Exelon Generation Company, LLC

Braidwood Nuclear Power Station
35100 South Route 53, Suite 84
Braceville, IL 60407-9619

www.exeloncorp.com

May 15, 2018
BW180048

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Braidwood Station, Units 1 and 2
Renewed Facility Operating License Nos. NPF-72 and NPF-77
NRC Docket Nos. STN 50-456 and STN 50-457

Subject: 2017 Annual Radiological Environmental Operating Report

Attached is the 2017 Annual Radiological Environmental Operating Report for Braidwood Station. This report is being submitted in accordance with Technical Specification 5.6.2, "Annual Radiological Environmental Operating Report." This report contains information associated with the station's radiological environmental and meteorological monitoring programs. This information is consistent with the objectives described in the Offsite Dose Calculation Manual and 10 CFR 50, Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion 'As Low as is Reasonably Achievable' for Radioactive Material In Light-Water-Cooled Nuclear Power Reactor Effluents," Sections IV.B.2, IV.B.3, and IV.C. Technical Specification 5.6.2 requires the Annual Radiological Environmental Operating Report to be submitted by May 15 of each year.

If you have any questions regarding this information, please contact Marta Spillie, Regulatory Assurance Manager, at (815) 417-4833.

Respectfully,

on Behalf of

Marri Marchionda-Palmer
Site Vice President
Braidwood Station

cc: US NRC Regional Administrator, Region III
US NRC Senior Resident Inspector - Braidwood Station
NRR Project Manager - Braidwood Station
Illinois Emergency Management Agency - Division of Nuclear Safety

Docket No: 50-456
50-457

BRAIDWOOD STATION

UNIT 1 and UNIT 2

Annual Radiological
Environmental Operating Report

1 January through 31 December 2017

Prepared By
Teledyne Brown Engineering
Environmental Services

Braidwood Station
Braceville, IL 60407

May 2018

Intentionally left blank

Table Of Contents

Appendices

I. Preface

The following sections of the preface are meant to help define key concepts, provide clarity, and give context to the readers of this report.

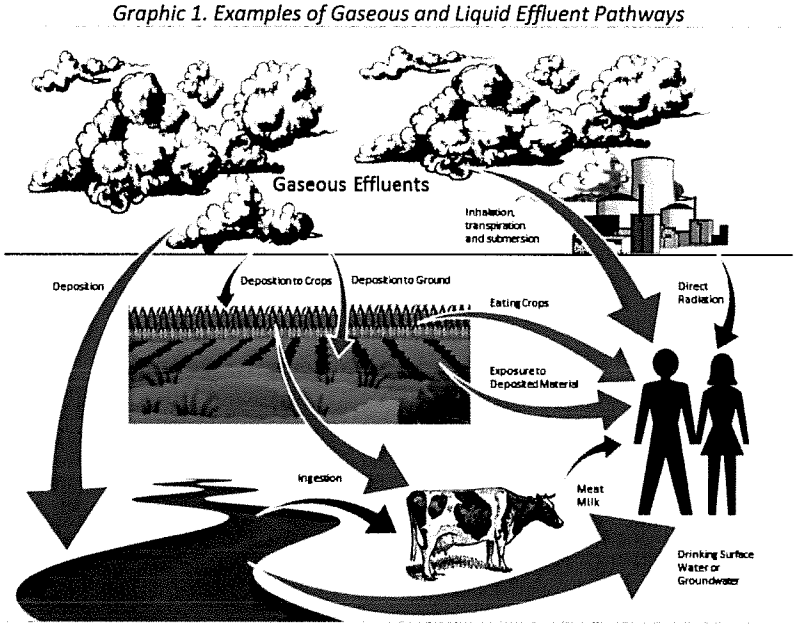
Annual Reports

The Nuclear Regulatory Commission (NRC) is the federal agency who has the role to protect public health and safety through the development of regulations governing nuclear power reactors and ensuring their compliance. As part of the many commitments Nuclear Power Plants have NRC to ensure this safety, they provide two reports annually to specifically address how the station's operation impacts the environment of local communities. The NRC then reviews these reports and makes them available to the public. The names of the reports are the Annual Radioactive Effluent Release Report (ARERR) and the Annual Radiological Environmental Operating Report (AREOR).

The ARERR reports the results of the sampling from the effluent release paths at the station analyzed for radioactivity. An effluent is a liquid or gaseous waste containing plant-related radioactive material emitted at the boundary of the facility.

The AREOR reports the results of the samples obtained in the environment surrounding the station. Environmental samples include air, water, vegetation, and other sample types that are identified as potential pathways radioactivity can reach humans.

Graphic 1. Examples of Gaseous and Liquid Effluent Pathways

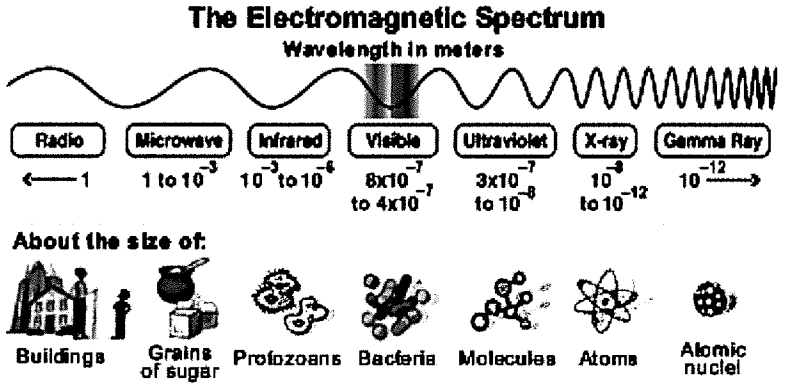


Graphic 1 demonstrates some potential exposure pathways from Braidwood Nuclear Power Station. The ARERR and AREOR together ensure Nuclear Power Plants are operating in a manner that is within established regulatory commitments meant to adequately protect the public.

Understanding Radiation

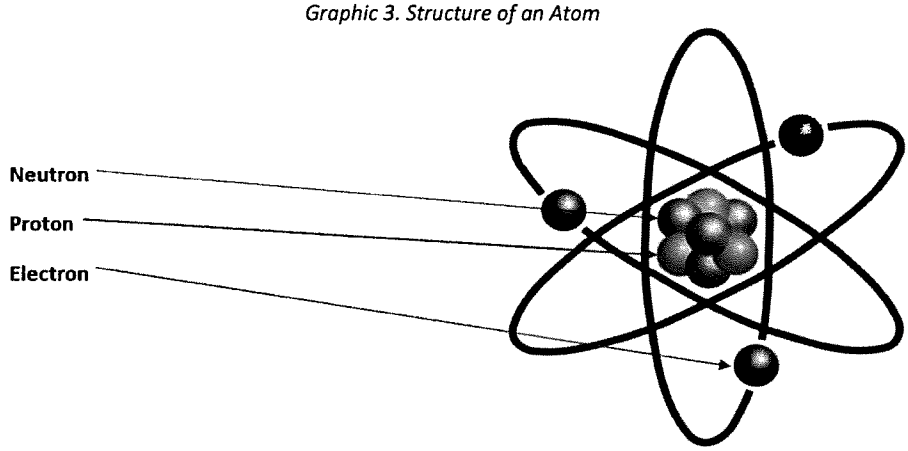
Generally radiation is defined as emitted energy in the form of waves or particles. If radiation has enough energy to displace electrons from an atom it is termed "ionizing", otherwise it is "non-ionizing". Non-Ionizing radiation includes light, heat given off from a stove, radiowaves and microwaves. Ionizing radiation occurs in atoms, particles too small for the eye to see. So, what are atoms and how does radiation come from them?

Graphic 2. Types of Radiation, from NASA Hubblesite



An atom is the smallest part of an element that maintains the characteristics of that element. Atoms are made up of three parts: protons, neutrons, and electrons.

Graphic 3. Structure of an Atom



The number of protons in an atom determines the element. For example, a hydrogen atom will always have one proton while an oxygen atom will always

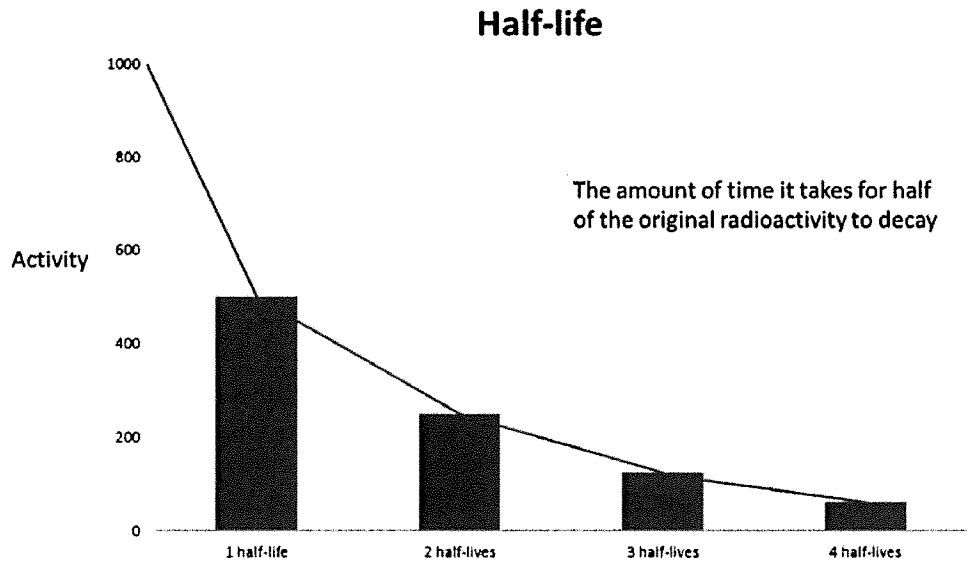
have eight protons. The protons are clustered with the neutrons forming the nucleus at the center of the atom. Orbiting around the nucleus are the relatively small electrons.

Isotopes are atoms that have the same number of protons but different numbers of neutrons. Different isotopes of an element will all have the same chemical properties and many isotopes are radioactive while other isotopes are not radioactive. A radioactive isotope can emit radiation because it contains excess energy in its nucleus. Radioactive atoms and isotopes are also referred to as radionuclides and radioisotopes.
There are two basic ways that radionuclides are produced at a nuclear power plant. The first is fission, which creates radionucides that are called *fission products.* Fission occurs when a very large atom, such as uranium-235 (U-235) or plutonium-239 (Pu-239), absorbs a neutron into its nucleus making the atom unstable. The unstable atom can then split into smaller atoms. When fission occurs there is a large amount of energy released, in the form of heat. A nuclear power plant uses the heat generated to boil water that spins turbines to produce electricity.

The second way a radionuclide is produced at a nuclear power plant is through a process called activation. Radionuclides produced in this method are termed *activation products*. Pure water that passes over the fissioning atoms is used to cool the reactor and also produce steam to turn the turbines. Although this water is considered to be very pure, there are always some contaminants within the water from material used in the plant's construction and operation. These contaminants are exposed to the fission process and may become activation products. The atoms in the water itself can also become activated and create radionuclides.

Over time, radioactive atoms will reach a stable state and no longer be radioactive. To do this they must release their excess energy. This release of excess energy is called radioactive decay. The time it takes for a radionuclide to become stable is measured in units called half-lives. A half-life is the amount of time it takes for half of the original radioactivity to decay. Each radionuclide has a specific half-life. Some half-lives can be very long and measured in years while others may be very short and measured in seconds.

Graphic 4. Radioactive Decay Half-Life



In the annual reports you will see both man made and naturally ocurring radionuclides listed, for example potassium-40 (K-40, natural) and cobalt-60 (Co-60, man-made). We are mostly concerned about man-made radionuclides because they can be produced as by-products when generating electricity at a nuclear power plant. It is important to note that there are also other ways man-made radionuclides are produced, such as detonating nuclear weapons. Weapons testing has deposited some of the same man-made radionuclides into the environment as those generated by nuclear power, and some are still present today because of long half-lives.

Measuring Radiation

There are four different but interrelated units for measuring radioactivity, exposure, absorbed dose, and dose equivalent. Together, they are used to scientifically report the amount of radiation and its effects on humans.

- Radioactivity refers to the amount of ionizing radiation released by a material. The units of measure for radioactivity used within the AREOR and ARERR are the Curie (Ci). Small fractions of the Ci often have a prefix, such as the microCurie (μCi), which means 1/1,000,000 of a Curie.

- Exposure describes the amount of radiation traveling through the air. The units of measure for exposure used within the AREOR and ARERR are the Roentgen (R). Traditionally direct radiation monitors placed around the site are measured milliRoentgen (mR), 1/1,000 of one R.

- Absorbed dose describes the amount of radiation absorbed by an object or person. The units of measure for absorbed dose used within the

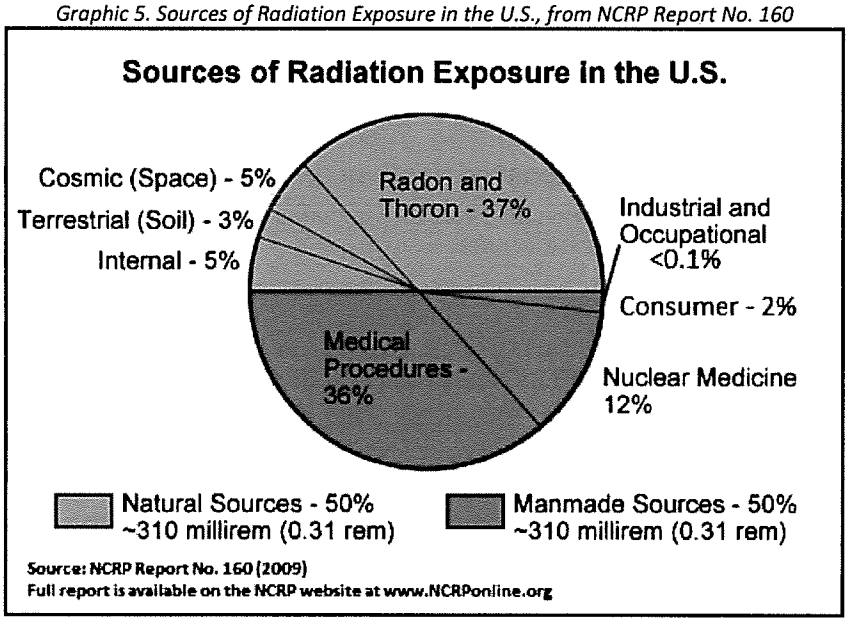
AREOR and ARERR are the rad. Noble gas air doses are reported by the site are measured in millirad (mrad), 1/1,000 of one rad.

- Dose equivalent (or effective dose) combines the amount of radiation absorbed and the health effects of that type of radiation. The units used within the AREOR and ARERR are the Roentgen equivalent man (rem). Regulations require doses to the whole body, specific organ, and direct radiation to be reported in millirem (mrem), 1/1,000 of one rem.

Sources of Radiation

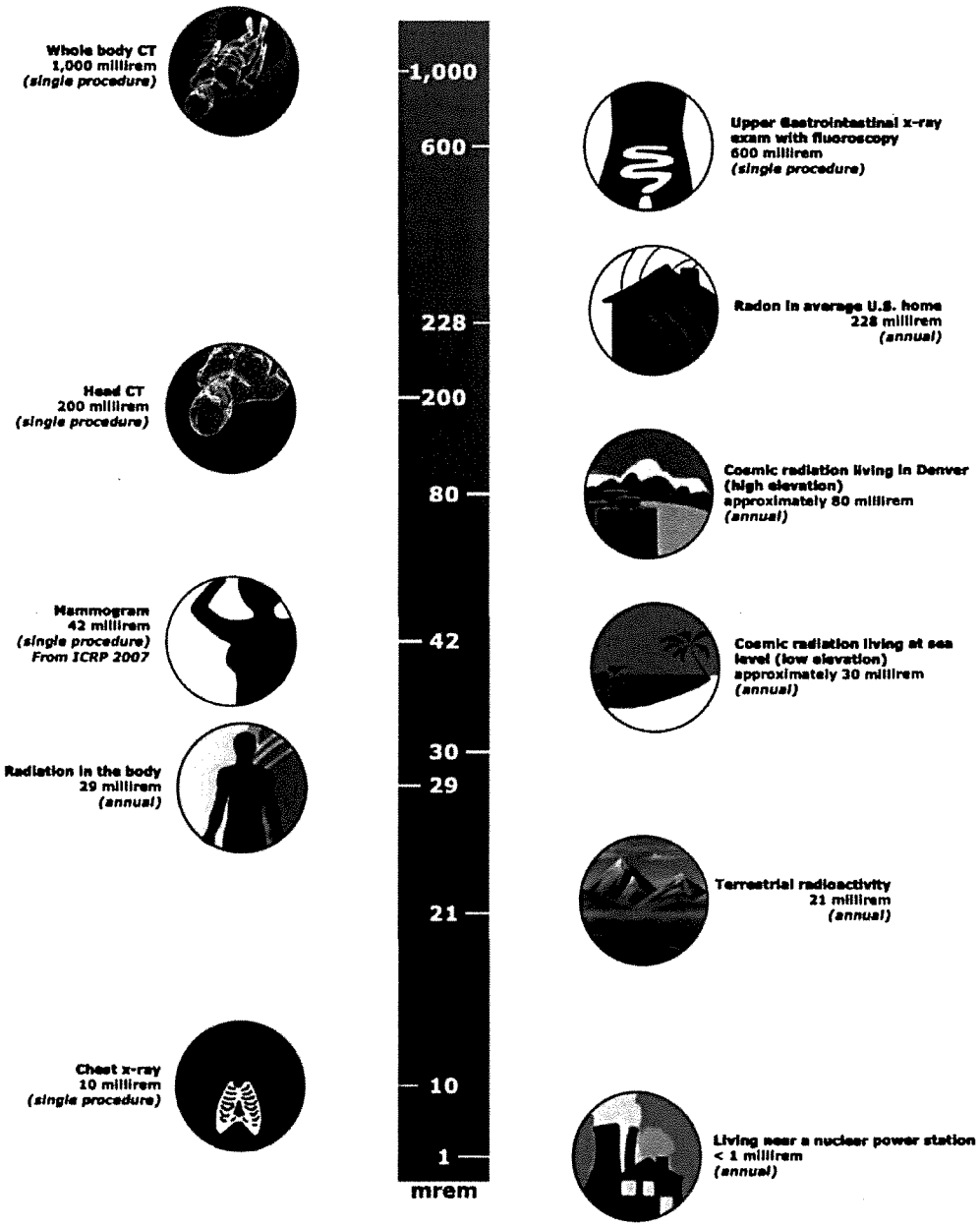
People are exposed to radiation every day of their lives and have been since the dawn of mankind. Some of this radiation is naturally occurring while some is man-made. There are many factors that will determine the amount of radiation individuals will be exposed to such as where they live, medical treatments, etc. The average person in the United States is exposed to approximately 620 mrem each year. Half of this exposure, 310 mrem, comes from natural sources and the other half, 310 mrem, from man-made sources. Graphic 5 shows what the typical sources of radiation are for an individual over a calendar year:

Graphic 5. Sources of Radiation Exposure in the U.S., from NCRP Report No. 160



The radiation from a nuclear power plant is included in the chart as part of the "Industrial and Occupational" fraction, <0.1%. The largest natural source of radiation is from radon, because radon gas travels in the air we breathe. Perhaps you know someone who had a CT scan at a hospital to check his or her bones, brain, or heart. CT scans are included in the chart as "Medical Procedures" which make up the next largest fraction. Graphic 6 on the following page shows some of the common doses humans receive from radiation every year.

Graphic 6 .Relative Doses from Radiation Sources, from EPA Radiation Doses and Sources

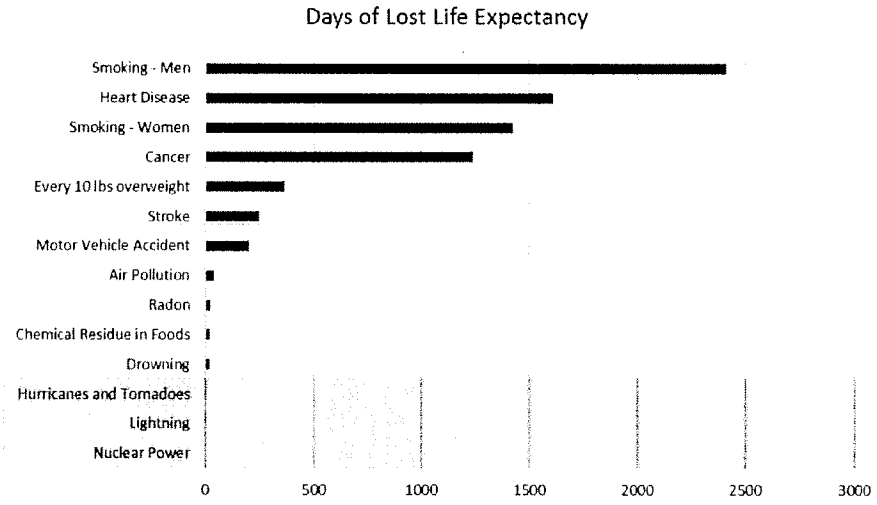


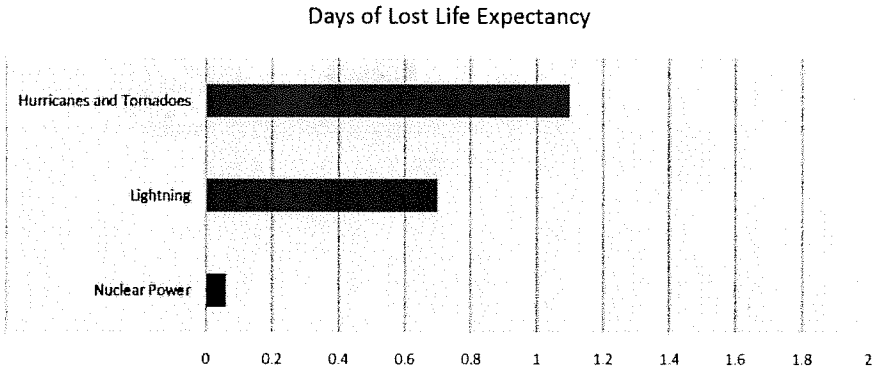
Radiation Risk

Current science suggests there is some risk from any exposure to radiation. However, it is very hard to tell whether cancers or deaths can be attributed to very low doses of radiation or by something else. U.S. radiation protection standards are based on the premise that any radiation exposure carries some risk.

The following graph is an example of one study that tries to relate risk from many different factors. This graph represents risk as "Days of Lost Life Expectancy". All the categories are averaged over the entire population except Male Smokers, Female Smokers, and individuals that are overweight. Those risks are only for people that fall into those categories. The category for Nuclear Power is a government estimate based on all radioactivity releases from nuclear power, including accidents and wastes.

Graphic 7. Days of Lost Life Expectancy, Adapted from the Journal of American Physicians and Surgeons Volume 8 Number 2 Summer 2003





II. Summary and Conclusions

This report on the Radiological Environmental Monitoring Program (REMP) conducted for Exelon's Braidwood Station covers the period January 1, 2017 through December 31, 2017. During that time period 1,699 analyses were performed on 1,375 samples. In assessing all the data gathered for this report and comparing these results with preoperational data, it was concluded that the operation of Braidwood Station had no adverse radiological impact on the environment.

Surface, public, and ground/well water samples were analyzed for concentrations of tritium and gamma-emitting nuclides. Surface water and public water samples were also analyzed for concentrations of gross beta. Gross beta and tritium activities detected were consistent with those detected in previous years. No fission or activation products were detected. As part of an effort to implement industry best practices, both gaseous and liquid station effluents were evaluated for all 10CFR61 required nuclides. Nuclides exceeding 1% relative abundance in the waste stream were added to the list of nuclides that Teledyne Brown evaluates in potentially impacted REMP matrices. For Braidwood Station, Nickel-63 (Ni-63) exceeds 1% relative abundance in the radwaste resins. Occasionally, Ni-63 is observed in liquid release tank quarterly composites, therefore, beginning in the fall of 2013 the station requested that Ni-63 be evaluated in the downstream surface water, sediment, and fish analyses. Ni-63 has not been observed in downstream surface water.

Fish (commercially and/or recreationally-important species) and sediment samples were analyzed for concentrations of gamma-emitting nuclides. No fission or activation products were detected in fish. Nickel-63 was not detected in any fish or sediment samples analyzed. Four of six sediment samples had Cs-137. The concentration was consistent with levels observed during the preoperational years. No plant-produced fission or activation products were found in sediment.

Air particulate samples were analyzed for concentrations of gross beta and gamma-emitting nuclides. No fission or activation products were detected.

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

Cow milk samples were analyzed for concentrations of I-131 and gamma-emitting nuclides. Iodine-131 was not detected in any milk samples. Concentrations of naturally-occurring Potassium-40 (K-40) were detected. No fission or activation products were found and all required LLDs (Lower Limit of Detection) were met.

Food Product samples were analyzed for concentrations of gamma-emitting nuclides. Two of thirty vegetation samples had Cs-137. The 2017 effluent data and historical trends were reviewed and positive results are consistent with Cs-137 concentrations present in background radiation from weapons testing

fallout.

Environmental gamma radiation measurements were performed quarterly using Optically Stimulated Luminescence Dosimeters (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 Thermo-luminescent 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).

III. Introduction

The Braidwood Station, consisting of two 3,645 MWt pressurized water reactors owned and operated by Exelon Corporation is located in Will County, Illinois. Unit No. 1 went critical on May 29, 1987. Unit No. 2 went critical on March 08, 1988. The site is located in northeastern Illinois, 20 miles south-southwest of Joliet, Illinois, 60 miles southwest of Chicago and southwest of the Kankakee River.

This report covers those analyses performed by Teledyne Brown Engineering (TBE) and Landauer Technologies on samples collected during the period January 1, 2017 through December 31, 2017.

A. Objectives of the 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

IV. Program Description

A. Sample Collection

Samples for the Braidwood Station REMP were collected for Exelon Nuclear by Environmental Inc. Midwest Labs (EIML). This section describes the general collection methods used by EIML to obtain environmental samples for the Braidwood Station REMP in 2017. Sample locations and descriptions can be found in Table B–1 and Figures B–1 through B–3, Appendix B. The sampling 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, public water, well water, fish, and sediment. Two gallon water samples were collected weekly from six surface water locations (BD-10, BD-25 [control], BD-38, BD-40, BD-55 and BD-56), and one weekly composite sample of public drinking water at location (BD-22) and ground/well water samples collected quarterly from eight locations (BD-13, BD-34, BD-35, BD-36, BD-37, BD-50, BD-51 and BD-54). All samples were collected in new plastic bottles, which were rinsed with source water prior to collection per procedure. Fish samples comprising the flesh of golden redhorse, shorthead redhorse, smallmouth bass, channel catfish, quillback, common carp, and largemouth bass were collected semiannually at three locations, BD-25 (control), BD-28 and BD-41. Sediment samples composed of recently deposited substrate were collected at three locations semiannually, BD-10, BD-25 (control), and BD-57.

Atmospheric Environment

The atmospheric environment was evaluated by performing radiological analyses on samples of air particulate and airborne iodine. Air particulate samples were collected and analyzed weekly at eight locations (BD-02, BD-03 [control], BD-04, BD-05, BD-06, BD-19, BD-20 and BD-21). 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

The terrestrial environment was evaluated by performing radiological analyses on milk and food product samples. Milk samples were collected

biweekly at two locations (BD-17 and BD-18 [control]) from May through October and monthly from November through April. All samples were collected in new two gallon plastic bottles from the bulk tank at each location, preserved with sodium bisulfite and shipped promptly to the laboratory. Food products were collected annually in at five locations (BD-Control, BD-Quad 1, BD-Quad 2, BD-Quad 3 and BD-Quad 4). 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 Dosimeters (OSLD) were deployed and the use of Thermoluminescent Dosimeters (TLD) was 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 2 OSLDs. The OSLDs were exchanged quarterly and sent to Landauer for analysis. The OSLDs were placed at locations on and around the Braidwood Station site as follows:

An inner ring consisting of 16 locations (BD-101, BD-102, BD-103, BD-104, BD-105, BD-106, BD-107, BD-108, BD-109, BD-110, BD-111a, BD-112, BD-113a, BD-114, BD-115 and BD-116) at or near the site boundary.

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

An additional (other) set consisting of seven locations (BD-02, BD-04, BD-05, BD-06, BD-19, BD-20 and BD-21).

The balance of one location (BD-03) represents the control area.

The specific OSLD locations were determined by the following criteria:

1. The presence of relatively dense population;

2. Site meteorological data taking into account distance and elevation for each of the sixteen–22 1/2 degree sectors around the site

3. Where estimated annual dose from Braidwood Station, if any, would be most significant.

B. Sample Analysis

This section describes the general analytical methodologies used by TBE to analyze the environmental samples for radioactivity for the Braidwood Station REMP in 2017. The analytical procedures used by the laboratories are listed in Table B-2.

