 6	< 2	< 3	< 116	< 48
	10/04/13 - 01/03/14	< 3	< 3	< 6	< 2	< 6	< 3	< 7	< 3	< 2	< 52	< 19
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-45	12/28/12 - 03/29/13	< 3	< 4	< 3	< 3	< 7	< 3	< 5	< 3	< 2	< 62	< 29
	03/29/13 - 06/28/13	< 2	< 3	< 6	< 3	< 5	< 3	< 4	< 2	< 2	< 54	< 26
	06/28/13 - 10/04/13	< 2	< 4	< 10	< 3	< 8	< 3	< 6	< 3	< 2	< 73	< 36
	10/04/13 - 01/03/14	< 3	< 5	< 12	< 4	< 11	< 5	< 10	< 3	< 3	< 65	< 31
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-V.3 **CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013**

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-53	12/28/12 - 03/29/13	< 3	< 4	< 9	< 2	< 6	< 4	< 7	< 3	< 3	< 74	< 29
	03/29/13 - 06/28/13	< 3	< 3	< 9	< 2	< 9	< 3	< 6	< 3	< 2	< 59	< 46
	06/28/13 - 10/04/13	< 2	< 3	< 11	< 2	< 6	< 3	< 5	< 2	< 2	< 82	< 38
	10/04/13 - 01/03/14	< 4	< 4	< 13	< 5	< 10	< 5	< 10	< 4	< 4	< 67	< 25
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-55	12/28/12 - 03/29/13	< 3	< 4	< 9	< 3	< 8	< 4	< 5	< 3	< 2	< 67	< 24
	03/29/13 - 06/28/13	< 3	< 4	< 9	< 3	< 6	< 3	< 6	< 3	< 2	< 68	< 16
	06/28/13 - 10/04/13	< 3	< 3	< 6	< 3	< 5	< 4	< 5	< 3	< 2	< 107	< 28
	10/04/13 - 01/03/14	< 2	< 3	< 7	< 3	< 6	< 3	< 5	< 3	< 2	< 45	< 11
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-56	12/28/12 - 03/29/13	< 1	< 1	< 6	< 2	< 3	< 1	< 4	< 2	< 1	< 35	< 15
	03/29/13 - 06/28/13	< 2	< 3	< 4	< 2	< 6	< 2	< 5	< 2	< 2	< 46	< 17
	06/28/13 - 10/04/13	< 4	< 6	< 14	< 3	< 5	< 5	< 9	< 3	< 3	< 141	< 38
	10/04/13 - 01/03/14	< 4	< 5	< 11	< 3	< 11	< 5	< 8	< 4	< 3	< 65	< 27
	MEAN	-	-	-	-	-	-	-	-	-	-	-
D-58	12/28/12 - 03/29/13	< 2	< 3	< 8	< 3	< 3	< 4	< 5	< 2	< 2	< 78	< 13
	03/29/13 - 06/28/13	< 3	< 4	< 10	< 3	< 7	< 5	< 7	< 4	< 3	< 83	< 38
	06/28/13 - 10/04/13	< 3	< 5	< 11	< 4	< 9	< 5	< 9	< 3	< 3	< 142	< 57
	10/04/13 - 01/03/14	< 2	< 3	< 5	< 1	< 6	< 3	< 6	< 2	< 3	< 44	< 12
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-VI.1 **CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013**

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
12/28/12 - 01/04/13	< 16	< 43	< 40	< 40	< 41	< 39	< 39	< 39	< 39
01/04/13 - 01/11/13	< 17	< 40	< 43	< 43	< 43	< 40	< 30	< 30	< 30
01/11/13 - 01/18/13	< 17	< 43	< 43	< 43	< 41	< 39	< 38	< 16	< 38
01/18/13 - 01/25/13	< 10	< 27	< 27	< 26	< 26	< 32	< 21	< 21	< 21
01/25/13 - 02/01/13	< 14	< 36	< 35	< 36	< 36	< 34	< 32	< 34	< 18
02/01/13 - 02/08/13	< 11	< 29	< 29	< 28	< 30	< 30	< 22	< 22	< 22
02/08/13 - 02/15/13	< 21	< 61	< 61	< 62	< 60	< 39	< 38	< 39	< 39
02/15/13 - 02/22/13	< 9	< 23	< 23	< 23	< 23	< 24	< 17	< 17	< 17
02/22/13 - 03/01/13	< 30	< 12	< 30	< 30	< 30	< 34	< 21	< 21	< 21
03/01/13 - 03/08/13	< 9	< 24	< 24	< 24	< 24	< 26	< 19	< 19	< 19
03/08/13 - 03/15/13	< 41	< 41	< 16	< 41	< 40	< 45	< 37	< 37	< 36
03/15/13 - 03/22/13	< 11	< 29	< 29	< 30	< 30	< 35	< 44	< 44	< 44
03/22/13 - 03/29/13	< 28	< 27	< 27	< 10	< 28	< 27	< 27	< 27	< 27
03/29/13 - 04/05/13	< 14	< 25	< 25	< 24	< 25	< 34	< 18	< 18	< 19
04/05/13 - 04/12/13	< 38	< 38	< 38	< 38	< 15	< 38	< 34	< 34	< 34
04/12/13 - 04/19/13	< 11	< 29	< 29	< 29	< 29	< 22	< 24	< 23	< 23
04/19/13 - 04/26/13	< 11	< 20	< 20	< 20	< 20	< 27	< 31	< 30	< 30
04/26/13 - 05/03/13	< 13	< 34	< 34	< 34	< 34	< 40	< 30	< 30	< 29
05/03/13 - 05/10/13	< 37	< 35	< 35	< 37	< 42	< 15	< 37	< 36	< 36
05/10/13 - 05/17/13	< 17	< 46	< 46	< 46	< 45	< 36	< 25	< 27	< 27
05/17/13 - 05/24/13	< 15 (1)	< 27 (1)	< 27 (1)	< 28 (1)	< 27 (1)	< 30	< 33	< 33 (1)	< 35 (1)
05/24/13 - 05/31/13	< 15	< 39	< 39	< 39	< 39	< 45	< 30	< 30	< 30
05/31/13 - 06/07/13	< 9	< 24	< 24	< 24	< 24	< 34	< 40	< 40	< 40
06/07/13 - 06/14/13	< 11	< 26	< 26	< 28	< 28	< 23	< 26	< 27	< 27
06/14/13 - 06/21/13	< 13	< 35	< 60 (1)	< 34	< 36	< 11	< 31	< 31	< 31
06/21/13 - 06/28/13	< 7	< 19	(1)	< 23 (1)	< 20	< 23	< 27	< 27	< 27
06/28/13 - 07/05/13	< 31	< 31	(1)	< 31	< 31	< 35	< 19	< 35	< 36
07/05/13 - 07/12/13	< 23	< 60	(1)	< 64 (1)	< 62	< 58	< 56	< 56	< 56
07/12/13 - 07/19/13	< 31	< 31	(1)	< 31	< 31	< 37	< 39	< 37	< 37
07/19/13 - 07/26/13	< 15	< 38	(1)	< 38	< 38	< 38	< 37	< 36	< 36
07/26/13 - 08/02/13	< 64	< 64	(1)	< 64	< 64	< 47	< 46	< 19	< 46
08/02/13 - 08/09/13	< 15	< 40	(1)	< 39	< 40	< 33	< 36	< 36	< 36
08/09/13 - 08/16/13	< 35	< 36	(1)	< 35	< 35	< 28	< 29	< 29	< 12
08/16/13 - 08/23/13	< 52	< 53	(1)	< 52	< 53	< 43	< 41	< 41	< 17
08/23/13 - 08/30/13	< 11	< 27	(1)	< 27	< 27	< 26	< 31	< 31	< 30
08/30/13 - 09/06/13	< 25	< 65	(1)	< 64	< 65	< 39	< 55	< 56	< 56
09/06/13 - 09/13/13	< 25	< 10	(1)	< 25	< 25	< 25	< 33	< 33	< 33
09/13/13 - 09/20/13	< 40	< 41	(1)	< 41	< 41	< 50	< 48	< 48	< 20
09/20/13 - 09/27/13	< 63	< 63	(1)	< 24	< 65	< 55	< 58	< 58	< 58
09/27/13 - 10/04/13	< 42	< 42	(1)	< 42	< 42	< 35	< 34	< 34	< 18
10/04/13 - 10/11/13	< 67	< 68	(1)	< 67	< 26	< 62	< 46	< 46	< 46
10/11/13 - 10/18/13	< 69	< 69	(1)	< 69	< 69	< 66	< 65	< 65	< 27
10/18/13 - 10/25/13	< 57	< 58	(1)	< 57	< 56	< 50	< 60	< 60	< 60
10/25/13 - 11/01/13	< 25	< 65	(1)	< 64	< 65	< 59	< 52	< 52	< 52
11/01/13 - 11/08/13	< 69	< 69	(1)	< 69	< 70	< 52	< 63	< 62	< 62
11/08/13 - 11/15/13	< 17	< 45	(1)	< 45	< 45	< 46	< 44	< 44	< 44
11/15/13 - 11/22/13	< 54	< 54	(1)	< 54	< 54	< 45	< 45	< 45	< 45
11/22/13 - 11/29/13	< 25	< 60	(1)	< 60	< 60	< 68	< 67	< 66	< 66
11/29/13 - 12/06/13	< 70	< 70	(1)	< 70	< 70	< 68	< 70	< 70	< 70
12/06/13 - 12/13/13	< 26	< 68	(1)	< 67	< 69	< 68	< 67	< 67	< 66
12/13/13 - 12/20/13	< 65	< 65	(1)	< 65	< 65	< 27	< 64	< 64	< 64
12/20/13 - 12/27/13	< 68	< 68	(1)	< 68	< 69	< 36	< 65	< 65	< 65
12/27/13 - 01/03/14	< 32	< 30	(1)	< 32	< 32	< 61	< 25	< 60	< 60
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, 2013**

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

COLLECTION	GROUP III				GROUP IV
PERIOD	D-08	D-10	D-14	D-55	D-12
12/28/12 - 01/04/13	< 31	< 30	< 31	< 17	< 31
01/04/13 - 01/11/13	< 16	< 40	< 40	< 30	< 40
01/11/13 - 01/18/13	< 29	< 29	< 28	< 37	< 29
01/18/13 - 01/25/13	< 14	< 32	< 33	< 22	< 33
01/25/13 - 02/01/13	< 38	< 38	< 38	< 34	< 38
02/01/13 - 02/08/13	< 13	< 30	< 30	< 23	< 30
02/08/13 - 02/15/13	< 15	< 39	< 39	< 39	< 39
02/15/13 - 02/22/13	< 10	< 24	< 24	< 18	< 24
02/22/13 - 03/01/13	< 15 (1)	< 34 (1)	< 34	< 21	< 34
03/01/13 - 03/08/13	< 11	< 26	< 26	< 19	< 26
03/08/13 - 03/15/13	< 19	< 45	< 45	< 37	< 45
03/15/13 - 03/22/13	< 15	< 35	< 34	< 46	< 35
03/22/13 - 03/29/13	< 11	< 27	< 27	< 27	< 27
03/29/13 - 04/05/13	< 17	< 33	< 34	< 20	< 34
04/05/13 - 04/12/13	< 16	< 38	< 38	< 34	< 38
04/12/13 - 04/19/13	< 9	< 21	< 22	< 23	< 22
04/19/13 - 04/26/13	< 11	< 27	< 29	< 31	< 27
04/26/13 - 05/03/13	< 17	< 40	< 40	< 30	< 40
05/03/13 - 05/10/13	< 42	< 18	< 43	< 37	< 43
05/10/13 - 05/17/13	< 15	< 36	< 37	< 27	< 36
05/17/13 - 05/24/13	< 31 (1)	< 30 (1)	< 30	< 33	< 13
05/24/13 - 05/31/13	< 19	< 46	< 45	< 30	< 44
05/31/13 - 06/07/13	< 35	< 35	< 14	< 38	< 34
06/07/13 - 06/14/13	< 10	< 24	< 23	< 27	< 23
06/14/13 - 06/21/13	< 64 (1)	< 24	< 25	< 33	< 25
06/21/13 - 06/28/13	< 20	< 23	< 23	< 27	< 23
06/28/13 - 07/05/13	< 36	< 36	< 36	< 35	< 36
07/05/13 - 07/12/13	< 62	< 58	< 58	< 58	< 58
07/12/13 - 07/19/13	< 29	< 29	< 29	< 14	< 29
07/19/13 - 07/26/13	< 38	< 37	< 37	< 38	< 38
07/26/13 - 08/02/13	< 57	< 58	< 58	< 47	< 58
08/02/13 - 08/09/13	< 40	< 34	< 34	< 36	< 34
08/09/13 - 08/16/13	< 44	< 44	< 43	< 28	< 43
08/16/13 - 08/23/13	< 44	< 44	< 46	< 43	< 46
08/23/13 - 08/30/13	< 27	< 26	< 26	< 31	< 26
08/30/13 - 09/06/13	< 65	< 39	< 37	< 56	< 39
09/06/13 - 09/13/13	< 25	< 25	< 25	< 35	< 25
09/13/13 - 09/20/13	< 57	< 57	< 57	< 49	< 56
09/20/13 - 09/27/13	< 65	< 53	< 51	< 58	< 53
09/27/13 - 10/04/13	< 28	< 28	< 29	< 35	< 28
10/04/13 - 10/11/13	< 68	< 66	< 64	< 46	< 66
10/11/13 - 10/18/13	< 53	< 53	< 53	< 66	< 53
10/18/13 - 10/25/13	< 22	< 52	< 50	< 57	< 51
10/25/13 - 11/01/13	< 66	< 56	< 59	< 55	< 58
11/01/13 - 11/08/13	< 52	< 22	< 52	< 63	< 52
11/08/13 - 11/15/13	< 47 (1)	< 47 (1)	< 46	< 45	< 45
11/15/13 - 11/22/13	< 45	< 45	< 45	< 45	< 19
11/22/13 - 11/29/13	< 60	< 68	< 68	< 68	< 68
11/29/13 - 12/06/13	< 68	< 68	< 29	< 61	< 68
12/06/13 - 12/13/13	< 69	< 68	< 68	< 69	< 68
12/13/13 - 12/20/13	< 58	< 58	< 58	< 65	< 58
12/20/13 - 12/27/13	< 67	< 67	< 68	< 69	< 67
12/27/13 - 01/03/14	< 48	< 48	< 49	< 63	< 49
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, 2013**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CONTROL FARM D-25
01/04/13	< 0.5
02/07/13	< 0.7
03/07/13	< 0.7
04/04/13	< 0.8
05/02/13	< 0.7
05/16/13	< 0.7
05/30/13	< 0.6
06/13/13	< 0.8
06/27/13	< 0.8
07/12/13	< 0.6
07/25/13	< 0.7
08/08/13	< 0.7
08/22/13	< 0.6
09/05/13	< 0.8
09/19/13	< 0.9
10/03/13	< 0.8
10/17/13	< 0.9
10/31/13	< 0.6
11/14/13	< 0.7
12/05/13	< 0.8
MEAN	-

Table C-VII.2 **CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013**

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	01/04/13	< 7	< 8	< 20	< 10	< 16	< 8	< 13	< 5	< 7	< 46	< 16
	02/07/13	< 5	< 6	< 14	< 7	< 11	< 7	< 10	< 5	< 5	< 39	< 9
	03/07/13	< 5	< 6	< 13	< 6	< 13	< 6	< 10	< 5	< 6	< 36	< 7
	04/04/13	< 6	< 5	< 14	< 8	< 12	< 6	< 13	< 6	< 6	< 46	< 12
	05/02/13	< 5	< 6	< 15	< 7	< 15	< 6	< 11	< 5	< 6	< 40	< 12
	05/16/13	< 6	< 7	< 15	< 7	< 14	< 7	< 9	< 5	< 6	< 44	< 13
	05/30/13	< 6	< 5	< 13	< 7	< 13	< 5	< 9	< 6	< 6	< 27	< 8
	06/13/13	< 6	< 7	< 15	< 8	< 13	< 7	< 11	< 5	< 7	< 28	< 9
	06/27/13	< 5	< 6	< 14	< 7	< 13	< 7	< 10	< 6	< 6	< 39	< 10
	07/12/13	< 5	< 5	< 11	< 5	< 10	< 5	< 9	< 4	< 5	< 31	< 8
	07/25/13	< 6	< 6	< 14	< 7	< 13	< 7	< 11	< 6	< 6	< 44	< 14
	08/08/13	< 7	< 7	< 16	< 7	< 15	< 8	< 13	< 6	< 7	< 49	< 13
	08/22/13	< 5	< 5	< 10	< 6	< 10	< 5	< 9	< 5	< 5	< 36	< 8
	09/05/13	< 6	< 7	< 16	< 9	< 15	< 7	< 13	< 6	< 6	< 39	< 11
	09/19/13	< 6	< 7	< 13	< 8	< 14	< 7	< 11	< 6	< 6	< 42	< 11
	10/03/13	< 7	< 7	< 14	< 7	< 15	< 7	< 10	< 5	< 6	< 45	< 8
	10/17/13	< 2	< 2	< 6	< 3	< 5	< 3	< 4	< 2	< 2	< 20	< 6
	10/31/13	< 7	< 7	< 16	< 7	< 14	< 7	< 14	< 6	< 7	< 42	< 15
	11/14/13	< 5	< 6	< 15	< 6	< 12	< 6	< 12	< 4	< 6	< 51	< 14
	12/05/13	< 7	< 6	< 17	< 9	< 15	< 6	< 12	< 6	< 7	< 45	< 9
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-VIII.1