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

1. Concentrations of beta emitters in public and surface water and air particulates

2. Concentrations of gamma emitters in public, ground/well and surface water, air particulates, milk, fish, sediment and food products

3. Concentrations of tritium in public, ground/well and surface water

4. Concentrations of I-131 in air, milk and public water

5. Concentrations of Ni-63 in surface water, fish and sediment

6. Ambient gamma radiation levels at various site environs

C. Data Interpretation

The radiological and direct radiation data collected prior to Braidwood Station becoming operational were used as a baseline with which these operational data were compared. For the purpose of this report, Braidwood Station was considered operational at initial criticality. In addition, data was 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 Braidwood Station detection capabilities for environmental sample analysis.

The MDC is the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal. The MDC is an *a posteriori* determination.

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 resulting in 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 surface, ground/well water, and fish 12 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 public water, sediment, air particulate, milk and vegetation 11 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 the single analysis uncertainty.

D. Program Exceptions

For 2017, the Braidwood Station REMP had a sample recovery rate in excess of 99.8%. 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
APAI	BD-20	01/05/17	No apparent reason for low reading of 161.2 hours
WG	BD-13	01/12/17	Sample not available (obtained 01/19/17)
WG	BD-36	01/12/17	Sample not available - house vacant, water off (obtained 02/20/17)
MI	BD-17,18	04/06/17	Samples lost in transit to TBE by FedEx (recollected 04/20/17)
WG	BD-13	04/13/17	Sample not available due to well repair (obtained 04/20/17)
WG	BD-36	04/13/17	Sample not available- house vacant, water off (obtained 04/22/17)
APAI	BD-05	05/18/17	Pump exchange was overdue (due 04/18/17). Collector checked pump and exchanged the pump on 05/18/17. Exchange date is for recommended maintenance but no signs of pump degradation were noted.
APAI	BD-04	06/15/17	Low reading of 150.2 hours possibly due to power outage from storms
APAI	BD-20	11/30/17	Temporary power outage at sampler; timer reading = 192.0; flow 61 CFH (average of previous 4 weeks) NOTE: According to the timer reading on 12/07/17, the power was out for approximately 15 minutes.
APAI	BD-21	11/30/17	Temporary power outage at sampler; timer reading = 192.1; flow 60 CFH (average of previous 4 weeks) NOTE: According to the timer reading on 12/07/17, the power was out for approximately 15 minutes.
APAI	BD-04	12/28/17	No apparent reason for low reading of 121.1 hours; timer working properly. NOTE: Timer reading on 01/04/18 was normal.

Table D-2 LISTING OF MISSED SAMPLES

Sample Type	Location Code	Collection Date	Reason
WT	BD-55,56	01/05/17	No sample; water frozen
WT	BD-10,55,56	01/12/17	No sample; water frozen
WT	BD-56	02/02/17	No sample; water frozen
WT	BD-56	02/09/17	No sample; water frozen
OSLD	BD-106-1	03/30/17	OSLD found missing during quarterly exchange; collector placed new 2nd quarter
APAI	ALL	04/06/17	Samples lost by FedEx in transit to TBE; tracked to Louisville, TN hub; FedEx unable to locate cooler after this point
OSLD	BD-215-2	06/29/17	OSLD found missing during quarterly exchange; collector replaced with new 3rd quarter OSLD
OSLD	BD-206-2	12/07/17	OSLD found missing during monthly visual check; OSLD was replaced with a spare, however spare was not processed by dosimetry vendor
WT	BD-25,56	12/14/17	No sample; water frozen
WT	BD-25,38,55,56	12/28/17	No sample; water frozen

Each program exception was reviewed to understand the causes of the program exception. Sampling and maintenance issues were reviewed with the personnel involved to prevent recurrence. Occasional equipment breakdowns, power outages and weather related issues were unavoidable.

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

E. Program Changes

There was a program change to the frequency of vegetation samples requested. EIML will collect samples continuously during the growing season (June-October) instead of the one-time harvest sample check. This change will be documented in an ODCM revision scheduled for 2018.

Due to past issues with food products sampling, Braidwood Station instituted sampling from an onsite garden in 2016, on a trial basis. This sampling was not continued in 2017. However, the Station intends to implement this additional food product sampling by including this onsite sampling plan in the pending ODCM change.

IV. Results and Discussion

A. Aquatic Environment

1. Surface Water

Samples were taken weekly and composited monthly at six locations (BD-10, BD-25 (control), BD-38, BD-40, BD-55 and BD-56). Of these locations, only BD-10 could be affected by Braidwood Station's effluent releases as it is downstream of the NPDES permitted outfall. The following analyses were performed:

Gross Beta

Samples from all locations were analyzed for concentrations of gross beta (Table C–I.1, Appendix C). Gross beta was detected in 62 of 72 samples. The values ranged from 2.7 to 11.6 pCi/L. Concentrations detected were consistent with those detected in previous years (Figures C–1 through C-3, Appendix C).

Tritium

Quarterly composites of weekly collections were analyzed for tritium activity (Table C–I.2, Appendix C). Tritium activity was detected in one sample. The value was 216 pCi/L. Concentrations detected were consistent with those detected in previous years (Figures C–4 through C-6, Appendix C).

Nickel-63

Monthly samples were analyzed for Ni-63 activity (Table C–I.3, Appendix C). Ni-63 was not detected and the required LLD was met.

Gamma Spectrometry

Samples from all locations were analyzed for gamma-emitting nuclides (Table C–I.4, Appendix C). No nuclides were detected and all other required LLDs were met.

2. Public Water

Monthly composites of weekly samples were made at one location (BD-22). This location could be affected by Braidwood Station's effluent releases. The following analyses were performed:

Gross Beta

Samples from the location were analyzed for concentrations of gross beta (Tables C–II.1, Appendix C). Gross beta was detected in 8 of 12 samples. The values ranged from 2.7 to 5.4 pCi/L. Concentrations detected were consistent with those detected in previous years (Figure C–7, Appendix C).

Tritium

Monthly composites of weekly samples from BD-22 were analyzed for tritium activity (Table C–II.2, Appendix C). Tritium was detected in 11 of 12 samples. Concentrations ranged from 208 to 1,540 pCi/L. Concentrations detected were consistent with those detected in previous years (Figure C–8, Appendix C).

Iodine

Monthly composites of weekly samples from the location were analyzed for I-131 (Table C-II.3, Appendix C). Iodine was not detected in any samples and the required LLD was met.

Gamma Spectrometry

Samples from the location were analyzed for gamma-emitting nuclides (Table C–II.4, Appendix C). No nuclides were detected and all required LLDs were met.

3. Ground/Well Water

Quarterly samples were collected at eight locations (BD-13, BD-34, BD-35, BD-36, BD-37, BD-50, BD-51 and BD-54). The following analyses were performed:

Tritium

Quarterly grab samples from the locations were analyzed for tritium activity (Table C–III.1, Appendix C). Tritium was not detected in any sample and the required LLD was met. Concentrations were consistent with those in previous years. (Figures C–9 through C–13, Appendix C).

Gamma Spectrometry

Samples from all locations were analyzed for gamma-emitting nuclides (Table C–III.2, Appendix C). No nuclides were detected

and all required LLDs were met.

4. Fish

Fish samples comprised of golden redhorse, shorthead redhorse, smallmouth bass, channel catfish, quillback, common carp, and largemouth bass were collected at three locations (BD-25, BD-28, and BD-41) semiannually. Location BD-28 could be affected by Braidwood Station's effluent releases. The following analyses were performed:

Nickel-63

The edible portion of fish samples from all three locations was analyzed for Ni-63 activity (Table C–IV.1, Appendix C). Ni-63 was not detected and the required LLD was met.

Gamma Spectrometry

The edible portion of fish samples from all three locations was analyzed for gamma-emitting nuclides (Table C–IV.1, Appendix C). No fission or activation products were found. No nuclides were detected and all required LLDs were met.

5. Sediment

Aquatic sediment samples were collected at three locations (BD-10, BD-25, and BD-57) semiannually. The locations at the Braidwood Station outfall to the Kankakee River and downstream of the outfall, could be affected by Braidwood Station's effluent releases. The following analyses were performed:

Nickel-63

Sediment samples from all three locations was analyzed for Ni-63 activity (Table C–V.1, Appendix C). Ni-63 was not detected and the required LLD was met.

Gamma Spectrometry

Sediment samples from the location were analyzed for gamma-emitting nuclides (Table C–V.1, Appendix C). Concentrations of the fission product Cs-137 were found at all three locations. The concentrations ranged from 88 ± 60 pCi/kg dry to 164 ± 72 pCi/kg dry. These concentrations of Cs-137 were less than the required Cs-137 in sediment LLD of 180 pCi/kg dry. Based on values

calculated using NCRP Report 154, *Cesium-137 In the Environment: Radioecology and Approaches to Assessment and Management (2006),* expected decay-corrected concentrations of Cs-137 from fallout would be between 321 and 4819 pCi/kg dry. The activity detected is below these levels and consistent with fallout. No other Braidwood fission or activation products were found and all required LLDs were met.

B. Atmospheric Environment

1. Airborne

a. Air Particulates

Continuous air particulate samples were collected from eight locations on a weekly basis. The eight locations were separated into three groups: Near field samplers (BD-06, BD-19, BD-20 and BD-21), far field samplers within 10 km of the site (BD-02, BD-04 and BD-05) and the Control sampler between 10 and 30 km from the site (BD-03). The following analyses were performed:

Gross Beta

Weekly samples were analyzed for concentrations of beta emitters (Table C–VI.1 and C-VI.2, Appendix C). Detectable gross beta activity was observed at all locations. Comparison of results among the three groups aid in determining the effects, if any, resulting from the operation of Braidwood Station. The results from the near field (Group I) ranged from 7E-03 to 36E-03 pCi/m^3 with a mean of 17E-03 pCi/m^3. The results from the far field (Group II) ranged from 6E-03 to 31E-03 pCi/m^3 with a mean of 17E-03 pCi/m^3. The results from the Control location (Group III) ranged from 7E-03 to 30E-03 pCi/m^3 with a mean of 16E-03 pCi/m^3. Comparison of the 2017 air particulate data with previous years' data indicate no effects from the operation of Braidwood Station. Additionally, a comparison of the weekly mean values for 2017 indicate no notable differences among the three groups (Figures C–14 through C-18, Appendix C).

Gamma Spectrometry

Weekly samples were composited quarterly and analyzed for gamma-emitting nuclides (Table C–VI.3, Appendix C). No nuclides were detected and all required LLDs were met.

b. Airborne Iodine

Continuous air samples were collected from eight locations (BD-02, BD-03, BD-04, BD-05, BD-06, BD-19, BD-20 and BD-21) and analyzed weekly. The following analysis was performed:

I-131

Continuous air samples were collected from eight locations for I-131 (Table C–VII.1, Appendix C). All results were less than the minimum detectable concentration for I-131. The required LLD was met for all analyses.

C. Terrestrial Environment

1. Milk

Samples were collected from two locations (BD-17 and control location BD-18). Sampling frequencies were increased to biweekly in May and continued through October and monthly sampling was performed November through April. The following analyses were performed:

Iodine-131

Milk samples from the indicator location were analyzed for concentrations of I-131 (Table C–VIII.1, Appendix C). Iodine-131 was not detected in any samples. All required LLDs were met.

Gamma Spectrometry

Each milk sample was analyzed for concentrations of gamma-emitting nuclides (Table C–VIII.2, Appendix C). No nuclides were detected and all required LLDs were met.

2. Food Products

Food product samples were collected at five locations that could be affected by Braidwood Station's effluent releases: BD-Control, BD-Quad 1, BD-Quad 2, BD-Quad 3 and BD-Quad 4 when available. The following analysis was performed:

Gamma Spectrometry

Samples from all locations were analyzed for gamma-emitting nuclides (Table C–IX.1, Appendix C). Concentrations of Cs-137 were found at two locations. One of these samples was a root vegetable and the other was a leaf vegetable that contained dirt in the sample. The concentrations ranged from 35 ± 23 pCi/kg wet (leafy vegetable) to 124 ± 33 pCi/kg wet (root vegetable). Gaseous and liquid effluent data were reviewed for 2017 and showed no Cs-137 values above LLD concentrations. Visual inspection of both samples with positive results showed trace amounts of soil were present during analysis. The results are below the expected fallout concentrations of sediment for Braidwood calculated using NCRP Report 154. Additionally, these results were trended against historical vegetation, soil, and sediment results and were consistent with previous positive results. No other nuclides were detected and all required LLDs were met.

D. Ambient Gamma Radiation

Ambient gamma radiation levels were measured utilizing Optically Stimulated Luminescence Dosimeter (OSLD). 90 OSLD locations were established around the site. Results of OSLD measurements are listed in Tables C–X.1 to C–X.3, Appendix C.

Most OSLD measurements were below 30 mrem/quarter, with a range of 17.3 to 42.1 mrem/quarter. A comparison of the Inner Ring, Outer Ring and Other data to the Control Location data, indicate that the ambient gamma radiation levels from all locations were similar.

The highest ISFSI location on site, BD-105-4, averaged 36.6 mrem/quarter vs. 20.3 mrem/quarter for BD-03-1 and 21.4 mrem/quarter for BD-03-2. This difference is statistically significant. Dose was assessed in the ARERR to the nearest resident and was found to be 0.34 mrem for the year.

E. Land Use Survey

A Land Use Survey conducted during August 2017 around the Braidwood Station was performed by EIML for Exelon Nuclear to comply with section 12.5.2 of the Braidwood Station's Offsite Dose Calculation Manual ODCM). The purpose of the survey was to document the nearest resident, milk-producing animal and garden of greater than 500 ft^2 in each of the sixteen 22 ½ degree sectors around the site. For dose calculation, a garden is assumed at the nearest residence. The only changes identified between the 2017 survey and the previous year's survey were

related to livestock. Three sectors (ENE, S, SW) that were previously had beef cattle, had no cattle in the 2017 survey. There were no changes required to the Braidwood Station REMP as a result of this survey. The results of this survey are summarized below:

Distance in Miles from the Braidwood Station Reactor Buildings			
Sector	Residence Miles	Livestock Miles	Milk Farm Miles
(A) N	0.50	2.6	-
(B) NNE	0.88	-	-
(C) NE	0.65	-	-
(D) ENE	0.75	-	-
(E) E	1.50	2.3	-
(F) ESE	2.20	2.3	-
(G) SE	2.70	2.7	-
(H) SSE	4.50	-	-
(J) S	4.20	-	-
(K) SSW	1.30	5.3	5.5
(L) SW	0.40	-	-
(M) WSW	0.45	-	-
(N) W	0.35	1.6	8.7
(P) WNW	0.40	-	-
(Q) NW	0.40	-	-
(N) W	0.7		
(P) WNW	0.7		
(Q) NW	0.7		

F. Errata Data

There was no errata data for 2017.

G. Summary of Results – Inter-Laboratory Comparison Program

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

1. Analytics Evaluation Criteria

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

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, National Environmental Laboratory Accreditation Conference (NELAC), state-specific Performance Testing (PT) program requirements or ERA's SOP for the Generation of Performance Acceptance Limits, as applicable. The acceptance limits are either determined by a regression equation specific to each analyte or a fixed percentage limit promulgated under the appropriate regulatory document.

3. DOE Evaluation Criteria

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

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

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

For the TBE laboratory, 168 out of 173 analyses performed met the specified acceptance criteria. Five analyses did not meet the specified acceptance criteria for the following reasons and were addressed through the TBE Corrective Action Program.

1. The ERA April 2017 two nuclides in water were evaluated as *Not Acceptable*. (NCR 17-09)
   a. The Zn-65 result of 39.3 pCi/L, exceeded the lower acceptance limit of 47.2. The known value was unusually low for this study. The sample was run in duplicate on two different detectors. The results of each were 39.3 ± 18.2 pCi/L (46% error and lower efficiency) and 59.3 ± 8.23 pCi/L (13.9% error and higher efficiency). The result from the 2nd detector would have been well within the acceptable range (47.2 – 65.9) and 110.2% of the known value of 53.8 pCi/L.

b. The Sr-89 result of 40.7 pCi/L exceeded the lower acceptance limit of 53.8. All associated QC and recoveries were reviewed and no apparent cause could be determined for the failure. The prior three cross-check results were from 99 – 115% of the known values and the one that followed this sample (November, 2017) was 114% of the known value.

2. The DOE MAPEP August 2017 air particulate U-238 result of 0.115 ± 0.025 Bq/sample was higher than the known value of 0.087 ± 0.002 with a ratio of 1.32, therefore the upper ratio of 1.30 (acceptable with warning) was exceeded. TBE's result with error easily overlaps with the acceptable range. MAPEP does not evaluate results with any associated error. Also, the spike level for this sample was very low (2.35 pCi) compared to TBE's normal LCS of 6 pCi. TBE considers this result as passing. (NCR 17-15)

3. The Analytics September 2017 soil Cr-51 result was evaluated as *Not Acceptable* (Ratio of TBE to known result at 0.65). The reported value was 0.230 ± 0.144 pCi/g and the known value was 0.355 ± 0.00592 pCi/g. The sample was counted overnight for 14 hours, however the Cr-51 was spiked at a very low level and had a counting error of 65%. Cr-51 has a 27-day half-life, making low-level quantification even more difficult. The error does not appear to have been taken into consideration for this result. If it had been evaluated with the error, the highest result would have been 105% of the reference value, which is acceptable. Also, the known value is significantly lower than TBE's typical MDC for this nuclide in a soil matrix and would typically not be reported to clients (unless specified). The results of all of the previous cross-checks have been in the acceptable (80 – 120%) range. TBE will evaluate further upon completion of the next ICP sample. (NCR 17-16)

4. The ERA November 2017 water Sr-90 sample was evaluated as *Not Acceptable*. TBE's result of 27.1 pCi/L exceeded the lower acceptance range (30.8 – 48.0 pCi/L). After reviewing the associated QC data for this sample, it was determined that although the spike recovery for Sr-90 was within our laboratory guidelines (70% -130%), both the spike result and our ERA result were biased low. The original cross-check sample was completely consumed and we were unable to reanalyze before submitting the result. We have modified our preparation process to avoid this situation for future cross-check samples. We also have enhanced LIMS programming to force a LCSD when a workgroup includes cross-check samples (as opposed to running a DUP). (NCR 17-19)

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

Intentionally left blank

APPENDIX A

RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT ANNUAL SUMMARY

Intentionally left blank

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR BRAIDWOOD STATION, 2017

NAME OF FACILITY: BRAIDWOOD						DOCKET NUMBERS:	50-456 & 50-457	
LOCATION OF FACILITY: BRACEVILLE, IL						REPORTING PERIOD:	2017	
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**	72	4	5.5 (53/60) *2.7 - 11.6*	4.5 (9/12) *3.3 - 6.2*	8.5 (12/12) *5.1 - 11.6*	BD-40 INDICATOR BRAIDWOOD STATION COOLING LAKE ONSITE	0
	H-3	24	200	216 (1/20)	<LLD	216 (1/4)	BD-10 INDICATOR KANKAKEE RIVER DOWNSTREAM 5.4 MILES NE OF SITE	0
	NI-63	72	30	<LLD	<LLD	-		0
	GAMMA	72						
	MN-54		15	<LLD	<LLD	-		0
	CO-58		15	<LLD	<LLD	-		0
	FE-59		30	<LLD	<LLD	-		0
	CO-60		15	<LLD	<LLD	-		0
	ZN-65		30	<LLD	<LLD	-		0
	NB-95		15	<LLD	<LLD	-		0
	ZR-95		30	<LLD	<LLD	-		0
	I-131		15	<LLD	<LLD	-		0
	CS-134		15	<LLD	<LLD	-		0
	CS-137		18	<LLD	<LLD	-		0
	BA-140		60	<LLD	<LLD	-		0
	LA-140		15	<LLD	<LLD	-		0
PUBLIC WATER *(PCI/LITER)*	**GR-B**	12	4	3.3 (8/12) *2.7 - 5.4*	NA	3.3 (8/12) *2.7 - 5.4*	BD-22 INDICATOR WILMINGTON 6.0 MILES NE OF SITE	0
	H-3	12	200	614 (11/12) *208 - 1540*	NA	614 (11/12) *208 - 1540*	BD-22 INDICATOR WILMINGTON 6.0 MILES NE OF SITE	0
	I-131	12	1	<LLD	NA	-		0

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

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR BRAIDWOOD STATION, 2017

NAME OF FACILITY: BRAIDWOOD						DOCKET NUMBERS:	50-456 & 50-457	
LOCATION OF FACILITY: BRACEVILLE, IL						REPORTING PERIOD:	2017	
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
PUBLIC WATER	**GAMMA**	12						
(PCI/LITER)	*MN-54*		15	<LLD	NA	-		0
	CO-58		15	<LLD	NA	-		0
	FE-59		30	<LLD	NA	-		0
	CO-60		15	<LLD	NA	-		0
	ZN-65		30	<LLD	NA	-		0
	NB-95		15	<LLD	NA	-		0
	ZR-95		30	<LLD	NA	-		0
	CS-134		15	<LLD	NA	-		0
	CS-137		18	<LLD	NA	-		0
	BA-140		60	<LLD	NA	-		0
	LA-140		15	<LLD	NA	-		0
GROUND WATER	**H-3**	32	200	<LLD	NA	-		0
(PCI/LITER)								
	GAMMA	32						
	MN-54		15	<LLD	NA	-		0
	CO-58		15	<LLD	NA	-		0
	FE-59		30	<LLD	NA	-		0
	CO-60		15	<LLD	NA	-		0
	ZN-65		30	<LLD	NA	-		0
	NB-95		15	<LLD	NA	-		0
	ZR-95		30	<LLD	NA	-		0
	I-131		15	<LLD	NA	-		0
	CS-134		15	<LLD	NA	-		0
	CS-137		18	<LLD	NA	-		0
	BA-140		60	<LLD	NA	-		0
	LA-140		15	<LLD	NA	-		0
FISH	**NI-63**	12	260	<LLD	<LLD	-		0
(PCI/KG WET)								

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

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR BRAIDWOOD STATION, 2017

NAME OF FACILITY: BRAIDWOOD						DOCKET NUMBERS:	50-456 & 50-457	
LOCATION OF FACILITY: BRACEVILLE, IL						REPORTING PERIOD:	2017	
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
FISH	**GAMMA**	12						
(PCI/KG WET)	*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
	NB-95		NA	<LLD	<LLD	-		0
	ZR-95		NA	<LLD	<LLD	-		0
	I-131		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)*	**NI-63**	6	260	<LLD	<LLD	-		0
	GAMMA	6						
	MN-54		NA	<LLD	<LLD	-		0
	CO-58		NA	<LLD	<LLD	-		0
	FE-59		NA	<LLD	<LLD	-		0
	CO-60		NA	<LLD	<LLD	-		0
	ZN-65		NA	<LLD	<LLD	-		0
	NB-95		NA	<LLD	<LLD	-		0
	ZR-95		NA	<LLD	<LLD	-		0
	CS-134		150	<LLD	<LLD	-		0
	CS-137		180	128	96	148	BD-10 INDICATOR	0
				(3/4)	(1/2)	(2/2)	KANKAKEE RIVER DOWNSTREAM	
				88 - 164		*131 - 164*	5.4 MILES NE OF SITE	
	BA-140		NA	<LLD	<LLD	-		0
	LA-140		NA	<LLD	<LLD	-		0

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

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR BRAIDWOOD STATION, 2017

NAME OF FACILITY: BRAIDWOOD							DOCKET NUMBERS:	50-456 & 50-457	
LOCATION OF FACILITY: BRACEVILLE, IL							REPORTING PERIOD:	2017	
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
AIR PARTICULATE	**GR-B**		416	10	17	16	17	BD-04 INDICATOR	0
(E-3 PCI/CU.METER)					(364/364)	(52/52)	(52/52)	ESSEX	
					6 - 36	*7 - 30*	*6 - 31*	4.8 MILES SSE OF SITE	
	GAMMA		32						
		MN-54		NA	<LLD	<LLD	-		0
		CO-58		NA	<LLD	<LLD	-		0
		FE-59		NA	<LLD	<LLD	-		0
		CO-60		NA	<LLD	<LLD	-		0
		ZN-65		NA	<LLD	<LLD	-		0
		NB-95		NA	<LLD	<LLD	-		0
		ZR-95		NA	<LLD	<LLD	-		0
		CS-134		50	<LLD	<LLD	-		0
		CS-137		60	<LLD	<LLD	-		0
		BA-140		NA	<LLD	<LLD	-		0
		LA-140		NA	<LLD	<LLD	-		0
AIR IODINE	**GAMMA**		416						
(E-3 PCI/CU.METER)		*I-131*		70	<LLD	<LLD	-		0
MILK	**I-131**		38	1	<LLD	<LLD	-		0
(PCI/LITER)									
	GAMMA		38						
		MN-54		NA	<LLD	<LLD	-		0
		CO-58		NA	<LLD	<LLD	-		0
		FE-59		NA	<LLD	<LLD	-		0
		CO-60		NA	<LLD	<LLD	-		0
		ZN-65		NA	<LLD	<LLD	-		0
		NB-95		NA	<LLD	<LLD	-		0
		ZR-95		NA	<LLD	<LLD	-		0
		CS-134		15	<LLD	<LLD	-		0
		CS-137		18	<LLD	<LLD	-		0
		BA-140		60	<LLD	<LLD	-		0
		LA-140		15	<LLD	<LLD	-		0

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

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR BRAIDWOOD STATION, 2017

NAME OF FACILITY: BRAIDWOOD						DOCKET NUMBERS:	50-456 & 50-457	
LOCATION OF FACILITY: BRACEVILLE, IL						REPORTING PERIOD:	2017	
						LOCATION WITH HIGHEST ANNUAL MEAN (M)		
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*	MEAN (M) (F) *RANGE*	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
VEGETATION	**GAMMA**	30						
(PCI/KG WET)	*MN-54*		NA	<LLD	<LLD	-		0
	CO-58		NA	<LLD	<LLD	-		0
	FE-59		NA	<LLD	<LLD	-		0
	CO-60		NA	<LLD	<LLD	-		0
	ZN-65		NA	<LLD	<LLD	-		0
	NB-95		NA	<LLD	<LLD	-		0
	ZR-95		NA	<LLD	<LLD	-		0
	CS-134		60	<LLD	<LLD	-		0
	CS-137		80	77.9	<LLD	124	BD-QUAD 4 INDICATOR	0
				(2/26)		(1/6)	BRUCE SINKULAR	
				34.9 - 124.2		124	1.9 MILES NNW OF SITE	
	BA-140		NA	<LLD	<LLD	-		0
	LA-140		NA	<LLD	<LLD	-		0
DIRECT RADIATION	**OSLD-QUARTERLY**	341	NA	20.9	20.8	36.6	BD-105-4 INDICATOR	0
(MILLIREM/QTR.)				(332/332)	(8/8)	(4/4)		
				16.9 - 42.1	*18.2 - 22.4*	*29.3 - 42.1*	0.20 MILES SE	

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

Intentionally left blank

APPENDIX B

LOCATION DESIGNATION, DISTANCE & DIRECTION, AND SAMPLE COLLECTION & ANALYTICAL METHODS

TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Braidwood Station, 2017

Location	Location Description	Distance & Direction From Site
A. Surface Water		
BD-10	Kankakee River Downstream (indicator)	5.4 miles NE
BD-25	Kankakee River Upstream (control)	9.6 miles E
BD-38	Main Drainage Ditch (indicator)	1.5 miles SE
BD-40	Braidwood Station Cooling Lake (indicator)	Onsite
BD-55	North Pond Fatlan Site (indicator)	0.6 miles NE
BD-56	South Pond Fatlan Site (indictor)	0.6 miles NE
B. Drinking (Potable) Water		
BD-22	Wilmington (indicator)	6.0 miles NE
C. Ground/Well Water		
BD-13	Braidwood City Hall Well (indicator)	1.7 miles NNE
BD-34	Gibson Well (indicator)	4.7 miles E
BD-35	Joly Well (indicator)	4.7 miles E
BD-36	Hutton Well (indicator)	4.7 miles E
BD-37	Nurczyk Well (indicator)	4.7 miles E
BD-50	Skole Well (indicator)	4.7 miles E
BD-51	Fatlan Well (indicator)	0.6 miles NE
BD-54	Cash Well (indicator)	0.9 miles NE
D. Milk - bi-weekly / monthly		
BD-17	Halpin's Dairy (indicator)	5.5 miles SSW
BD-18	Biros' Farm (control)	8.7 miles W
E. Air Particulates / Air Iodine		
BD-02	Custer Park (indicator)	5.0 miles E
BD-03	County Line Road (control)	6.2 miles ESE
BD-04	Essex (indicator)	4.8 miles SSE
BD-05	Gardner (indicator)	5.5 miles SW
BD-06	Godley (indicator)	0.5 miles WSW
BD-19	Nearsite NW (indicator)	0.3 miles NW
BD-20	Nearsite N (indicator)	0.6 miles N
BD-21	Nearsite NE (indicator)	0.5 miles NE
F. Fish		
BD-25	Kankakee River, Upstream (control)	9.6 miles E
BD-28	Kankakee River, Discharge (indicator)	5.4 miles E
BD-41	Cooling Lake (indicator)	1.0 mile E
G. Sediment		
BD-10	Kankakee River, Downstream (indicator)	5.4 miles NE
BD-25	Kankakee River Upstream (control)	9.6 miles E
BD-57	Circulating Water Blowdown Discharge (indicator)	5.4 miles E

TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Braidwood Station, 2017

Location	Location Description	Distance & Direction From Site
H. Food Products		
Quadrant 1	Clark Farm	3.8 miles ENE
Quadrant 2	W.F. Soltwisch	4.5 miles SSE
Quadrant 3	Terri Schultz	4.8 miles SSW
Quadrant 4	Bruce Sinkular	1.9 miles NNW
Control	Gorman Farm	9.0 miles NE
I. Environmental Dosimetry - OSLD		
Inner Ring		
BD-101-3 and -4		0.5 miles N
BD-102-1 and -2		1.1 miles NNE
BD-103-1 and -2		1.0 mile NE
BD-104-1 and -2		0.7 miles ENE
BD-105-1 and -2		2.2 miles E
BD-106-1 and -2		2.5 miles ESE
BD-107-1 and -2		3.2 miles SE
BD-108-1 and -2		3.2 miles SSE
BD-109-1 and -2		3.8 miles S
BD-110-1 and -2		2.8 miles SSW
BD-111a-1 and -2		1.4 miles SW
BD-112-1 and -2		0.7 miles WSW
BD-113a-1 and -2		0.5 miles W
BD-114-1 and -2		0.4 miles WNW
BD-115-1 and -2		0.3 miles NW
BD-116-1		0.4 miles NNW
BD-116-2		0.5 miles NNW
Outer Ring		
BD-201-1 and -2		4.2 miles N
BD-202-1 and -2		4.8 miles NNE
BD-203-1 and -2		4.9 miles NE
BD-204-1 and -2		4.3 miles ENE
BD-205-1 and -2		4.0 miles E
BD-206-1 and -2		4.5 miles ESE
BD-207-1 and -2		4.5 miles SE
BD-208-1 and -2		4.5 miles SSE
BD-209-1 and -2		4.8 miles S
BD-210-1 and -2		5.3 miles SSW
BD-211-1 and -2		4.8 miles SW
BD-212-3 and -4		5.0 miles WSW
BD-213-3 and -4		4.8 miles W
BD-214-1 and -2		4.3 miles WNW
BD-215-1 and -2		4.5 miles NW
BD-216-1 and -2		4.0 miles NNW
Other		
BD-02-1 and -2	Custer Park (indicator)	5.0 miles E
BD-04-1 and -2	Essex (indicator)	4.8 miles SSE
BD-05-1 and -2	Gardner (indicator)	5.5 miles SW
BD-06-1 and -2	Godley (indicator)	0.5 miles WSW
BD-19-1 and -2	Nearsite NW (indicator)	0.3 miles NW

TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Braidwood Station, 2017

Location	Location Description	Distance & Direction From Site
I. Environmental Dosimetry – OSLD (cont'd)		
Other (cont'd)		
BD-20-1 and -2	Nearsite N (indicator)	0.6 miles N
BD-21-1 and -2	Nearsite NE (indicator)	0.5 miles NE
Control		
BD-03-1 and -2	13000 W. Road	6.2 miles ESE
ISFSI		
BD-104-3 and -4		0.12 miles E
BD-105-3 and -4		0.22 miles SE
BD-110-3 and -4		0.17 miles SE

Distance in Miles from the Braidwood Station ISFSI Pad, 2017

Sector	Residence Miles
(N) W	0.7
(P) WNW	0.7
(Q) NW	0.7
(R) NNW	0.7

Distance in Miles from the Braidwood Station Reactor Buildings, 2017

Sector	Residence Miles	Livestock Miles	Milk Farm Miles
(A) N	0.5	2.6	-
(B) NNE	0.9	-	-
(C) NE	0.7	-	-
(D) ENE	0.8	3.3	-
(E) E	1.5	2.3	-
(F) ESE	2.2	2.3	-
(G) SE	2.7	2.7	-
(H) SSE	4.5	-	-
(J) S	4.2	4.8	-
(K) SSW	1.3	5.3	5.5
(L) SW	0.4	1.2	-
(M) WSW	0.5	-	-
(N) W	0.4	1.6	8.7
(P) WNW	0.4	-	-
(Q) NW	0.4	-	-
(R) NNW	0.4	-	-

TABLE B-2: Radiological Environmental Monitoring Program – Summary of Sample Collection and Analytical Methods, Braidwood Station, 2017

Sample Medium	Analysis	Sampling Method	Analytical Procedure Number
Surface Water	Gamma Spectroscopy	Monthly composite from weekly grab samples.	TBE, TBE-2007 Gamma emitting radioisotope analysis
Surface Water	Gross Beta	Monthly composite from weekly grab samples.	TBE, TBE-2008 Gross Alpha and/or Gross Beta activity in various matrices
Surface Water	Tritium	Quarterly composite from weekly grab samples.	TBE, TBE-2011 Tritium analysis in drinking water by liquid scintillation
Surface Water	Nickel-63	Monthly composite from weekly grab samples.	TBE, TBE-2013 Radionickel activity in various matrices
Drinking Water	Gross Beta	Monthly composite from weekly composite samples.	TBE, TBE-2008 Gross Alpha and/or Gross Beta activity in various matrices
Drinking Water	Gamma Spectroscopy	Monthly composite from weekly composite samples.	TBE, TBE-2007 Gamma emitting radioisotope analysis
Drinking Water	Tritium	Monthly composite from weekly composite samples.	TBE, TBE-2011 Tritium analysis in drinking water by liquid scintillation
Drinking Water	Iodine	Monthly composite from weekly composite samples.	TBE, TBE-2031 Radioactive Iodine in drinking water
Ground/ Well Water	Gamma Spectroscopy	Quarterly grab samples.	TBE, TBE-2007 Gamma emitting radioisotope analysis
Ground/ Well Water	Tritium	Quarterly grab samples.	TBE, TBE-2011 Tritium analysis in drinking water by liquid scintillation
Fish	Nickel-63	Semi-annual samples collected via electroshocking or other techniques	TBE, TBE-2013 Radionickel activity in various matrices
Fish	Gamma Spectroscopy	Samples collected twice annually via electro-shocking or other techniques	TBE-2007 Gamma emitting radioisotope analysis
Sediment	Gamma Spectroscopy	Semi-annual grab samples	TBE, TBE-2007 Gamma emitting radioisotope analysis
Sediment	Nickel-63	Semi-annual grab samples	TBE, TBE-2013 Radionickel activity in various matrices
Air Particulates	Gross Beta	One-week composite of continuous air sampling through glass fiber filter paper	TBE, TBE-2008 Gross Alpha and/or gross beta activity in various matrices
Air Particulates	Gamma Spectroscopy	Quarterly composite of each station	TBE, TBE-2007 Gamma emitting radioisotope analysis

TABLE B-2: Radiological Environmental Monitoring Program – Summary of Sample Collection and Analytical Methods, Braidwood Station, 2017

Sample Medium	Analysis	Sampling Method	Analytical Procedure Number
Air Iodine	I-131	Weekly composite of continuous air sampling through charcoal filter	TBE, TBE-2007 Gamma emitting radioisotope analysis
Milk	I-131	Bi-weekly grab sample May through October. Monthly all other times	TBE, TBE-2012 Radioiodine in various matrices
Milk	Gamma Spectroscopy	Bi-weekly grab sample May through October. Monthly all other times	TBE, TBE-2007 Gamma emitting radioisotope analysis
Food Products	Gamma Spectroscopy	Annual grab samples.	TBE, TBE-2007 Gamma emitting radioisotope analysis
OSLD	Optically Stimulated Luminescence Dosimetry	Quarterly OSLDs comprised of two Al_2O_3:C Landauer Incorporated elements.	Landauer Incorporated

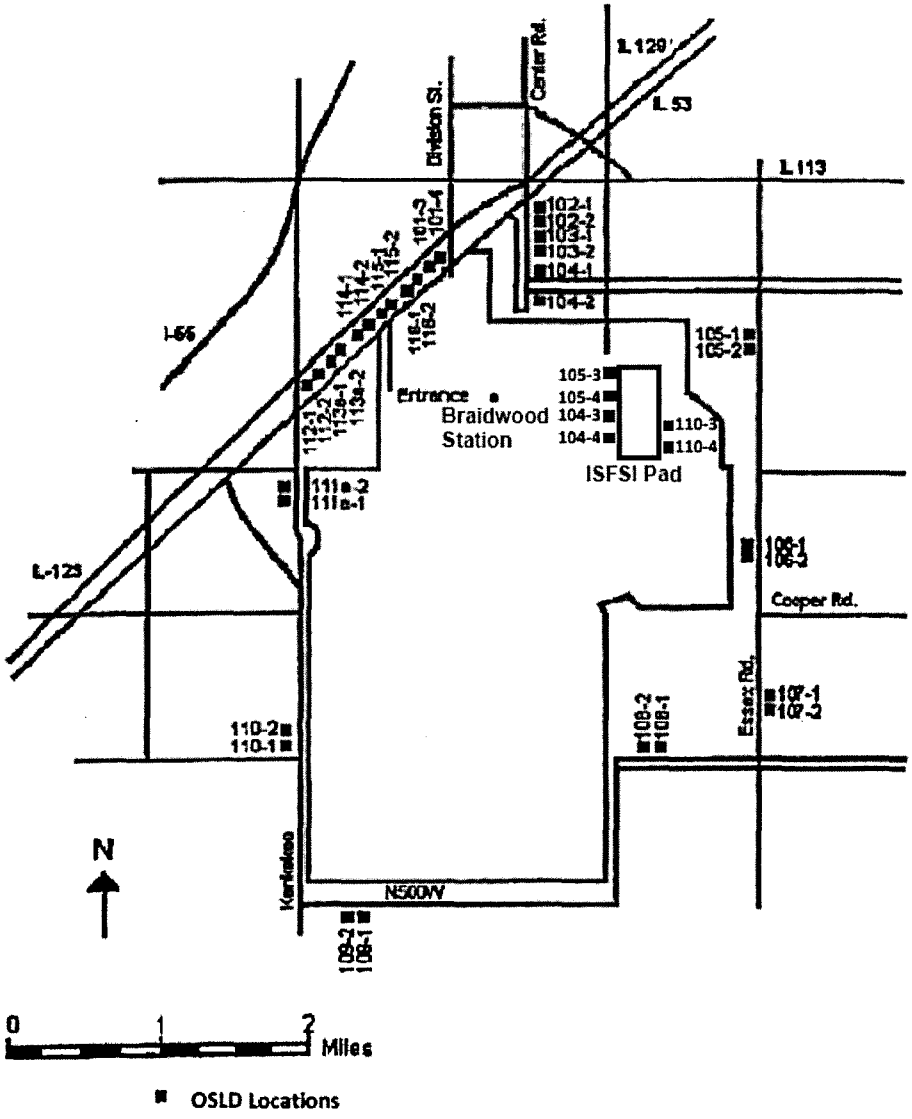


Figure B-1
Inner Ring and Other OSLD Locations
of Braidwood Station, 2017

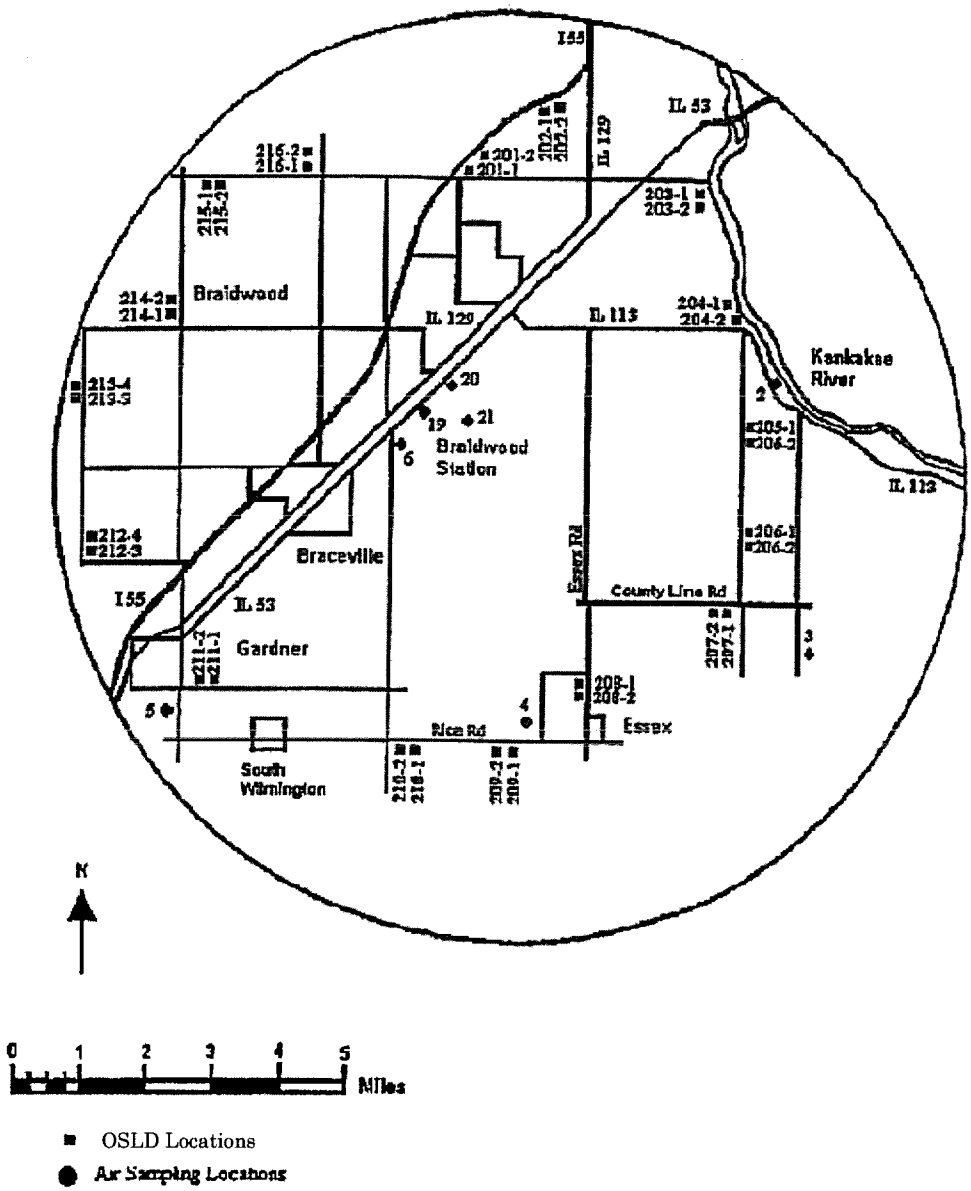


Figure B-2
Fixed Air Sampling and Outer Ring
OSLD Locations of Braidwood Station, 2017

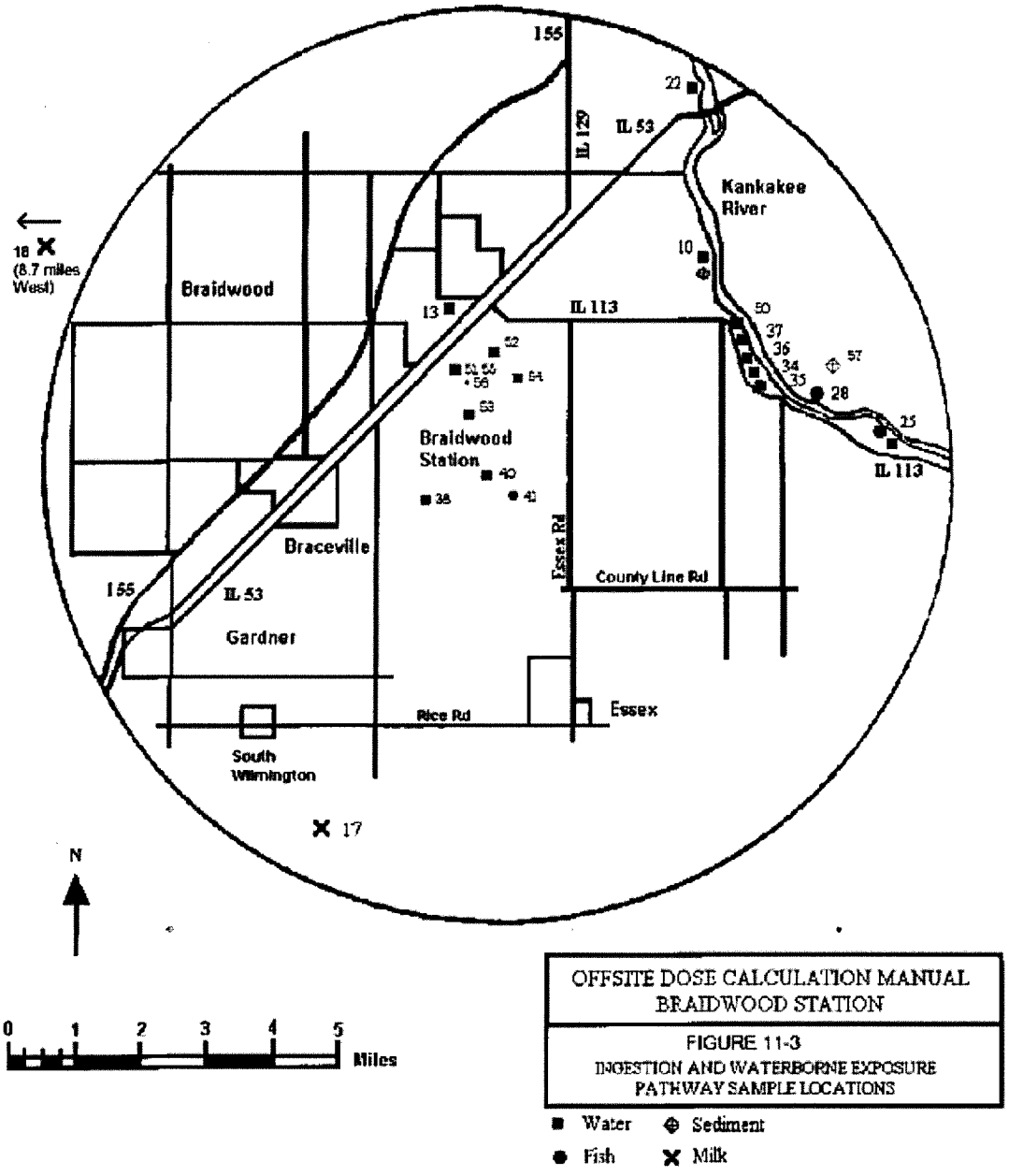


Figure B-3
Ingestion and Waterborne Exposure Pathway
Sample Locations of Braidwood Station, 2017

Intentionally left blank

APPENDIX C

DATA TABLES AND FIGURES
PRIMARY LABORATORY

Intentionally left blank

Table C-I.1 CONCENTRATIONS OF GROSS BETA IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	BD-10	BD-25	BD-38	BD-40	BD-55	BD-56
01/05/17 - 01/26/17	2.9 ± 1.7	5.1 ± 1.9	4.4 ± 2.2	9.2 ± 2.5	3.6 ± 1.5	5.6 ± 1.9
02/02/17 - 02/23/17	< 2.8	< 2.9	3.3 ± 2.2	7.8 ± 2.5	< 2.5	< 3.0
03/02/17 - 03/30/17	6.0 ± 1.9	4.4 ± 1.8	5.8 ± 2.1	7.3 ± 2.2	4.2 ± 1.6	3.3 ± 1.8
04/06/17 - 04/27/17	3.6 ± 2.0	3.3 ± 2.0	6.9 ± 2.5	7.7 ± 2.4	2.7 ± 1.7	< 3.0
05/04/17 - 05/25/17	2.9 ± 1.8	3.7 ± 1.8	3.5 ± 2.2	5.1 ± 2.1	2.7 ± 1.6	3.7 ± 1.9
06/01/17 - 06/29/17	5.0 ± 1.7	5.1 ± 1.7	6.3 ± 2.2	8.3 ± 2.1	3.8 ± 1.5	7.2 ± 2.0
07/06/17 - 07/27/17	3.9 ± 2.1	< 2.9	5.0 ± 2.8	8.9 ± 2.6	2.8 ± 1.8	3.8 ± 2.0
08/03/17 - 08/31/17	4.7 ± 2.0	5.4 ± 2.0	7.0 ± 2.9	10.6 ± 2.6	4.2 ± 1.6	5.9 ± 2.2
09/07/17 - 09/28/17	3.0 ± 1.8	3.5 ± 1.9	7.8 ± 3.1	7.6 ± 2.4	3.1 ± 1.6	< 2.6
10/05/17 - 10/26/17	< 2.2	3.7 ± 1.8	4.7 ± 2.1	9.2 ± 2.3	2.7 ± 1.6	< 2.8
11/02/17 - 11/30/17	5.9 ± 2.0	6.2 ± 2.1	7.6 ± 2.8	11.6 ± 2.7	5.3 ± 1.7	4.5 ± 2.1
12/07/17 - 12/28/17	3.5 ± 2.0	< 2.7	6.7 ± 2.7	8.1 ± 2.4	3.1 ± 1.5	5.8 ± 2.2
MEAN ± 2 STD DEV	4.1 ± 2.4	4.5 ± 2.0	5.7 ± 3.1	8.5 ± 3.3	3.5 ± 1.7	5.0 ± 2.7

Table C-I.2 CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	BD-10	BD-25	BD-38	BD-40	BD-55	BD-56
01/05/17 - 03/30/17	< 192	< 192	< 191	< 197	< 189	< 193
04/06/17 - 06/29/17	< 177	< 175	< 177	< 176	< 174	< 172
07/06/17 - 09/28/17	< 191	< 189	< 187	< 191	< 189	< 189
10/05/17 - 12/28/17	216 ± 130	< 195	< 194	< 198	< 192	< 196
MEAN	-	-	-	-	-	-

Table C-I.3 CONCENTRATIONS OF NICKEL-63 IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	BD-10	BD-25	BD-38	BD-40	BD-55	BD-56
01/05/17 - 01/26/17	< 5	< 16	< 4	< 5	< 4	< 6
02/16/17 - 02/23/17	< 26	< 24	< 23	< 24	< 24	< 23
03/02/17 - 03/30/17	< 18	< 19	< 16	< 17	< 17	< 18
04/06/17 - 04/27/17	< 5	< 5	< 5	< 5	< 15	< 5
05/04/17 - 05/25/17	< 13	< 13	< 13	< 13	< 13	< 13
06/01/17 - 06/29/17	< 15	< 14	< 15	< 15	< 15	< 17
07/06/17 - 07/27/17	< 14	< 14	< 14	< 15	< 14	< 14
08/03/17 - 08/31/17	< 14	< 16	< 17	< 16	< 16	< 16
09/07/17 - 09/28/17	< 12	< 12	< 12	< 12	< 12	< 13
10/05/17 - 10/26/17	< 18	< 18	< 14	< 18	< 17	< 15
11/02/17 - 11/30/17	< 16	< 16	< 25	< 24	< 15	< 15
12/07/17 - 12/28/17	< 19	< 19	< 20	< 19	< 18	< 20
MEAN	-	-	-	-	-	-

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

Table C-I.4 **CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017**

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
BD-10	01/05/17 - 01/26/17	< 4	< 4	< 8	< 4	< 9	< 5	< 7	< 10	< 4	< 4	< 27	< 9
	02/02/17 - 02/23/17	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 8	< 2	< 2	< 15	< 5
	03/02/17 - 03/30/17	< 4	< 6	< 13	< 6	< 11	< 6	< 10	< 14	< 5	< 6	< 32	< 9
	04/06/17 - 04/27/17	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 8	< 2	< 2	< 17	< 5
	05/04/17 - 05/25/17	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 11	< 2	< 2	< 19	< 6
	06/01/17 - 06/29/17	< 4	< 5	< 10	< 4	< 10	< 5	< 8	< 15	< 5	< 5	< 31	< 7
	07/06/17 - 07/27/17	< 3	< 3	< 6	< 3	< 6	< 3	< 6	< 9	< 3	< 3	< 21	< 6
	08/03/17 - 08/31/17	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 14	< 2	< 2	< 20	< 6
	09/07/17 - 09/28/17	< 3	< 4	< 7	< 3	< 6	< 3	< 6	< 13	< 3	< 3	< 27	< 7
	10/05/17 - 10/26/17	< 2	< 3	< 5	< 3	< 5	< 3	< 4	< 13	< 3	< 2	< 21	< 7
	11/02/17 - 11/30/17	< 5	< 6	< 12	< 5	< 12	< 6	< 11	< 15	< 6	< 6	< 34	< 10
	12/07/17 - 12/28/17	< 3	< 3	< 7	< 4	< 6	< 4	< 7	< 11	< 3	< 3	< 24	< 8
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
BD-25	01/05/17 - 01/26/17	< 6	< 6	< 11	< 7	< 12	< 6	< 10	< 14	< 4	< 5	< 32	< 12
	02/02/17 - 02/23/17	< 3	< 3	< 6	< 3	< 5	< 3	< 5	< 11	< 3	< 3	< 23	< 8
	03/02/17 - 03/30/17	< 6	< 6	< 12	< 6	< 12	< 7	< 11	< 15	< 6	< 7	< 33	< 8
	04/06/17 - 04/27/17	< 3	< 3	< 7	< 3	< 6	< 3	< 5	< 10	< 3	< 3	< 20	< 7
	05/04/17 - 05/25/17	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 12	< 2	< 2	< 21	< 7
	06/01/17 - 06/29/17	< 4	< 6	< 10	< 4	< 11	< 6	< 9	< 15	< 6	< 5	< 37	< 10
	07/06/17 - 07/27/17	< 3	< 2	< 6	< 3	< 5	< 3	< 5	< 8	< 3	< 3	< 18	< 5
	08/03/17 - 08/31/17	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 14	< 2	< 1	< 21	< 7
	09/07/17 - 09/28/17	< 2	< 2	< 6	< 2	< 5	< 2	< 4	< 10	< 2	< 2	< 19	< 6
	10/05/17 - 10/26/17	< 2	< 2	< 6	< 2	< 4	< 3	< 4	< 13	< 3	< 2	< 22	< 6
	11/02/17 - 11/30/17	< 7	< 7	< 13	< 7	< 14	< 5	< 11	< 13	< 7	< 6	< 36	< 14
	12/07/17 - 12/21/17 (1)	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 12	< 2	< 2	< 19	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
BD-38	01/05/17 - 01/26/17	< 5	< 6	< 10	< 5	< 11	< 6	< 10	< 15	< 5	< 5	< 37	< 11
	02/02/17 - 02/23/17	< 2	< 2	< 5	< 2	< 4	< 3	< 4	< 10	< 2	< 2	< 19	< 6
	03/02/17 - 03/30/17	< 6	< 7	< 12	< 5	< 11	< 7	< 11	< 14	< 7	< 6	< 43	< 8
	04/06/17 - 04/27/17	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 9	< 3	< 3	< 18	< 6
	05/04/17 - 05/25/17	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 11	< 2	< 2	< 21	< 6
	06/01/17 - 06/29/17	< 5	< 5	< 14	< 5	< 11	< 5	< 11	< 15	< 6	< 5	< 29	< 13
	07/06/17 - 07/27/17	< 3	< 3	< 7	< 3	< 6	< 4	< 5	< 9	< 4	< 3	< 20	< 7
	08/03/17 - 08/31/17	< 1	< 2	< 3	< 2	< 3	< 2	< 3	< 14	< 1	< 2	< 20	< 7
	09/07/17 - 09/28/17	< 3	< 3	< 8	< 3	< 7	< 4	< 6	< 15	< 3	< 3	< 27	< 9
	10/05/17 - 10/26/17	< 2	< 2	< 6	< 2	< 4	< 2	< 4	< 12	< 2	< 2	< 19	< 6
	11/02/17 - 11/30/17	< 5	< 4	< 13	< 6	< 12	< 6	< 10	< 15	< 6	< 6	< 37	< 12
	12/07/17 - 12/21/17 (1)	< 2	< 2	< 5	< 2	< 4	< 3	< 4	< 13	< 2	< 2	< 22	< 8
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-I.4 **CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017**