CONCENTRATIONS OF GAMMA EMITTERS IN VEGETATION SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013

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	09/14/13	< 11	< 9	< 28	< 13	< 24	< 11	< 21	< 49	< 9	< 10	< 91	< 30
Potatoes	09/14/13	< 10	< 10	< 31	< 17	< 32	< 12	< 23	< 49	< 10	< 11	< 102	< 21
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-QUAD 1													
Beets	09/13/13	< 10	< 12	< 27	< 14	< 27	< 12	< 20	< 54	< 9	< 11	< 93	< 25
Cabbage	09/13/13	< 10	< 11	< 28	< 12	< 24	< 11	< 21	< 51	< 9	< 10	< 90	< 25
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-QUAD 2													
Beets	09/14/13	< 9	< 10	< 25	< 10	< 18	< 10	< 17	< 41	< 8	< 9	< 79	< 24
Broccoli	09/14/13	< 10	< 11	< 29	< 13	< 26	< 11	< 20	< 51	< 11	< 10	< 98	< 26
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-QUAD 3													
Brussel sprouts	09/14/13	< 10	< 11	< 27	< 10	< 21	< 11	< 15	< 44	< 8	< 20	< 93	< 19
Radishes	09/14/13	< 9	< 13	< 30	< 14	< 28	< 12	< 22	< 45	< 9	< 11	< 96	< 22
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
D-QUAD 4													
Cabbage	09/14/13	< 7	< 7	< 20	< 8	< 17	< 9	< 14	< 38	< 6	< 6	< 65	< 18
Carrots	09/14/13	< 11	< 16	< 44	< 14	< 35	< 14	< 27	< 56	< 12	< 11	< 120	< 28
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-IX.1 QUARTERLY OSLD RESULTS FOR DRESDEN NUCLEAR POWER STATION, 2013

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	31.3 ± 6.9	34.0	28.2	35.2	30.8
D-01-2	31.4 ± 4.1	33.1	28.7	32.9	30.7
D-02-1	33.4 ± 1.4	33.2	33.1	34.4	32.9
D-02-2	34.0 ± 3.3	35.2	32.0	35.5	33.2
D-03-1	27.6 ± 6.3	28.9	25.5	31.4	24.5
D-03-2	27.5 ± 4.8	28.4	24.2	29.9	27.6
D-04-1	32.4 ± 5.2	33.0	29.4	35.6	31.7
D-04-2	31.1 ± 2.2	31.1	30.2	32.6	30.3
D-07-1	30.2 ± 5.6	31.3	26.4	33.0	30.0
D-07-2	30.7 ± 5.2	31.7	27.6	33.7	29.8
D-08-1	31.8 ± 5.0	31.5	28.8	34.9	31.9
D-08-2	31.9 ± 4.3	31.9	29.2	34.4	32.2
D-10-1	31.7 ± 5.1	33.2	28.7	34.3	30.6
D-10-2	30.7 ± 6.3	32.5	26.4	33.5	30.5
D-12-1	29.3 ± 5.4	28.8	28.5	33.1	26.8
D-12-2	26.9 ± 3.9	29.2	24.6	27.4	26.2
D-14-1	28.4 ± 5.0	30.4	25.5	30.6	27.2
D-14-2	29.9 ± 4.7	30.6	26.5	32.0	30.4
D-45-1	32.9 ± 7.5	34.5	29.1	37.4	30.6
D-45-2	33.8 ± 5.0	34.1	30.9	37.0	33.3
D-53-1	27.9 ± 3.1	26.2	25.9	29.6	27.8
D-53-2	27.2 ± 3.8	27.9	25.1	29.5	26.3
D-55-1	30.9 ± 1.4	30.6	30.6	32.0	30.5
D-55-2	29.7 ± 7.4	31.5	24.9	33.4	28.8
D-56-1	26.2 ± 3.9	27.2	24.9	28.4	24.3
D-56-2	26.7 ± 4.1	28.2	25.0	28.7	24.8
D-58-1	26.3 ± 4.2	28.5	24.2	27.6	24.7
D-58-2	27.0 ± 6.3	28.0	22.9	30.4	26.6
D-101-1	31.5 ± 5.7	33.3	27.9	34.2	30.7
D-101-2	29.0 ± 6.4	28.8	25.3	33.1	28.7
D-102-1	32.3 ± 5.5	33.2	29.3	35.6	30.9
D-102-2	32.0 ± 4.3	32.6	28.9	33.9	32.4
D-103-1	30.1 ± 5.1	31.4	27.7	33.0	28.1
D-103-2	30.1 ± 4.3	31.0	27.1	32.1	30.2
D-104-1	31.2 ± 5.5	33.9	27.9	32.9	30.1
D-104-2	33.5 ± 8.2	34.4	28.9	38.7	32.1
D-105-1	30.2 ± 5.8	31.6	26.1	32.8	30.1
D-105-2	31.6 ± 4.5	32.3	28.4	33.6	32.0
D-106-1	28.8 ± 5.0	30.5	25.8	31.1	27.6
D-106-2	27.0 ± 5.6	28.4	23.6	30.0	26.1
D-107-1	26.5 ± 4.9	28.0	24.1	29.1	24.7
D-107-2	28.0 ± 4.4	28.4	25.8	30.9	26.9
D-108-1	31.9 ± 3.9	32.3	29.3	34.0	31.9
D-108-2	28.5 ± 4.8	27.6	27.1	32.1	27.2
D-109-1	30.6 ± 4.6	30.0	27.6	32.9	31.7
D-109-2	31.5 ± 5.3	32.1	29.0	35.0	30.0
D-110-3	33.3 ± 4.1	33.8	30.4	35.3	33.8
D-110-4	35.5 ± 5.2	36.7	32.1	38.1	35.0
D-111-1	34.0 ± 4.0	33.4	32.0	36.8	33.9
D-111-2	31.1 ± 4.9	31.8	30.3	34.1	28.3

Table C-IX.1 QUARTERLY OSLD RESULTS FOR DRESDEN NUCLEAR POWER STATION, 2013

RESULTS IN UNITS OF MREM/QUARTER ± 2 STANDARD DEVIATIONS

STATION CODE	MEAN ± 2 S.D.	JAN - MAR	APR - JUN	JUL - SEP	OCT - DEC
D-113-1	28.1 ± 6.3	29.5	24.3	31.6	28.9
D-113-2	30.0 ± 5.8	30.3	26.1	33.1	30.6
D-114-1	28.5 ± 4.9	28.9	25.6	31.5	27.9
D-114-2	29.1 ± 5.2	30.5	26.4	32.0	27.5
D-115-1	31.0 ± 4.9	31.7	27.6	33.4	31.3
D-115-2	31.9 ± 3.7	31.1	30.2	34.5	31.7
D-116-1	33.0 ± 6.9	32.7	29.1	37.5	32.5
D-116-2	33.6 ± 5.6	34.6	29.6	36.2	34.0
D-201-1	34.7 ± 4.9	34.0	32.7	37.4	(1)
D-201-2	35.3 ± 4.7	36.7	32.6	36.7	(1)
D-202-1	31.6 ± 4.7	32.7	28.1	33.1	32.6
D-202-2	31.5 ± 2.1	31.1	30.9	33.1	30.9
D-203-1	31.1 ± 4.6	31.9	27.8	33.5	31.1
D-203-2	29.7 ± 3.4	31.5	28.1	30.7	28.4
D-204-1	29.0 ± 6.2	30.8	25.6	32.3	27.3
D-204-2	27.0 ± 5.3	28.5	24.5	30.0	25.1
D-205-1	28.3 ± 6.0	30.3	24.5	31.0	27.2
D-205-2	29.5 ± 5.7	28.7	26.9	33.6	28.8
D-206-1	30.1 ± 4.8	29.6	27.1	32.9	30.6
D-206-2	30.2 ± 4.4	30.9	27.5	32.8	29.7
D-207-1	28.4 ± 3.5	29.0	25.8	29.7	29.0
D-207-2	30.0 ± 4.2	30.1	27.8	32.8	29.1
D-208-1	26.5 ± 3.9	28.1	24.0	27.9	25.8
D-208-2	25.6 ± 3.4	25.5	23.8	27.9	25.2
D-209-1	26.0 ± 5.1	27.2	22.6	28.5	25.8
D-209-2	26.9 ± 4.7	27.9	24.3	29.6	25.8
D-210-1	30.1 ± 6.1	31.4	26.5	33.5	28.9
D-210-2	29.9 ± 4.5	29.8	26.8	32.1	30.7
D-211-1	30.6 ± 5.4	30.3	28.5	34.4	29.0
D-211-2	30.6 ± 4.6	31.2	28.1	33.4	29.5
D-212-3	27.0 ± 4.4	29.5	24.4	27.9	26.1
D-212-4	28.2 ± 3.8	28.7	26.6	30.7	26.7
D-213-1	27.2 ± 5.9	28.4	22.9	29.6	27.9
D-213-2	26.4 ± 5.3	27.6	23.2	29.3	25.6
D-214-1	33.0 ± 7.7	34.7	30.1	37.7	29.6
D-214-2	31.9 ± 9.0	33.9	28.0	37.2	28.3
D-215-1	34.1 ± 4.2	34.2	31.0	35.5	35.5
D-215-2	33.1 ± 3.2	34.4	32.0	34.4	31.4
D-216-1	29.5 ± 2.9	29.8	27.9	(1)	30.8
D-216-2	31.9 ± 3.7	32.6	29.7	31.2	34.0
D-112A-1	28.3 ± 8.2	27.4	23.1	32.8	29.7
D-112A-2	29.9 ± 4.9	30.8	26.8	32.6	29.2

(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, 2013

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

COLLECTION PERIOD	INNER RING ± 2 S.D.	OUTER RING	OTHER	CONTROL
JAN-MAR	31.2 ± 4.6	30.7 ± 5.1	31.3 ± 4.6	29.0 ± 0.6
APR-JUN	27.4 ± 4.8	27.2 ± 5.6	27.7 ± 5.1	26.6 ± 5.5
JUL-SEP	33.3 ± 4.9	32.3 ± 5.7	32.9 ± 5.1	30.3 ± 8.1
OCT-DEC	29.9 ± 5.4	28.9 ± 5.2	29.6 ± 5.3	26.5 ± 0.8

TABLE C-IX.3 SUMMARY OF THE AMBIENT DOSIMETRY PROGRAM FOR DRESDEN NUCLEAR POWER STATION, 2013

RESULTS IN UNITS OF MREM/QUARTER

LOCATION	SAMPLES ANALYZED	PERIOD MINIMUM	PERIOD MAXIMUM	PERIOD MEAN ± 2 S.D.
INNER RING	136	22.9	38.7	30.4 ± 6.5
OUTER RING	125	22.6	37.7	29.7 ± 6.6
OTHER	96	24.2	37.4	30.4 ± 6.3
CONTROL	8	24.6	33.1	28.1 ± 5.1

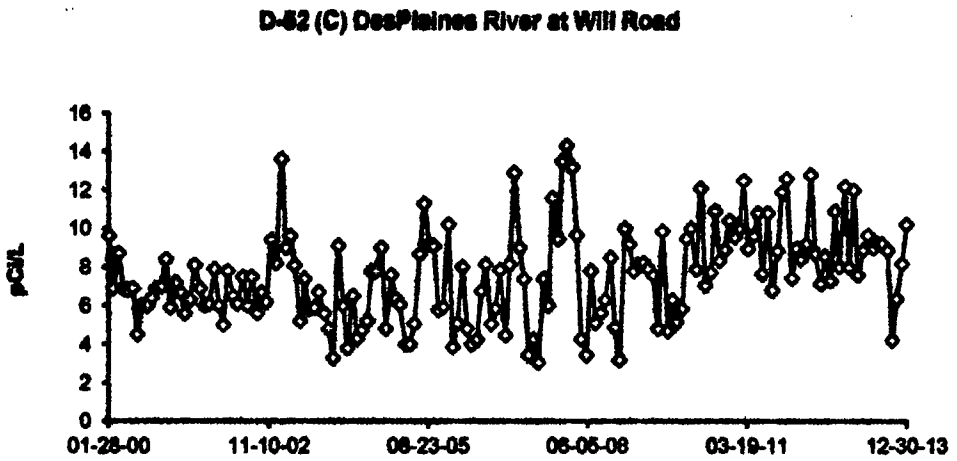
INNER RING STATIONS - D-101-1, D-101-2, D-102-1, D-102-2, D-103-1, D-103-2, D-104-1, D-104-2, D-105-1, D-105-2, D-106-1, D-106-2, D-107-1, D-107-2, D-108-1, D-108-2, D-109-1, D-109-2, D-110-3, D-110-4, D-111-1, D-111-2, D-112A-1, D-112A-2, D-113-1, D-113-2, D-114-1, D-114-2, D-115-1, D-115-2, D-116-1,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

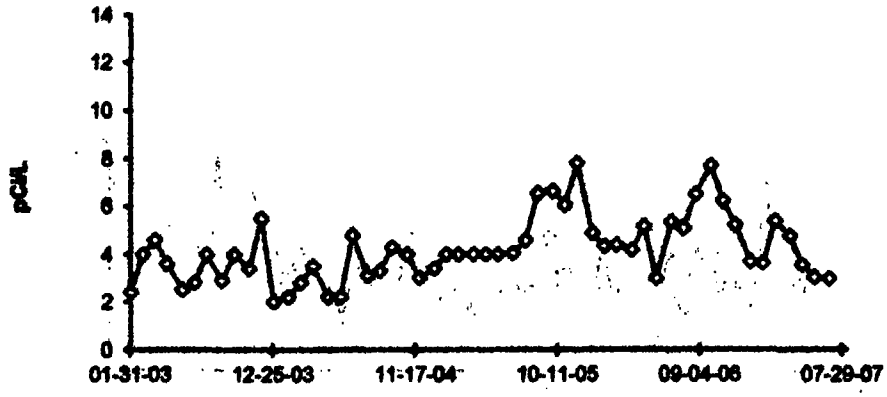
FIGURE C-1
SURFACE WATER - GROSS BETA - STATION
D-52 (C) COLLECTED IN THE VICINITY OF DNPS, 2000 - 2013



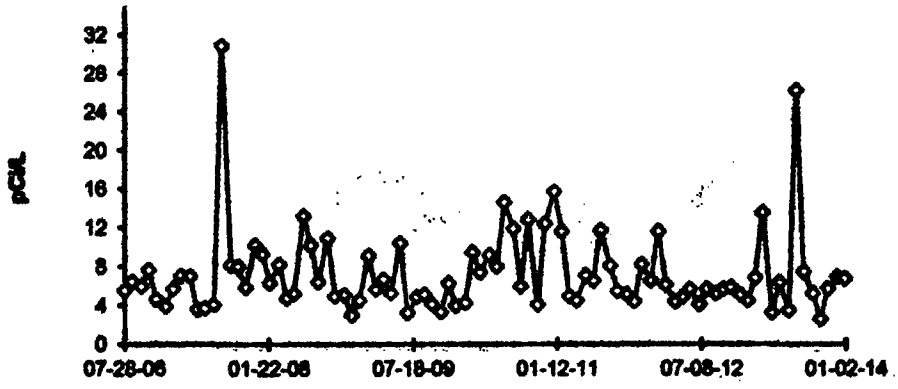
DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005 AND MDC VALUES AFTER JULY 2005

FIGURE C-2
SURFACE WATER - GROSS BETA - STATION D-54 (C) and D-57 (C) COLLECTED IN THE VICINITY OF DNPS, 2003 - 2013

D-54 (C) Kankakee River



D-57 (C) Kankakee River at Will Road

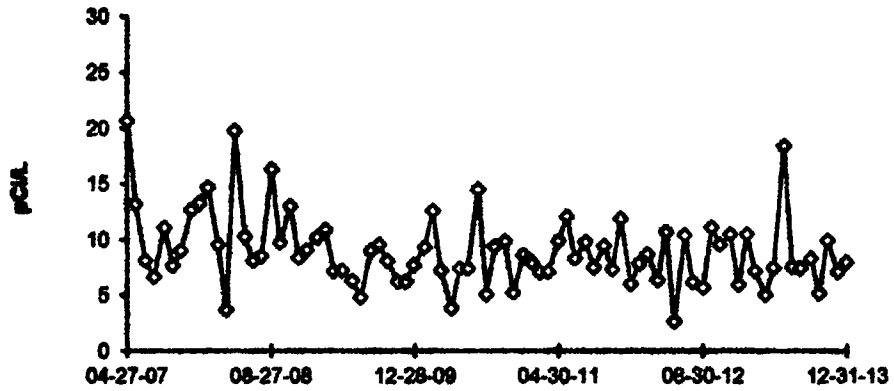


DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005 AND MDC VALUES AFTER JULY 2005

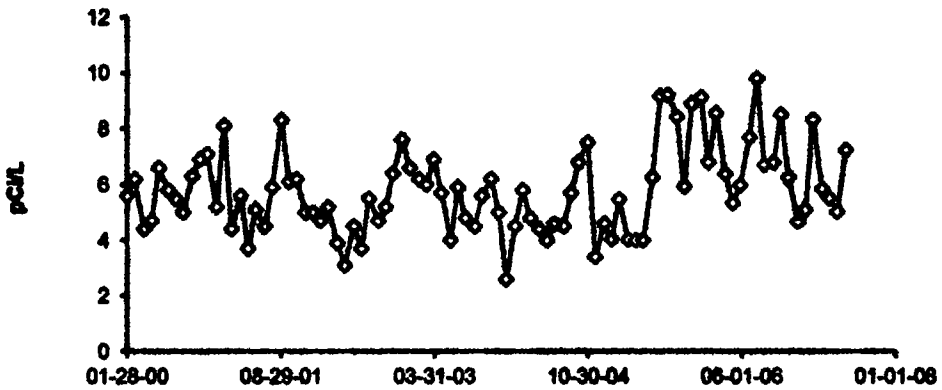
D-54 LOCATION REMOVED FROM PROGRAM JUNE 28, 2007 AND REPLACED WITH D-57

FIGURE C-3
SURFACE WATER - GROSS BETA - STATIONS D-21 and D-51
COLLECTED IN THE VICINITY OF DNPS, 2000 - 2013

D-21 Illinois River at EJ&E Bridge



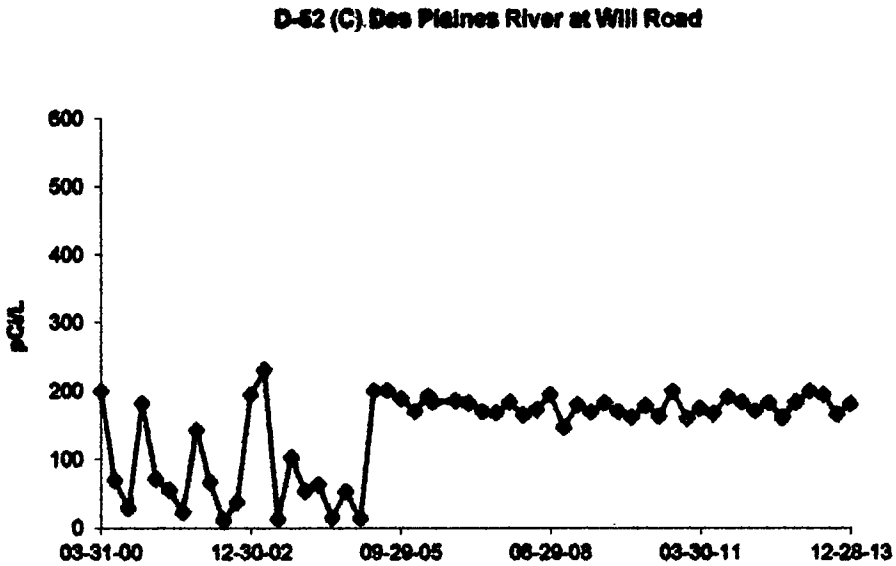
D-51 Dresden Lock & Dam



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

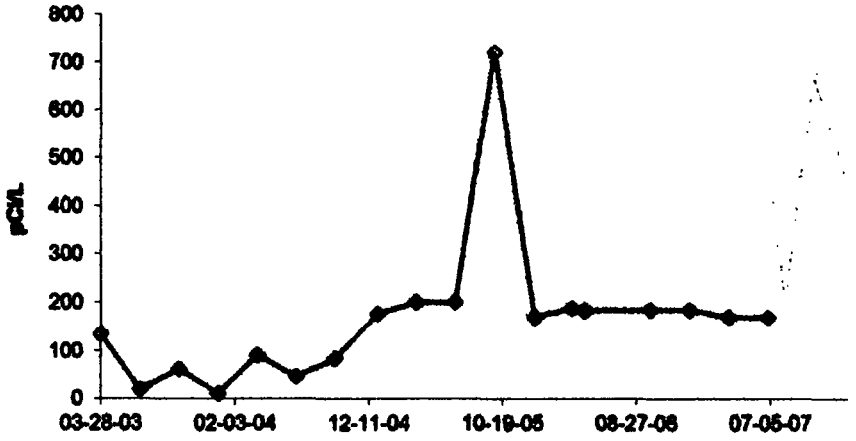
FIGURE C-4
SURFACE WATER - TRITIUM - STATION
D-52 (C) COLLECTED IN THE VICINITY OF DNPS, 2000 - 2013



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

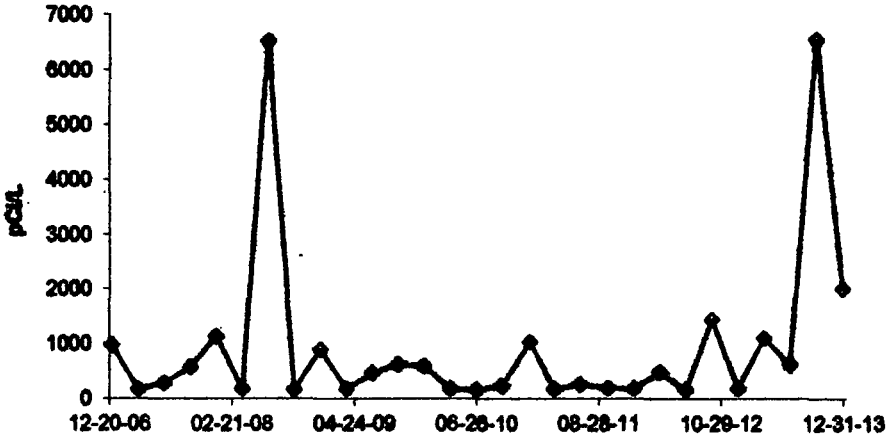
FIGURE C-5
SURFACE WATER - TRITIUM - STATION D-54 (C) AND D-57 (C) COLLECTED IN THE VICINITY OF DNPS, 2003 - 2013

D-54 (C) Kankakee River



Location shared with Braidwood Station (BD-10).

D-57 (C) Kankakee River at Will Road

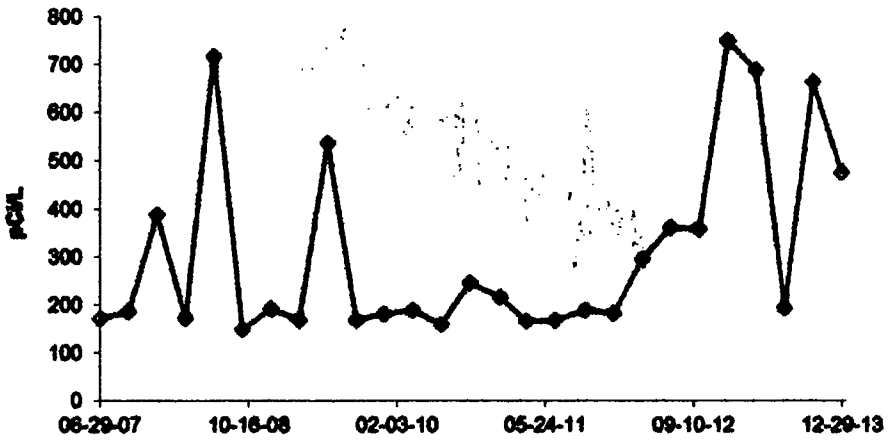


DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005 AND MDC VALUES AFTER JULY 2005

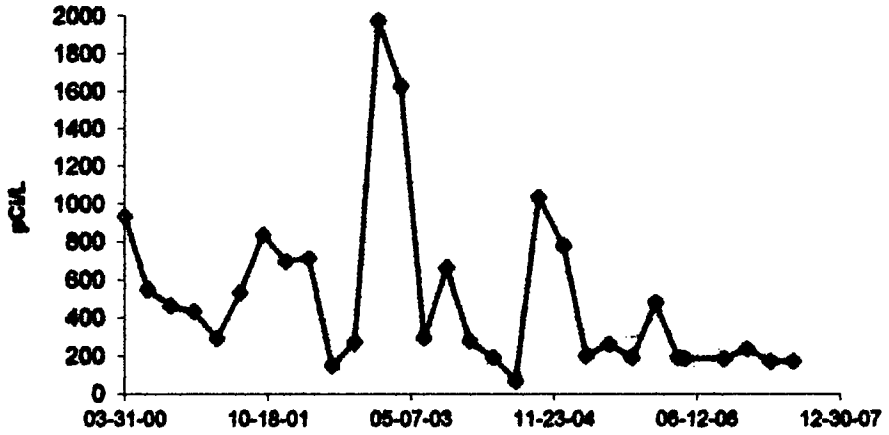
D-57 NEW STATION JULY 24, 2006. REPLACED D-54 ON JUNE 28, 2007

FIGURE C-6
SURFACE WATER - TRITIUM - STATIONS D-21 and D-51 COLLECTED IN THE VICINITY OF DNPS, 2000 - 2013

D-21 Illinois River at EJ&E Bridge



D-51 Dresden Lock & Dam

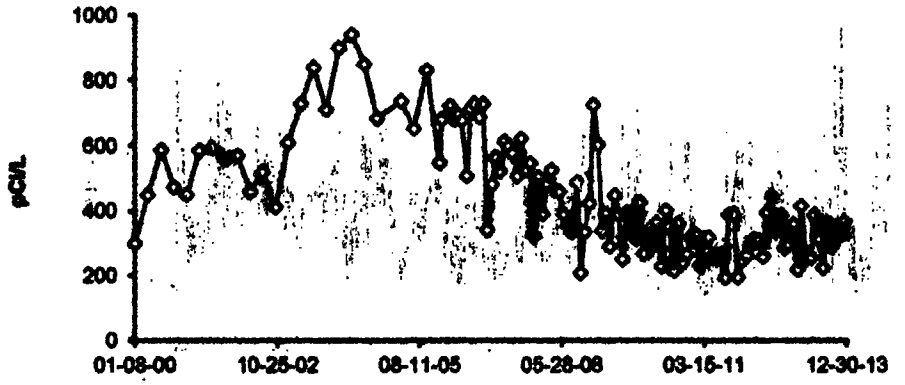


D-21 REPLACED D-51 JUNE 29, 2007

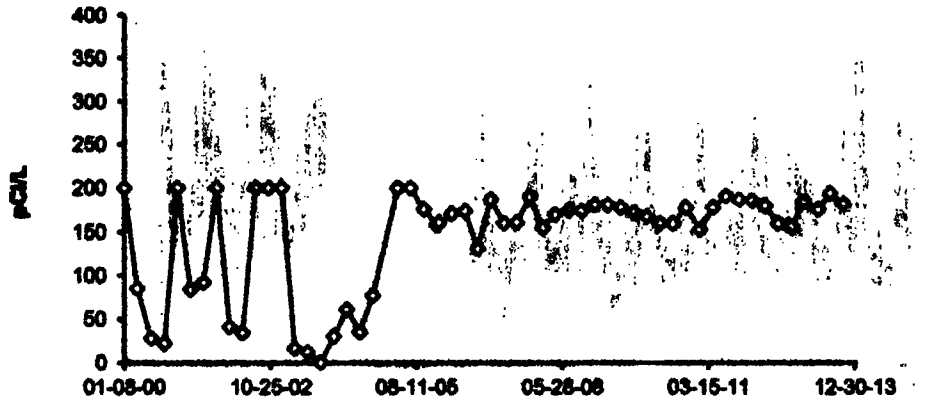
D-51 LOCATION REMOVED FROM PROGRAM JUNE 29, 2007 AND REPLACED WITH D-21

FIGURE C-7
GROUND WATER - TRITIUM - STATIONS D-23 and D-35 COLLECTED IN THE VICINITY OF DNPS, 2000 - 2013

D-23 Thorsen Well



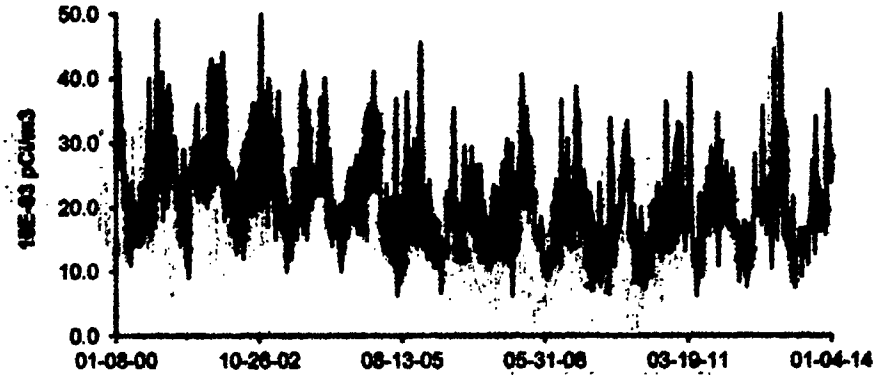
D-35 Dresden Lock and Dam



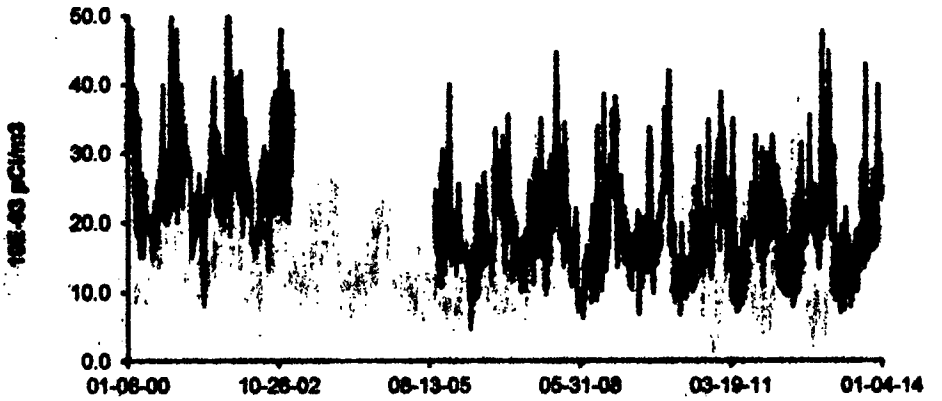
DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005 AND MDC VALUES AFTER JULY 2005

FIGURE C-8
AIR PARTICULATES - GROSS BETA - STATIONS D-01 and D-02 COLLECTED IN THE VICINITY OF DNPS, 2000 - 2013

D-01 Onsite Station 1



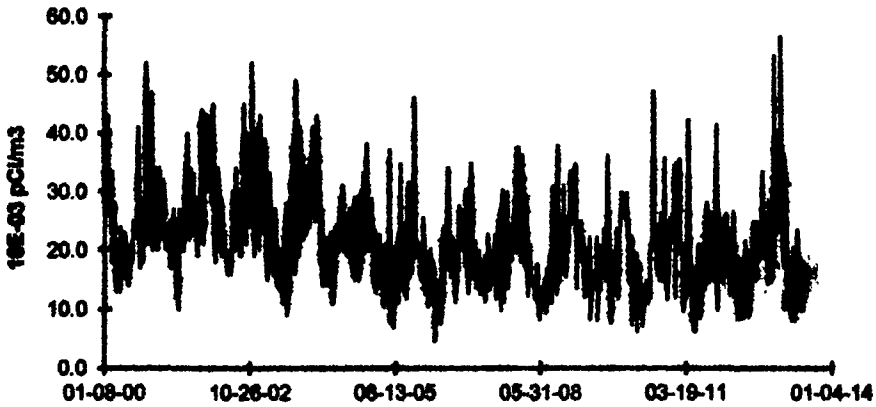
D-02 Onsite Station 2



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 - 2013

D-03 Onsite Station 3



D-04 Collins Road on Station Property

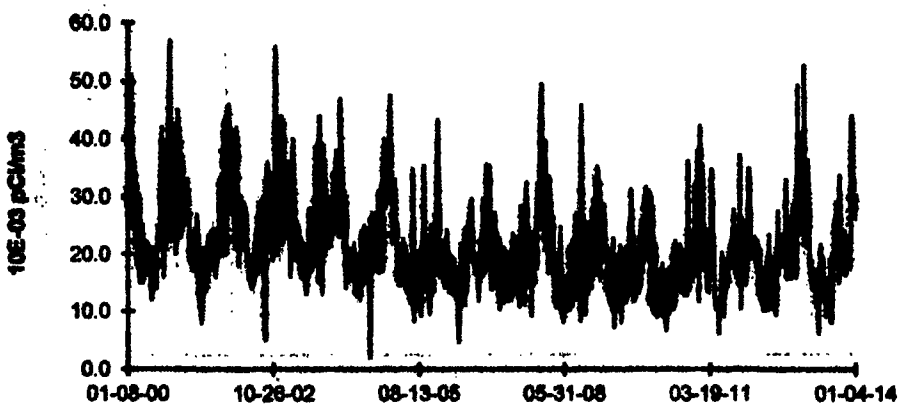
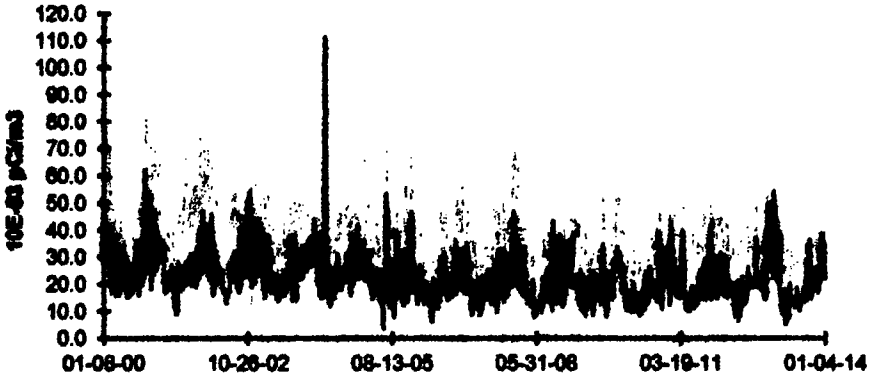