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
BD-40	01/05/17 - 01/26/17	< 5	< 4	< 10	< 6	< 12	< 6	< 9	< 12	< 5	< 6	< 33	< 12
	02/02/17 - 02/23/17	< 2	< 2	< 6	< 2	< 5	< 3	< 5	< 11	< 3	< 2	< 20	< 6
	03/02/17 - 03/30/17	< 4	< 4	< 8	< 4	< 8	< 4	< 7	< 11	< 5	< 4	< 25	< 9
	04/06/17 - 04/27/17	< 3	< 4	< 8	< 3	< 7	< 4	< 6	< 11	< 4	< 3	< 23	< 9
	05/04/17 - 05/25/17	< 2	< 3	< 6	< 2	< 5	< 3	< 5	< 13	< 3	< 2	< 23	< 7
	06/01/17 - 06/29/17	< 5	< 5	< 10	< 6	< 10	< 6	< 9	< 14	< 5	< 5	< 32	< 10
	07/06/17 - 07/27/17	< 2	< 3	< 6	< 3	< 6	< 3	< 5	< 8	< 3	< 3	< 17	< 5
	08/03/17 - 08/31/17	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 15	< 2	< 1	< 22	< 7
	09/07/17 - 09/28/17	< 3	< 3	< 7	< 3	< 6	< 3	< 5	< 15	< 3	< 3	< 26	< 8
	10/05/17 - 10/26/17	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 15	< 3	< 3	< 27	< 9
	11/02/17 - 11/30/17	< 5	< 4	< 11	< 5	< 11	< 5	< 9	< 14	< 6	< 5	< 32	< 10
	12/07/17 - 12/28/17	< 4	< 4	< 8	< 4	< 9	< 4	< 6	< 10	< 4	< 3	< 25	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
BD-55	01/19/17 - 01/26/17	< 5	< 5	< 10	< 5	< 10	< 6	< 10	< 13	< 5	< 5	< 30	< 12
	02/02/17 - 02/23/17	< 3	< 3	< 7	< 3	< 5	< 3	< 5	< 14	< 3	< 3	< 25	< 8
	03/02/17 - 03/30/17	< 6	< 7	< 10	< 6	< 12	< 7	< 10	< 14	< 6	< 5	< 30	< 8
	04/06/17 - 04/27/17	< 2	< 3	< 6	< 3	< 5	< 3	< 5	< 9	< 3	< 3	< 18	< 6
	05/04/17 - 05/25/17	< 2	< 3	< 6	< 2	< 5	< 3	< 4	< 13	< 3	< 2	< 23	< 7
	06/01/17 - 06/29/17	< 5	< 6	< 11	< 6	< 11	< 5	< 10	< 15	< 6	< 6	< 35	< 10
	07/06/17 - 07/27/17	< 4	< 4	< 8	< 4	< 7	< 4	< 7	< 10	< 4	< 4	< 23	< 9
	08/03/17 - 08/31/17	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 15	< 2	< 2	< 20	< 5
	09/07/17 - 09/28/17	< 3	< 3	< 7	< 3	< 6	< 4	< 6	< 15	< 3	< 3	< 28	< 8
	10/05/17 - 10/26/17	< 2	< 3	< 6	< 2	< 5	< 3	< 5	< 12	< 3	< 2	< 24	< 8
	11/02/17 - 11/30/17	< 4	< 4	< 9	< 5	< 9	< 5	< 9	< 12	< 5	< 5	< 28	< 9
	12/07/17 - 12/21/17	< 2	< 3	< 6	< 3	< 5	< 3	< 5	< 14	< 3	< 3	< 25	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
BD-56	01/19/17 - 01/26/17	< 6	< 7	< 12	< 6	< 11	< 6	< 11	< 15	< 5	< 6	< 35	< 11
	02/16/17 - 02/23/17	< 3	< 3	< 7	< 3	< 6	< 4	< 6	< 14	< 3	< 3	< 26	< 9
	03/02/17 - 03/30/17	< 5	< 5	< 10	< 5	< 8	< 5	< 8	< 12	< 5	< 5	< 31	< 9
	04/06/17 - 04/27/17	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 10	< 3	< 3	< 22	< 8
	05/04/17 - 05/25/17	< 2	< 2	< 5	< 2	< 5	< 3	< 5	< 13	< 2	< 2	< 23	< 7
	06/01/17 - 06/29/17	< 5	< 6	< 13	< 6	< 8	< 5	< 9	< 15	< 6	< 6	< 34	< 9
	07/06/17 - 07/27/17	< 3	< 4	< 8	< 3	< 7	< 4	< 6	< 11	< 4	< 4	< 24	< 7
	08/03/17 - 08/31/17	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 15	< 2	< 1	< 20	< 7
	09/07/17 - 09/28/17	< 3	< 3	< 6	< 3	< 5	< 3	< 5	< 14	< 3	< 3	< 26	< 8
	10/05/17 - 10/26/17	< 2	< 3	< 5	< 2	< 4	< 3	< 5	< 13	< 2	< 2	< 22	< 7
	11/02/17 - 11/30/17	< 4	< 5	< 12	< 6	< 10	< 5	< 9	< 13	< 5	< 5	< 26	< 7
	12/07/17 - 12/21/17	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 14	< 2	< 2	< 23	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-II.1 **CONCENTRATIONS OF GROSS BETA IN PUBLIC WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	BD-22
12/29/16 - 02/02/17	< 2.2
02/02/17 - 03/02/17	3.2 ± 1.7
03/02/17 - 03/30/17	2.9 ± 1.4
03/30/17 - 04/27/17	< 2.4
04/27/17 - 06/01/17	< 2.1
06/01/17 - 06/29/17	3.3 ± 1.5
06/29/17 - 08/03/17	3.2 ± 1.4
08/03/17 - 08/31/17	< 2.2
08/31/17 - 09/28/17	5.4 ± 1.7
09/28/17 - 11/02/17	2.7 ± 1.4
11/02/17 - 11/30/17	3.3 ± 1.6
11/30/17 - 01/04/18	2.7 ± 1.4
MEAN ± 2 STD DEV	3.3 ± 1.7

Table C-II.2 **CONCENTRATIONS OF TRITIUM IN PUBLIC WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	BD-22
12/29/16 - 02/02/17	208 ± 128
02/02/17 - 03/02/17	239 ± 130
03/02/17 - 03/30/17	363 ± 132
03/30/17 - 04/27/17	450 ± 141
04/27/17 - 06/01/17	424 ± 130
06/01/17 - 06/29/17	247 ± 125
06/29/17 - 08/03/17	< 180
08/03/17 - 08/31/17	764 ± 151
08/31/17 - 09/28/17	919 ± 163
09/28/17 - 11/02/17	1540 ± 216
11/02/17 - 11/30/17	1270 ± 192
11/30/17 - 01/04/18	329 ± 133
MEAN ± 2 STD DEV	614 ± 906

Table C-II.3 **CONCENTRATIONS OF I-131 IN PUBLIC WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	BD-22
12/29/16 - 02/02/17	< 0.5
02/02/17 - 03/02/17	< 0.5
03/02/17 - 03/30/17	< 0.3
03/30/17 - 04/27/17	< 0.5
04/27/17 - 06/01/17	< 0.7
06/01/17 - 06/29/17	< 0.7
06/29/17 - 08/03/17	< 0.6
08/03/17 - 08/31/17	< 0.4
08/31/17 - 09/28/17	< 0.7
09/28/17 - 11/02/17	< 0.9
11/02/17 - 11/30/17	< 0.4
11/30/17 - 01/04/18	< 0.8
MEAN	-

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

Table C-II.4

CONCENTRATIONS OF GAMMA EMITTERS IN PUBLIC WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017

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
BD-22	12/29/16 - 02/02/17	< 5	< 7	< 10	< 7	< 9	< 7	< 12	< 6	< 5	< 32	< 7
	02/02/17 - 03/02/17	< 5	< 5	< 11	< 5	< 11	< 5	< 9	< 6	< 5	< 31	< 10
	03/02/17 - 03/30/17	< 6	< 6	< 14	< 5	< 15	< 6	< 11	< 6	< 8	< 34	< 10
	03/30/17 - 04/27/17	< 4	< 4	< 11	< 4	< 9	< 5	< 8	< 4	< 5	< 30	< 8
	04/27/17 - 06/01/17	< 5	< 6	< 9	< 5	< 10	< 6	< 10	< 7	< 7	< 33	< 9
	06/01/17 - 06/29/17	< 5	< 5	< 11	< 4	< 10	< 6	< 10	< 5	< 5	< 28	< 11
	06/29/17 - 08/03/17	< 1	< 1	< 3	< 1	< 2	< 1	< 2	< 1	< 1	< 30	< 10
	08/03/17 - 08/31/17	< 3	< 3	< 7	< 3	< 6	< 3	< 6	< 3	< 3	< 22	< 8
	08/31/17 - 09/28/17	< 3	< 4	< 9	< 4	< 7	< 4	< 7	< 4	< 3	< 30	< 9
	09/28/17 - 11/02/17	< 3	< 3	< 6	< 3	< 6	< 3	< 6	< 3	< 3	< 20	< 7
	11/02/17 - 11/30/17	< 5	< 6	< 8	< 4	< 8	< 5	< 9	< 7	< 6	< 36	< 11
	11/30/17 - 01/04/18	< 4	< 4	< 9	< 5	< 8	< 5	< 7	< 5	< 4	< 29	< 8
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-III.1 **CONCENTRATIONS OF TRITIUM IN GROUND/WELL WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	BD-13	BD-34	BD-35	BD-36	BD-37	BD-50	BD-51	BD-54
01/12/17 - 02/20/17	< 182	< 185	< 183	< 188	< 187	< 188	< 183	< 184
04/13/17 - 04/22/17	< 193	< 194	< 192	< 195	< 194	< 192	< 192	< 189
07/13/17 - 07/13/17	< 182	< 183	< 183	< 184	< 185	< 180	< 185	< 182
10/12/17 - 10/12/17	< 187	< 186	< 190	< 185	< 188	< 187	< 189	< 185
MEAN	-	-	-	-	-	-	-	-

Table C-III.2

CONCENTRATIONS OF GAMMA EMITTERS IN GROUND/WELL WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017

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
BD-13	01/19/17 - 01/19/17	< 5	< 6	< 12	< 6	< 12	< 6	< 10	< 8	< 6	< 6	< 30	< 6
	04/20/17 - 04/20/17	< 5	< 5	< 13	< 6	< 13	< 6	< 9	< 10	< 6	< 6	< 27	< 10
	07/13/17 - 07/13/17	< 6	< 7	< 14	< 6	< 11	< 7	< 13	< 10	< 7	< 8	< 32	< 6
	10/12/17 - 10/12/17	< 4	< 5	< 12	< 6	< 13	< 6	< 9	< 10	< 7	< 6	< 30	< 12
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
BD-34	01/12/17 - 01/12/17	< 7	< 6	< 12	< 5	< 12	< 7	< 11	< 11	< 7	< 7	< 31	< 9
	04/13/17 - 04/13/17	< 8	< 6	< 19	< 7	< 14	< 6	< 8	< 8	< 7	< 8	< 33	< 10
	07/13/17 - 07/13/17	< 7	< 9	< 11	< 9	< 15	< 10	< 12	< 14	< 8	< 7	< 41	< 8
	10/12/17 - 10/12/17	< 5	< 5	< 9	< 5	< 9	< 5	< 9	< 9	< 5	< 5	< 20	< 8
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
BD-35	01/12/17 - 01/12/17	< 8	< 10	< 20	< 7	< 19	< 10	< 16	< 15	< 10	< 9	< 38	< 13
	04/13/17 - 04/13/17	< 6	< 6	< 12	< 5	< 9	< 6	< 10	< 11	< 6	< 7	< 28	< 8
	07/13/17 - 07/13/17	< 9	< 7	< 15	< 9	< 15	< 7	< 12	< 12	< 9	< 7	< 35	< 13
	10/12/17 - 10/12/17	< 7	< 7	< 11	< 8	< 14	< 6	< 12	< 10	< 7	< 6	< 35	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
BD-36	02/20/17 - 02/20/17	< 6	< 7	< 13	< 7	< 12	< 7	< 11	< 15	< 7	< 6	< 42	< 9
	04/22/17 - 04/22/17	< 6	< 5	< 12	< 6	< 11	< 6	< 12	< 15	< 5	< 6	< 35	< 8
	07/13/17 - 07/13/17	< 7	< 8	< 15	< 7	< 16	< 8	< 14	< 14	< 11	< 7	< 38	< 13
	10/12/17 - 10/12/17	< 5	< 6	< 11	< 7	< 10	< 5	< 9	< 10	< 5	< 5	< 28	< 8
		-	-	-	-	-	-	-	-	-	-	-	-
BD-37	01/12/17 - 01/12/17	< 7	< 6	< 14	< 6	< 16	< 9	< 12	< 13	< 8	< 8	< 33	< 7
	04/13/17 - 04/13/17	< 8	< 8	< 17	< 5	< 18	< 8	< 16	< 12	< 9	< 9	< 38	< 10
	07/13/17 - 07/13/17	< 8	< 8	< 16	< 9	< 22	< 9	< 15	< 15	< 9	< 9	< 40	< 11
	10/12/17 - 10/12/17	< 5	< 5	< 14	< 6	< 11	< 6	< 12	< 11	< 7	< 7	< 31	< 9
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-III.2

CONCENTRATIONS OF GAMMA EMITTERS IN GROUND/WELL WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017

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
BD-50	01/12/17 - 01/12/17	< 9	< 8	< 12	< 9	< 13	< 8	< 14	< 13	< 7	< 8	< 39	< 10
	04/13/17 - 04/13/17	< 7	< 7	< 12	< 8	< 17	< 8	< 12	< 11	< 6	< 7	< 35	< 12
	07/13/17 - 07/13/17	< 4	< 5	< 12	< 5	< 11	< 6	< 11	< 9	< 6	< 5	< 25	< 9
	10/12/17 - 10/12/17	< 5	< 6	< 11	< 6	< 11	< 7	< 12	< 11	< 6	< 7	< 27	< 11
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
BD-51	01/12/17 - 01/12/17	< 6	< 6	< 15	< 6	< 11	< 7	< 13	< 9	< 5	< 6	< 29	< 7
	04/13/17 - 04/13/17	< 7	< 7	< 17	< 8	< 13	< 8	< 12	< 12	< 8	< 8	< 33	< 10
	07/13/17 - 07/13/17	< 6	< 5	< 12	< 5	< 8	< 5	< 8	< 8	< 6	< 6	< 24	< 10
	10/12/17 - 10/12/17	< 4	< 5	< 13	< 6	< 11	< 6	< 10	< 11	< 6	< 6	< 27	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
BD-54	01/12/17 - 01/12/17	< 8	< 8	< 16	< 9	< 18	< 10	< 16	< 13	< 8	< 9	< 40	< 9
	04/20/17 - 04/20/17	< 6	< 6	< 16	< 6	< 10	< 7	< 12	< 10	< 6	< 7	< 35	< 7
	07/13/17 - 07/13/17	< 7	< 5	< 12	< 5	< 14	< 7	< 9	< 12	< 7	< 7	< 28	< 8
	10/12/17 - 10/12/17	< 7	< 7	< 15	< 10	< 17	< 8	< 12	< 14	< 7	< 8	< 36	< 10
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-IV.1

CONCENTRATIONS OF NICKEL-63 AND GAMMA EMITTERS IN FISH SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

SITE	COLLECTION PERIOD	Ni-63	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
BD-25														
Golden Redhorse	05/03/17	< 222	< 68	< 69	< 133	< 55	< 98	< 69	< 98	< 135	< 77	< 73	< 347	< 108
Shorthead Redhorse	05/03/17	< 186	< 56	< 56	< 98	< 51	< 148	< 62	< 104	< 126	< 76	< 51	< 307	< 70
Golden Redhorse	10/24/17	< 49	< 39	< 37	< 87	< 39	< 86	< 31	< 63	< 75	< 46	< 39	< 179	< 71
Smallmouth Bass	10/24/17	< 52	< 53	< 50	< 124	< 74	< 135	< 64	< 91	< 98	< 61	< 66	< 250	< 77
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-
BD-28														
Golden Redhorse	05/03/17	< 185	< 43	< 33	< 74	< 34	< 85	< 41	< 70	< 69	< 34	< 31	< 176	< 47
Channel Catfish	05/03/17	< 146	< 54	< 70	< 127	< 68	< 128	< 72	< 121	< 109	< 76	< 76	< 334	< 65
Smallmouth Bass	10/24/17	< 55	< 46	< 52	< 116	< 43	< 144	< 57	< 110	< 97	< 62	< 48	< 304	< 92
Quillback	10/24/17	< 57	< 99	< 72	< 151	< 49	< 174	< 75	< 142	< 134	< 89	< 76	< 358	< 117
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-
BD-41														
Common Carp	05/03/17	< 154	< 40	< 37	< 70	< 35	< 70	< 43	< 68	< 54	< 43	< 34	< 205	< 57
Largemouth Bass	05/03/17	< 155	< 60	< 80	< 96	< 81	< 163	< 89	< 125	< 98	< 59	< 75	< 341	< 95
Common Carp	10/24/17	< 51	< 41	< 51	< 55	< 53	< 109	< 47	< 69	< 76	< 47	< 43	< 263	< 91
Largemouth Bass	10/24/17	< 66	< 72	< 80	< 126	< 84	< 167	< 70	< 95	< 148	< 74	< 87	< 379	< 112
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C-V.1

CONCENTRATIONS OF NICKEL-63 AND GAMMA EMITTERS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017

RESULTS IN UNITS OF PCI/KG DRY ± 2 SIGMA

SITE	COLLECTION PERIOD	Ni-63	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
BD-10	05/27/17	< 192	< 92	< 78	< 206	< 91	< 167	< 82	< 147	< 95	164 ± 72	< 421	< 96
	10/18/17	< 193	< 97	< 105	< 266	< 107	< 259	< 126	< 195	< 135	131 ± 91	< 490	< 176
	MEAN	-	-	-	-	-	-	-	-	-	148 ± 47	-	-
BD-25	05/27/17	< 197	< 71	< 65	< 152	< 59	< 144	< 83	< 120	< 82	96 ± 87	< 371	< 64
	10/18/17	< 185	< 86	< 111	< 208	< 111	< 239	< 98	< 175	< 119	< 123	< 504	< 128
	MEAN	-	-	-	-	-	-	-	-	-	96 ± 0	-	-
BD-57	05/27/17	< 196	< 56	< 52	< 121	< 49	< 150	< 61	< 107	< 69	88 ± 60	< 286	< 93
	10/18/17	< 169	< 81	< 76	< 184	< 93	< 177	< 90	< 146	< 101	< 115	< 356	< 102
	MEAN	-	-	-	-	-	-	-	-	-	88 ± 0	-	-

Table C-VI.1

CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017

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

COLLECTION	GROUP I - NEAR FIELD				GROUP II - FAR FIELD			GROUP III - CONTROL
PERIOD	BD-06	BD-19	BD-20	BD-21	BD-02	BD-04	BD-05	BD-03
12/29/16 - 01/05/17	17 ± 4	15 ± 4	16 ± 4	19 ± 4	17 ± 4	15 ± 4	16 ± 4	16 ± 4
01/05/17 - 01/12/17	21 ± 5	20 ± 5	18 ± 5	19 ± 5	21 ± 5	21 ± 5	17 ± 5	19 ± 5
01/12/17 - 01/19/17	16 ± 4	19 ± 4	18 ± 4	21 ± 4	18 ± 4	21 ± 4	21 ± 4	17 ± 4
01/19/17 - 01/26/17	14 ± 4	16 ± 4	13 ± 4	12 ± 4	15 ± 4	14 ± 4	14 ± 4	16 ± 4
01/26/17 - 02/02/17	13 ± 4	18 ± 4	15 ± 4	16 ± 4	17 ± 4	16 ± 4	13 ± 4	17 ± 4
02/02/17 - 02/09/17	17 ± 4	16 ± 4	12 ± 4	15 ± 4	17 ± 4	17 ± 4	17 ± 4	15 ± 4
02/09/17 - 02/16/17	15 ± 4	23 ± 5	18 ± 4	22 ± 5	16 ± 4	22 ± 5	19 ± 4	19 ± 4
02/16/17 - 02/23/17	23 ± 4	21 ± 4	25 ± 5	25 ± 5	23 ± 5	24 ± 5	22 ± 4	21 ± 4
02/23/17 - 03/02/17	16 ± 4	15 ± 4	15 ± 4	16 ± 4	15 ± 4	15 ± 4	15 ± 4	13 ± 4
03/02/17 - 03/09/17	16 ± 4	17 ± 4	12 ± 4	14 ± 4	15 ± 4	15 ± 4	11 ± 4	15 ± 4
03/09/17 - 03/16/17	17 ± 4	16 ± 4	17 ± 4	17 ± 4	19 ± 4	17 ± 4	14 ± 4	19 ± 4
03/16/17 - 03/23/17	14 ± 5	14 ± 5	14 ± 5	16 ± 5	14 ± 5	12 ± 5	15 ± 5	14 ± 5
03/23/17 - 03/30/17	15 ± 4	12 ± 4	15 ± 4	14 ± 4	15 ± 4	16 ± 4	15 ± 4	16 ± 4
03/30/17 - 04/06/17	*(1)*	*(1)*	*(1)*	*(1)*	*(1)*	*(1)*	*(1)*	*(1)*
04/06/17 - 04/13/17	12 ± 4	14 ± 5	9 ± 4	11 ± 4	14 ± 5	11 ± 4	11 ± 4	7 ± 4
04/13/17 - 04/20/17	16 ± 4	15 ± 4	15 ± 4	17 ± 4	15 ± 4	17 ± 4	16 ± 4	17 ± 4
04/20/17 - 04/27/17	11 ± 4	12 ± 4	11 ± 4	11 ± 4	11 ± 4	12 ± 4	12 ± 4	13 ± 4
04/27/17 - 05/04/17	10 ± 3	11 ± 4	8 ± 3	10 ± 3	7 ± 3	9 ± 3	8 ± 3	10 ± 4
05/04/17 - 05/12/17	17 ± 4	17 ± 4	18 ± 4	16 ± 4	17 ± 4	18 ± 4	16 ± 3	16 ± 4
05/12/17 - 05/18/17	18 ± 5	15 ± 4	18 ± 5	19 ± 5	18 ± 4	18 ± 5	21 ± 4	17 ± 4
05/18/17 - 05/25/17	10 ± 4	7 ± 3	11 ± 4	10 ± 3	8 ± 3	10 ± 4	11 ± 4	11 ± 4
05/25/17 - 06/01/17	14 ± 4	12 ± 4	14 ± 4	18 ± 4	14 ± 4	17 ± 4	14 ± 4	14 ± 4
06/01/17 - 06/08/17	17 ± 4	15 ± 4	14 ± 4	15 ± 4	14 ± 4	15 ± 4	19 ± 4	17 ± 4
06/08/17 - 06/15/17	18 ± 4	18 ± 4	17 ± 4	18 ± 4	16 ± 4	20 ± 5	19 ± 4	17 ± 4
06/15/17 - 06/22/17	14 ± 4	12 ± 4	11 ± 4	13 ± 4	14 ± 4	12 ± 4	12 ± 4	15 ± 4
06/22/17 - 06/29/17	11 ± 4	9 ± 4	12 ± 4	11 ± 4	13 ± 4	9 ± 4	11 ± 4	8 ± 4
06/29/17 - 07/06/17	20 ± 5	16 ± 4	19 ± 4	20 ± 5	17 ± 4	18 ± 4	19 ± 4	21 ± 4
07/06/17 - 07/13/17	22 ± 5	23 ± 5	22 ± 5	20 ± 4	22 ± 5	23 ± 5	21 ± 5	25 ± 5
07/13/17 - 07/20/17	15 ± 4	14 ± 4	12 ± 4	17 ± 4	13 ± 4	14 ± 4	17 ± 4	16 ± 4
07/20/17 - 07/27/17	14 ± 4	10 ± 3	12 ± 3	14 ± 4	13 ± 4	15 ± 4	15 ± 4	13 ± 4
07/27/17 - 08/03/17	16 ± 4	15 ± 4	13 ± 4	17 ± 4	16 ± 4	16 ± 4	19 ± 4	18 ± 4
08/03/17 - 08/10/17	14 ± 4	15 ± 4	12 ± 4	12 ± 4	13 ± 4	19 ± 5	14 ± 4	14 ± 4
08/10/17 - 08/17/17	17 ± 4	13 ± 4	20 ± 4	19 ± 4	16 ± 4	17 ± 4	16 ± 4	16 ± 4
08/17/17 - 08/24/17	17 ± 4	16 ± 4	15 ± 4	14 ± 4	21 ± 4	17 ± 4	22 ± 4	18 ± 4
08/24/17 - 08/31/17	16 ± 4	15 ± 4	14 ± 4	17 ± 4	19 ± 4	20 ± 4	20 ± 4	19 ± 4
08/31/17 - 09/07/17	13 ± 4	17 ± 4	14 ± 4	17 ± 4	12 ± 4	14 ± 4	18 ± 4	14 ± 4
09/07/17 - 09/14/17	17 ± 4	17 ± 4	17 ± 4	17 ± 4	16 ± 4	18 ± 4	18 ± 4	17 ± 4
09/14/17 - 09/21/17	24 ± 5	21 ± 5	20 ± 4	20 ± 5	21 ± 5	25 ± 5	22 ± 4	24 ± 5
09/21/17 - 09/28/17	25 ± 5	23 ± 5	24 ± 5	22 ± 4	25 ± 5	21 ± 4	21 ± 4	20 ± 5
09/28/17 - 10/05/17	19 ± 4	17 ± 4	16 ± 4	17 ± 4	16 ± 4	22 ± 4	14 ± 4	14 ± 4
10/05/17 - 10/12/17	17 ± 5	15 ± 4	17 ± 5	14 ± 4	16 ± 4	16 ± 5	17 ± 5	16 ± 4
10/12/17 - 10/19/17	15 ± 4	16 ± 4	17 ± 4	13 ± 4	14 ± 4	13 ± 4	16 ± 4	16 ± 4
10/19/17 - 10/26/17	19 ± 4	13 ± 4	16 ± 4	16 ± 4	15 ± 4	18 ± 4	18 ± 4	10 ± 4
10/26/17 - 11/02/17	7 ± 3	7 ± 3	8 ± 3	10 ± 4	8 ± 3	6 ± 3	7 ± 3	8 ± 4
11/02/17 - 11/09/17	27 ± 5	23 ± 4	19 ± 4	24 ± 4	23 ± 4	20 ± 4	23 ± 4	22 ± 4
11/09/17 - 11/16/17	22 ± 5	27 ± 5	25 ± 5	21 ± 5	18 ± 4	20 ± 5	23 ± 5	19 ± 5
11/16/17 - 11/22/17	19 ± 5	20 ± 5	22 ± 5	22 ± 5	24 ± 5	22 ± 5	20 ± 5	19 ± 5
11/22/17 - 11/30/17	15 ± 4	16 ± 4	14 ± 4	16 ± 4	12 ± 3	16 ± 4	14 ± 4	12 ± 4
11/30/17 - 12/07/17	25 ± 5	15 ± 4	17 ± 4	22 ± 4	20 ± 4	19 ± 4	22 ± 5	20 ± 5
12/07/17 - 12/14/17	23 ± 5	17 ± 4	19 ± 4	20 ± 5	23 ± 5	17 ± 4	20 ± 4	21 ± 5
12/14/17 - 12/21/17	21 ± 5	21 ± 5	17 ± 4	23 ± 5	18 ± 4	20 ± 5	19 ± 4	17 ± 4
12/21/17 - 12/28/17	18 ± 4	19 ± 5	18 ± 4	19 ± 4	18 ± 4	28 ± 6	18 ± 4	20 ± 5
12/28/17 - 01/04/18	36 ± 5	36 ± 5	30 ± 5	29 ± 5	27 ± 5	31 ± 5	27 ± 5	30 ± 5
MEAN ± 2 STD DEV	17 ± 10	16 ± 10	16 ± 9	17 ± 8	16 ± 8	17 ± 9	17 ± 8	16 ± 9

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

Table C-VI.2 **MONTHLY AND YEARLY VALUES OF GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017**