FIGURE C-10
AIR PARTICULATES - GROSS BETA - STATIONS D-07 and D-12 (C) COLLECTED IN THE VICINITY OF DNPS, 2000 - 2013

D-07 Clay Products, Dresden Road



D-12 (C), Quarry Road, Lisbon

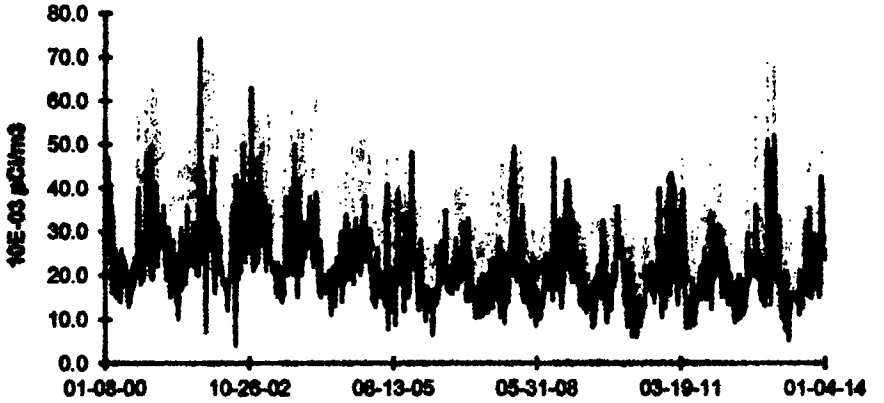
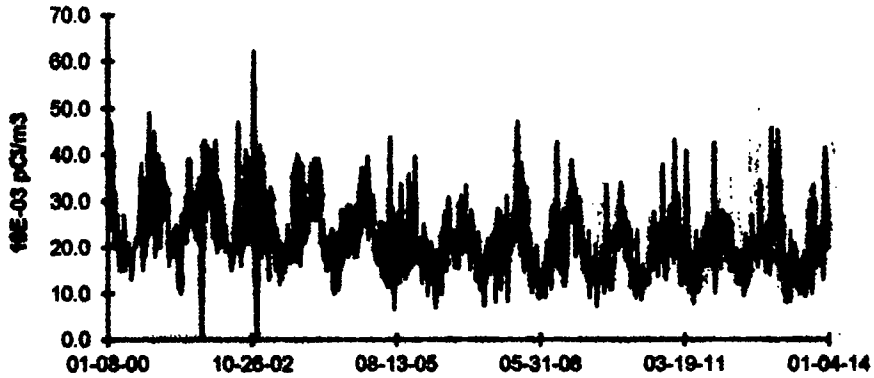


FIGURE C-11
AIR PARTICULATES - GROSS BETA - STATIONS D-45 and D-53 COLLECTED IN THE VICINITY OF DNPS, 2000 - 2013

D-45 McKinley Woods Road, Channahon



D-53 Will Road, Hollyhock

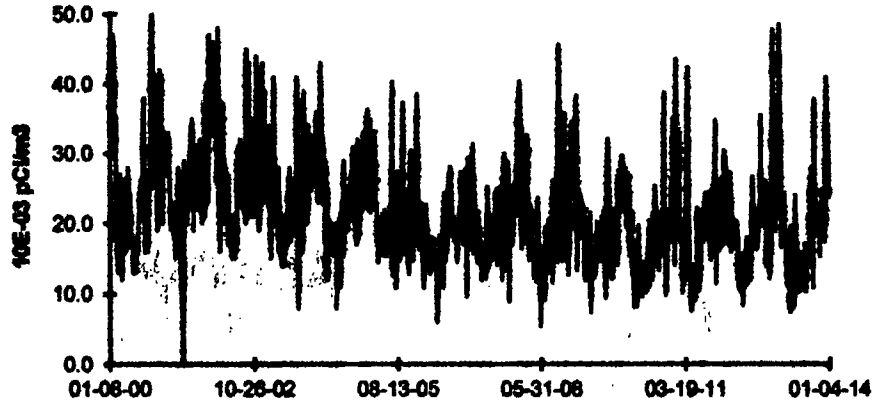
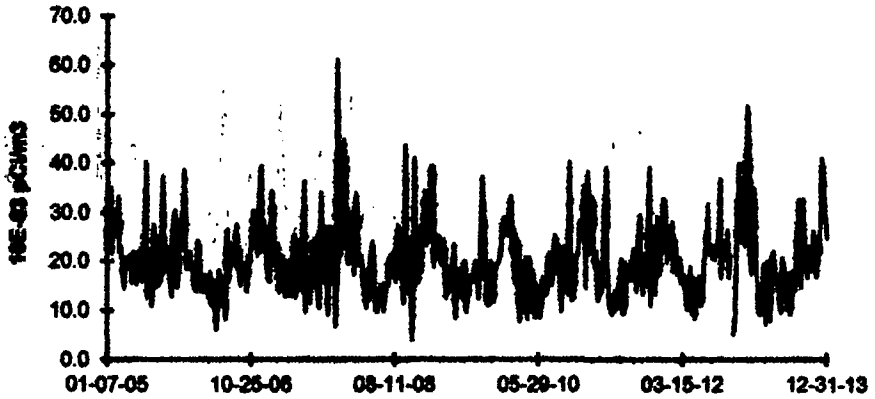


FIGURE C-12
AIR PARTICULATES - GROSS BETA - STATIONS D-08 and D-10 COLLECTED IN THE VICINITY OF DNPS, 2005 - 2013

D-08 Juglown Road, Prairie Parks



D-10 Goose Lake Road, Geese Lake Village

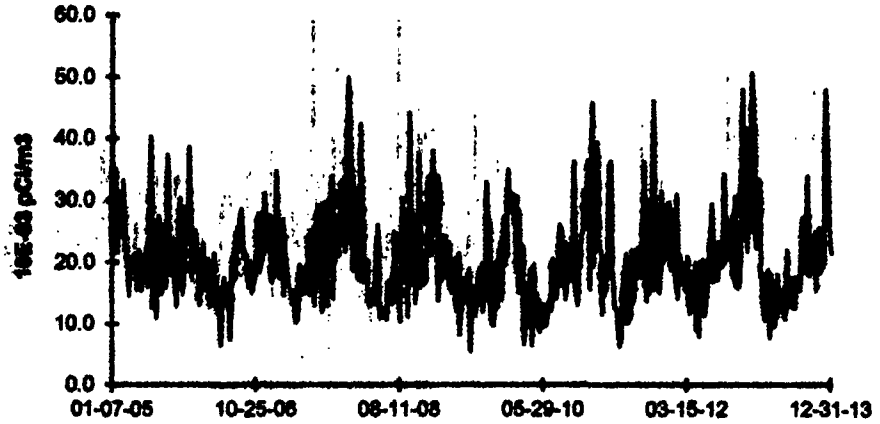
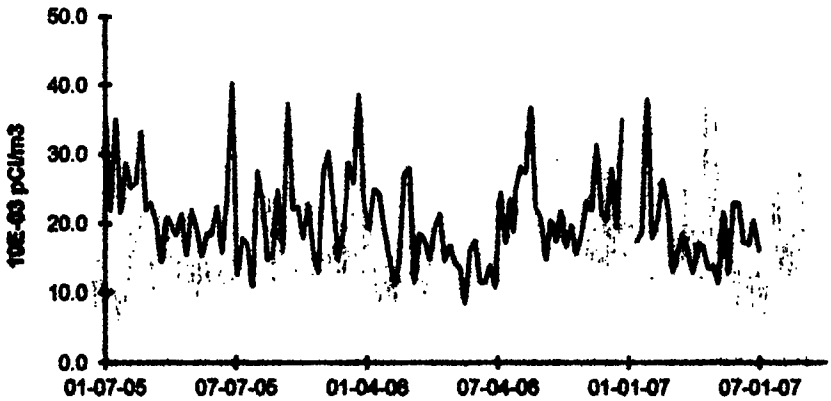
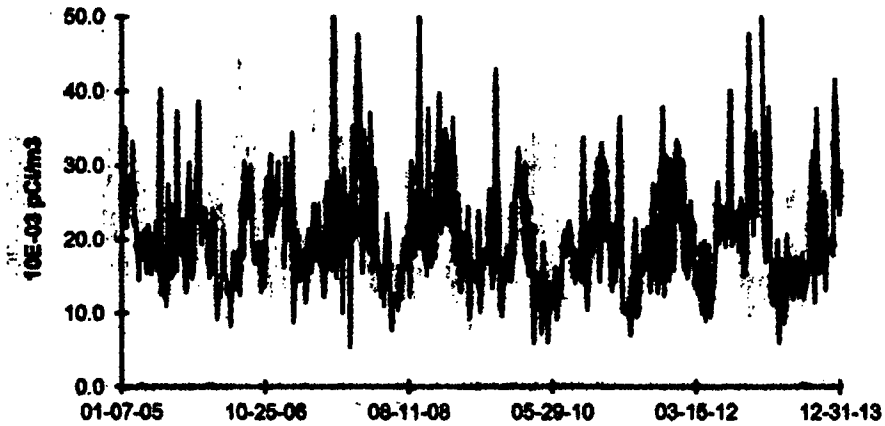


FIGURE C-13
AIR PARTICULATES - GROSS BETA - STATIONS D-13 and D-14 COLLECTED IN THE VICINITY OF DNPS, 2005 - 2013

D-13 Minooka



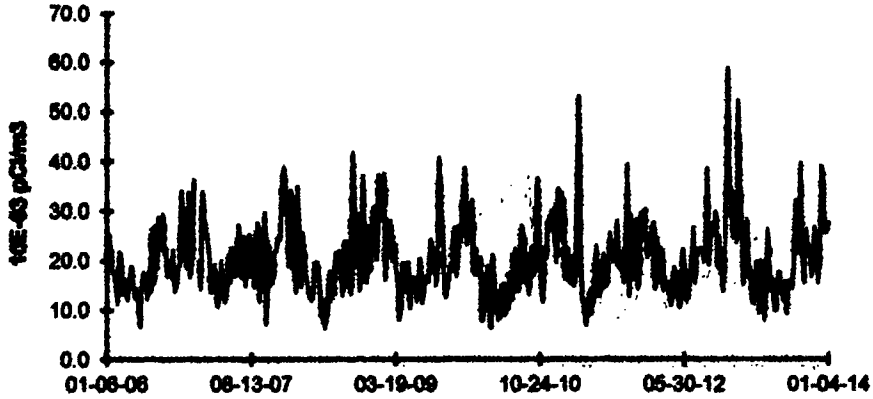
D-14 Center Street, Channahon



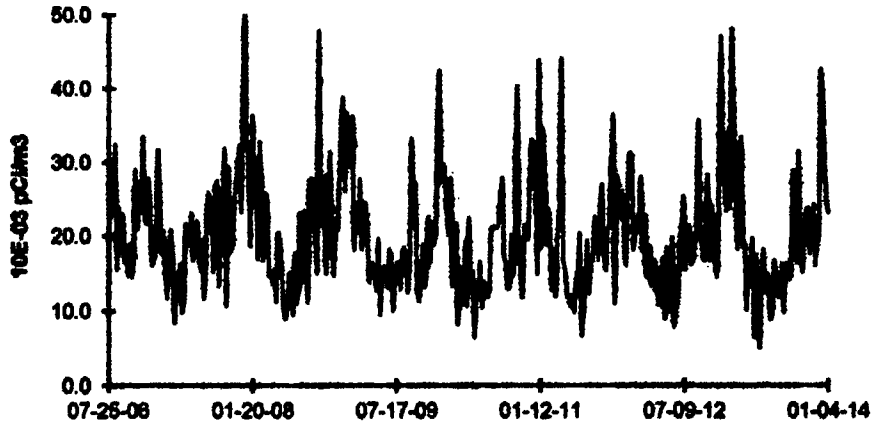
D-13 TAKEN OUT OF SERVICE JUNE 29, 2007 AND REPLACED WITH D-55

FIGURE C-14
AIR PARTICULATES - GROSS BETA - STATIONS D-55 and D-56 COLLECTED IN THE VICINITY OF DNPS, 2006-2013

D-55 Ridge Road, Minooka



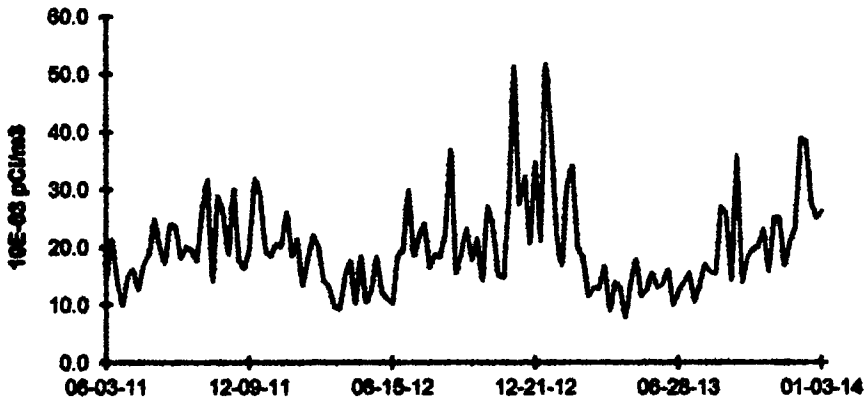
D-56 Will Road, Wilmington



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, 2011-2013

D-58 Will Road Marina



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, 2013
(PAGE 1 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
March 2013	E10477	Milk	Sr-89	pCi/L	120	99.7	1.20	A
			Sr-90	pCi/L	9.21	11.0	0.84	A
	E10478	Milk	I-131	pCi/L	87.1	100	0.87	A
			Ce-141	pCi/L	186	187	0.99	A
			Cr-51	pCi/L	463	472	0.98	A
			Cs-134	pCi/L	201	214	0.94	A
			Cs-137	pCi/L	262	266	0.98	A
			Co-58	pCi/L	200	208	0.96	A
			Mn-54	pCi/L	215	208	1.03	A
			Fe-59	pCi/L	266	252	1.06	A
			Zn-65	pCi/L	311	301	1.03	A
			Co-60	pCi/L	384	400	0.96	A
	E10480	AP	Ce-141	pCi	95.3	95.6	1.00	A
			Cr-51	pCi	264	241	1.10	A
			Cs-134	pCi	123	109	1.13	A
			Cs-137	pCi	142	136	1.04	A
			Co-58	pCi	112	106	1.06	A
			Mn-54	pCi	115	106	1.08	A
			Fe-59	pCi	139	129	1.08	A
			Zn-65	pCi	163	153	1.07	A
			Co-60	pCi	212	204	1.04	A
	E10479	Charcoal	I-131	pCi	90.1	92.8	0.97	A
	E10481	Water	Fe-55	pCi/L	1840	1890	0.97	A
June 2013	E10544	Milk	Sr-89	pCi/L	110	95.0	1.16	A
			Sr-90	pCi/L	15.8	17.0	0.93	A
	E10545	Milk	I-131	pCi/L	92.6	95.5	0.97	A
			Ce-141	pCi/L	83.1	90.4	0.92	A
			Cr-51	pCi/L	253	250	1.01	A
			Cs-134	pCi/L	118	125	0.94	A
			Cs-137	pCi/L	143	151	0.95	A
			Co-58	pCi/L	87.1	94.0	0.93	A
			Mn-54	pCi/L	171	172	0.99	A
			Fe-59	pCi/L	125	120	1.04	A
			Zn-65	pCi/L	220	217	1.01	A
			Co-60	pCi/L	169	175	0.97	A
	E10547	AP	Ce-141	pCi	56.8	58.7	1.00	A
			Cr-51	pCi	168	157	1.07	A
			Cs-134	pCi	85.2	78.4	1.09	A
			Cs-137	pCi	101	94.6	1.07	A
			Co-58	pCi	62.7	58.9	1.06	A
			Mn-54	pCi	125	108	1.16	A
			Fe-59	pCi	85.7	75.0	1.14	A
			Zn-65	pCi	169	136	1.24	W
			Co-60	pCi	116	110	1.05	A
	E10546	Charcoal	I-131	pCi	86.5	89.7	0.96	A

TABLE D-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2013
(PAGE 2 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
June 2013	E10549	Water	Fe-55	pCi/L	1610	1610	1.00	A
September 2013	E10646	Milk	Sr-89	pCi/L	63.9	96.0	0.67	N (1)
			Sr-90	pCi/L	8.88	13.2	0.67	N (1)
	E10647	Milk	I-131	pCi/L	93.9	98.3	0.96	A
			Ce-141	pCi/L				NA (2)
			Cr-51	pCi/L	272	277	0.98	A
			Cs-134	pCi/L	150	172	0.87	A
			Cs-137	pCi/L	125	131	0.95	A
			Co-58	pCi/L	105	108	0.97	A
			Mn-54	pCi/L	138	139	0.99	A
			Fe-59	pCi/L	125	130	0.96	A
			Zn-65	pCi/L	264	266	0.99	A
			Co-60	pCi/L	187	196	0.95	A
	E10672	AP	Ce-141	pCi				NA (2)
			Cr-51	pCi	208	223	0.93	A
			Cs-134	pCi	143	139	1.03	A
			Cs-137	pCi	106	105	1.01	A
			Co-58	pCi	97.0	86.5	1.12	A
			Mn-54	pCi	116	112	1.04	A
			Fe-59	pCi	99.6	105	0.94	A
			Zn-65	pCi	219	214	1.02	A
			Co-60	pCi	166	158	1.05	A
	E10648	Charcoal	I-131	pCi	76.3	71.7	1.06	A
	E10673	Water	Fe-55	pCi/L	1790	1690	1.06	A
December 2013	E10774	Milk	Sr-89	pCi/L	97.3	93.8	1.04	A
			Sr-90	pCi/L	13.3	12.9	1.03	A
	E10775	Milk	I-131	pCi/L	89.7	96.1	0.93	A
			Ce-141	pCi/L	99.8	110	0.91	A
			Cr-51	pCi/L	297	297	1.00	A
			Cs-134	pCi/L	129	142	0.91	A
			Cs-137	pCi/L	126	126	1.00	A
			Co-58	pCi/L	116	112	1.04	A
			Mn-54	pCi/L	167	168	0.99	A
			Fe-59	pCi/L	117	110	1.06	A
			Zn-65	pCi/L	757	741	1.02	A
			Co-60	pCi/L	141	147	0.96	A
	E10777	AP	Ce-141	pCi	85.1	88.0	0.97	A
			Cr-51	pCi	278	238	1.17	A
			Cs-134	pCi	123	114	1.08	A
			Cs-137	pCi	102	101	1.01	A
			Co-58	pCi	84.4	89.9	0.94	A
			Mn-54	pCi	132	135	0.98	A
			Fe-59	pCi	101	88.3	1.14	A
			Zn-65	pCi	506	595	0.85	A
			Co-60	pCi	118	118	1.00	A

TABLE D-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2013
(PAGE 3 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
December 2013	E10776	Charcoal	I-131	pCi	84.7	80.5	1.05	A
	E10778	Water	Fe-55	pCi/L	2010	1910	1.05	A

(1) Milk, Sr-89/90 - The failure was due to analyst error. No client samples were affected by this failure. NCR 13-15

(2) The sample was not spiked with Ce-141.