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

GROUP I - NEAR FIELD LOCATIONS				GROUP II - FAR FIELD LOCATIONS				GROUP III - CONTROL LOCATIONS			
COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD	COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD	COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD
12/29/16 - 02/02/17	12	21	17 ± 5	12/29/16 - 02/02/17	13	21	17 ± 6	12/29/16 - 02/02/17	16	19	17 ± 2
02/02/17 - 03/02/17	12	25	18 ± 8	02/02/17 - 03/02/17	15	24	18 ± 7	02/02/17 - 03/02/17	13	21	17 ± 7
03/02/17 - 03/30/17	12	17	15 ± 3	03/02/17 - 03/30/17	11	19	15 ± 4	03/02/17 - 03/30/17	14	19	16 ± 4
04/06/17 - 05/04/17	8	17	12 ± 5	04/06/17 - 05/04/17	7	17	12 ± 6	04/06/17 - 05/04/17	7	17	12 ± 8
05/04/17 - 06/01/17	7	19	15 ± 7	05/04/17 - 06/01/17	8	21	15 ± 8	05/04/17 - 06/01/17	11	17	15 ± 6
06/01/17 - 06/29/17	9	18	14 ± 6	06/01/17 - 06/29/17	9	20	14 ± 7	06/01/17 - 06/29/17	8	17	14 ± 8
06/29/17 - 08/03/17	10	23	16 ± 7	06/29/17 - 08/03/17	13	23	17 ± 6	06/29/17 - 08/03/17	13	25	19 ± 9
08/03/17 - 08/31/17	12	20	15 ± 5	08/03/17 - 08/31/17	13	22	18 ± 6	08/03/17 - 08/31/17	14	19	17 ± 4
08/31/17 - 09/28/17	13	25	19 ± 7	08/31/17 - 09/28/17	12	25	19 ± 8	08/31/17 - 09/28/17	14	24	19 ± 9
09/28/17 - 11/02/17	7	19	14 ± 8	09/28/17 - 11/02/17	6	22	14 ± 8	09/28/17 - 11/02/17	8	16	13 ± 7
11/02/17 - 11/30/17	14	27	21 ± 8	11/02/17 - 11/30/17	12	24	19 ± 8	11/02/17 - 11/30/17	12	22	18 ± 8
11/30/17 - 01/04/18	15	36	22 ± 12	11/30/17 - 01/04/18	17	31	22 ± 9	11/30/17 - 01/04/18	17	30	22 ± 10
12/29/16 - 01/04/18	7	36	17 ± 9	12/29/16 - 01/04/18	6	31	17 ± 9	12/29/16 - 01/04/18	7	30	16 ± 9

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

Table C-VI.3

CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017

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
BD-02	12/29/16 - 03/30/17	< 2	< 2	< 5	< 2	< 4	< 2	< 3	< 2	< 2	< 11	< 5
	04/06/17 - 06/29/17	< 3	< 4	< 5	< 3	< 9	< 3	< 6	< 4	< 3	< 22	< 7
	06/29/17 - 09/28/17	< 2	< 3	< 5	< 3	< 6	< 3	< 4	< 3	< 2	< 25	< 8
	09/28/17 - 01/04/18	< 2	< 2	< 4	< 2	< 5	< 2	< 3	< 2	< 1	< 16	< 5
	MEAN	-	-	-	-	-	-	-	-	-	-	-
BD-03	12/29/16 - 03/30/17	< 2	< 2	< 5	< 3	< 6	< 2	< 4	< 3	< 2	< 14	< 7
	04/06/17 - 06/29/17	< 3	< 2	< 5	< 2	< 5	< 2	< 4	< 2	< 2	< 15	< 6
	06/29/17 - 09/28/17	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 23	< 10
	09/28/17 - 01/04/18	< 2	< 3	< 4	< 3	< 6	< 3	< 5	< 2	< 2	< 19	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-
BD-04	12/29/16 - 03/30/17	< 2	< 2	< 3	< 2	< 6	< 2	< 4	< 3	< 3	< 14	< 6
	04/06/17 - 06/29/17	< 2	< 3	< 6	< 4	< 7	< 2	< 6	< 4	< 3	< 20	< 3
	06/29/17 - 09/28/17	< 2	< 2	< 6	< 3	< 7	< 2	< 4	< 3	< 2	< 30	< 6
	09/28/17 - 01/04/18	< 4	< 4	< 8	< 4	< 9	< 5	< 7	< 4	< 4	< 26	< 15
	MEAN	-	-	-	-	-	-	-	-	-	-	-
BD-05	12/29/16 - 03/30/17	< 4	< 3	< 8	< 4	< 9	< 3	< 6	< 4	< 3	< 24	< 9
	04/06/17 - 06/29/17	< 3	< 3	< 6	< 3	< 6	< 3	< 6	< 3	< 3	< 18	< 5
	06/29/17 - 09/28/17	< 4	< 5	< 10	< 4	< 9	< 5	< 8	< 5	< 3	< 50	< 21
	09/28/17 - 01/04/18	< 2	< 3	< 6	< 2	< 5	< 3	< 5	< 1	< 2	< 21	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-
BD-06	12/29/16 - 03/30/17	< 2	< 2	< 4	< 2	< 3	< 2	< 4	< 2	< 2	< 13	< 4
	04/06/17 - 06/29/17	< 3	< 2	< 6	< 2	< 5	< 3	< 5	< 3	< 2	< 16	< 6
	06/29/17 - 09/28/17	< 2	< 2	< 7	< 2	< 5	< 2	< 4	< 3	< 2	< 28	< 15
	09/28/17 - 01/04/18	< 3	< 4	< 8	< 4	< 10	< 4	< 7	< 3	< 3	< 27	< 8
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-VI.3

CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017

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
BD-19	12/29/16 - 03/30/17	< 3	< 4	< 6	< 4	< 8	< 3	< 5	< 3	< 3	< 20	< 6
	04/06/17 - 06/29/17	< 4	< 3	< 8	< 4	< 9	< 3	< 7	< 4	< 3	< 24	< 6
	06/29/17 - 09/28/17	< 2	< 3	< 5	< 3	< 5	< 2	< 6	< 3	< 2	< 30	< 12
	09/28/17 - 01/04/18	< 2	< 3	< 6	< 2	< 4	< 2	< 4	< 3	< 3	< 16	< 6
	MEAN	-	-	-	-	-	-	-	-	-	-	-
BD-20	12/29/16 - 03/30/17	< 3	< 2	< 6	< 3	< 5	< 3	< 4	< 3	< 2	< 11	< 5
	04/06/17 - 06/29/17	< 3	< 3	< 4	< 3	< 5	< 3	< 4	< 2	< 2	< 19	< 8
	06/29/17 - 09/28/17	< 3	< 4	< 9	< 4	< 8	< 4	< 7	< 3	< 4	< 47	< 13
	09/28/17 - 01/04/18	< 3	< 3	< 5	< 2	< 7	< 3	< 5	< 2	< 2	< 17	< 6
	MEAN	-	-	-	-	-	-	-	-	-	-	-
BD-21	12/29/16 - 03/30/17	< 3	< 3	< 8	< 3	< 7	< 2	< 4	< 3	< 3	< 15	< 7
	04/06/17 - 06/29/17	< 4	< 3	< 6	< 3	< 7	< 3	< 4	< 3	< 3	< 24	< 10
	06/29/17 - 09/28/17	< 2	< 3	< 7	< 3	< 5	< 3	< 4	< 3	< 2	< 24	< 10
	09/28/17 - 01/04/18	< 2	< 2	< 7	< 3	< 6	< 2	< 4	< 2	< 2	< 19	< 9
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-VII.1 CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017

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

COLLECTION PERIOD	GROUP I - NEAR FIELD				GROUP II - FAR FIELD			GROUP III - CONTROL
	BD-06	BD-19	BD-20	BD-21	BD-02	BD-04	BD-05	BD-03
12/29/16 - 01/05/17	< 37	< 37	< 37	< 38	< 49	< 49	< 47	< 47
01/05/17 - 01/12/17	< 35	< 34	< 35	< 35	< 58	< 59	< 54	< 57
01/12/17 - 01/19/17	< 53	< 52	< 51	< 53	< 40	< 40	< 17	< 40
01/19/17 - 01/26/17	< 61	< 60	< 58	< 62	< 51	< 51	< 48	< 49
01/26/17 - 02/02/17	< 41	< 39	< 15	< 41	< 47	< 44	< 44	< 46
02/02/17 - 02/09/17	< 40	< 37	< 37	< 38	< 50	< 52	< 49	< 49
02/09/17 - 02/16/17	< 48	< 49	< 49	< 50	< 46	< 47	< 19	< 47
02/16/17 - 02/23/17	< 49	< 50	< 48	< 50	< 42	< 42	< 40	< 41
02/23/17 - 03/02/17	< 56	< 56	< 56	< 58	< 49	< 47	< 48	< 50
03/02/17 - 03/09/17	< 51	< 52	< 49	< 52	< 43	< 45	< 41	< 42
03/09/17 - 03/16/17	< 36	< 36	< 35	< 37	< 32	< 32	< 30	< 32
03/16/17 - 03/23/17	< 30	< 31	< 29	< 31	< 38	< 38	< 15	< 38
03/23/17 - 03/30/17	< 44	< 44	< 18	< 19	< 35	< 33	< 34	< 35
03/30/17 - 04/06/17	*(1)*	*(1)*	*(1)*	*(1)*	*(1)*	*(1)*	*(1)*	*(1)*
04/06/17 - 04/13/17	< 47	< 47	< 45	< 48	< 35	< 35	< 33	< 35
04/13/17 - 04/20/17	< 28	< 28	< 28	< 28	< 57	< 58	< 57	< 57
04/20/17 - 04/27/17	< 43	< 42	< 40	< 41	< 50	< 51	< 48	< 50
04/27/17 - 05/04/17	< 41	< 40	< 38	< 40	< 41	< 41	< 41	< 42
05/04/17 - 05/12/17	< 26	< 27	< 26	< 27	< 23	< 22	< 22	< 23
05/12/17 - 05/18/17	< 29	< 29	< 28	< 30	< 29	< 31	< 27	< 29
05/18/17 - 05/25/17	< 48	< 48	< 47	< 47	< 46	< 46	< 45	< 45
05/25/17 - 06/01/17	< 45	< 44	< 18	< 45	< 31	< 30	< 30	< 32
06/01/17 - 06/08/17	< 30	< 29	< 28	< 29	< 40	< 42	< 16	< 40
06/08/17 - 06/15/17	< 43	< 42	< 42	< 42	< 49	< 56	< 49	< 49
06/15/17 - 06/22/17	< 38	< 37	< 38	< 37	< 38	< 39	< 39	< 39
06/22/17 - 06/29/17	< 42	< 42	< 40	< 42	< 62	< 63	< 61	< 63
06/29/17 - 07/06/17	< 44	< 42	< 40	< 45	< 47	< 47	< 16	< 47
07/06/17 - 07/13/17	< 43	< 42	< 42	< 41	< 58	< 58	< 58	< 59
07/13/17 - 07/20/17	< 43	< 42	< 41	< 42	< 49	< 49	< 47	< 49
07/20/17 - 07/27/17	< 46	< 46	< 44	< 46	< 51	< 53	< 51	< 53
07/27/17 - 08/03/17	< 37	< 37	< 36	< 37	< 47	< 47	< 46	< 47
08/03/17 - 08/10/17	< 43	< 41	< 40	< 41	< 35	< 40	< 33	< 35
08/10/17 - 08/17/17	< 52	< 49	< 49	< 26	< 56	< 55	< 53	< 56
08/17/17 - 08/24/17	< 39	< 38	< 36	< 32	< 43	< 43	< 42	< 43
08/24/17 - 08/31/17	< 35	< 36	< 36	< 35	< 43	< 44	< 43	< 44
08/31/17 - 09/07/17	< 47	< 47	< 24	< 47	< 54	< 52	< 55	< 54
09/07/17 - 09/14/17	< 61	< 59	< 57	< 60	< 48	< 52	< 47	< 50
09/14/17 - 09/21/17	< 46	< 45	< 36	< 45	< 54	< 53	< 51	< 52
09/21/17 - 09/28/17	< 54	< 53	< 53	< 52	< 34	< 31	< 33	< 34
09/28/17 - 10/05/17	< 25	< 25	< 24	< 25	< 37	< 39	< 16	< 37
10/05/17 - 10/12/17	< 44	< 43	< 42	< 34	< 49	< 51	< 50	< 49
10/12/17 - 10/19/17	< 55	< 53	< 49	< 53	< 35	< 37	< 36	< 35
10/19/17 - 10/26/17	< 29	< 31	< 29	< 29	< 37	< 37	< 37	< 37
10/26/17 - 11/02/17	< 35	< 34	< 34	< 34	< 42	< 40	< 42	< 43
11/02/17 - 11/09/17	< 31	< 31	< 30	< 30	< 44	< 46	< 46	< 46
11/09/17 - 11/16/17	< 40	< 39	< 38	< 38	< 55	< 56	< 54	< 57
11/16/17 - 11/22/17	< 40	< 41	< 39	< 40	< 53	< 54	< 53	< 55
11/22/17 - 11/30/17	< 25	< 24	< 24	< 24	< 36	< 37	< 36	< 37
11/30/17 - 12/07/17	< 51	< 51	< 21	< 50	< 61	< 58	< 61	< 63
12/07/17 - 12/14/17	< 52	< 52	< 51	< 52	< 53	< 56	< 27	< 55
12/14/17 - 12/21/17	< 54	< 54	< 23	< 54	< 68	< 70	< 69	< 70
12/21/17 - 12/28/17	< 56	< 58	< 55	< 55	< 48	< 67	< 49	< 51
12/28/17 - 01/04/18	< 50	< 51	< 48	< 48	< 47	< 48	< 46	< 48
MEAN	-	-	-	-	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-VIII.1 CONCENTRATIONS OF I-131 IN MILK SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	INDICATOR FARM BD-17	CONTROL FARM BD-18
01/04/17	< 0.7	< 0.6
02/01/17	< 0.6	< 0.8
03/01/17	< 0.3	< 0.5
04/20/17	< 0.6	< 0.7
05/04/17	< 0.6	< 0.8
05/18/17	< 0.9	< 0.7
05/31/17	< 0.8	< 0.8
06/15/17	< 0.7	< 1.0
06/28/17	< 0.9	< 0.7
07/12/17	< 0.4	< 0.4
07/27/17	< 0.9	< 0.8
08/10/17	< 0.7	< 0.6
08/24/17	< 0.5	< 0.6
09/06/17	< 0.5	< 0.4
09/21/17	< 0.4	< 0.4
10/05/17	< 0.7	< 0.8
10/19/17	< 0.4	< 0.4
11/01/17	< 0.7	< 0.8
12/06/17	< 0.6	< 0.7
MEAN	-	-

Table C-VIII.2

CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017

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
BD-17	01/06/17	< 5	< 5	< 14	< 6	< 13	< 6	< 10	< 6	< 7	< 25	< 5
	02/02/17	< 7	< 7	< 16	< 8	< 15	< 8	< 13	< 8	< 8	< 31	< 7
	03/02/17	< 7	< 8	< 17	< 8	< 16	< 7	< 11	< 6	< 9	< 32	< 11
	04/20/17	< 7	< 12	< 21	< 9	< 21	< 10	< 18	< 11	< 9	< 44	< 15
	05/04/17	< 8	< 9	< 16	< 8	< 25	< 8	< 12	< 8	< 8	< 35	< 11
	05/18/17	< 5	< 5	< 10	< 5	< 12	< 5	< 10	< 6	< 5	< 21	< 7
	06/01/17	< 10	< 9	< 25	< 12	< 22	< 9	< 15	< 11	< 9	< 42	< 11
	06/15/17	< 6	< 5	< 13	< 5	< 14	< 6	< 10	< 6	< 5	< 24	< 7
	06/29/17	< 7	< 6	< 18	< 8	< 14	< 8	< 13	< 8	< 7	< 30	< 8
	07/13/17	< 6	< 9	< 13	< 12	< 18	< 9	< 16	< 9	< 8	< 34	< 8
	07/27/17	< 7	< 9	< 22	< 8	< 16	< 7	< 13	< 9	< 10	< 32	< 11
	08/10/17	< 5	< 5	< 11	< 5	< 11	< 5	< 9	< 6	< 5	< 25	< 6
	08/24/17	< 7	< 7	< 15	< 7	< 16	< 8	< 13	< 9	< 8	< 28	< 10
	09/07/17	< 5	< 6	< 11	< 6	< 12	< 6	< 10	< 5	< 5	< 41	< 13
	09/21/17	< 9	< 9	< 20	< 9	< 22	< 10	< 17	< 10	< 9	< 49	< 14
	10/05/17	< 10	< 11	< 23	< 10	< 21	< 10	< 17	< 13	< 11	< 43	< 11
	10/19/17	< 7	< 7	< 17	< 9	< 19	< 10	< 15	< 9	< 8	< 36	< 11
	11/02/17	< 5	< 6	< 12	< 6	< 10	< 6	< 9	< 6	< 5	< 24	< 8
	12/07/17	< 6	< 5	< 13	< 7	< 17	< 7	< 10	< 6	< 7	< 27	< 8
	MEAN	-	-	-	-	-	-	-	-	-	-	-
BD-18	01/04/17	< 7	< 8	< 15	< 8	< 17	< 8	< 13	< 6	< 7	< 33	< 6
	02/01/17	< 8	< 7	< 11	< 8	< 15	< 8	< 11	< 6	< 7	< 29	< 11
	03/01/17	< 6	< 7	< 15	< 7	< 13	< 7	< 14	< 7	< 8	< 41	< 10
	04/20/17	< 5	< 7	< 12	< 6	< 13	< 6	< 10	< 5	< 6	< 25	< 7
	05/04/17	< 6	< 7	< 17	< 7	< 15	< 8	< 10	< 8	< 7	< 33	< 8
	05/18/17	< 9	< 7	< 16	< 9	< 18	< 7	< 14	< 8	< 8	< 31	< 10
	05/31/17	< 5	< 5	< 10	< 4	< 11	< 5	< 8	< 6	< 5	< 25	< 5
	06/15/17	< 6	< 7	< 12	< 7	< 15	< 7	< 12	< 7	< 7	< 25	< 8
	06/28/17	< 9	< 11	< 25	< 12	< 21	< 9	< 17	< 12	< 9	< 46	< 13
	07/12/17	< 10	< 11	< 23	< 10	< 21	< 10	< 18	< 11	< 9	< 47	< 14
	07/27/17	< 10	< 11	< 26	< 13	< 21	< 9	< 17	< 9	< 9	< 38	< 13
	08/10/17	< 6	< 6	< 15	< 7	< 15	< 5	< 10	< 6	< 6	< 29	< 9
	08/24/17	< 8	< 7	< 16	< 7	< 23	< 9	< 12	< 11	< 8	< 33	< 12
	09/06/17	< 5	< 4	< 14	< 5	< 12	< 6	< 9	< 5	< 5	< 39	< 12
	09/21/17	< 7	< 9	< 20	< 8	< 20	< 8	< 14	< 8	< 9	< 41	< 15
	10/05/17	< 8	< 8	< 19	< 8	< 20	< 9	< 15	< 9	< 8	< 38	< 13
	10/19/17	< 10	< 10	< 22	< 9	< 20	< 9	< 16	< 11	< 10	< 47	< 12
	11/01/17	< 5	< 6	< 14	< 6	< 14	< 5	< 9	< 6	< 6	< 26	< 9
	12/06/17	< 9	< 9	< 20	< 9	< 22	< 9	< 16	< 10	< 8	< 39	< 10
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-IX.1

CONCENTRATIONS OF GAMMA EMITTERS IN VEGETATION SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017

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
BD-CONTROL													
Cabbage	08/17/17		< 35	< 31	< 59	< 37	< 81	< 32	< 61	< 41	< 36	< 141	< 49
Radish leaves	08/17/17		< 37	< 32	< 76	< 36	< 82	< 40	< 59	< 43	< 38	< 168	< 45
Radishes	08/17/17		< 43	< 39	< 73	< 42	< 86	< 45	< 72	< 45	< 44	< 174	< 52
Radishes	09/28/17		< 41	< 38	< 83	< 43	< 89	< 43	< 70	< 44	< 41	< 172	< 51
	MEAN		-	-	-	-	-	-	-	-	-	-	-
BD-QUAD 1													
Radish leaves	08/16/17		< 23	< 22	< 59	< 34	< 52	< 30	< 53	< 30	< 29	< 113	< 33
Radishes	08/16/17		< 40	< 39	< 76	< 41	< 74	< 35	< 75	< 38	< 48	< 151	< 50
	MEAN		-	-	-	-	-	-	-	-	-	-	-
BD-QUAD 2													
Green onions	06/29/17		< 26	< 27	< 40	< 20	< 43	< 21	< 50	< 25	< 26	< 121	< 28
Lettuce	06/29/17		< 13	< 22	< 49	< 17	< 43	< 22	< 35	< 21	35 ± 23	< 85	< 19
Lettuce	06/29/17	(R1)									55 ± 17		
Beets	07/20/17		< 37	< 33	< 74	< 28	< 62	< 31	< 71	< 34	< 41	< 157	< 46
Green onions	07/20/17		< 42	< 41	< 92	< 57	< 110	< 42	< 72	< 48	< 51	< 165	< 50
Red cabbage	07/20/17		< 42	< 36	< 80	< 39	< 78	< 38	< 73	< 48	< 37	< 146	< 45
Red beets	08/10/17		< 28	< 31	< 58	< 33	< 62	< 35	< 53	< 35	< 33	< 149	< 44
Red cabbage	08/10/17		< 19	< 19	< 36	< 17	< 40	< 20	< 24	< 20	< 22	< 84	< 24
Beets	09/07/17		< 36	< 39	< 78	< 36	< 84	< 39	< 63	< 37	< 38	< 148	< 53
Green cabbage	09/07/17		< 32	< 25	< 63	< 29	< 59	< 32	< 56	< 34	< 39	< 134	< 40
Red cabbage	09/07/17		< 33	< 31	< 66	< 35	< 75	< 38	< 67	< 33	< 32	< 161	< 40
Brussels sprouts	10/05/17		< 32	< 31	< 89	< 37	< 80	< 45	< 61	< 48	< 43	< 176	< 40
	MEAN		-	-	-	-	-	-	-	-	45 ± 28	-	-
BD-QUAD 3													
Beet greens	07/13/17		< 36	< 37	< 81	< 40	< 95	< 52	< 65	< 36	< 40	< 166	< 56
Beets	07/13/17		< 37	< 36	< 83	< 36	< 96	< 35	< 65	< 41	< 40	< 155	< 43
Green onions	07/13/17		< 26	< 30	< 52	< 29	< 62	< 29	< 51	< 32	< 36	< 123	< 46
Beet greens	08/24/17		< 34	< 29	< 69	< 36	< 65	< 31	< 65	< 39	< 37	< 143	< 49
Beets	08/24/17		< 14	< 15	< 36	< 19	< 41	< 16	< 24	< 18	< 18	< 65	< 20
Beet greens	09/21/17		< 34	< 35	< 73	< 37	< 70	< 33	< 52	< 41	< 37	< 159	< 54
Beets	09/21/17		< 21	< 20	< 47	< 24	< 54	< 21	< 44	< 26	< 26	< 109	< 27
	MEAN		-	-	-	-	-	-	-	-	-	-	-
BD-QUAD 4													
Beet greens	07/13/17		< 43	< 34	< 65	< 36	< 80	< 40	< 74	< 37	< 45	< 184	< 43
Beets/green onions	07/13/17		< 41	< 51	< 67	< 53	< 92	< 48	< 85	< 52	< 52	< 177	< 70
Cauliflower leaves	08/24/17		< 26	< 23	< 60	< 24	< 54	< 20	< 45	< 22	< 25	< 117	< 30
Cauliflower root	08/24/17		< 27	< 26	< 65	< 32	< 74	< 28	< 51	< 34	124 ± 33	< 109	< 35
Cauliflower root	08/24/17	(R1)									98 ± 17		
Cauliflower	09/28/17		< 36	< 35	< 84	< 39	< 94	< 42	< 60	< 41	< 50	< 181	< 68
Cauliflower leaves	09/28/17		< 32	< 26	< 71	< 40	< 66	< 35	< 51	< 30	< 36	< 142	< 15
	MEAN		-	-	-	-	-	-	-	-	111 ± 38	-	-

R1 - Sample re-analyzed for confirmation

Table C-X.1 **QUARTERLY OSLD RESULTS FOR BRAIDWOOD STATION, 2017**

RESULTS IN UNITS OF MREM/QUARTER ± 2 STANDARD DEVIATIONS

STATION CODE	MEAN ± 2 S.D.	JAN - MAR	APR - JUN	JUL - SEP	OCT - DEC
BD-02-1	21.0 ± 1.9	22.4	20.8	20.8	20.1
BD-02-2	20.5 ± 1.1	20.0	20.6	21.2	20.0
BD-03-1	20.3 ± 3.6	19.5	22.4	20.9	18.2
BD-03-2	21.4 ± 0.9	21.3	22.0	20.9	21.4
BD-04-1	20.1 ± 2.5	18.2	20.4	20.8	20.9
BD-04-2	19.7 ± 1.1	18.9	20.0	19.9	20.1
BD-05-1	20.5 ± 1.5	20.1	21.2	19.6	21.0
BD-05-2	21.2 ± 1.2	21.0	21.1	22.1	20.7
BD-06-1	19.4 ± 2.9	18.4	21.1	20.0	18.0
BD-06-2	19.9 ± 1.3	19.7	20.9	19.7	19.4
BD-19-1	20.5 ± 1.9	19.5	21.6	19.8	20.9
BD-19-2	21.0 ± 2.0	20.3	21.3	22.3	20.1
BD-20-1	20.6 ± 1.8	21.4	19.3	20.7	21.0
BD-20-2	20.7 ± 0.6	20.4	20.9	21.0	20.6
BD-21-1	20.1 ± 1.7	20.0	20.6	20.7	18.9
BD-21-2	19.9 ± 1.9	18.5	20.6	20.3	20.3
BD-101-3	20.2 ± 1.2	20.5	19.6	20.9	19.9
BD-101-4	20.0 ± 1.7	20.2	21.0	19.1	19.5
BD-102-1	19.7 ± 1.4	20.1	20.2	18.7	19.7
BD-102-2	21.6 ± 1.1	22.2	21.8	21.0	21.2
BD-103-1	19.6 ± 1.0	19.5	20.0	18.9	19.9
BD-103-2	19.5 ± 2.1	18.3	20.8	19.5	19.2
BD-104-1	18.4 ± 2.7	17.8	20.4	17.9	17.5
BD-104-2	19.4 ± 1.2	19.4	20.0	19.5	18.5
BD-104-3	26.3 ± 5.4	29.8	25.9	26.0	23.3
BD-104-4	24.1 ± 1.8	24.1	24.7	24.8	22.8
BD-105-1	19.0 ± 3.0	18.4	19.7	17.3	20.7
BD-105-2	19.3 ± 1.6	19.3	19.9	19.8	18.2
BD-105-3	25.7 ± 2.6	26.7	24.1	26.8	25.3
BD-105-4	36.6 ± 11.0	29.3	35.7	42.1	39.2
BD-106-1	20.1 ± 4.4	*(1)*	18.9	22.6	18.7
BD-106-2	19.1 ± 1.8	19.9	19.0	17.9	19.7
BD-107-1	19.3 ± 0.9	19.1	19.6	18.7	19.6
BD-107-2	18.5 ± 1.7	18.6	19.6	17.6	18.2
BD-108-1	19.5 ± 2.9	18.3	20.5	18.1	20.9
BD-108-2	21.0 ± 1.3	20.3	20.7	21.2	21.8
BD-109-1	22.8 ± 3.3	21.5	24.7	23.6	22.3
BD-109-2	22.4 ± 1.7	22.7	23.1	21.2	22.6
BD-110-1	19.0 ± 2.7	18.6	21.0	18.3	18.2
BD-110-2	19.1 ± 1.8	18.0	20.2	19.3	19.0
BD-110-3	24.5 ± 5.5	21.4	23.0	27.3	26.3
BD-110-4	27.3 ± 6.2	24.9	27.2	25.3	31.7
BD-112-1	18.5 ± 1.7	18.3	19.7	18.1	17.7
BD-112-2	20.1 ± 1.5	19.1	20.7	20.1	20.6
BD-114-1	19.8 ± 1.1	19.0	20.0	20.1	20.1
BD-114-2	21.1 ± 1.8	19.8	21.8	21.4	21.3
BD-115-1	19.6 ± 1.9	18.7	19.3	20.9	19.4
BD-115-2	20.2 ± 3.0	21.3	21.4	18.2	19.7
BD-116-1	22.0 ± 1.8	21.5	21.9	21.3	23.3
BD-116-2	20.3 ± 2.2	18.9	20.4	20.1	21.6