(a) Teledyne Brown Engineering reported result.

(b) 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.

(c) Ratio of Teledyne Brown Engineering to Analytics results.

(d) Analytics evaluation based on TBE internal QC limits:
A= Acceptable, reported result falls within ratio limits of 0.60-1.20.
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 ERA ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2013
(PAGE 1 OF 1)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Limits	Evaluation (c)
May 2013	RAD-93	Water	Sr-89	pCi/L	48.3	41.3	31.6 - 48.4	A
			Sr-90	pCi/L	19.3	23.9	17.2 - 28.0	A
			Ba-133	pCi/L	81.9	82.1	69.0 - 90.3	A
			Cs-134	pCi/L	40.9	42.8	34.2 - 47.1	A
			Cs-137	pCi/L	44.0	41.7	37.0 - 48.8	A
			Co-60	pCi/L	61.9	65.9	59.3 - 75.0	A
			Zn-65	pCi/L	202	189	170 - 222	A
			Gr-A	pCi/L	34.2	40.8	21.1 - 51.9	A
			Gr-B	pCi/L	18.0	21.6	13.0 - 29.7	A
			I-131	pCi/L	23.8	23.8	19.7 - 28.3	A
			U-Nat	pCi/L	60.4	61.2	49.8 - 67.9	A
			H-3	pCi/L	3970	4050	3450 - 4460	A
	MRAD-18	Filter	Gr-A	pCi/filter	Lost during processing			
November 2013	RAD-95	Water	Sr-89	pCi/L	25.5	21.9	14.4 - 28.2	A
			Sr-90	pCi/L	14.3	18.1	12.8 - 21.5	A
			Ba-133	pCi/L	57.2	54.2	44.7 - 59.9	A
			Cs-134	pCi/L	83.3	86.7	71.1 - 95.4	A
			Cs-137	pCi/L	201	206	185 - 228	A
			Co-60	pCi/L	104	102	91.8 - 114	A
			Zn-65	pCi/L	361	333	300 - 389	A
			Gr-A	pCi/L	29.5	42.8	22.2 - 54.3	A
			Gr-B	pCi/L	30.1	32.2	20.8 - 39.9	A
			I-131	pCi/L	23.1	23.6	19.6 - 28.0	A
			U-Nat	pCi/L	5.53	6.24	4.70 - 7.44	A
			H-3	pCi/L	17650	17700	15500 - 19500	A
	MRAD-19	Filter	Gr-A	pCi/filter	33.0	83.0	27.8 - 129	A

(a) Teledyne Brown Engineering reported result.

(b) 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.

(c) ERA evaluation:

A=acceptable. Reported result falls within the Warning Limits.

NA=not acceptable. Reported result falls outside of the Control Limits.

CE=check for Error. Reported result falls within the Control Limits and outside of the Warning Limit.

TABLE D-3 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
TELEDYNE BROWN ENGINEERING, 2013
(PAGE 1 OF 2)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
March 2013	13-MaW28	Water	Cs-134	Bq/L	21.0	24.4	17.1 - 31.7	A
			Cs-137	Bq/L	0.0446		(1)	A
			Co-57	Bq/L	28.3	30.9	21.6 - 40.2	A
			Co-60	Bq/L	18.2	19.56	13.69 - 25.43	A
			H-3	Bq/L	506	507	355 - 659	A
			Mn-54	Bq/L	25.7	27.4	19.2 - 35.6	A
			K-40	Bq/L	2.09		(1)	A
			Sr-90	Bq/L	10.5	10.5	7.4 - 13.7	A
			Zn-65	Bq/L	29.2	30.4	21.3 - 39.5	A
	13-GrW28	Water	Gr-A	Bq/L	2.74	2.31	0.69 - 3.93	A
			Gr-B	Bq/L	15.6	13.0	6.5 - 19.5	A
	13-MaS28	Soil	Cs-134	Bq/kg	859	887	621 - 1153	A
			Cs-137	Bq/kg	633	587	411 - 763	A
			Co-57	Bq/kg	0.256		(1)	A
			Co-60	Bq/kg	738	691	484 - 898	A
			Mn-54	Bq/kg	0.671		(1)	A
			K-40	Bq/kg	714	625.3	437.7 - 812.9	A
			Sr-90	Bq/kg	442	628	440 - 816	W
			Zn-65	Bq/kg	1057	995	697 - 1294	A
	13-RdF28	AP	Cs-134	Bq/sample	1.73	1.78	1.25 - 2.31	A
			Cs-137	Bq/sample	2.73	2.60	1.82 - 3.38	A
			Co-57	Bq/sample	2.38	2.36	1.65 - 3.07	A
			Co-60	Bq/sample	0.0302		(1)	A
			Mn-54	Bq/sample	4.36	4.26	2.98 - 5.54	A
			Sr-90	Bq/sample	1.43	1.49	1.04 - 1.94	A
			Zn-65	Bq/sample	3.14	3.13	2.19 - 4.07	A
	13-GrF28	AP	Gr-A	Bq/sample	0.767	1.20	0.36 - 2.04	A
			Gr-B	Bq/sample	0.871	0.85	0.43 - 1.28	A
	13-RdV28	Vegetation	Cs-134	Bq/sample	-0.197		(1)	A
			Cs-137	Bq/sample	7.39	6.87	4.81 - 8.93	A
			Co-57	Bq/sample	9.87	8.68	6.08 - 11.28	A
			Co-60	Bq/sample	6.08	5.85	4.10 - 7.61	A
			Mn-54	Bq/sample	-0.0104		(1)	A
			Sr-90	Bq/sample	1.28	1.64	1.15 - 2.13	W
			Zn-65	Bq/sample	6.84	6.25	4.38 - 8.13	A
September 2013	13-MaW29	Water	Cs-134	Bq/L	29.1	30.0	21.0 - 39.0	A
			Cs-137	Bq/L	34.5	31.6	22.1 - 41.1	A
			Co-57	Bq/L	0.0358		(1)	A
			Co-60	Bq/L	24.6	23.58	16.51 - 30.65	A
			H-3	Bq/L	2.45		(1)	A
			Mn-54	Bq/L	0.0337		(1)	A
			K-40	Bq/L	0.193		(1)	A
			Sr-90	Bq/L	9.12	7.22	5.05 - 9.39	W
			Zn-65	Bq/L	38.1	34.6	24.2 - 45.0	A
	13-GrW29	Water	Gr-A	Bq/L	1.13	0.701	0.210 - 1.192	A
			Gr-B	Bq/L	7.61	5.94	2.97 - 8.91	A

TABLE D-3 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
TELEDYNE BROWN ENGINEERING, 2013
(PAGE 2 OF 2)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
September 2013	13-MaS29	Soil	Cs-134	Bq/kg	1150	1172	820 - 1524	A
			Cs-137	Bq/kg	1100	977	684 - 1270	A
			Co-57	Bq/kg	670		(1)	N (2)
			Co-60	Bq/kg	502	451	316 - 586	A
			Mn-54	Bq/kg	758	674	472 - 876	A
			K-40	Bq/kg	796	633	443 - 823	W
			Sr-90	Bq/kg	664	460	322 - 598	N (2)
			Zn-65	Bq/kg	210		(1)	N (2)
	13-RdF29	AP	Cs-134	Bq/sample	-0.570		(1)	N (2)
			Cs-137	Bq/sample	2.85	2.7	1.9 - 3.5	A
			Co-57	Bq/sample	3.30	3.4	2.4 - 4.4	A
			Co-60	Bq/sample	2.41	2.3	1.6 - 3.0	A
			Mn-54	Bq/sample	3.65	3.5	2.5 - 4.6	A
			Sr-90	Bq/sample	1.40	1.81	1.27 - 2.35	W
			Zn-65	Bq/sample	2.90	2.7	1.9 - 3.5	A
	13-GrF29	AP	Gr-A	Bq/sample	0.872	0.9	0.3 - 1.5	A
			Gr-B	Bq/sample	1.57	1.63	0.82 - 2.45	A
	13-RdV29	Vegetation	Cs-134	Bq/sample	5.29	5.20	3.64 - 6.76	A
			Cs-137	Bq/sample	7.48	6.60	4.62 - 8.58	A
			Co-57	Bq/sample	0.0129		(1)	A
			Co-60	Bq/sample	0.0523		(1)	A
			Mn-54	Bq/sample	8.76	7.88	5.52 - 10.24	A
			Sr-90	Bq/sample	1.63	2.32	1.62 - 3.02	W (2)
			Zn-65	Bq/sample	3.18	2.63	1.84 - 3.42	W

(1) False positive test.

(2) Soil, Co-57 & Zn-65 identified by gamma software as not detected, MAPEP evaluated as failing the false positive test. A large concentration of Eu-152 was spiked into the sample, causing interference in the analysis. Gamma software recognized the interference and identified them as not detected. MAPEP does not allow clients to enter non-detect designation. NCR 13-04
Soil, Sr-90 - incorrect results were submitted to MAPEP. Actual result was 332 bq/kg, which is with the acceptance range. NCR 13-04
AP, Cs-134 - MAPEP evaluated the -0.570 as a failed false positive test. No client samples were affected by these failures. NCR 13-04
Vegetation, Sr-90 - it appears that the carrier was double spiked into the sample, resulting in the low activity for this sample. NCR 13-04

(a) Teledyne Brown Engineering reported result.

(b) 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.

(c) DOE/MAPEP evaluation: A=acceptable, W=acceptable with warning, N=not acceptable.

APPENDIX E

ERRATA DATA

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Due to an incorrect setting on gamma detector 08, 3.29 rather than 4.66 was used in the MDC calculation. Nonconformance 13-07 was initiated and corrective actions have been implemented to address this issue. All samples counted on detector 08 were reprocessed using the correct calculation. As a result, all MDCs for these samples have increased by 41.6%. The previously reported activities and uncertainties were not affected. In some cases, the increased MDC resulted in missed LLDs. All samples with MDCs affected by this issue are listed below. The samples with missed LLDs are shown in the table for 2011, 2012, and 2013. All other required LLDs were met.

2011

CLIENT ID	START DATE	END DATE	MATRIX	NUCLIDE	REQUIRED MDC	REVISED MDC	UNITS
4Q11 D-02	09/30/11	12/30/11	Air Particulate	*	*	*	*
4Q11 D-56	09/30/11	12/30/11	Air Particulate	*	*	*	*

*Required LLDs were achieved.

2012

CLIENT ID	START DATE	END DATE	MATRIX	NUCLIDE	REQUIRED MDC	REVISED MDC	UNITS
1Q12 D-12	12/30/11	03/30/12	Air Particulate	*	*	*	*
1Q12 D-45	12/30/11	03/30/12	Air Particulate	*	*	*	*
1Q12 D-55	12/30/11	03/30/12	Air Particulate	*	*	*	*
D-35	01/13/12	01/13/12	Ground Water	I-131	<15	<17.1	pCi/L
D-35	01/13/12	01/13/12	Ground Water	La-140	<15	<15.29	pCi/L
D-57	01/27/12	02/24/12	Surface Water	*	*	*	*
D-25	03/01/12	03/01/12	Milk	*	*	*	*
DN-MW-DN-116S	03/20/12	03/20/12	RGPP	*	*	*	*
2Q12 D-07	03/30/12	06/29/12	Air Particulate	*	*	*	*
D-23	05/11/12	05/11/12	Ground Water	I-131	<15	<18	pCi/L
D-23	05/11/12	05/11/12	Ground Water	La-140	<15	<15.2	pCi/L
D-25	05/17/12	05/17/12	Milk	*	*	*	*
DN-SW-DN-103	05/21/12	05/21/12	RGPP	I-131	<15	<21.08	pCi/L
DN-MW-DN-116I	05/23/12	05/23/12	RGPP	I-131	<15	<19.63	pCi/L
DN-DSP-107	05/29/12	05/29/12	RGPP	*	*	*	*
DN-MW-DN-101S	05/29/12	05/29/12	RGPP	I-131	<15	<18.58	pCi/L
DN-SW-DN-113S	06/04/12	06/04/12	RGPP	I-131	<15	<19.87	pCi/L
DN-DSP-132	06/05/12	06/05/12	RGPP	I-131	<15	<21.14	pCi/L
D-25	06/26/12	06/26/12	Milk	*	*	*	*
3Q12 D-45	06/29/12	09/28/12	Air Particulate	*	*	*	*
3Q12 D-56	06/29/12	09/28/12	Air Particulate	*	*	*	*
D-25	07/13/12	07/13/12	Milk	La-140	<15	<16.43	pCi/L
D-25	08/09/12	08/09/12	Milk	*	*	*	*
DN-SW-DN-116I	08/22/12	08/22/12	RGPP	I-131	<15	<16.6	pCi/L
DN-DSP-107	08/27/12	08/27/12	RGPP	I-131	<15	<19.14	pCi/L
D-25	09/06/12	09/06/12	Milk	*	*	*	*
D-CONTROL (Potatoes)	09/15/12	09/15/12	Vegetation	*	*	*	*
D-QUAD 3 (Beets)	09/22/12	09/22/12	Vegetation	*	*	*	*
4Q12 D-02	09/28/12	12/28/12	Air Particulate	*	*	*	*
4Q12 D-55	09/28/12	12/28/12	Air Particulate	*	*	*	*
D-25	10/18/12	10/18/12	Milk	La-140	<15	<16.27	pCi/L
DN-MW-DN-108I	10/23/12	10/23/12	RGPP	I-131	<15	<21.2	pCi/L
DN-MW-DN-108I	10/23/12	10/23/12	RGPP	La-140	<15	<20.36	pCi/L
DN-DSP-108	10/24/12	10/24/12	RGPP	I-131	<15	<17.93	pCi/L
DN-DSP-108	10/24/12	10/24/12	RGPP	La-140	<15	<18.69	pCi/L
D-57	10/26/12	11/30/12	Surface Water	*	*	*	*
DN-MW-DN-124S	10/30/12	10/30/12	Ground Water	I-131	<15	<17.16	pCi/L
D-25	11/01/12	11/01/12	Milk	La-140	<15	<17.01	pCi/L

*Required LLDs were achieved.

2012

CLIENT ID	START DATE	END DATE	MATRIX	NUCLIDE	REQUIRED MDC	REVISED MDC	UNITS
D-21	11/30/12	12/28/12	Surface Water	I-131	<15	<19.04	pCi/L
D-21	11/30/12	12/28/12	Surface Water	La-140	<15	<17.67	pCi/L
D-25	12/07/12	12/07/12	Milk	*	*	*	*
MW-DN-141S	12/21/12	12/21/12	RGPP	I-131	<15	<20.05	pCi/L

*Required LLDs were achieved.

2013

CLIENT ID	START DATE	END DATE	MATRIX	NUCLIDE	REQUIRED MDC	REVISED MDC	UNITS
D-25	01/04/13	01/04/13	Milk	La-140	<15	<16.26	pCi/L
D-25	03/07/13	03/07/13	Milk	*	*	*	*

*Required LLDs were achieved.

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APPENDIX F

ANNUAL RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM REPORT (ARGPPR)

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Docket No: 50-010
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DRESDEN NUCLEAR POWER STATION
UNITS 1, 2 and 3

Annual Radiological
Groundwater Protection Program Report

1 January Through 31 December 2013

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I. Summary and Conclusions

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

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

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

The fleetwide Hydrogeologic Investigation Report (HIR) shows that groundwater movement on the Dresden site is very slow. In addition, there is a confining rock layer, the Maquoketa Shale layer, about 55 feet below the surface that impedes groundwater movement below this depth.

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

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

II. Introduction

Radiological Groundwater Monitoring Program (RGPP):

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

The Dresden RGPP was established in 2008 and there have been no significant changes to this program. This program does not impact the operation of the plant and is independent of the REMP.

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

There are 98 sampling points in the RGPP:

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

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

Dresden has 11 surface water monitoring locations on the owner-controlled area sampled as part of the Dresden RGPP.

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

Dresden has 6 sentinel wells. These wells are not constructured to code or developed to a standard. The majority of these wells are idle and only used for qualitative troubleshooting.

The Dresden site-specific RGPP procedure identifies the historic 'events' that would affect the individual RGPP sample results. This procedure identifies threshold values for each sample point, which if exceeded, could be an indication of a new spill from an above ground system or a new leak in an underground pipe containing tritiated water. The RGPP sample points are currently sampled on a frequency determined by the well detection category in accordance with site document EN-DR-408-4160, Dresden RGPP Reference Material. During 2013, there were 578 analyses that were performed on 251 samples from 74 sampling points.

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

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

A. Objectives of the RGPP

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

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

Specific Objectives include:

1. Perform routine water sampling and radiological analysis of water from selected locations.

2. Report new leaks, spills, or other detections with potential radiological significance to stakeholders in a timely manner.

3. Regularly assess analytical results to identify adverse trends.

3. Take necessary corrective actions to protect groundwater resources.

B. Implementation of the Objectives

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

2. Dresden Nuclear Power Station has implemented procedures to identify and report new leaks, spills, or other detections with potential radiological significance in a timely manner.

3. Dresden Nuclear Power Station staff and consulting hydrogeologist assess analytical results on an ongoing basis to identify adverse trends.

4. If an adverse trend in groundwater monitoring analytical results is identified, further investigation will be undertaken. If the investigation identifies a leak or unidentified spill, corrective actions will be implemented.

C. Program Description

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

1. Sample Collection

Sample locations can be found in Table A–1, Appendix A.

<u>Groundwater and Surface Water</u>

Water samples are collected in accordance with the schedule delineated in the Dresden site-specific RGPP procedures. Analytical laboratories are subject to internal quality assurance programs, industry crosscheck programs, as well as nuclear industry audits. Station personnel review and evaluate the analytical results.

D. Characteristics of Tritium (H-3)

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

chemical properties of tritium are essentially those of ordinary hydrogen.

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

Tritium is produced naturally in the upper atmosphere when cosmic rays strike air molecules. Tritium is also produced during nuclear weapons explosions, as a by-product in reactors producing electricity and in special production reactors, where the isotopes lithium-7 and/or boron-10 are activated to produce tritium. Like normal water, tritiated water is colorless and odorless. Tritiated water behaves chemically and physically like non-tritiated water in the subsurface and therefore tritiated water will travel at the same velocity as the average groundwater velocity.

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

III. Program Description

A. Sample Analysis

This section describes the general analytical methodologies used by Teledyne Brown Engineers (TBE) to analyze the environmental samples for radioactivity for the Dresden Nuclear Power Station RGPP in 2013.

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

1. Concentrations of gamma emitters in groundwater and surface water.

2. Concentrations of strontium in groundwater.

3. Concentrations of tritium in groundwater, surface water and precipitation water.

4. Concentrations of gross alpha and gross beta in groundwater.

5. Concentrations of Am-241 in groundwater.

6. Concentrations of Cm-242 and Cm-243/244 in groundwater.

7. Concentrations of Pu-238 and Pu-239/240 in groundwater.

8. Concentrations of U-233/234, U-235 and U-238 in groundwater.

9. Concentrations of Fe-55 in groundwater.

10. Concentrations of Ni-63 in groundwater.

B. Data Interpretation

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

1. Lower Limit of Detection and Minimum Detectable Concentration

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

2. Laboratory Measurements Uncertainty

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

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

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

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

Gamma spectroscopy results for each type of sample were grouped as follows:

For groundwater and surface water 14 nuclides, Be-7, K-40, Mn-54, Co-58, Fe-59, Co-60, Zn-65, Nb-95, Zr-95, I-131, Cs-134, Cs-137, Ba-140 and La-140 were reported.

C. Background Analysis

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

1. Background Concentrations of Tritium

The purpose of the following discussion is to summarize background measurements of tritium in various media performed by others. Additional detail may be found by consulting references (CRA 2008).

a. Tritium Production

Tritium is created in the environment from naturally occurring processes both cosmic and subterranean, as well as from anthropogenic (i.e., man-made) sources. In the upper atmosphere, "Cosmogenic" tritium is produced from the bombardment of stable nuclides and combines with oxygen

to form tritiated water, which will then enter the hydrologic cycle. Below ground, "lithogenic" tritium is produced by the bombardment of natural lithium present in crystalline rocks by neutrons produced by the radioactive decay of naturally abundant uranium and thorium. Lithogenic production of tritium is usually negligible compared to other sources due to the limited abundance of lithium in rock. The lithogenic tritium is introduced directly to groundwater.

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

b. Precipitation Data

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

Tritium concentrations in surface water showed a sharp decline up until 1975 followed by a gradual decline since that time. Tritium concentrations in Midwest precipitation have typically been below 100 pCi/L since around 1980. Tritium concentrations in wells may still be above the 200-pCi/L detection limit from the external causes described

majority were installed in areas of historic spills or close to piping containing tritiated water (Table B-I.1, Appendix B).

Strontium

Samples were collected and analyzed for strontium-89 and strontium-90 activity (Table B-I.1, Appendix B). Strontium-89 was not detected in any of the samples. Strontium was detected at a concentration greater than 1 pCi/L at two sampling locations (DSP-108 and MW-DN-105-S). The concentrations ranged from 1.5 to 4.9 pCi/L.

Gross Alpha and Gross Beta (dissolved and suspended)

Gross Alpha and Gross Beta analyses in the dissolved and suspended fractions were performed on groundwater samples throughout the sampling year in 2013. Gross Alpha (dissolved) was detected in ten groundwater locations. The concentrations ranged from 1.3 to 15.6 pCi/L. Gross Alpha (suspended) was detected in one groundwater location at a concentration of 1.0 pCi/L. Gross Beta (dissolved) was detected in 32 of the groundwater locations. The concentrations ranged from 2.7 to 46.8 pCi/L. Gross Beta (suspended) was detected in one groundwater location at a concentration of 30.2 pCi/L. The concentrations of Gross Alpha and Gross Beta, which are slightly above detectable levels, are considered to be background and are not the result of plant effluents.

Gamma Emitters

Naturally-occurring K-40 was detected in two samples. The concentrations ranged from 37 to 65 pCi/L. No other gamma emitting nuclides were detected (Table B-I.2, Appendix B).

Hard-To-Detects

Hard-To-Detect analyses were performed on two groundwater locations to establish background levels. The analyses included Fe-55, Ni-63, Am-241, Cm-242, Cm-243/244, Pu-238, Pu-239/240, U-233/234, U-235 and U-238. The isotope U-233/234 and U-238 was detected at one of the two groundwater monitoring locations. The concentration of U-234 was 1.0 pCi/L and the concentration U-238 was 0.39 pCi/L (Table B-I.3, Appendix B). The concentrations detected are considered background.

All other hard-to-detect nuclides were not detected at concentrations greater than their respective MDCs.

above. Water from previous years and decades is naturally captured in groundwater, so some well water sources today are affected by the surface water from the 1960s that was elevated in tritium.

c. Surface Water Data

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

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

IV. Results and Discussion

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

A. Groundwater Results

Groundwater

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

Tritium

Tritium concentrations in the shallow and intermediate aquifer are stable or decreasing over time. Tritium concentrations in MW-DN-124S and MW-DN-124I continue to be closely monitored for the existing plume in this area. The few wells that exceed the United States Environmental Protection Agency (USEPA) drinking water standard (and the Nuclear Regulatory Commission Reporting Limit) of 20,000 pCi/L are located onsite and are not available as a drinking water source. Although tritium is detected in a large number of these wells, it is important to note that the

B. Surface Water Results

Surface Water

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

Tritium

Samples from all locations were analyzed for tritium activity (Table B-II.1, Appendix B). Tritium values ranged from the detection limit to 4,740 pCi/l. The measurable concentrations of tritium are from an upstream source.

Strontium

Samples were not analyzed for strontium activity (Table B-II.1. Appendix B).

Gross Alpha and Gross Beta (dissolved and suspended)

Samples were not analyzed for Gross Alpha and Gross Beta in 2013.

Gamma Emitters

No gamma emitting nuclides were detected (Table B-II.2, Appendix B).

Hard-To-Detects

Samples were not analyzed for Hard-To-Detect analyses in 2013.

C. Precipitation Water Results

Precipitation Water

Samples were collected from 4 precipitation water locations throughout the year in accordance with the station radiological groundwater protection program. Analytical results and anomalies are discussed below.

Tritium

Samples from 4 locations were analyzed for tritium activity (Table B-III.1, Appendix B). Tritium was not detected in any samples.

D. Drinking Water Well Survey

No drinking water well surveys were conducted in 2013.

E. Summary of Results – Inter-Laboratory Comparison Program

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

F. Leaks, Spills, and Releases

There were no leaks, spills or releases of radioactive material in 2013.

G. Trends

The elevated tritium concentrations are expected for the wells in the vicinity (MW-DN-124S and MW-DN-124I) as the plume continues to reside in this area.

Overall, tritium concentrations in the shallow and intermediate aquifers are decreasing over time.

H. Investigations

No additional investigation conducted in 2013.

I. Actions Taken

1. Compensatory Actions

No compensatory actions were required in 2013.

2. Actions to Recover/Reverse Plumes

No actions were taken in 2013 by Dresden Station in an effort to reverse plume movement.

APPENDIX A

LOCATION DISTANCE

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TABLE A-1: Radiological Groundwater Protection Program - Sampling Locations, Dresden Nuclear Power Station, 2013

Site	Site Type	Location
DSP-105	Monitoring Well	30 feet east of the east wall of the EM Shop
DSP-106	Monitoring Well	65 feet east of east wall of EM Shop
DSP-107	Monitoring Well	9 feet east of the east Unit 1 Fuel Pool wall
DSP-108	Monitoring Well	40 ft east of the Unit 1 Sphere
DSP-117	Monitoring Well	Northeast of Unit 1 Sphere; 825 feet west of Ross Bridge
DSP-121	Monitoring Well	72 feet north of 2/3 Intake Canal fence
DSP-122	Monitoring Well	50 feet north of the Radwaste Tank Farm
DSP-123	Monitoring Well	Northeast corner of the Unit 1 Off-gas Building
DSP-124	Monitoring Well	9 feet south of Floor Drain Collector Tank
DSP-125	Monitoring Well	Northeast corner of the Unit 2/3A CST
DSP-126	Monitoring Well	21 feet northwest of the northwest bend in road behind Training Building
DSP-147	Monitoring Well	325 feet west of Telemetry Bridge
DSP-148	Monitoring Well	130 feet southeast of the Flow Regulating Station building
DSP-149R	Monitoring Well	35 feet south by southwest of the 138 KV yard fence
DSP-150	Monitoring Well	85 feet east of the northeast corner of the Unit 1 Spent Fuel Pool pad
DSP-151	Monitoring Well	65 feet north of the northeast corner of the Storeroom
DSP-152	Monitoring Well	210 feet south by southeast of the southeast corner of Maintenance Garage
DSP-153	Monitoring Well	150 feet east of the southeast corner of liquid hydrogen tank farm fence
DSP-154	Monitoring Well	33 feet west of the track; 165 feet east of the Security Checkpoint
DSP-156	Monitoring Well	70 feet east by northeast of the northwest corner of 138 KV yard fence
DSP-157-I	Monitoring Well	25 feet south of the south edge of the Employee Parking lot
DSP-157-M	Monitoring Well	25 feet south of the south edge of the Employee Parking lot
DSP-157-S	Monitoring Well	25 feet south of the south edge of the Employee Parking lot
DSP-158-I	Monitoring Well	53 feet west of the Kankakee River; 33 feet west of the cinder track
DSP-158-M	Monitoring Well	53 feet west of the Kankakee River; 33 feet west of the cinder track
DSP-158-S	Monitoring Well	50 feet west of the Kankakee River; 33 feet west of the cinder track
DSP-159-I	Monitoring Well	250 feet west of the Thorsen house; 450 ft south of the plant access gate
DSP-159-M	Monitoring Well	250 feet west of the Thorsen house; 450 ft south of the plant access gate
DSP-159-S	Monitoring Well	251 feet west of the Thorsen house; 450 ft south of the plant access gate
MW-DN-101-I	Monitoring Well	60 feet north of the Unit 1 Diesel Fuel Storage
MW-DN-101-S	Monitoring Well	60 feet north of the Unit 1 Diesel Fuel Storage
MW-DN-102-I	Monitoring Well	12 feet south of the southeast corner of the MUDS Building
MW-DN-102-S	Monitoring Well	13 feet south of the southeast corner of the MUDS Building
MW-DN-103-I	Monitoring Well	260 feet west of the northwest corner of N-GET Building
MW-DN-103-S	Monitoring Well	281 feet west of the northwest corner of N-GET Building
MW-DN-104-S	Monitoring Well	50 feet north of Radwaste Tank Farm
MW-DN-105-S	Monitoring Well	65 feet north of the northeast corner of the Storeroom
MW-DN-106-S	Monitoring Well	75 feet north of the 2/3 Intake Canal fence; east of the Unit 1 Intake Canal
MW-DN-107-S	Monitoring Well	15 feet west by southwest of the Unit 1 CST
MW-DN-108-I	Monitoring Well	7 feet southwest of the southwest corner of the Unit 1 Cribhouse
MW-DN-109-I	Monitoring Well	8 feet north of Chemistry Building
MW-DN-109-S	Monitoring Well	8 feet north of Chemistry Building
MW-DN-110-I	Monitoring Well	25 feet west of the Waste Water Treatment (WWT) Building
MW-DN-110-S	Monitoring Well	25 feet west of the Waste Water Treatment (WWT) Building
MW-DN-111-S	Monitoring Well	9 feet east of the Floor Drain Collector Tank
MW-DN-112-I	Monitoring Well	100 feet south of the Chemistry Building
MW-DN-112-S	Monitoring Well	100 feet south of the Chemistry Building
MW-DN-113-I	Monitoring Well	90 feet west of the southwest corner of the Administration Building
MW-DN-113-S	Monitoring Well	91 feet west of the southwest corner of the Administration Building
MW-DN-114-I	Monitoring Well	50 feet east of the Unit 1 Clean Demineralized Water Tank
MW-DN-114-S	Monitoring Well	8 feet southwest of the Radiation protection Dept west access doors
MW-DN-115-I	Monitoring Well	11 feet south of Instrument Maintenance Shop
MW-DN-115-S	Monitoring Well	12 feet south of Instrument Maintenance Shop
MW-DN-116-I	Monitoring Well	75 feet south of the Calgon Building roll-up door
MW-DN-116-S	Monitoring Well	75 feet south of the Calgon Building roll-up door
MW-DN-117-I	Monitoring Well	35 feet east by northeast of the Unit 1 Stack
MW-DN-118-S	Monitoring Well	Southeast corner of the Unit 1 Fuel Pool
MW-DN-119-I	Monitoring Well	20 feet east by northeast of the Unit 1 Sewage Ejector Building
MW-DN-119-S	Monitoring Well	21 feet east by northeast of the Unit 1 Sewage Ejector Building
MW-DN-120-I	Monitoring Well	45 feet north by northeast of the Ross Bridge railing
MW-DN-120-S	Monitoring Well	46 feet north by northeast of the Ross Bridge railing
MW-DN-121-S	Monitoring Well	7 feet west of the dirt road; 42 feet east of the 345KV yard fence

TABLE A-1: Radiological Groundwater Protection Program - Sampling Locations, Dresden Nuclear Power Station, 2013

Site	Site Type	Location
MW-DN-122-I	Monitoring Well	150 feet north of Collins Road; northeast of the G.E. Fuel Storage Facility
MW-DN-122-S	Monitoring Well	150 feet north of Collins Road; northeast of the G.E. Fuel Storage Facility
MW-DN-123-I	Monitoring Well	400 feet west of the Thorsen house; west of the Cold Canal
MW-DN-123-S	Monitoring Well	400 feet west of the Thorsen house; west of the Cold Canal
MW-DN-124-I	Monitoring Well	10 feet south of the liquid nitrogen inerting tanks
MW-DN-124-S	Monitoring Well	10 feet south of the liquid nitrogen inerting tanks
MW-DN-125-S	Monitoring Well	40 feet east of 2/3 B CST
MW-DN-126-S	Monitoring Well	15 feet south of fence around Unit 2/3 A CST and B CST (outside of fence)
MW-DN-127-S	Monitoring Well	20 feet south of Unit 3 HRSS
MW-DN-134-S	Monitoring Well	20-ft North of Mausoleum Building
MW-DN-135-S	Monitoring Well	20-ft East of Mausoleum Building
MW-DN-136-S	Monitoring Well	14.5-ft South of Mausoleum Building
MW-DN-137-S	Monitoring Well	20-ft West of Mausoleum Building
MW-DN-140-S	Monitoring Well	East of MW-DN-104S at SW corner outside of 2/3 crib house
MW-DN-141-S	Monitoring Well	North of 'A' Waste Tank next to 2/3 main chimney
MW-DN-MD-11	Monitoring Well	Piping located between Condensate Storage Tanks.
DSP-131	Surface Water	Storm water – 35 ft NE of the Unit 2/3 heating boiler 150,000 gallon diesel fuel storage tank. 15 ft W of the hot canal fence – underneath Security Block
DSP-132	Surface Water	Storm water – 150 ft NE of the Unit 1 Sphere. The sewer is in the middle of the road with a solid cover (no slots). There are two other sewers in the vicinity with solid covers on them, but both have the word "SANITARY" on the cover. The sewer is 66 ft SE of the Unit 1 diesel fuel transfer shed.
SW-DN-101	Surface Water	Unit 2/3 Intake (DSP50) at the Ross Bridge
SW-DN-102	Surface Water	Unit 2/3 Discharge (DSP20) at the Telemetry Bridge
SW-DN-103	Surface Water	Unit 2/3 Return Canal at the Discharge to the Intake Canal
SW-DN-104	Surface Water	Cold Canal (DSP34A) at the Cooling Tower walkway bridge
SW-DN-105	Surface Water	Hot Canal (DSP34B) at the Cooling Tower walkway bridge
SW-DN-106	Surface Water	Cooling Pond - Pool II at the east side of the Covered Bridge
FW-1	Precipitation	40 feet southwest of Unit 2/3 Off-gas Filter Building access door; north end of guardrail
FW-2	Precipitation	50 feet East of Q[illegible]m Feed Trailer
FW-3	Precipitation	South of Stock Truck Bay rollup door
FW-4	Precipitation	Southeast corner of Unit 3 RB Interlock
FW-5	Precipitation	East of Unit 2/3 Intake Ross barrier
FW-6	Precipitation	North of Unit 1 Chimney
FW-7	Precipitation	Southeast of Unit 2 TB Trackway
FW-8	Precipitation	Southwest corner of 2/3 CST on fence
FW-9	Precipitation	South of MUDS Building on Security fence
FW-10	Precipitation	At the fence at the northwest corner of the SBO Building
FW-11	Precipitation	30 feet east of the east wall of the EM shop; at the stanchion for RGPP well DSP-105
FW-12	Precipitation	60 feet southeast of the southwest corner of the Admin Building; on the security fence