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-X.1 **QUARTERLY OSLD RESULTS FOR BRAIDWOOD STATION, 2017**

RESULTS IN UNITS OF MREM/QUARTER ± 2 STANDARD DEVIATIONS

STATION CODE	MEAN ± 2 S.D.	JAN - MAR	APR - JUN	JUL - SEP	OCT - DEC
BD-201-1	24.9 ± 1.6	24.1	25.9	25.0	24.4
BD-201-2	21.7 ± 1.7	21.1	21.2	22.9	21.7
BD-202-1	20.8 ± 1.4	21.4	21.1	20.7	19.8
BD-202-2	20.4 ± 1.7	21.1	21.2	19.6	19.8
BD-203-1	21.2 ± 1.0	21.6	21.3	20.4	21.3
BD-203-2	19.4 ± 0.9	19.2	20.0	19.3	18.9
BD-204-1	19.4 ± 0.8	19.7	19.8	19.1	19.0
BD-204-2	18.6 ± 1.5	18.6	18.8	17.5	19.3
BD-205-1	20.0 ± 1.3	19.9	20.9	19.9	19.4
BD-205-2	19.7 ± 2.7	18.1	21.0	19.1	20.6
BD-206-1	20.0 ± 1.8	19.3	21.3	19.4	20.0
BD-206-2	19.1 ± 0.7	18.8	19.0	19.5	*(1)*
BD-207-1	19.0 ± 2.6	17.5	20.5	19.5	18.5
BD-207-2	19.0 ± 2.2	18.4	20.5	18.9	18.0
BD-208-1	19.8 ± 1.8	18.5	20.5	20.3	20.0
BD-208-2	20.2 ± 1.0	20.0	19.9	20.0	21.0
BD-209-1	23.8 ± 2.1	25.0	23.5	24.0	22.5
BD-209-2	24.9 ± 1.3	25.7	25.2	24.5	24.3
BD-210-1	22.8 ± 1.5	22.8	23.5	23.0	21.7
BD-210-2	19.6 ± 1.0	19.9	18.9	19.7	19.9
BD-211-1	24.7 ± 2.1	24.3	24.1	26.3	24.2
BD-211-2	23.7 ± 2.8	22.9	24.0	25.6	22.4
BD-212-3	19.6 ± 1.3	19.1	19.3	20.5	19.3
BD-212-4	24.5 ± 2.5	22.7	25.0	25.5	24.9
BD-213-3	18.3 ± 0.8	18.3	17.8	18.4	18.8
BD-213-4	18.0 ± 1.5	16.9	18.5	18.5	18.0
BD-214-1	19.8 ± 2.8	18.2	21.5	19.4	20.1
BD-214-2	23.1 ± 1.5	22.9	22.2	23.8	23.6
BD-215-1	20.6 ± 2.0	20.4	21.6	19.3	21.1
BD-215-2	18.3 ± 1.3	18.9	*(1)*	18.3	17.6
BD-216-1	22.1 ± 1.9	21.0	21.7	23.2	22.6
BD-216-2	20.9 ± 0.5	20.8	21.1	21.1	20.6
BD-111A-1	19.8 ± 2.0	20.7	20.6	18.7	19.3
BD-111A-2	19.6 ± 1.7	18.9	20.6	20.1	18.9
BD-113A-1	20.3 ± 2.2	20.0	21.2	18.9	21.2
BD-113A-2	20.7 ± 2.3	19.7	22.3	20.0	20.6

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-X.2 MEAN QUARTLY OSLD RESULTS FOR THE INNER RING, OUTER RING, OTHER, CONTROL, AND INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) LOCATIONS FOR BRAIDWOOD STATION, 2017

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

COLLECTION PERIOD	SITE BOUNDARY ± 2 S.D.	INTERMEDIATE DIST ± 2 S.D.	OTHER ± 2 S.D.	CONTROL ± 2 S.D.	ISFSI ± 2 S.D.
JAN-MAR	19.6 ± 2.5	20.5 ± 4.6	19.9 ± 2.4	20.4 ± 2.5	26.0 ± 6.4
APR-JUN	20.6 ± 2.4	21.3 ± 4.1	20.7 ± 1.2	22.2 ± 0.6	26.8 ± 9.2
JUL-SEP	19.7 ± 3.0	21.0 ± 5.0	20.6 ± 1.7	20.9 ± 0.0	28.7 ± 13.2
OCT-DEC	20.0 ± 2.9	20.8 ± 4.1	20.1 ± 1.7	19.8 ± 4.5	28.1 ± 12.6

TABLE C-X.3 SUMMARY OF THE AMBIENT DOSIMETRY PROGRAM FOR BRAIDWOOD STATION, 2017

RESULTS IN UNITS OF MREM/QUARTER ± 2 STANDARD DEVIATION

LOCATION	SAMPLES ANALYZED	PERIOD MINIMUM	PERIOD MAXIMUM	PERIOD MEAN ± 2 S.D.
SITE BOUNDARY	126	17.3	24.7	20.0 ± 2.8
INTERMEDIATE DISTANCE	126	16.9	26.3	20.9 ± 4.4
OTHER	56	18.0	22.4	20.4 ± 1.9
CONTROL	8	18.2	22.4	20.8 ± 2.7
ISFSI	24	21.4	42.1	27.4 ± 10.2

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

INTERMEDIATE DISTANCE STATIONS - BD-201-1, BD-201-2, BD-202-1, BD-202-2, BD-203-1, BD-203-2, BD-204-1, BD-204-2, BD-205-1, BD-205-2, BD-206-1, BD-206-2, BD-207-1, BD-207-2, BD-208-1, BD-208-2, BD-209-1, BD-209-2, BD-210-1, BD-210-2, BD-211-1, BD-211-2, BD-212-3, BD-212-4, BD-213-3, BD-213-4, BD-214-1, BD-214-2, BD-215-1, BD-215-2, BD-216-1, BD-216-2

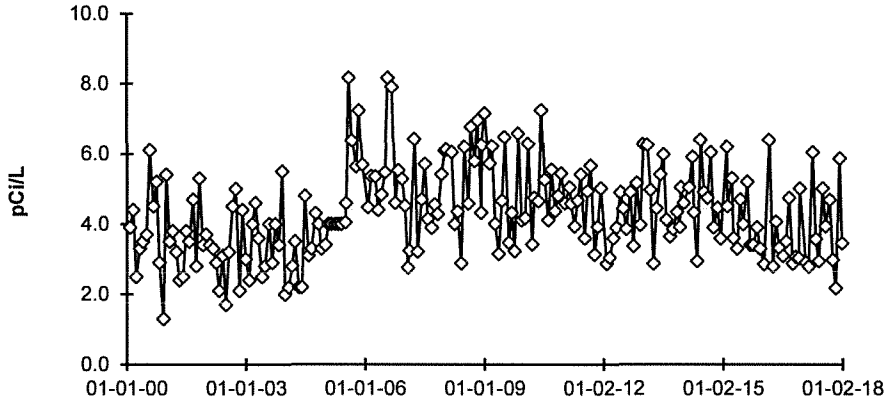
OTHER STATIONS - BD-02-1, BD-02-2, BD-04-1, BD-04-2, BD-05-1, BD-05-2, BD-06-1, BD-06-2, BD-19-1, BD-19-2, BD-20-1, BD-20-2, BD-21-1, BD-21-2

CONTROL STATIONS - BD-03-1, BD-03-2

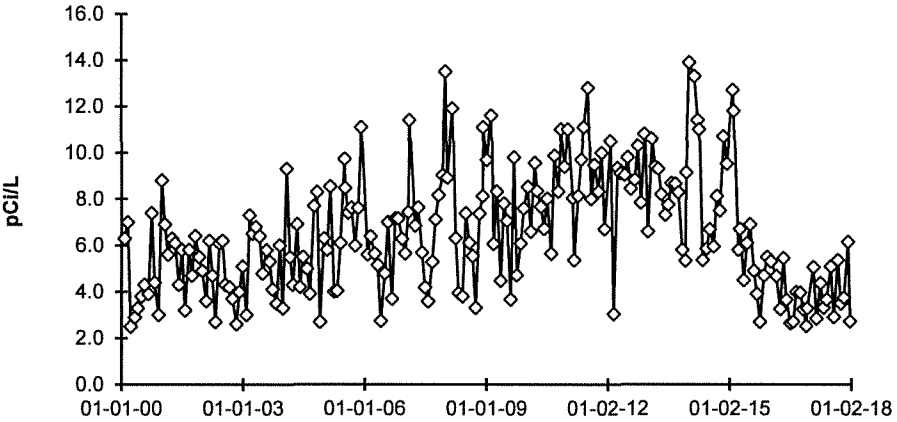
ISFSI STATIONS - BD-104-3, BD-104-4, BD-105-3, BD-105-4, BD-110-3, BD-110-4

FIGURE C-1
Surface Water - Gross Beta - Stations BD-10 and BD-25 (C) Collected in the Vicinity of Braidwood Station, 2000 - 2017

BD-10 Kankaee River, Downstream



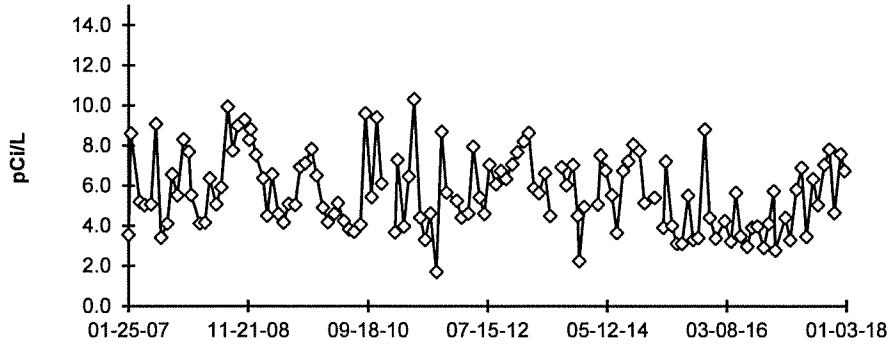
BD-25 (C) Kankakee River, Upstream



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

FIGURE C-2
Surface Water - Gross Beta - Stations BD-38 and BD-40 Collected in the Vicinity of Braidwood Station, 2007 - 2017

BD-38 Main Drainage Ditch



BD-40 Braidwood Station Cooling Lake

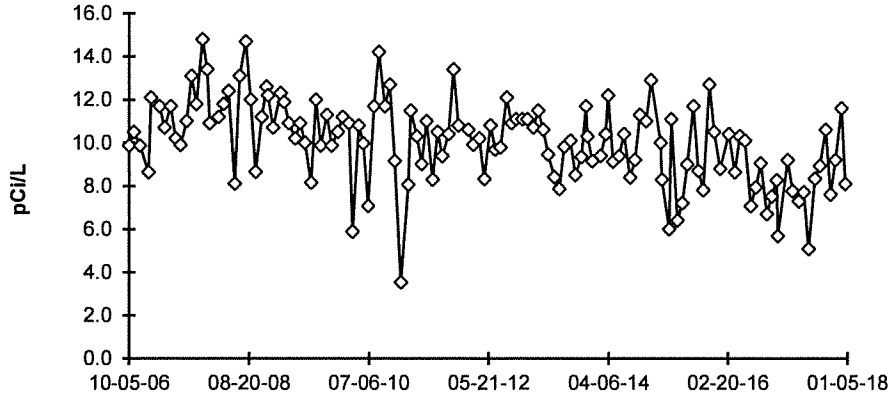
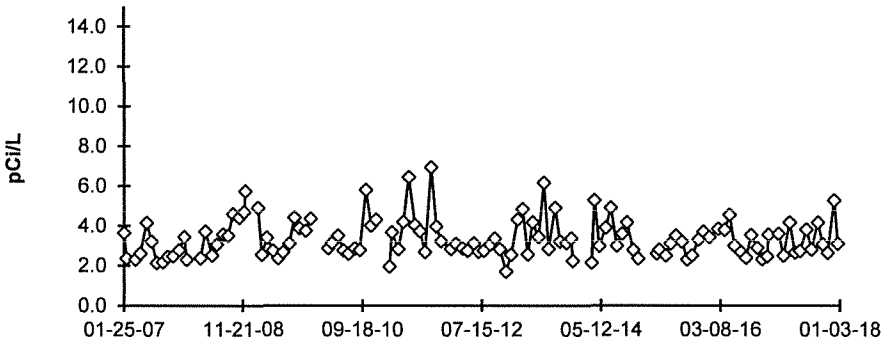
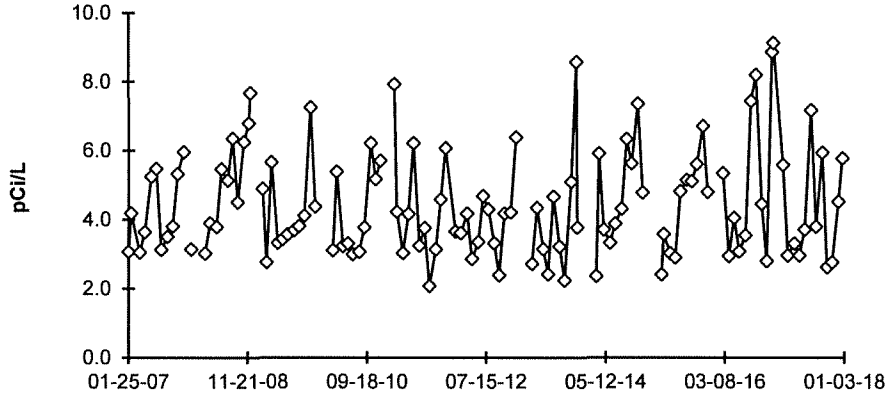


FIGURE C-3
Surface Water - Gross Beta - Stations BD-55 and BD-56 Collected in the Vicinity of Braidwood Station, 2007 - 2017

BD-55 North Pond Fatlan Site



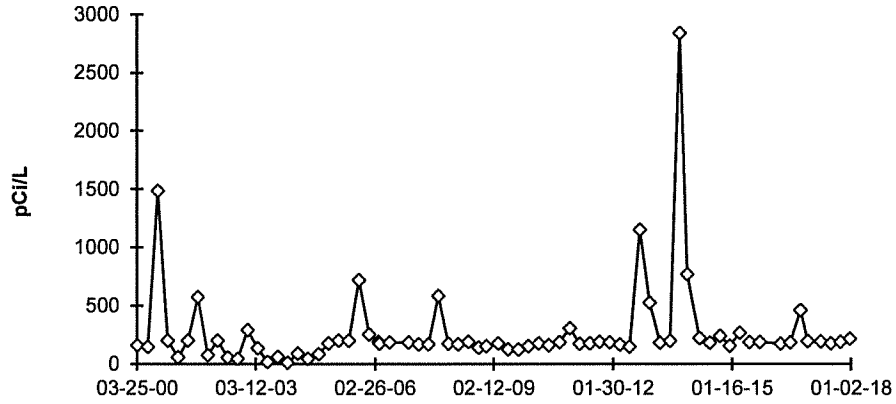
BD-56 South Pond Fatlan Site



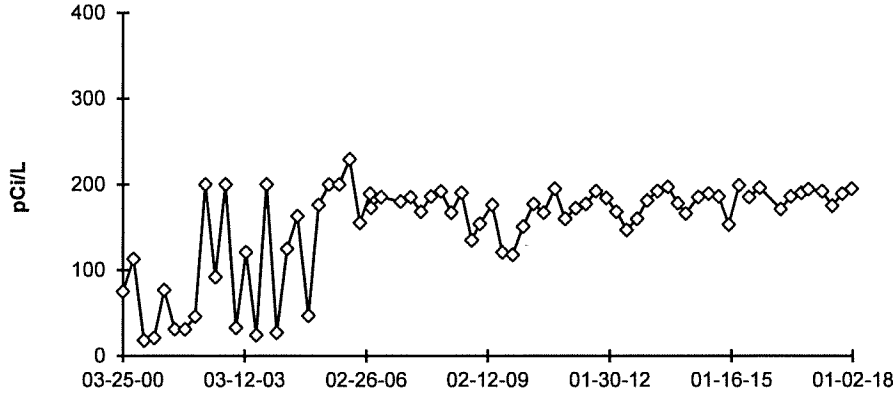
GAPS IN DATA ARE DUE TO SAMPLING POINTS BEING FROZEN AT TIME OF COLLECTION

FIGURE C-4
Surface Water - Tritium - Stations BD-10 and BD-25 (C) Collected in the Vicinity of Braidwood Station, 2000 - 2017

BD-10 Kankakee River, Downstream



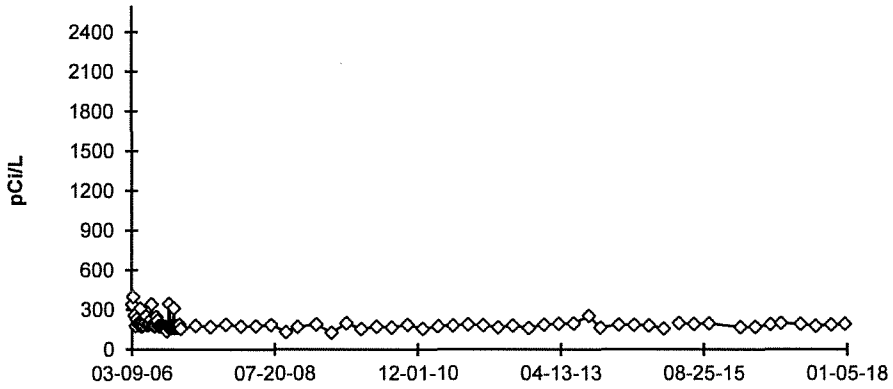
BD-25 (C) Kankakee River, Upstream



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

FIGURE C-5
Surface Water - Tritium - Stations BD-38 and BD-40 Collected in the Vicinity of Braidwood Station, 2006 - 2017

BD-38 Main Drainage Ditch



BD-40 Braidwood Station Cooling Lake

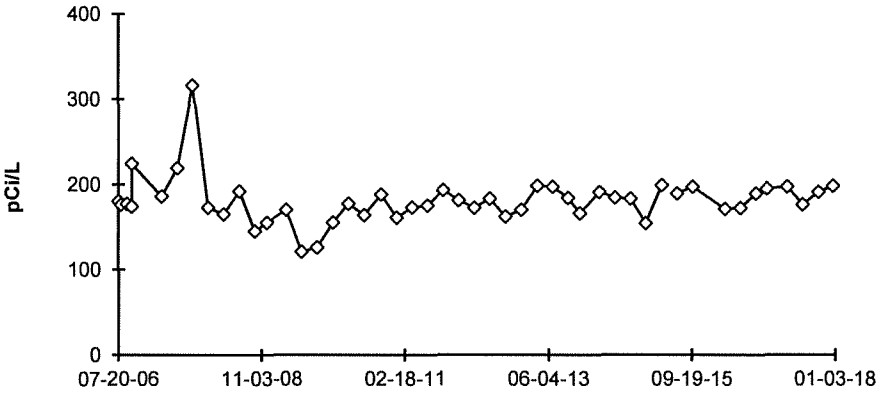
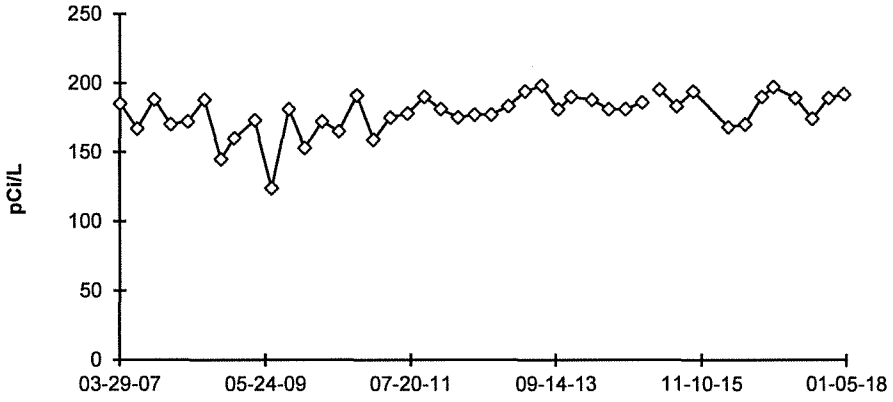


FIGURE C-6
Surface Water - Tritium - Stations BD-55 and BD-56 Collected in the Vicinity of Braidwood Station, 2007 - 2017

BD-55 North Pond Fatlan Site



BD-56 South Pond Fatlan Site

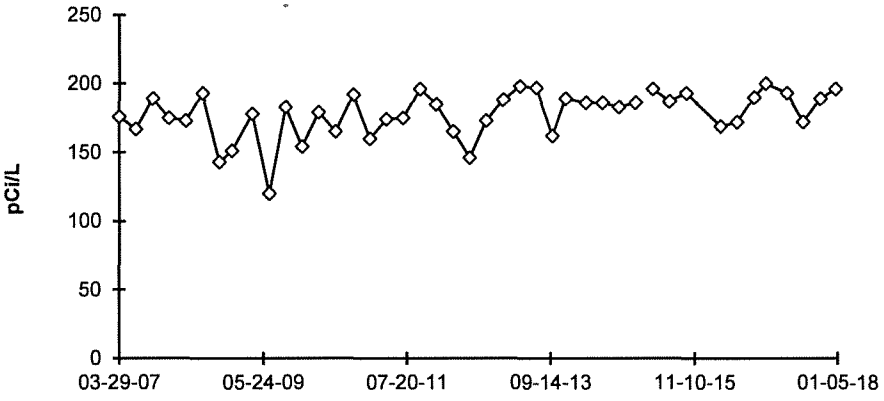
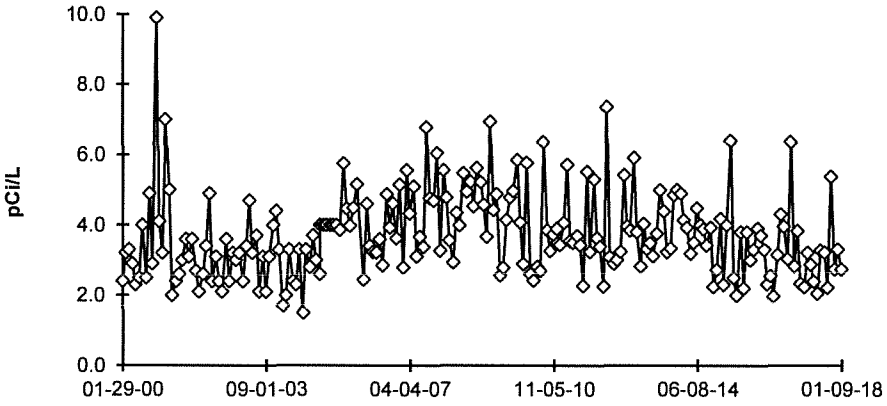


FIGURE C-7
Public Water - Gross Beta - Station BD-22
Collected in the Vicinity of Braidwood Station, 2000 - 2017

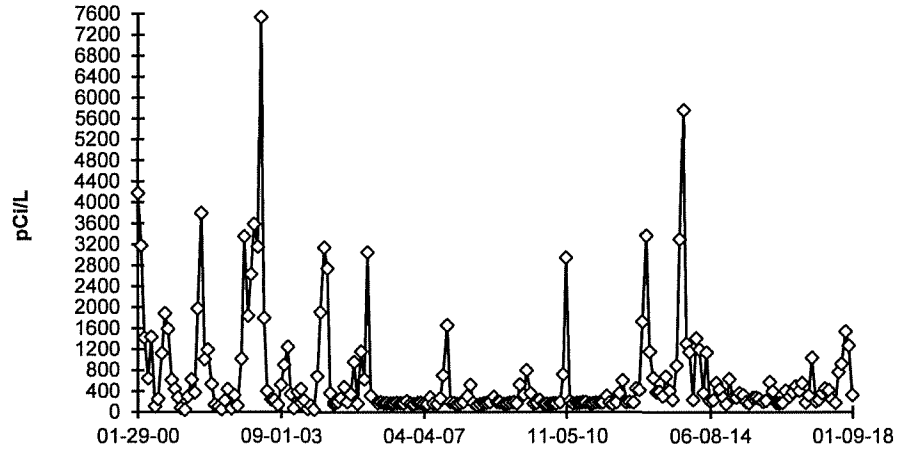
BD-22 Wilmington



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

FIGURE C-8
Public Water - Tritium - Station BD-22
Collected in the Vicinity of Braidwood Station, 2000 - 2017

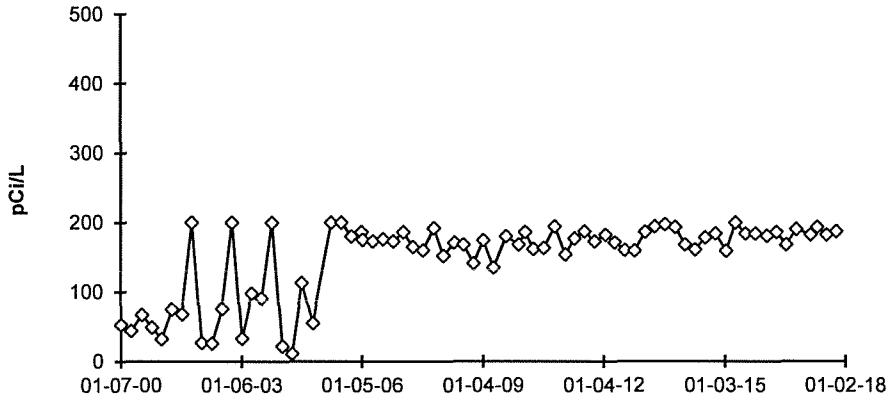
BD-22 Wilmington



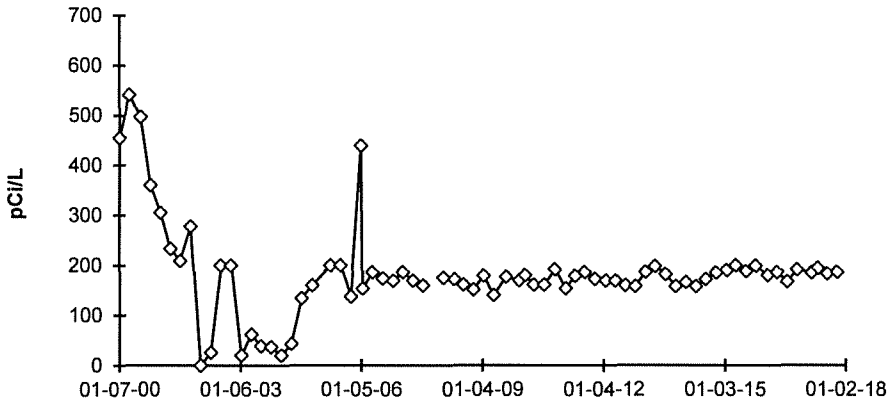
DUE TO VENDOR CHANGE, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005 AND MDC VALUES AFTER JUNE 2005

FIGURE C-9
Ground/Well Water - Tritium - Stations BD-13 and BD-34 Collected in the Vicinity of Braidwood Station, 2000 - 2017

BD-13 Braidwood City Hall Well



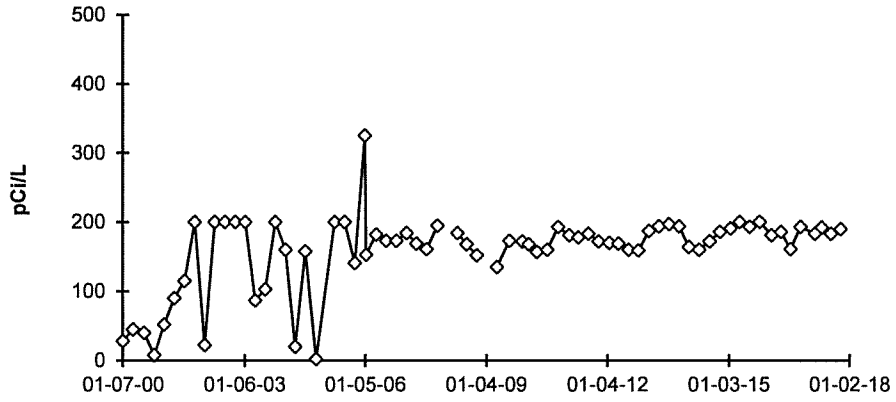
BD-34 Gibson Well



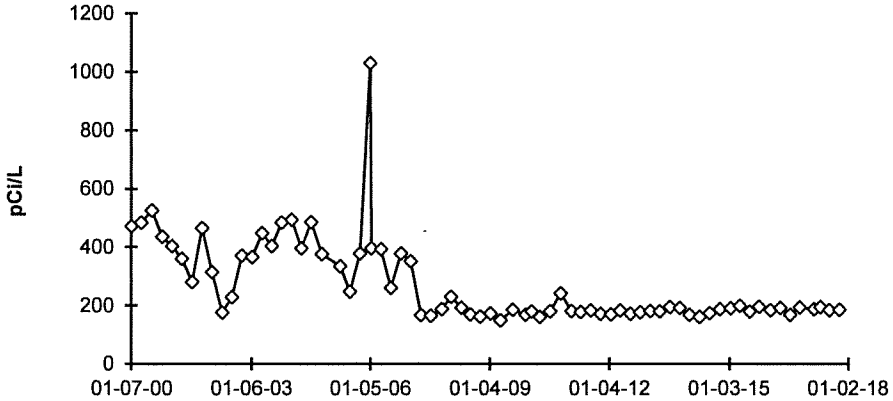
DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005 AND MDC VALUES AFTER JULY.