ARGPPR APPENDIX B

DATA TABLES

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TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA, AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE		H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)	Gr-B (Dis)	Gr-B (Sus)
DSP-105	03/04/13		< 196						
DSP-105	06/13/13		< 170	< 7.8	< 1.0	< 1.2	< 0.8	6.1 ± 1.2	< 1.3
DSP-105	08/15/13		252 ± 116						
DSP-105	10/23/13		< 184						
DSP-106	03/04/13		2490 ± 311						
DSP-106	06/13/13		2310 ± 281	< 8.6	< 0.8	< 0.7	< 0.8	4.2 ± 1.1	< 1.3
DSP-106	08/15/13		2200 ± 269						
DSP-106	10/23/13		1830 ± 240						
DSP-107	03/04/13		2900 ± 351						
DSP-107	06/13/13		2880 ± 336	< 8.6	< 0.8	< 1.0	< 0.4	7.3 ± 1.3	< 1.5
DSP-107	08/15/13		2560 ± 305						
DSP-107	10/23/13		2530 ± 305						
DSP-108	03/04/13		746 ± 157						
DSP-108	06/13/13	Original	917 ± 150	< 8.8	1.6 ± 0.7	< 1.4	< 0.4	12.3 ± 1.5	< 1.5
DSP-108	06/13/13	Reanalysis			1.5 ± 0.4				
DSP-108	06/13/13	Recount			1.7 ± 0.7				
DSP-108	07/31/13		930 ± 146	< 7.5	2.4 ± 0.7	< 7.9	< 0.9	18.2 ± 3.9	< 2.0
DSP-108	08/14/13		801 ± 144						
DSP-108	10/23/13		529 ± 139						
DSP-122	02/27/13		650 ± 143						
DSP-122	06/06/13		1090 ± 172						
DSP-122	08/13/13		797 ± 143						
DSP-122	10/22/13		791 ± 150						
DSP-123	03/04/13		1980 ± 263						
DSP-123	06/07/13		1720 ± 224	< 3.2	< 0.9	< 1.7	< 0.6	11.8 ± 1.5	< 1.6
DSP-123	08/14/13		1820 ± 232						
DSP-123	10/23/13		1630 ± 220						
DSP-124	02/27/13		1350 ± 200						
DSP-124	06/14/13		4150 ± 459						
DSP-124	08/16/13		3680 ± 413						
DSP-124	10/25/13		3960 ± 446						
DSP-125	03/06/13		< 195						
DSP-125	06/05/13		277 ± 119	< 4.0	< 1.0	< 6.8	< 1.7	37.2 ± 6.3	< 3.8
DSP-125	08/12/13		259 ± 118						
DSP-125	10/25/13		< 179						
DSP-126	06/10/13		< 168						
DSP-147	06/04/13		< 171						
DSP-148	03/08/13		< 194						
DSP-148	06/03/13		312 ± 123						
DSP-148	08/19/13		< 178						
DSP-148	10/28/13		292 ± 122						
DSP-149 (R)	03/08/13		< 196						
DSP-149 (R)	06/03/13		454 ± 128						
DSP-149 (R)	08/19/13		197 ± 118						
DSP-149 (R)	10/28/13		244 ± 118						
DSP-150	03/05/13		< 196						
DSP-150	06/13/13		< 166						
DSP-150	08/15/13		< 169						
DSP-150	10/24/13		< 182						
DSP-151	03/05/13		< 196						
DSP-151	06/13/13		< 169						
DSP-151	08/15/13		< 168						
DSP-151	10/24/13		< 176						

TABLE B-I.1

CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA, AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)	Gr-B (Dis)	Gr-B (Sus)
DSP-154	06/10/13	< 165						
DSP-156	03/06/13	< 194						
DSP-156	06/03/13	204 ± 116						
DSP-156	08/19/13	< 178						
DSP-156	10/28/13	253 ± 116						
DSP-157-I (M)	06/10/13	< 168						
DSP-157-S	06/10/13	< 167						
DSP-159-I	06/18/13	310 ± 134						
DSP-159-S	06/18/13	< 186						
MW-DN-101-I	03/04/13	854 ± 153						
MW-DN-101-I	06/07/13	940 ± 151	< 3.6	< 0.8	< 1.3	< 0.3	12.3 ± 1.6	< 0.8
MW-DN-101-I	08/14/13	855 ± 147						
MW-DN-101-I	10/23/13	831 ± 149						
MW-DN-101-S	03/04/13	< 176						
MW-DN-101-S	06/07/13	< 171	< 3.5	< 0.7	< 1.5	< 0.7	9.9 ± 1.5	< 1.7
MW-DN-101-S	08/14/13	< 193						
MW-DN-101-S	10/23/13	< 178						
MW-DN-102-I	03/06/13	< 172						
MW-DN-102-I	06/14/13	< 167	< 7.2	< 0.6	1.3 ± 0.6	< 0.5	3.6 ± 0.9	< 1.6
MW-DN-102-I	08/16/13	< 190						
MW-DN-102-I	10/25/13	< 179						
MW-DN-102-S	03/06/13	< 178						
MW-DN-102-S	06/14/13	< 166	< 9.2	< 0.7	15.6 ± 9.3	< 1.9	43.2 ± 9.2	< 5.5
MW-DN-102-S	08/16/13	< 187						
MW-DN-102-S	10/25/13	< 180						
MW-DN-103-I	06/10/13	< 169						
MW-DN-103-S	06/10/13	< 164						
MW-DN-104-S	02/27/13	< 187						
MW-DN-104-S	06/06/13	< 170						
MW-DN-104-S	08/13/13	251 ± 115						
MW-DN-104-S	10/22/13	< 180						
MW-DN-105-S	03/05/13	< 178	< 7.4	4.9 ± 0.8				
MW-DN-105-S	06/13/13	< 166	< 9.1	< 0.9				
MW-DN-105-S	08/15/13	< 161	< 6.6	< 0.9				
MW-DN-105-S	10/24/13	< 191	< 3.8	< 0.5				
MW-DN-106-S	06/03/13	< 172						
MW-DN-107-S	03/05/13	306 ± 124						
MW-DN-107-S	06/13/13	250 ± 116						
MW-DN-107-S	08/15/13	< 161						
MW-DN-107-S	10/21/13	< 190						
MW-DN-108-I	03/04/13	< 177						
MW-DN-108-I	06/07/13	< 170	< 3.4	< 0.9	< 0.8	< 0.6	12.9 ± 1.4	< 1.6
MW-DN-108-I	08/14/13	< 168						
MW-DN-108-I	10/22/13	< 190						
MW-DN-109-I	02/27/13	< 189						
MW-DN-109-I	06/06/13	< 169	< 3.8	< 0.7	< 0.5	< 0.6	2.7 ± 0.8	< 1.6
MW-DN-109-I	08/13/13	541 ± 148						
MW-DN-109-I	10/22/13	689 ± 157						
MW-DN-109-S	02/27/13	< 186						
MW-DN-109-S	06/06/13	< 169	< 3.7	< 0.9	< 2.7	< 0.5	15.7 ± 1.9	< 1.4
MW-DN-109-S	08/13/13	< 193						
MW-DN-109-S	10/22/13	201 ± 128						
MW-DN-110-I	02/27/13	< 189						

TABLE B-I.1

CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA, AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)	Gr-B (Dis)	Gr-B (Sus)
MW-DN-110-I	06/06/13	202 ± 117						
MW-DN-110-I	08/13/13	< 187						
MW-DN-110-I	10/22/13	< 185						
MW-DN-110-S	02/27/13	< 187						
MW-DN-110-S	06/06/13	< 172						
MW-DN-110-S	08/13/13	< 183						
MW-DN-110-S	10/22/13	< 190						
MW-DN-111-S	02/27/13	385 ± 134						
MW-DN-111-S	06/14/13	351 ± 122						
MW-DN-111-S	08/16/13	< 173						
MW-DN-111-S	10/25/13	232 ± 130						
MW-DN-112-I	02/27/13	< 185						
MW-DN-112-I	06/06/13	< 170						
MW-DN-112-I	08/13/13	< 173						
MW-DN-112-I	10/22/13	< 192						
MW-DN-112-S	02/27/13	< 166						
MW-DN-112-S	06/06/13	< 172						
MW-DN-112-S	08/13/13	< 170						
MW-DN-112-S	10/22/13	< 192						
MW-DN-113-I	03/05/13	< 176						
MW-DN-113-I	06/14/13	< 168	< 6.8	< 0.7	< 3.9	< 1.3	< 7.2	< 3.8
MW-DN-113-I	08/16/13	< 165						
MW-DN-113-I	10/24/13	< 169						
MW-DN-113-S	03/05/13	< 176						
MW-DN-113-S	06/14/13	< 169	< 8.0	< 0.8	< 2.6	< 0.4	9.0 ± 2.2	< 1.3
MW-DN-113-S	08/16/13	< 160						
MW-DN-113-S	10/24/13	< 189						
MW-DN-114-I	03/05/13	5600 ± 607						
MW-DN-114-I	06/06/13	7900 ± 833						
MW-DN-114-I	08/13/13	5150 ± 560						
MW-DN-114-I	10/21/13	7100 ± 755						
MW-DN-114-S	03/05/13	< 176						
MW-DN-114-S	06/06/13	206 ± 117						
MW-DN-114-S	08/13/13	< 151						
MW-DN-114-S	10/21/13	< 190						
MW-DN-115-I	03/05/13	433 ± 131						
MW-DN-115-I	06/13/13	355 ± 122						
MW-DN-115-I	08/15/13	< 143						
MW-DN-115-I	10/24/13	272 ± 124						
MW-DN-115-S	03/05/13	< 174						
MW-DN-115-S	06/13/13	< 168						
MW-DN-115-S	08/15/13	< 190						
MW-DN-115-S	10/24/13	< 171						
MW-DN-116-I	02/27/13	216 ± 123						
MW-DN-116-I	06/07/13	220 ± 117	< 5.2	< 0.7	1.6 ± 0.9	< 0.5	11.2 ± 1.4	< 1.4
MW-DN-116-I	08/14/13	1270 ± 194						
MW-DN-116-I	10/22/13	1210 ± 179						
MW-DN-116-S	02/27/13	403 ± 134						
MW-DN-116-S	06/07/13	430 ± 123	< 4.2	< 0.8	3.6 ± 1.8	< 0.5	18.6 ± 1.8	< 1.4
MW-DN-116-S	08/14/13	254 ± 128						

TABLE B-I.1

CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA, AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE		H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)	Gr-B (Dis)	Gr-B (Sus)
MW-DN-118-S	10/22/13		320 ± 125						
MW-DN-118-S	03/04/13		1370 ± 194						
MW-DN-118-S	06/13/13		594 ± 135	< 7.7	< 0.7	< 1.2	< 0.5	8.4 ± 1.4	< 1.6
MW-DN-118-S	08/15/13		343 ± 132						
MW-DN-118-S	10/23/13		345 ± 129						
MW-DN-119-I	03/04/13		< 169						
MW-DN-119-I	06/07/13		422 ± 122	< 3.6	< 0.7	3.6 ± 1.7	1.0 ± 0.7	23.0 ± 1.9	< 1.4
MW-DN-119-I	08/14/13		< 186						
MW-DN-119-I	10/23/13		313 ± 122						
MW-DN-119-S	03/04/13		< 181						
MW-DN-119-S	3/6/2013			< 8.4	< 0.9	< 0.8	< 1.0	15.5 ± 1.3	< 1.7
MW-DN-119-S	06/07/13		< 159	< 2.8	< 0.8	< 1.6	< 0.6	8.1 ± 1.4	< 1.4
MW-DN-119-S	08/14/13		< 190						
MW-DN-119-S	10/23/13		< 175						
MW-DN-122-I	06/10/13		< 166						
MW-DN-122-S	06/10/13		< 165						
MW-DN-124-I	03/06/13		43500 ± 4390	< 7.9	< 0.7				
MW-DN-124-I	06/14/13		51500 ± 5190	< 7.6	< 0.9	< 3.4	< 0.7	33.4 ± 3.9	< 2.0
MW-DN-124-I	08/18/13		43700 ± 4410						
MW-DN-124-I	10/25/13		40600 ± 4100						
MW-DN-124-S	03/06/13		23100 ± 2350	< 9.7	< 0.8				
MW-DN-124-S	06/14/13		6690 ± 711	< 7.2	< 0.7	< 1.7	< 0.6	12.1 ± 1.5	< 1.6
MW-DN-124-S	08/18/13		8750 ± 928						
MW-DN-124-S	10/25/13		9350 ± 980						
MW-DN-125-S	03/06/13		< 173						
MW-DN-125-S	06/14/13		255 ± 119	< 7.6	< 0.8	< 1.8	< 0.8	5.4 ± 1.3	< 1.3
MW-DN-125-S	08/18/13		< 189						
MW-DN-125-S	10/25/13		< 176						
MW-DN-126-S	03/05/13		1190 ± 178						
MW-DN-126-S	06/14/13		659 ± 138	< 8.4	< 0.9	12.7 ± 7.2	< 1.5	35.4 ± 6.8	< 3.9
MW-DN-126-S	08/15/13		389 ± 133						
MW-DN-126-S	10/24/13	Original	968 ± 157						
MW-DN-126-S	10/24/13	Recount	938 ± 162						
MW-DN-127-S	03/05/13		283 ± 124						
MW-DN-127-S	06/14/13		413 ± 127	< 8.0	< 0.9	< 2.4	< 0.5	11.2 ± 2.5	< 1.6
MW-DN-127-S	08/15/13		< 192						
MW-DN-127-S	10/24/13		< 175						
MW-DN-134-S	03/09/13		< 175	< 6.9	< 0.7	< 1.7	< 0.9	10.1 ± 1.4	< 1.6
MW-DN-134-S	06/04/13		< 163	< 3.4	< 0.7	2.6 ± 1.4	< 0.5	7.6 ± 1.4	< 1.6
MW-DN-134-S	08/19/13		< 178						
MW-DN-134-S	10/28/13		< 173						
MW-DN-135-S	03/09/13		< 172	< 7.2	< 0.8	2.8 ± 1.1	< 1.1	11.6 ± 1.4	< 1.7
MW-DN-135-S	06/04/13		< 161	< 3.8	< 0.9	4.2 ± 1.3	< 0.5	16.8 ± 1.6	< 1.6
MW-DN-135-S	08/19/13		< 178						
MW-DN-135-S	10/28/13		< 173						
MW-DN-136-S	03/09/13		< 177	< 7.5	< 0.9	< 2.3	< 0.4	13.8 ± 1.8	< 1.0
MW-DN-136-S	06/04/13		< 162	< 4.5	< 0.9	3.3 ± 2.1	< 0.5	11.6 ± 1.7	< 1.6

TABLE B-I.1

CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA, AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)	Gr-B (Dis)	Gr-B (Sus)
MW-DN-136-S	08/19/13	< 178						
MW-DN-136-S	10/28/13	< 173						
MW-DN-137-S	03/06/13	< 176	< 6.6	< 0.9	< 8.5	< 1.3	46.8 ± 6.5	< 3.6
MW-DN-137-S	06/04/13	< 160	< 4.0	< 0.8	< 1.6	< 0.6	7.4 ± 1.6	< 2.0
MW-DN-137-S	08/19/13	< 178						
MW-DN-137-S	10/28/13	< 169						
MW-DN-140-S	02/27/13	1740 ± 236						
MW-DN-140-S	03/06/13		< 7.8	< 0.8	6.6 ± 3.8	< 1.5	17.7 ± 4.9	30.2 ± 3.6
MW-DN-140-S	06/06/13	1510 ± 200						
MW-DN-140-S	08/13/13	1170 ± 187						
MW-DN-140-S	10/22/13	596 ± 141						
MW-DN-141-S	02/27/13	1160 ± 183						
MW-DN-141-S	06/06/13	2300 ± 279	< 3.9	< 0.7	< 0.8	< 0.5	16.8 ± 1.3	< 1.6
MW-DN-141-S	08/13/13	707 ± 149						
MW-DN-141-S	10/22/13	1280 ± 186						