FIGURE C-10
Ground/Well Water - Tritium - Stations BD-35 and BD-36 Collected in the Vicinity of Braidwood Station, 2000 - 2017

BD-35 Joly Well



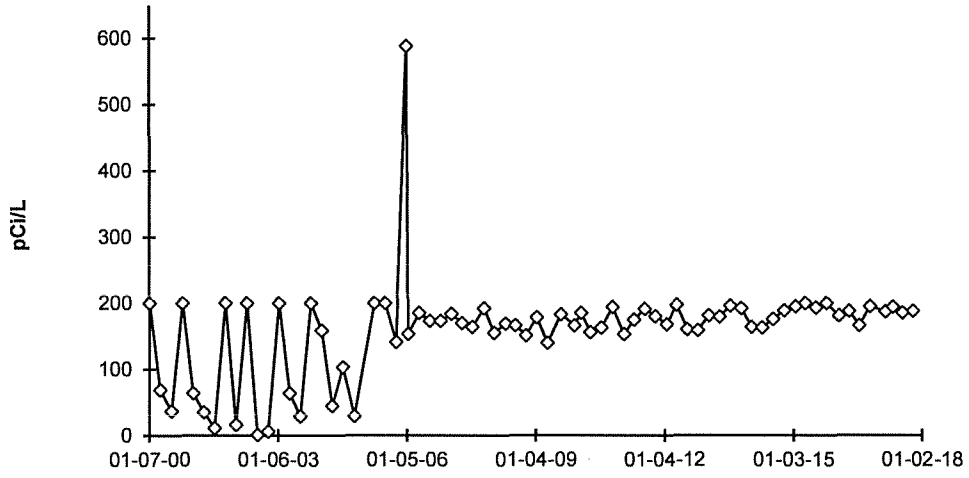
BD-36 Hutton Well



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

FIGURE C-11
Ground/Well Water - Tritium - Station BD-37
Collected in the Vicinity of Braidwood Station, 2000 - 2017

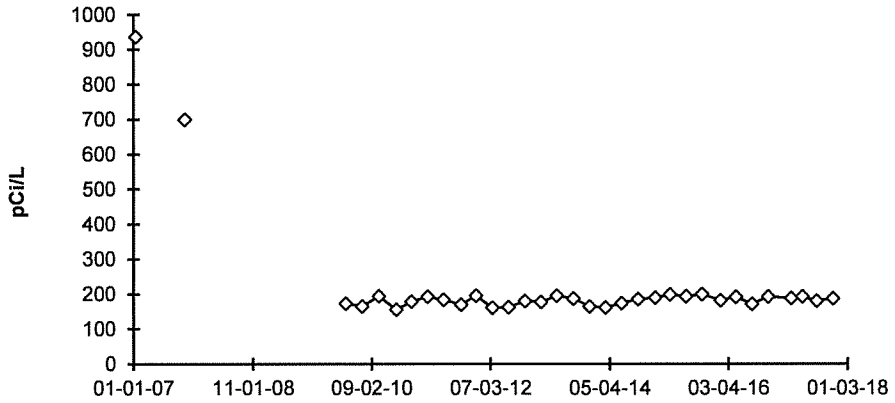
BD-37 Nurczyk Well



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

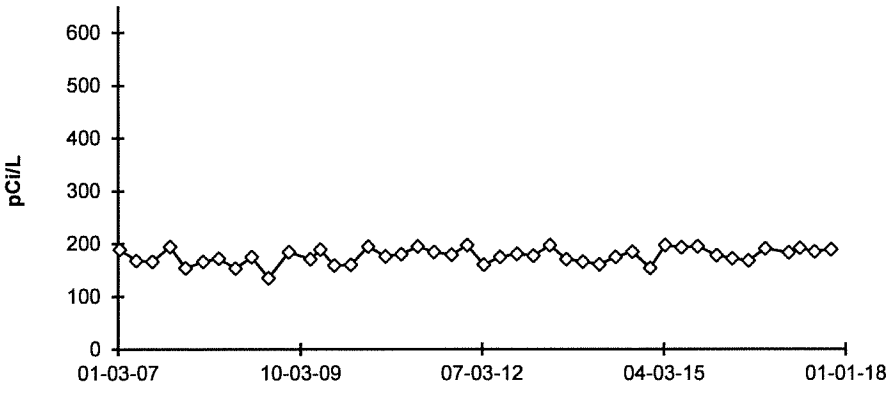
FIGURE C-12
Ground/Well Water - Tritium - Station BD-50 and BD-51 Collected in the Vicinity of Braidwood Station, 2007 - 2017

BD-50 Skole Well



STATION BD-50 WAS INITIALLY DISCONTINUED ON 10/18/07 AND RESUMED ON 04/08/10

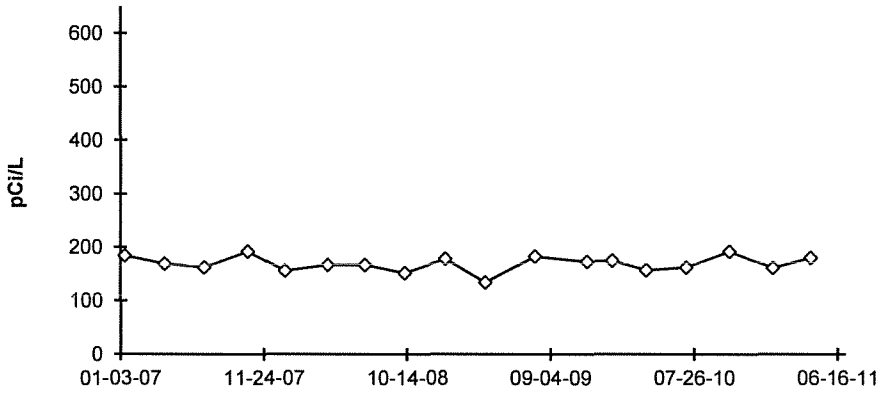
BD-51 Fatlan Well



NEW STATIONS BD-50 AND BD-51 ADDED IN 2007

FIGURE C-13
Ground/Well Water - Tritium - Stations BD-53 and BD-54 Collected in the Vicinity of Braidwood Station, 2007 - 2017

BD-53 Phelps Well*



**BD-53 was removed from the program during the 3rd quarter of 2011*

BD-54 Cash Well

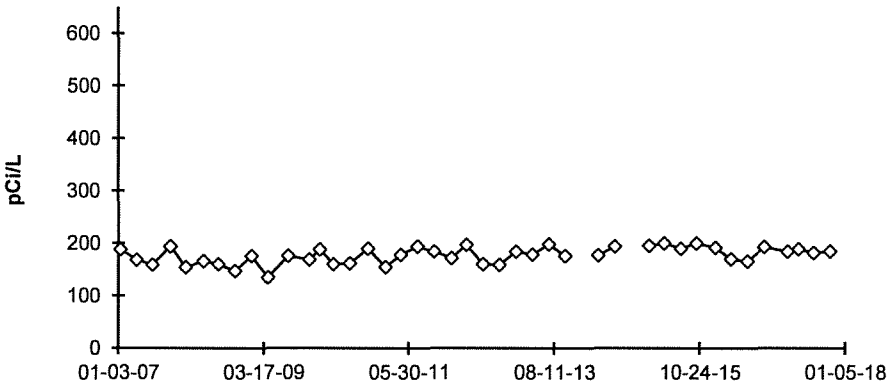
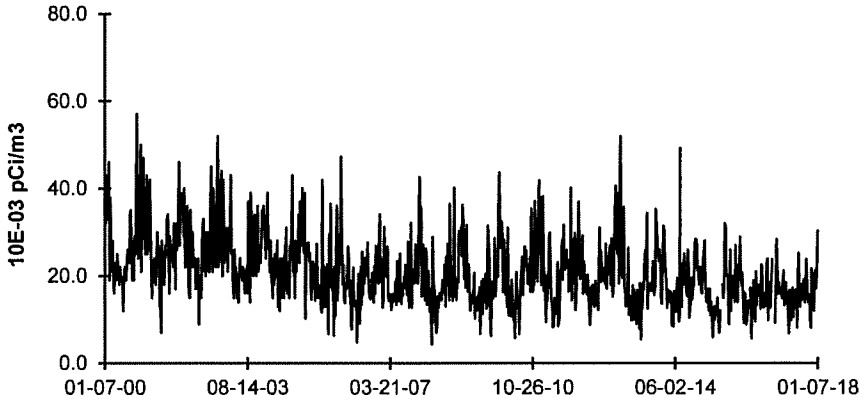


FIGURE C-14
Air Particulate - Gross Beta- Stations BD-03 (C) and BD-06 Collected in the Vicinity of Braidwood Station, 2000 - 2017

BD-03 (C) County Line Road



BD-06 Godley

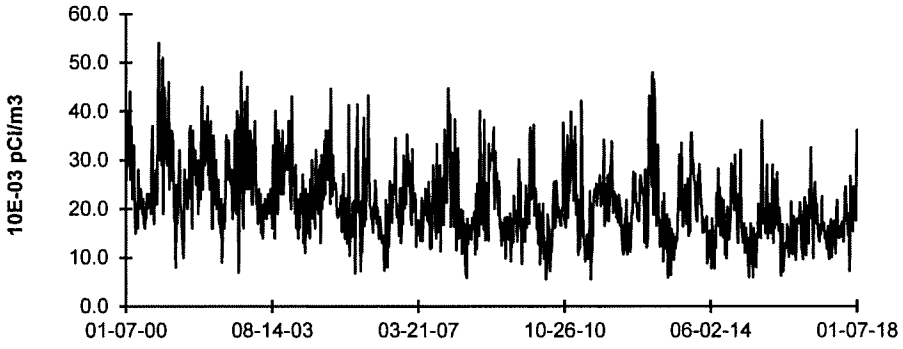
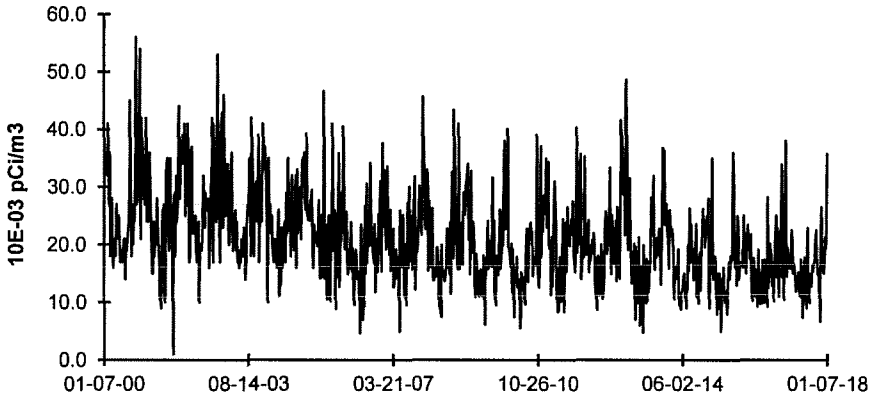


FIGURE C-15
Air Particulate - Gross Beta- Stations BD-19 and BD-20 Collected in the Vicinity of Braidwood Station, 2000 - 2017

BD-19 Near Field, NW



BD-20 Near Field, N

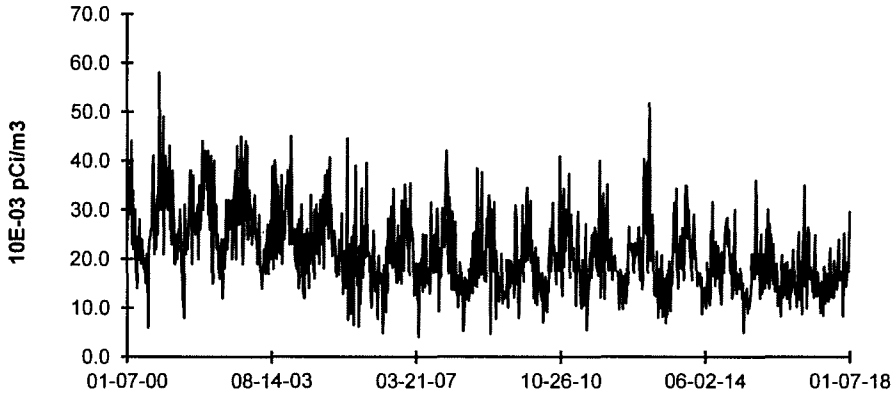


FIGURE C-16
Air Particulate - Gross Beta- Station BD-21
Collected in the Vicinity of Braidwood Station, 2000 - 2017

BD-21 Near Field, NE

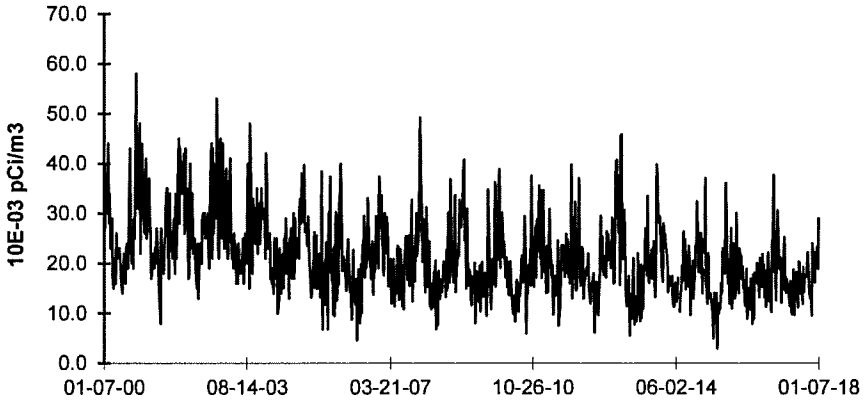
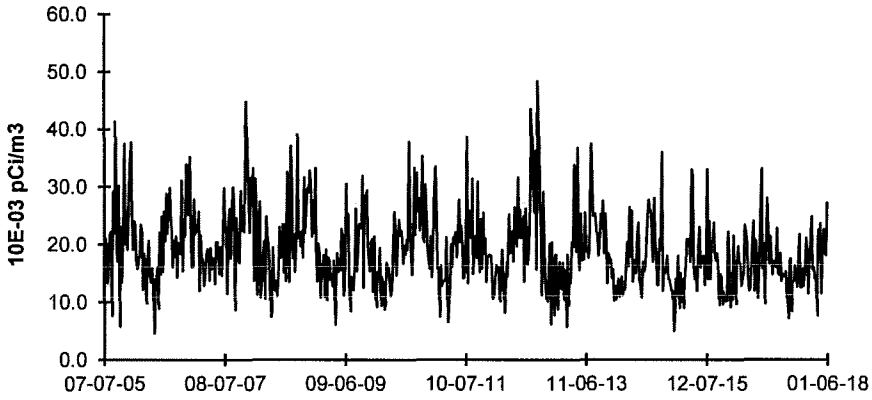


FIGURE C-17
Air Particulate - Gross Beta- Stations BD-02 and BD-04 Collected in the Vicinity of Braidwood Station, 2005 - 2017

BD-02 Near Field, NW



BD-04 Near Field, N

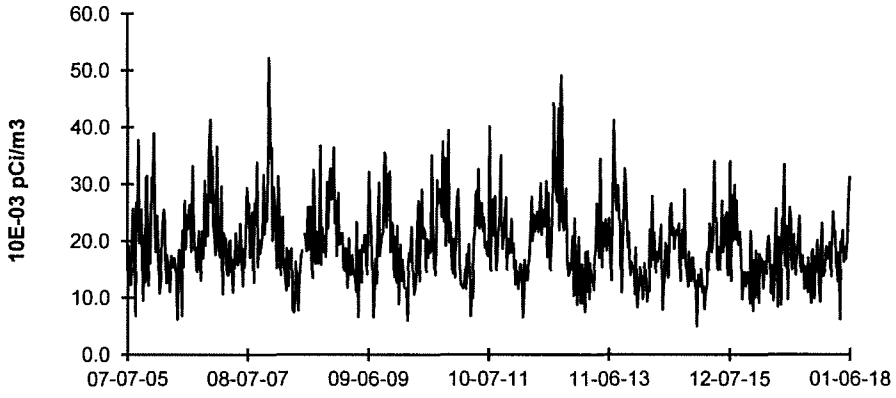
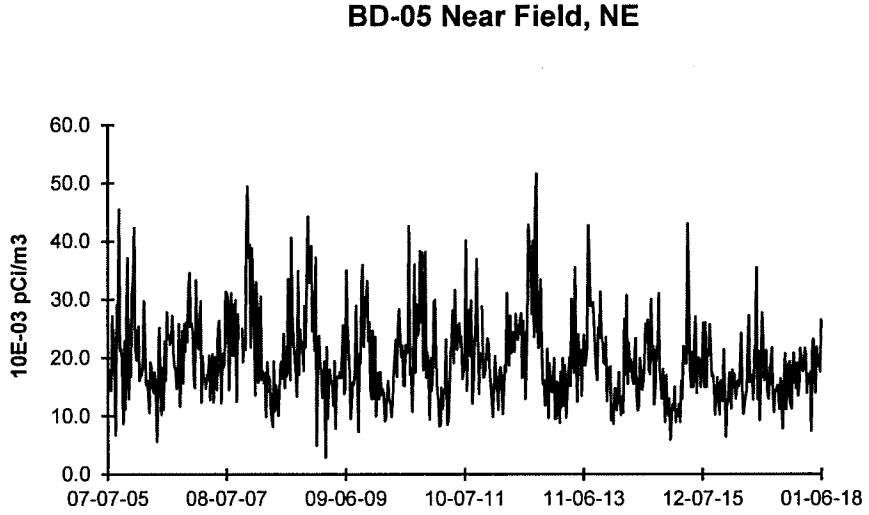


FIGURE C-18
Air Particulate - Gross Beta- Station BD-05
Collected in the Vicinity of Braidwood Station, 2005 - 2017



Intentionally left blank

APPENDIX D

INTER-LABORATORY COMPARISON PROGRAM

Intentionally left blank

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

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [a]	Ratio of TBE to Analytics Result	Evaluation [b]
March 2017	E11811	Milk	Sr-89	pCi/L	87	97.7	0.89	A
			Sr-90	pCi/L	12.4	16.2	0.77	W
	E11812	Milk	Ce-141	pCi/L	135	145	0.93	A
			Co-58	pCi/L	153	150	1.02	A
			Co-60	pCi/L	182	183	1.00	A
			Cr-51	pCi/L	258	290	0.89	A
			Cs-134	pCi/L	104	120	0.87	A
			Cs-137	pCi/L	142	140	1.02	A
			Fe-59	pCi/L	135	129	1.05	A
			I-131	pCi/L	92.6	97.9	0.95	A
			Mn-54	pCi/L	173	164	1.05	A
			Zn-65	pCi/L	208	199	1.04	A
	E11813	Charcoal	I-131	pCi	92	93.9	0.98	A
	E11814	AP	Ce-141	pCi	99.9	101	0.99	A
			Co-58	pCi	95.4	104	0.92	A
			Co-60	pCi	140	127	1.10	A
			Cr-51	pCi	211	201	1.05	A
			Cs-134	pCi	82.1	83.2	0.99	A
			Cs-137	pCi	92.8	97.0	0.96	A
			Fe-59	pCi	107	89.3	1.20	A
			Mn-54	pCi	106	114	0.93	A
			Zn-65	pCi	137	138	0.99	A
	E11816	Soil	Ce-141	pCi/g	0.258	0.250	1.03	A
			Co-58	pCi/g	0.241	0.258	0.93	A
			Co-60	pCi/g	0.312	0.315	0.99	A
			Cr-51	pCi/g	0.439	0.500	0.88	A
			Cs-134	pCi/g	0.176	0.207	0.85	A
			Cs-137	pCi/g	0.304	0.317	0.96	A
			Fe-59	pCi/g	0.210	0.222	0.95	A
			Mn-54	pCi/g	0.292	0.283	1.03	A
			Zn-65	pCi/g	0.353	0.344	1.03	A
	E11815	Water	Fe-55	pCi/L	1600	1890	0.85	A

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

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

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

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

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

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

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [(a)]	Ratio of TBE to Analytics Result	Evaluation [(b)]
June 2017	E11844	Milk	Sr-89	pCi/L	81.3	92.6	0.88	A
			Sr-90	pCi/L	12.1	13.5	0.90	A
	E11846	Milk	Ce-141	pCi/L	142	151	0.94	A
			Co-58	pCi/L	147	155	0.95	A
			Co-60	pCi/L	185	191	0.97	A
			Cr-51	pCi/L	321	315	1.02	A
			Cs-134	pCi/L	168	188	0.89	A
			Cs-137	pCi/L	148	150	0.99	A
			Fe-59	pCi/L	116	115	1.01	A
			I-131	pCi/L	102	93.6	1.09	A
			Mn-54	pCi/L	168	172	0.98	A
			Zn-65	pCi/L	195	204	0.96	A
	E11847	Charcoal	I-131	pCi	87.9	84.8	1.04	A
	E11845	AP	Sr-89	pCi	70.8	79.1	0.90	A
			Sr-90	pCi	9.10	11.5	0.79	W
	E11848	AP	Ce-141	pCi	112	116	0.96	A
			Co-58	pCi	119	119	1.00	A
			Co-60	pCi	171	146	1.17	A
			Cr-51	pCi	270	241	1.12	A
			Cs-134	pCi	152	144	1.05	A
			Cs-137	pCi	114	115	0.99	A
			Fe-59	pCi	94.1	88.3	1.07	A
			Mn-54	pCi	139	132	1.06	A
			Zn-65	pCi	141	156	0.90	A
	E11849	Water	Fe-55	pCi/L	1840	1890	0.97	A
July 2017	E11901	AP	GR-A	pCi	50.1	44.2	1.13	A
			GR-B	pCi	218	233	0.93	A

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

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

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

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

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

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

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [a]	Ratio of TBE to Analytics Result	Evaluation [b]
September 2017	E11914	Milk	Sr-89	pCi/L	84.3	82.7	1.02	A
			Sr-90	pCi/L	12.6	12.1	1.04	A
	E11915	Milk	Ce-141	pCi/L	93.9	87.0	1.08	A
			Co-58	pCi/L	115	117	0.98	A
			Co-60	pCi/L	265	262	1.01	A
			Cr-51	pCi/L	273	217	1.26	W
			Cs-134	pCi/L	186	201	0.93	A
			Cs-137	pCi/L	175	172	1.02	A
			Fe-59	pCi/L	137	125	1.09	A
			I-131	pCi/L	78.0	71.0	1.10	A
			Mn-54	pCi/L	128	123	1.04	A
			Zn-65	pCi/L	206	184	1.12	A
	E11916	Charcoal	I-131	pCi	71.9	64.4	1.12	A
	E11917	AP	Ce-141	pCi	80.1	86.3	0.93	A
			Co-58	pCi	110	116	0.95	A
			Co-60	pCi	277	260	1.07	A
			Cr-51	pCi	275	215	1.28	W
			Cs-134	pCi	192	199	0.96	A
			Cs-137	pCi	165	170	0.97	A
			Fe-59	pCi	122	124	0.98	A
			Mn-54	pCi	120	122	0.99	A
			Zn-65	pCi	175	183	0.96	A
	E11918	Water	Fe-55	pCi/L	1630	1630	1.00	A
	E11919	Soil	Ce-141	pCi/g	0.136	0.142	0.96	A
			Co-58	pCi/g	0.179	0.191	0.94	A
			Co-60	pCi/g	0.405	0.429	0.94	A
			Cr-51	pCi/g	0.230	0.355	0.65	N [1]
			Cs-134	pCi/g	0.272	0.328	0.83	A
			Cs-137	pCi/g	0.336	0.356	0.94	A
			Fe-59	pCi/g	0.210	0.205	1.02	A
			Mn-54	pCi/g	0.210	0.201	1.05	A
			Zn-65	pCi/g	0.301	0.301	1.00	A

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

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

(1) See NCR 17-16

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

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [(a)]	Ratio of TBE to Analytics Result	Evaluation [(b)]
December 2017	E12054	Milk	Sr-89	pCi/L	92.1	92.3	1.00	A
			Sr-90	pCi/L	18.3	16.9	1.09	A
	E12055	Milk	Ce-141	pCi/L	97.8	98.3	0.99	A
			Co-58	pCi/L	92.3	89.9	1.03	A
			Co-60	pCi/L	176	173	1.02	A
			Cr-51	pCi/L	226	242	0.93	A
			Cs-134	pCi/L	118	125	0.95	A
			Cs-137	pCi/L	148	141	1.05	A
			Fe-59	pCi/L	123	113	1.08	A
			I-131	pCi/L	66.0	57.8	1.14	A
			Mn-54	pCi/L	173	161	1.08	A
			Zn-65	pCi/L	233	211	1.10	A
	E12056	Charcoal	I-131	pCi	48.1	47.5	1.01	A
	E12057A	AP	Ce-141	pCi	108	111	0.97	A
			Co-58	pCi	89.5	102	0.88	A
			Co-60	pCi	223	196	1.14	A
			Cr-51	pCi	311	274	1.13	A
			Cs-134	pCi	141	142	1.00	A
			Cs-137	pCi	162	160	1.01	A
			Fe-59	pCi	121	129	0.94	A
			Mn-54	pCi	177	182	0.97	A
			Zn-65	pCi	203	239	0.85	A
	E12058	Water	Fe-55	pCi/L	1970	1740	1.13	A
	E12059	AP	Sr-89	pCi	71.2	87.4	0.81	A
			Sr-90	pCi	12.9	16.0	0.81	A

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

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

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

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

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

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

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [a]	Acceptance Range	Evaluation [b]
February 2017	17-MaS36	Soil	Ni-63	Bq/kg	-5.512		*(1)*	A
			Sr-90	Bq/kg	571	624	437 - 811	A
	17-MaW36	Water	Am-241	Bq/L	0.693	0.846	0.592 - 1.100	A
			Ni-63	Bq/L	13.4	12.2	8.5 - 15.9	A
			Pu-238	Bq/L	0.7217	0.703	0.492 - 0.914	A
			Pu-239/240	Bq/L	0.9277	0.934	0.654 - 1.214	A
	17-RdF36	AP	U-234/233	Bq/sample	0.0911	0.104	0.073 - 0.135	A
			U-238	Bq/sample	0.0967	0.107	0.075 - 0.139	A
	17-RdV36	Vegetation	Cs-134	Bq/sample	6.44	6.95	4.87 - 9.04	A
			Cs-137	Bq/sample	4.61	4.60	3.22 - 5.98	A
			Co-57	Bq/sample	-0.0229		*(1)*	A
			Co-60	Bq/sample	8.52	8.75	6.13 - 11.38	A
			Mn-54	Bq/sample	3.30	3.28	2.30 - 4.26	A
			Sr-90	Bq/sample	1.30	1.75	1.23 - 2.28	W
			Zn-65	Bq/sample	5.45	5.39	3.77 - 7.01	A
August 2017	17-MaS37	Soil	Ni-63	Bq/kg	1130	1220	854 - 1586	A
			Sr-90	Bq/kg	296	289	202 - 376	A
	17-MaW37	Water	Am-241	Bq/L	0.838	0.892	0.624 - 1.160	A
			Ni-63	Bq/L	-0.096		*(1)*	A
			Pu-238	Bq/L	0.572	0.603	0.422 - 0.784	A
			Pu-239/240	Bq/L	0.863	0.781	0.547 - 1.015	A
	17-RdF37	AP	U-234/233	Bq/sample	0.103	0.084	0.059 - 0.109	W
			U-238	Bq/sample	0.115	0.087	0.061 - 0.113	N [2]
	17-RdV37	Vegetation	Cs-134	Bq/sample	2.34	2.32	1.62 - 3.02	A
			Cs-137	Bq/sample	0.05		*(1)*	A
			Co-57	Bq/sample	3.32	2.8	2.0 - 3.6	A
			Co-60	Bq/sample	2.09	2.07	1.45 - 2.69	A
			Mn-54	Bq/sample	2.90	2.62	1.83 - 3.41	A
			Sr-90	Bq/sample	1.17	1.23	0.86 - 1.60	A
			Zn-65	Bq/sample	6.07	5.37	3.76 - 6.98	A

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

(b) DOE/MAPEP evaluation:

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

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

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

(1) False positive test

(2) See NCR 17-15

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

Month/Year	Identrification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [a]	Acceptance Limits	Evaluation [b]
March 2017	MRAD-26	AP	GR-A	pCi/sample	76.3	85.5	28.6 - 133	A
April 2017	RAD-109	Water	Ba-133	pCi/L	49.2	49.7	40.8 - 55.1	A
			Cs-134	pCi/L	83.2	90.1	74.0 - 99.1	A
			Cs-137	pCi/L	202	206	185 - 228	A
			Co-60	pCi/L	51.2	54.7	49.2 - 62.7	A
			Zn-65	pCi/L	39.3	53.8	47.2 - 65.9	N (1)
			GR-A	pCi/L	53.6	75.0	39.5 - 92.3	A
			GR-B	pCi/L	42.7	38.5	25.5 - 46.0	A
			U-Nat	pCi/L	50.1	55.6	45.2 - 61.7	A
			H-3	pCi/L	7080	6850	5920 - 7540	A
			Sr-89	pCi/L	40.7	66.2	53.8 - 74.3	N (1)
			Sr-90	pCi/L	26.9	26.7	19.3 - 31.1	A
			I-131	pCi/L	26.7	29.9	24.9 - 34.9	A
September 2017	MRAD-27	AP	GR-A	pCi/sample	40.9	50.1	16.8 - 77.8	A
		AP	GR-B	pCi/sample	58.0	61.8	39.1 - 90.1	A
October 2017	RAD-111	Water	Ba-133	pCi/L	71.3	73.7	61.7 - 81.1	A
			Cs-134	pCi/L	43.0	53.0	42.8 - 58.3	A
			Cs-137	pCi/L	48.2	52.9	47.6 - 61.1	A
			Co-60	pCi/L	69.0	69.5	62.6 - 78.9	A
			Zn-65	pCi/L	335	348	313 - 406	A
			GR-A	pCi/L	32.5	35.6	18.3 - 45.8	A
			GR-B	pCi/L	24.3	25.6	16.0 - 33.6	A
			U-Nat	pCi/L	36.6	37.0	30.0 - 40.9	A
			H-3	pCi/L	6270	6250	5390 - 6880	A
			I-131	pCi/L	26.4	24.2	20.1 - 28.7	A
November 2017	111317O	Water	Sr-89	pCi/L	57.1	50.0	39.4 - 57.5	A
			Sr-90	pCi/L	27.1	41.8	30.8 - 48.0	N (2)

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

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

(1) See NCR 17-09
(2) See NCR 17-19

APPENDIX E

EFFLUENT DATA

Please refer to the Annual Radioactive Effluent Release Report
for information regarding this program

Intentionally left blank

APPENDIX F

ERRATA DATA

There is no errata data for 2017.