TABLE B-I.2

CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
DSP-105	03/04/13	< 39	< 72	< 4	< 4	< 10	< 4	< 8	< 4	< 8	< 12	< 4	< 3	< 30	< 11
DSP-105	06/13/13	< 35	< 69	< 4	< 3	< 9	< 4	< 7	< 4	< 7	< 12	< 3	< 4	< 24	< 8
DSP-105	08/15/13	< 37	< 65	< 4	< 4	< 9	< 4	< 9	< 5	< 7	< 13	< 3	< 4	< 29	< 12
DSP-105	10/23/13	< 14	< 14	< 1	< 2	< 3	< 1	< 3	< 2	< 3	< 7	< 1	< 2	< 13	< 4
DSP-106	03/04/13	< 30	< 54	< 3	< 4	< 8	< 4	< 7	< 4	< 7	< 14	< 3	< 3	< 27	< 10
DSP-106	06/13/13	< 39	< 43	< 4	< 5	< 10	< 4	< 9	< 5	< 9	< 12	< 4	< 4	< 27	< 9
DSP-106	08/15/13	< 26	< 22	< 3	< 3	< 7	< 2	< 6	< 3	< 5	< 9	< 3	< 3	< 21	< 6
DSP-106	10/23/13	< 16	< 30	< 1	< 2	< 3	< 2	< 3	< 2	< 3	< 7	< 1	< 2	< 14	< 4
DSP-107	03/04/13	< 36	< 85	< 5	< 4	< 9	< 3	< 9	< 4	< 7	< 14	< 4	< 4	< 27	< 13
DSP-107	06/13/13	< 42	< 86	< 4	< 5	< 10	< 4	< 8	< 5	< 9	< 12	< 4	< 5	< 29	< 10
DSP-107	08/15/13	< 37	< 75	< 4	< 4	< 8	< 4	< 7	< 4	< 7	< 14	< 3	< 4	< 29	< 8
DSP-107	10/23/13	< 16	< 14	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 8	< 2	< 2	< 14	< 5
DSP-108	03/04/13	< 37	< 31	< 3	< 4	< 8	< 3	< 7	< 4	< 7	< 13	< 3	< 3	< 29	< 9
DSP-108	06/13/13	< 46	< 85	< 4	< 5	< 10	< 4	< 8	< 4	< 8	< 15	< 4	< 5	< 32	< 9
DSP-108	07/31/13	< 22	< 20	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 12	< 2	< 2	< 20	< 7
DSP-108	08/14/13	< 38	< 40	< 4	< 5	< 10	< 4	< 8	< 5	< 8	< 15	< 4	< 4	< 35	< 10
DSP-108	10/23/13	< 20	< 34	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 10	< 2	< 2	< 18	< 6
DSP-123	03/04/13	< 34	< 32	< 3	< 4	< 6	< 4	< 6	< 4	< 7	< 13	< 4	< 3	< 25	< 7
DSP-123	06/07/13	< 42	< 82	< 5	< 6	< 11	< 5	< 9	< 5	< 10	< 13	< 5	< 4	< 28	< 11
DSP-123	08/14/13	< 35	< 63	< 4	< 4	< 8	< 3	< 8	< 5	< 8	< 15	< 4	< 4	< 28	< 11
DSP-123	10/23/13	< 21	< 34	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 11	< 2	< 2	< 19	< 6
DSP-125	06/05/13	< 28	< 20	< 3	< 3	< 6	< 2	< 5	< 3	< 5	< 10	< 3	< 3	< 20	< 6
DSP-126	06/10/13	< 31	< 33	< 4	< 4	< 9	< 3	< 8	< 4	< 6	< 14	< 3	< 3	< 30	< 10
DSP-147	06/04/13	< 24	< 53	< 3	< 3	< 6	< 2	< 5	< 3	< 5	< 8	< 2	< 3	< 18	< 5
DSP-154	06/10/13	< 31	< 25	< 3	< 4	< 8	< 4	< 6	< 4	< 6	< 13	< 3	< 3	< 26	< 8
DSP-157-I (M)	06/10/13	< 28	< 25	< 3	< 3	< 7	< 3	< 6	< 3	< 5	< 11	< 3	< 3	< 24	< 7
DSP-157-S	06/10/13	< 30	< 30	< 3	< 3	< 8	< 3	< 7	< 3	< 6	< 12	< 3	< 3	< 26	< 8
DSP-159-I	06/18/13	< 14	< 12	< 1	< 1	< 3	< 1	< 3	< 1	< 3	< 5	< 1	< 1	< 11	< 3
DSP-159-S	06/18/13	< 16	37 ± 22	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 6	< 1	< 2	< 12	< 4
MW-DN-101-I	03/04/13	< 32	< 31	< 3	< 3	< 8	< 3	< 7	< 4	< 7	< 12	< 3	< 3	< 24	< 9
MW-DN-101-I	06/07/13	< 46	< 33	< 4	< 5	< 10	< 4	< 10	< 5	< 9	< 13	< 4	< 5	< 30	< 7
MW-DN-101-I	08/14/13	< 38	< 30	< 4	< 4	< 8	< 3	< 8	< 4	< 7	< 15	< 3	< 4	< 28	< 9
MW-DN-101-I	10/23/13	< 18	< 16	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 9	< 2	< 2	< 16	< 5
MW-DN-101-S	03/04/13	< 38	< 66	< 4	< 4	< 9	< 4	< 7	< 4	< 8	< 14	< 4	< 3	< 28	< 10
MW-DN-101-S	06/07/13	< 33	< 33	< 4	< 4	< 8	< 4	< 7	< 4	< 7	< 10	< 3	< 4	< 25	< 8
MW-DN-101-S	08/14/13	< 35	< 70	< 4	< 4	< 8	< 4	< 7	< 4	< 7	< 14	< 3	< 4	< 29	< 9
MW-DN-101-S	10/23/13	< 24	< 49	< 2	< 3	< 7	< 2	< 5	< 3	< 5	< 12	< 2	< 2	< 23	< 8
MW-DN-102-I	06/14/13	< 25	< 30	< 3	< 3	< 7	< 3	< 5	< 3	< 5	< 7	< 3	< 3	< 18	< 6

TABLE B-I.2

CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
MW-DN-102-S	06/14/13	< 37	< 34	< 4	< 4	< 8	< 4	< 8	< 4	< 6	< 10	< 3	< 4	< 20	< 8
MW-DN-103-I	06/10/13	< 39	< 30	< 4	< 4	< 8	< 5	< 8	< 4	< 8	< 15	< 4	< 5	< 33	< 10
MW-DN-103-S	06/10/13	< 37	< 76	< 4	< 4	< 8	< 4	< 7	< 4	< 7	< 13	< 3	< 3	< 24	< 9
MW-DN-108-S	06/03/13	< 25	< 25	< 3	< 3	< 6	< 2	< 5	< 3	< 5	< 10	< 2	< 3	< 21	< 6
MW-DN-108-I	03/04/13	< 39	< 37	< 4	< 4	< 9	< 4	< 8	< 5	< 8	< 13	< 4	< 4	< 30	< 9
MW-DN-108-I	06/07/13	< 41	< 40	< 5	< 5	< 11	< 5	< 10	< 5	< 8	< 12	< 4	< 4	< 26	< 9
MW-DN-108-I	06/14/13	< 35	< 32	< 4	< 4	< 10	< 3	< 8	< 4	< 7	< 15	< 4	< 4	< 31	< 8
MW-DN-108-I	10/22/13	< 20	< 17	< 2	< 2	< 5	< 2	< 4	< 2	< 3	< 10	< 2	< 2	< 18	< 6
MW-DN-109-I	06/06/13	< 31	< 29	< 3	< 3	< 7	< 3	< 5	< 3	< 7	< 8	< 3	< 4	< 19	< 7
MW-DN-109-S	06/06/13	< 23	< 49	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 7	< 2	< 3	< 18	< 6
MW-DN-113-I	06/14/13	< 48	< 53	< 5	< 5	< 12	< 5	< 9	< 5	< 10	< 11	< 5	< 5	< 33	< 9
MW-DN-113-S	06/14/13	< 35	< 37	< 4	< 4	< 10	< 4	< 6	< 4	< 7	< 10	< 4	< 4	< 27	< 8
MW-DN-116-I	02/27/13	< 41	< 30	< 4	< 4	< 8	< 5	< 8	< 4	< 7	< 13	< 4	< 4	< 27	< 8
MW-DN-116-I	06/07/13	< 33	< 35	< 4	< 4	< 8	< 4	< 7	< 4	< 7	< 6	< 4	< 4	< 18	< 6
MW-DN-116-I	06/14/13	< 32	< 24	< 3	< 3	< 7	< 3	< 7	< 3	< 6	< 12	< 3	< 3	< 26	< 8
MW-DN-116-I	10/22/13	< 19	< 16	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 10	< 2	< 2	< 19	< 6
MW-DN-116-S	02/27/13	< 40	< 32	< 3	< 5	< 10	< 4	< 8	< 4	< 8	< 14	< 3	< 4	< 28	< 9
MW-DN-116-S	06/07/13	< 38	< 98	< 5	< 6	< 11	< 4	< 10	< 5	< 8	< 11	< 4	< 5	< 28	< 8
MW-DN-116-S	06/14/13	< 37	66 ± 42	< 4	< 4	< 9	< 4	< 8	< 5	< 7	< 14	< 3	< 4	< 30	< 12
MW-DN-116-S	10/22/13	< 20	< 18	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 11	< 2	< 2	< 20	< 6
MW-DN-118-S	03/04/13	< 40	< 39	< 4	< 5	< 10	< 4	< 7	< 5	< 8	< 15	< 4	< 5	< 30	< 8
MW-DN-118-S	06/13/13	< 33	< 35	< 4	< 4	< 9	< 4	< 9	< 4	< 8	< 11	< 4	< 4	< 23	< 9
MW-DN-118-S	06/15/13	< 39	< 33	< 3	< 4	< 9	< 4	< 9	< 5	< 7	< 13	< 4	< 4	< 31	< 9
MW-DN-118-S	10/23/13	< 20	< 38	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 10	< 2	< 2	< 19	< 6
MW-DN-119-I	06/07/13	< 30	< 39	< 4	< 4	< 7	< 4	< 7	< 4	< 5	< 11	< 3	< 4	< 24	< 7
MW-DN-119-S	06/07/13	< 39	< 38	< 4	< 5	< 9	< 4	< 8	< 4	< 7	< 12	< 4	< 4	< 27	< 8
MW-DN-122-I	06/10/13	< 28	< 25	< 3	< 3	< 7	< 3	< 6	< 3	< 5	< 11	< 3	< 3	< 21	< 6
MW-DN-122-S	06/10/13	< 32	< 32	< 3	< 4	< 7	< 3	< 7	< 3	< 7	< 12	< 3	< 4	< 26	< 9
MW-DN-124-I	06/14/13	< 33	< 42	< 3	< 4	< 9	< 4	< 8	< 4	< 7	< 10	< 3	< 4	< 24	< 7
MW-DN-124-I	10/25/13	< 19	< 38	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 9	< 2	< 2	< 17	< 6
MW-DN-124-S	06/14/13	< 34	< 69	< 4	< 3	< 7	< 4	< 6	< 4	< 7	< 9	< 4	< 4	< 20	< 6
MW-DN-124-S	10/25/13	< 54	< 54	< 5	< 5	< 13	< 6	< 10	< 6	< 11	< 14	< 6	< 7	< 39	< 11
MW-DN-125-S	06/14/13	< 44	< 104	< 5	< 6	< 13	< 5	< 11	< 5	< 10	< 13	< 5	< 5	< 31	< 12
MW-DN-126-S	06/14/13	< 35	< 76	< 4	< 4	< 9	< 3	< 8	< 4	< 6	< 9	< 4	< 4	< 25	< 8
MW-DN-127-S	06/14/13	< 41	< 89	< 6	< 6	< 11	< 5	< 9	< 6	< 9	< 14	< 5	< 5	< 34	< 12
MW-DN-134-S	03/09/13	< 46	< 106	< 5	< 6	< 14	< 5	< 11	< 6	< 8	< 13	< 5	< 5	< 27	< 8
MW-DN-134-S	06/04/13	< 25	< 45	< 3	< 3	< 7	< 3	< 5	< 3	< 5	< 9	< 2	< 3	< 20	< 7
MW-DN-135-S	03/09/13	< 34	< 73	< 4	< 4	< 9	< 4	< 8	< 4	< 6	< 9	< 4	< 4	< 22	< 8

TABLE B-I.2

CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
MW-DN-135-S	06/04/13	< 21	< 19	< 2	< 2	< 5	< 2	< 5	< 2	< 4	< 7	< 2	< 2	< 16	< 5
MW-DN-136-S	03/09/13	< 52	< 109	< 5	< 6	< 13	< 5	< 12	< 6	< 10	< 12	< 6	< 5	< 34	< 11
MW-DN-136-S	06/04/13	< 22	< 26	< 3	< 3	< 7	< 3	< 5	< 3	< 4	< 9	< 2	< 3	< 19	< 7
MW-DN-137-S	03/09/13	< 41	< 45	< 4	< 5	< 9	< 4	< 9	< 5	< 8	< 11	< 4	< 4	< 28	< 7
MW-DN-137-S	06/04/13	< 23	< 24	< 2	< 2	< 6	< 3	< 5	< 3	< 5	< 8	< 2	< 3	< 17	< 5
MW-DN-140-S	03/06/13	< 44	< 43	< 5	< 5	< 11	< 4	< 9	< 5	< 9	< 15	< 5	< 5	< 32	< 10
MW-DN-141-S	03/06/13	< 42	< 40	< 4	< 4	< 9	< 4	< 9	< 5	< 9	< 14	< 4	< 5	< 30	< 9
MW-DN-141-S	06/06/13	< 33	< 69	< 3	< 4	< 7	< 3	< 6	< 4	< 7	< 10	< 4	< 4	< 26	< 6

TABLE B-I.3

CONCENTRATIONS OF HARD TO DETECTS IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	Am-241	Cm-242	Cm-243/244	Pu-238	Pu-239/240	U-234	U-235	U-238	Fe-55	Ni-63
MW-DN-124-I	03/06/13	< 0.1	< 0.19	< 0.13	< 0.09	< 0.03	< 0.08	< 0.0	< 0.08	< 97	< 3.7
MW-DN-124-I	06/14/13	< 0.2	< 0.07	< 0.06	< 0.06	< 0.07	< 0.13	< 0.1	< 0.09	< 108	< 3.6
MW-DN-124-S	03/06/13	< 0.0	< 0.05	< 0.02	< 0.06	< 0.04	< 0.06	< 0.0	< 0.04	< 122	< 3.7
MW-DN-124-S	06/14/13	< 0.1	< 0.11	< 0.14	< 0.07	< 0.07	0.97 ± 0.32	< 0.1	0.39 ± 0.20	< 148	< 3.3

TABLE B-II.1 CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3
DSP-131	03/06/13	< 197
DSP-131	06/18/13	206 ± 127
DSP-131	08/13/13	205 ± 116
DSP-131	10/21/13	< 178
DSP-132	03/06/13	< 194
DSP-132	06/18/13	< 188
DSP-132	08/13/13	< 167
DSP-132	10/21/13	255 ± 124
SW-DN-101	03/08/13	1150 ± 176
SW-DN-101	06/03/13	215 ± 110
SW-DN-101	08/19/13	4740 ± 531
SW-DN-101	10/28/13	747 ± 146
SW-DN-102	03/08/13	1510 ± 209
SW-DN-102	06/03/13	485 ± 125
SW-DN-102	08/19/13	4550 ± 512
SW-DN-102	10/28/13	2720 ± 320
SW-DN-103	03/08/13	694 ± 154
SW-DN-103	06/03/13	501 ± 126
SW-DN-103	08/19/13	4660 ± 523
SW-DN-103	10/28/13	2610 ± 309
SW-DN-104	03/08/13	733 ± 154
SW-DN-104	06/03/13	486 ± 125
SW-DN-104	08/19/13	4680 ± 525
SW-DN-104	10/28/13	2630 ± 312
SW-DN-105	03/08/13	870 ± 161
SW-DN-105	06/03/13	551 ± 128
SW-DN-105	08/19/13	4630 ± 520
SW-DN-105	10/28/13	2660 ± 314
SW-DN-106	03/08/13	775 ± 157
SW-DN-106	06/03/13	569 ± 127
SW-DN-106	08/19/13	4010 ± 457
SW-DN-106	10/28/13	2860 ± 334

TABLE B-II.2 **CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
DSP-131	06/18/13	< 15	< 32	< 1	< 2	< 3	< 2	< 3	< 2	< 3	< 5	< 1	< 2	< 11	< 3
DSP-132	06/18/13	< 16	< 16	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 6	< 2	< 2	< 14	< 5
DN-SW-DN-101	06/03/13	< 22	< 41	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 8	< 2	< 2	< 17	< 4
DN-SW-DN-102	06/03/13	< 17	< 17	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 6	< 2	< 2	< 14	< 5
DN-SW-DN-103	06/03/13	< 43	< 47	< 4	< 5	< 9	< 3	< 9	< 5	< 7	< 14	< 4	< 4	< 28	< 10
DN-SW-DN-104	06/03/13	< 36	< 67	< 4	< 4	< 8	< 3	< 7	< 5	< 8	< 15	< 4	< 4	< 33	< 7
DN-SW-DN-105	06/03/13	< 31	< 25	< 3	< 3	< 7	< 3	< 7	< 4	< 6	< 13	< 3	< 3	< 27	< 7
DN-SW-DN-106	06/03/13	< 25	< 20	< 2	< 2	< 5	< 2	< 5	< 3	< 5	< 11	< 2	< 3	< 21	< 6

TABLE B-III.1 **CONCENTRATIONS OF TRITIUM IN PRECIPITATION WATER SAMPLES COLLECTED IN THE VICINITY OF DRESDEN NUCLEAR POWER STATION, 2013**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3
FW-1	06/06/13	< 161
FW-10	06/07/13	< 160
FW-11	06/13/13	< 169
FW-12	06/14/13	< 168