APPENDIX G

ANNUAL RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM REPORT (ARGPPR)

Intentionally left blank

Docket No: 50-456
50-457

BRAIDWOOD STATION

UNIT 1 and UNIT 2

Annual Radiological
Groundwater Protection Program Report

1 January through 31 December 2017

Prepared By
Teledyne Brown Engineering
Environmental Services

Braidwood Station
Braceville, IL 60407

May 2018

Intentionally left blank

Table Of Contents

Appendices

I. Summary and Conclusions

In 2017, Exelon continued a comprehensive program that evaluates the impact of station operations on groundwater and surface water in the vicinity of Braidwood Station. This report reviews groundwater and surface water samples collected from the environment, both on and off station property, in 2017. During that time period, 558 analyses were performed on 308 samples from 46 locations.

In assessing all the data gathered for this report, it was concluded that the operation of Braidwood Station had no adverse radiological impact on the environment.

Gamma-emitting radionuclides associated with licensed plant operations were not detected at concentrations greater than their respective Lower Limits of Detection (LLDs) as specified in the Offsite Dose Calculation Manual (ODCM) in any of the groundwater or surface water samples. In the case of tritium, Exelon specified that its laboratories achieve a lower limit of detection 10 times less than Braidwood's ODCM and 100 times less than federal regulation.

Strontium-89/90 (Sr-89/90) was not detected at a concentration greater than the LLD of 10.0 and 1.0 picocuries per liter (pCi/L) respectively in any of the groundwater samples tested.

No tritium was detected in surface water samples at concentrations greater than the United States Environmental Protection Agency (USEPA) drinking water standard (and the Nuclear Regulatory Commission Reporting Limit) of 20,000 pCi/L. Seven groundwater samples had tritium detections at concentrations > 20,000 pCi/L, due to the abnormal release at the CWBD House identified in June 2017. Low levels of tritium were detected in groundwater and surface water at concentrations greater than the LLD of 200 pCi/L in 175 of 308 analyses. The tritium concentrations ranged from 175 ± 112 pCi/L to 24,900 ± 2520 pCi/L. The tritium that was detected in the groundwater or surface water is believed to be the result of isolated historical releases and/or background from external sources greater than 200 pCi/L.

Gross Alpha and Gross Beta analyses in the dissolved and suspended fractions were performed on groundwater and surface water samples throughout the sampling year in 2017. Gross Alpha (dissolved) was not detected in any surface water samples and was detected in 2 groundwater samples. The concentrations ranged from 0.8 to 14.3 pCi/L. Gross Alpha (suspended) was not detected in surface water samples and was detected in 1 groundwater sample. The concentration was 1.0 ± 0.6 pCi/L. Gross Beta (dissolved) was detected in 2 surface water and 28 groundwater samples. The concentrations ranged from 1.4 to 49.0 pCi/L. Gross Beta (suspended) was not detected in any surface water samples and was detected in 1 groundwater sample. The concentration was 3.1 ± 1.2 pCi/L.

Hard-To-Detect analyses were performed on 2 groundwater samples in 2017. The analyses included Americium-241 (Am-241), Cerium-242 (Cm-242, Cerium

243/244 (Cm-243/244), Plutonium-238 (Pu-238), Plutonium-239/240 (Pu-239/240), Uranium-234 (U-234), Uranium-235 (U-235) and Uranium-238 (U-238). Naturally-occurring U-234 was detected in one sample at a concentration of 2.8 ± 0.9 pCi/L. All other hard-to-detect nuclides were not detected at concentrations greater than their respective minimum detectable concentrations (MDCs).

II. Introduction

Braidwood Station, a two-unit PWR station is located in Will County, Illinois, 20 miles south-southwest of Joliet, Illinois. Each reactor is designed to have a capacity of 3,645 thermal megawatts. Units No. 1 went critical on May 29, 1987 and Unit No. 2 went critical on March 8, 1988. The station has been designed to keep releases to the environment at levels below those specified in the regulations.

This report covers those analyses performed by Teledyne Brown Engineering (TBE) and Environmental Inc. Midwest Labs (EIML) on samples collected in 2017.

A. Objective of the Radiological Groundwater Protection Program (RGPP)

The long-term objectives of the RGPP are as follows:

1. Identify suitable locations to monitor and evaluate potential impacts from station operations to preclude radiological impact to the environment and potential drinking water sources;

2. Understand the local hydrogeologic regime in the vicinity of the station and maintain up-to-date knowledge of flow patterns on the surface and shallow subsurface;

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

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

5. Regularly assess analytical results to identify adverse trends;

6. Take necessary corrective actions to protect groundwater resources.

B. Implementation of the Objectives

The objectives identified have been implemented at Braidwood Station as discussed below:

1. Exelon identified locations to monitor and evaluated potential impacts from station operations

2. The Braidwood Station reports describe the local hydrogeologic regime. Periodically, the flow patterns on the surface and shallow subsurface are updated based on ongoing measurements

3. Braidwood Station will continue to perform routine sampling and radiological analysis of water from selected locations

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

5. Braidwood Station staff and consulting hydrogeologist assess analytical results on an ongoing basis to identify adverse trends

C. Program Description

1. Sample Collection

Sample locations can be found in Table A-1 and Figures A-1 through A-5, Appendix A.

2. Groundwater and Surface Water

Samples of groundwater and surface water are collected, managed, transported and analyzed in accordance with EPA methods. Sample locations, sample collection frequencies and analytical frequencies are managed in accordance with approved station procedures. Contractor and/or station personnel are trained in the collection, preservation management and shipment of samples as well as in documentation of sampling events. Analytical laboratories are subject to internal quality assurance programs, industry cross-check programs as well as nuclear industry audits. Station personnel review and evaluate all analytical data as it is received. Additionally, analytical data results are reviewed by an independent hydrogeologist for adverse trends or changes to hydrogeologic conditions.

D. Characteristics of Tritium (H-3)

Tritium is a radioactive isotope of hydrogen. Its chemical properties are the same as hydrogen. Tritiated water behaves the same as ordinary water in both the environment and the body. Tritiated water can be taken into the body by drinking water, breathing air, eating food or absorption through the skin. Once tritiated water enters the body, it disperses quickly and is uniformly distributed. Tritiated water is excreted primarily through urine with a clearance rate characterized by an effective biological half-life of about 14 days. With such a short biological half-life, an acute ingestion would be cleared rapidly. Organically bound tritium (tritium that is incorporated into carbon containing compounds) can remain in the body for a longer period. Tritium is produced naturally in the upper atmosphere when cosmic rays

interact with air molecules. Tritium is also produced during nuclear weapons explosions, as a by-product in reactors producing electricity and in special production reactors. 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 non tritiated groundwater.

III. Program Description

A. Sample Analysis

This section describes the general analytical methodologies used by Teledyne Brown Engineering (TBE) and Environmental Incorporated Midwest Laboratory (EIML) to analyze the environmental samples for radioactivity for the Braidwood Station RGPP in 2017.

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 and surface water
3. Concentrations of tritium in groundwater and surface water
4. Concentrations of Gross Alpha and Gross Beta (Dissolved and Suspended) in groundwater and surface water
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-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 Braidwood Station becoming operational were used as a baseline with which these operational data were compared. For the purpose of this report, Braidwood 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 specified by federal regulation as a 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 (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 foodstuffs. The results of the monitoring were detailed in the report entitled, Environmental Radiological Monitoring for Braidwood 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.

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 Sr-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 2014. RadNet provides tritium precipitation concentration data for samples collected at stations throughout the U.S. from 1960 up to and including 2017. Based on GNIP data for sample stations located in the U.S. Midwest, tritium concentrations peaked around 1963. This peak, which approached 10,000 pCi/L for some stations, coincided with the atmospheric

testing of thermonuclear weapons. Tritium concentrations in surface water showed a sharp decline up until 1975 followed by a gradual decline since that time. Tritium concentrations in Midwest precipitation have typically been below 100 pCi/L since around 1980. Tritium concentrations in wells may still be above the 200 pCi/L detection limit from the external causes described above. Water from previous years and decades is naturally captured in groundwater, so some well water sources today are affected by the surface water from the 1960s that was elevated in tritium.

c. Surface Water Data

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

The USEPA RadNet surface water data typically has a reported 'Combined Standard Uncertainty' of 35 to 50 pCi/L. According to USEPA, this corresponds to a ± 70 to 100 pCi/L 95% confidence bound on each given measurement. Therefore, the typical background data provided may be subject to measurement uncertainty of approximately ± 70 to 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. Clearly, these sample results cannot be distinguished as different from background at this concentration.

IV. Results and Discussion

A. Missed Samples

There was one missed sample from VB-2-5D for Quarter 4 in 2017 due to miscommunication between the program owner and the vendor sample collector.

B. Groundwater Results

Groundwater

Samples were collected from on- and off-site wells 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. Tritium values ranged from the lower detection limit to 24,900 pCi/L. (Table B-I.1, Appendix B).

Strontium

Sr-89 and Sr-90 were analyzed for in 33 samples. Sr-89 was less than the required detection limit of 10.0 pCi/liter. Sr-90 was less than the required detection limit of 1.0 pCi/liter (Table B-I.1, Appendix B).

Gross Alpha and Beta (dissolved and suspended)

Gross Alpha and Gross Beta analyses in the dissolved and suspended fractions were performed on groundwater and surface water samples throughout the sampling year in 2017. Gross Alpha (dissolved) was detected in 2 groundwater samples. The concentrations ranged from 0.8 to 14.3 pCi/L. Gross Alpha (suspended) was detected in 1 groundwater sample. The concentration was 1.0 ± 0.6 pCi/L. Gross Beta (dissolved) was detected in 28 groundwater samples. The concentrations ranged from 1.4 to 49.0 pCi/L. Gross Beta (suspended) was detected in 1 groundwater sample. The concentration was 3.1 ± 1.2 pCi/L. (Table B-I.1, Appendix B).

Hard-To-Detect

Hard-To-Detect analyses were performed on 2 groundwater samples in 2017. The analyses included Am-241, Cm-242, Cm-243/244, Pu-238, Pu-239/240, U-234, U-235 and U-238. The naturally-occurring isotope U-234 was detected in the sample at a concentration of 2.8 ± 0.9 pCi/L. All other hard-to-detect nuclides were not detected at concentrations greater than their respective MDCs. (Table B-I.3, Appendix B).

Gamma Emitters

Naturally-occurring K-40 was detected in one sample at a concentration of 61 ± 32 pCi/L. No other gamma-emitting nuclides were detected in any of the samples analyzed. (Table B–I.2, Appendix B)

C. Surface Water Results

Surface Water

Samples were collected from two 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. All results were less than the minimum detection limit (Table B-II.1, Appendix B).

Strontium

Sr-89 and Sr-90 were analyzed in two samples. Sr-89 was less than the required detection limit of 10.0 pCi/liter. Sr-90 was less than the required detection limit of 1.0 pCi/liter (Table B-II.1, Appendix B).

Gross Alpha and Beta (dissolved and suspended)

Two surface water samples for analyzed for Gross Alpha (dissolved and suspended) and Gross Beta (dissolved and suspended). Gross Alpha (dissolved) and Gross Alpha (suspended) were not detected in any surface water samples. Gross Beta (dissolved) was detected in 2 surface water samples at a concentrations of 5.8 and 2.7 pCi/L. Gross Beta (suspended) was not detected in any surface water samples. (Table B-II.1, Appendix B).

Gamma Emitters

Two surface water samples were analyzed for gamma emitters. No gamma-emitting nuclides were detected in any of the samples analyzed (Table B–II.2, Appendix B).

D. Summary of Results – Inter-Laboratory Comparison Program

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

E. Leaks, Spills, and Releases

There was one abnormal liquid release that occurred in 2017. It is described below:

On June 11th, 2017 it was identified that water being removed as part of maintenance activities in the Circulating Water Blowdown (CWBD) House was discharged to the ground approximately 50 feet from the discharge canal. Once discovered, the discharge was terminated and the area was inspected. The investigation determined that approximately 35,000 gallons of water was released between May 28, 2017 and June 11, 2017, with variable concentrations with a maximum tritium concentration of 200,209 pCi/L. The water released did not migrate off station property.

F. Trends and Analyses

Since June 2017, the CWBD House well tritium concentrations have been decreasing steadily. Monitoring of groundwater wells surrounding the plant indicate that tritium concentrations in affected areas near the Turbine Building have remained relatively unchanged since 2010.

G. Investigations

An investigation was performed in response to the CWBD House water discharge to the ground event in June 2017. Monitoring and remediation efforts were implemented immediately following the event.

H. Actions Taken

1. Installation of Monitoring Wells

   Corrective actions taken in response to the CWBD House event included the placement of multiple monitoring wells at various depths in the vicinity of the CWBD house to determine soil contamination levels, as well as the establishment of soil remediation efforts to remove the tritium contamination from the area.

2. Compensatory Actions

   The discharges of the CWBD House remediation wells are treated as non-routine planned discharges. They are sampled regularly and permitted in the same manner as other ODCM pathways. The corresponding activity values are included as part of Table B-I.1 in this report.

3. Actions to Recover/Reverse Plumes

   Remediation efforts for the CWBD House area included the placement of multiple monitoring wells at various depths in the vicinity of the CWBD house to determine soil contamination levels, as well as the establishment of soil remediation efforts to remove the tritium contamination from the area.

4. Well Reduction Efforts

Sampling was ceased at monitoring well VB 2-5DR after the 1st Quarter 2017, when sample results indicated the Illinois EPA's requirements to discontinue monitoring had been met. Monitoring was discontinued and the well abandoned according to appropriate abandonment requirements, and per the letter from the IEPA to Braidwood Station Re: Exelon Braidwood Station NPDES Permit Number IL0048321 VB 2/3 and the Pond Area Completion Report, dated March 28, 2013.

Additionally, sampling was discontinued at monitoring wells PS-7, PS-9, PS-13, PS-14, and PS-16 during the 4th Quarter 2017 when tritium concentrations fell below the lower level of detection. Monitoring well PS-17 proved to be dry after it was initially drilled and no samples were ever obtained. This well was abandoned due to the well's level above the groundwater table.

APPENDIX A

LOCATION DESIGNATION

TABLE A-1: Radiological Groundwater Protection Program - Sampling Locations, Braidwood Station, 2017

Station Code	Sample Description
DITCH F (DS-2)	Surface Water
MW-102R	Monitoring Well
MW-11	Monitoring Well
MW-141D	Monitoring Well
MW-142D	Monitoring Well
MW-143D	Monitoring Well
MW-144D	Monitoring Well
MW-145D	Monitoring Well
MW-154	Background Well
MW-155	Background Well
MW-159D	Monitoring Well
MW-162D	Monitoring Well
MW-2	Monitoring Well
MW-4	Monitoring Well
MW-5	Monitoring Well
MW-6	Monitoring Well
MW-7	Monitoring Well
MW-BW-201S	Monitoring Well
MW-BW-202S	Monitoring Well
MW-BW-203S	Monitoring Well
MW-BW-207I	Monitoring Well
0WM31P	Drinking Water
PS-7	Monitoring Well
PS-8	Monitoring Well
PS-9	Monitoring Well
PS-10	Monitoring Well
PS-11	Monitoring Well
PS-12	Monitoring Well
PS-13	Monitoring Well
PS-14	Monitoring Well
PS-15	Monitoring Well
PS-16	Monitoring Well
RW-6	Recovery Well
RW-11	Recovery Well
RW-12	Recovery Well
SG-BW-102 DITCH C	Surface Water
VB10-1R	Monitoring Well
VB1-1	Monitoring Well
VB11-1	Monitoring Well
VB2-5DR	Monitoring Well
VB3-2	Monitoring Well
VB5-2	Monitoring Well
VB6-1	Monitoring Well
VB7-1	Monitoring Well
VB8-2R	Monitoring Well
VB9-1	Monitoring Well

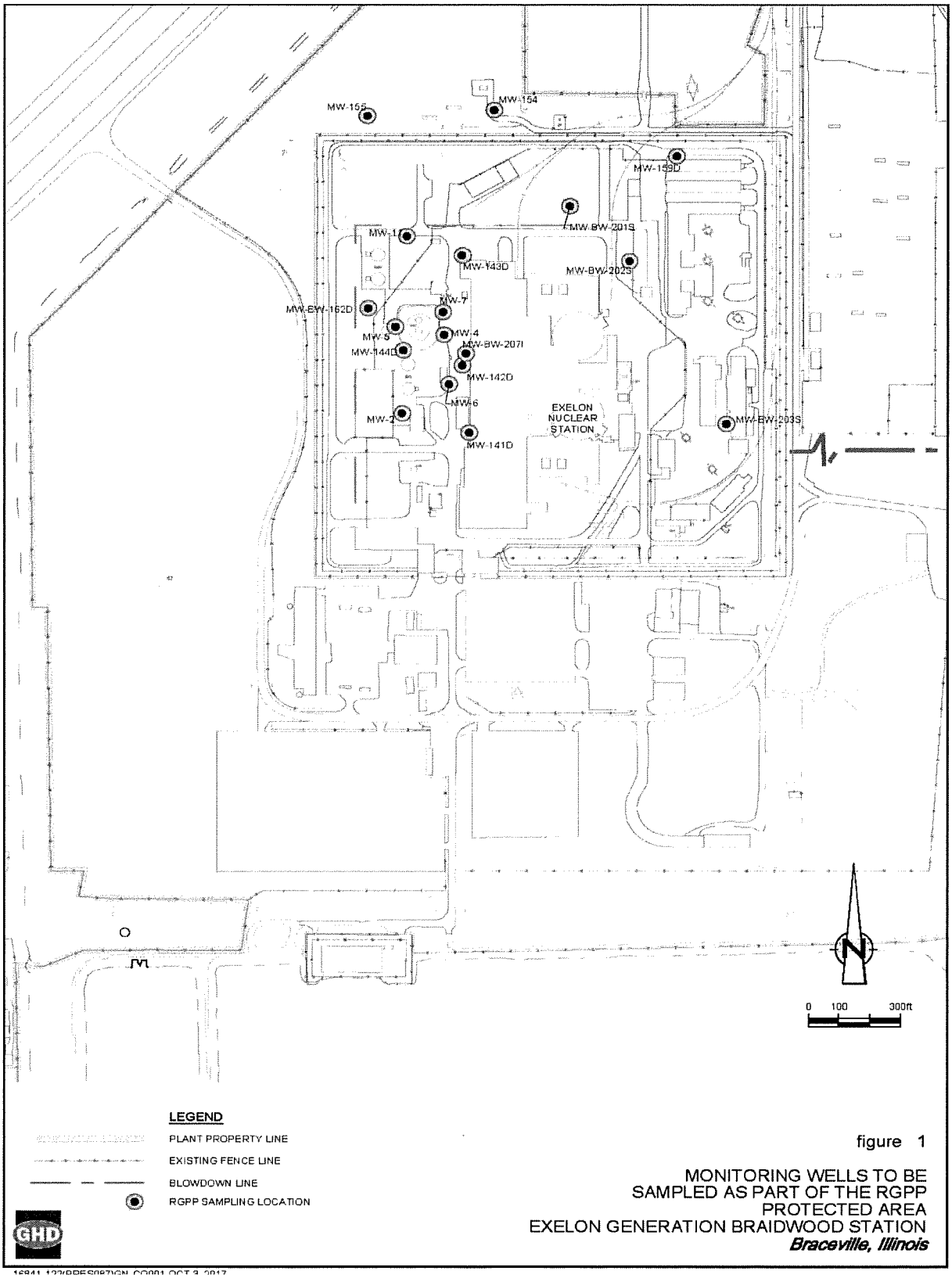


Figure A-1
RGPP Protected Area Monitoring Well Sample Locations
Braidwood Station, 2017

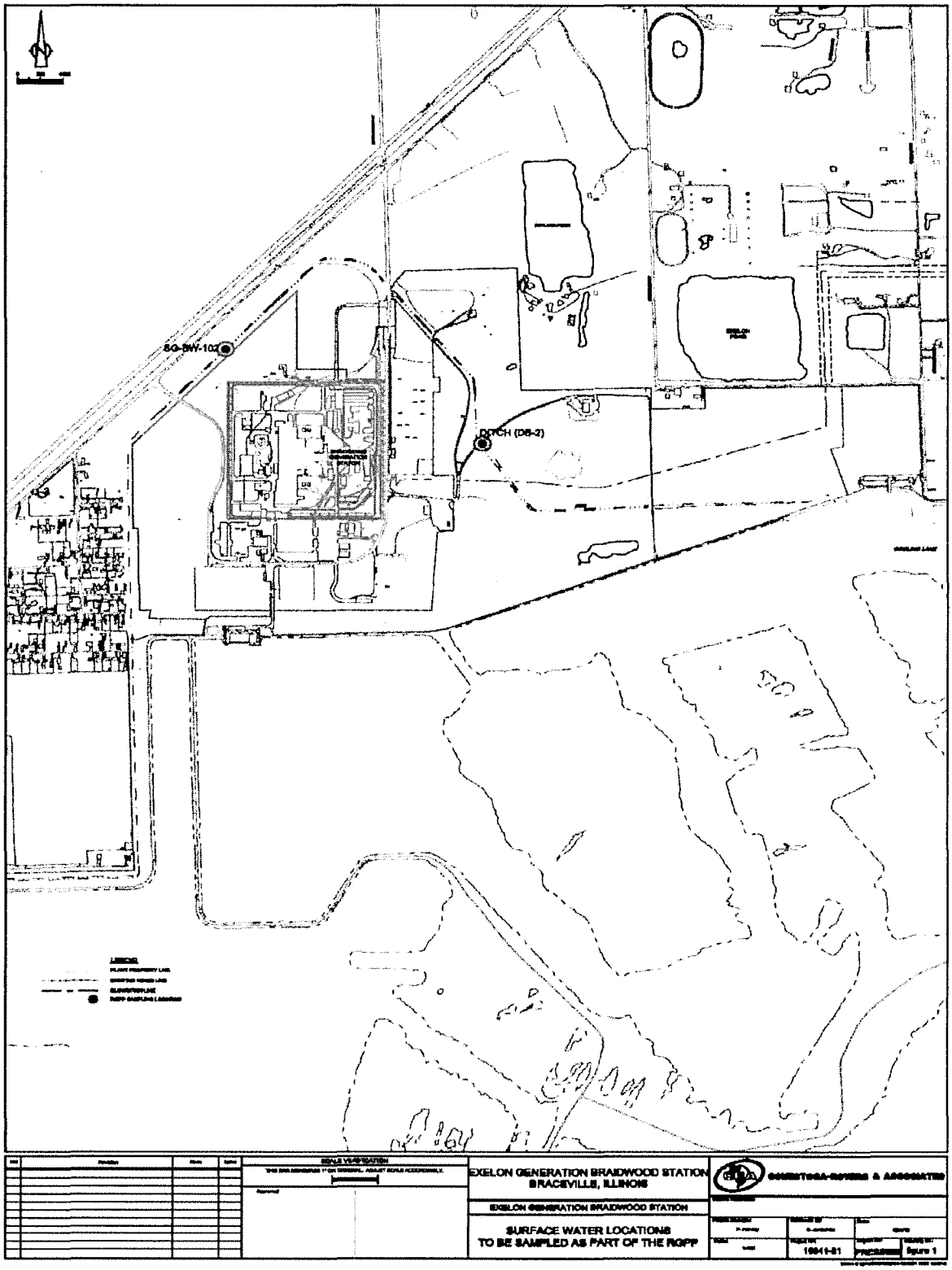


Figure A-2
RGPP Surface Water Sample Locations
Braidwood Station, 2017

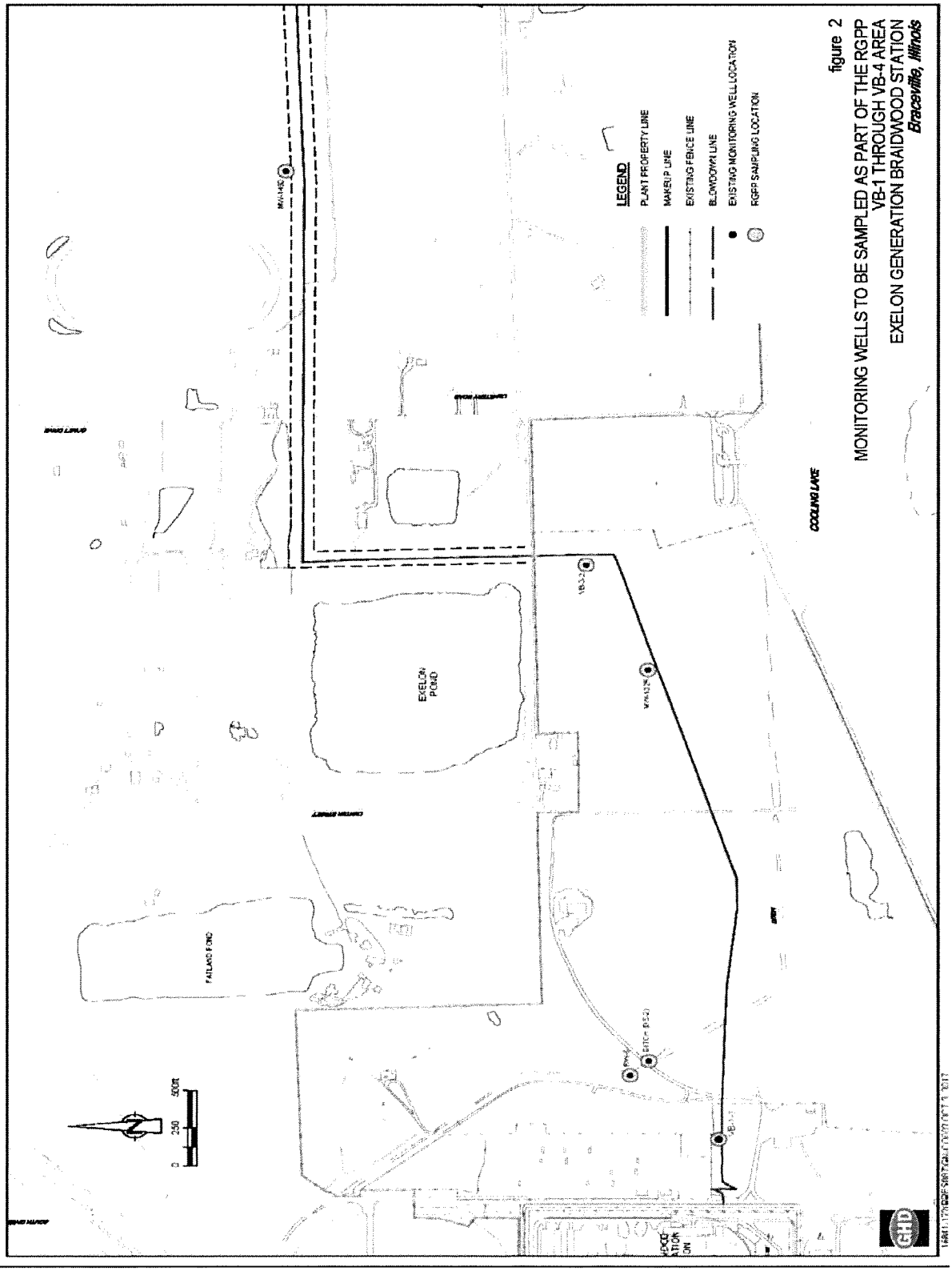


Figure A-3
RGPP VB-1 – VB-4 Area Monitoring Well Sample Locations
Braidwood Station, 2017

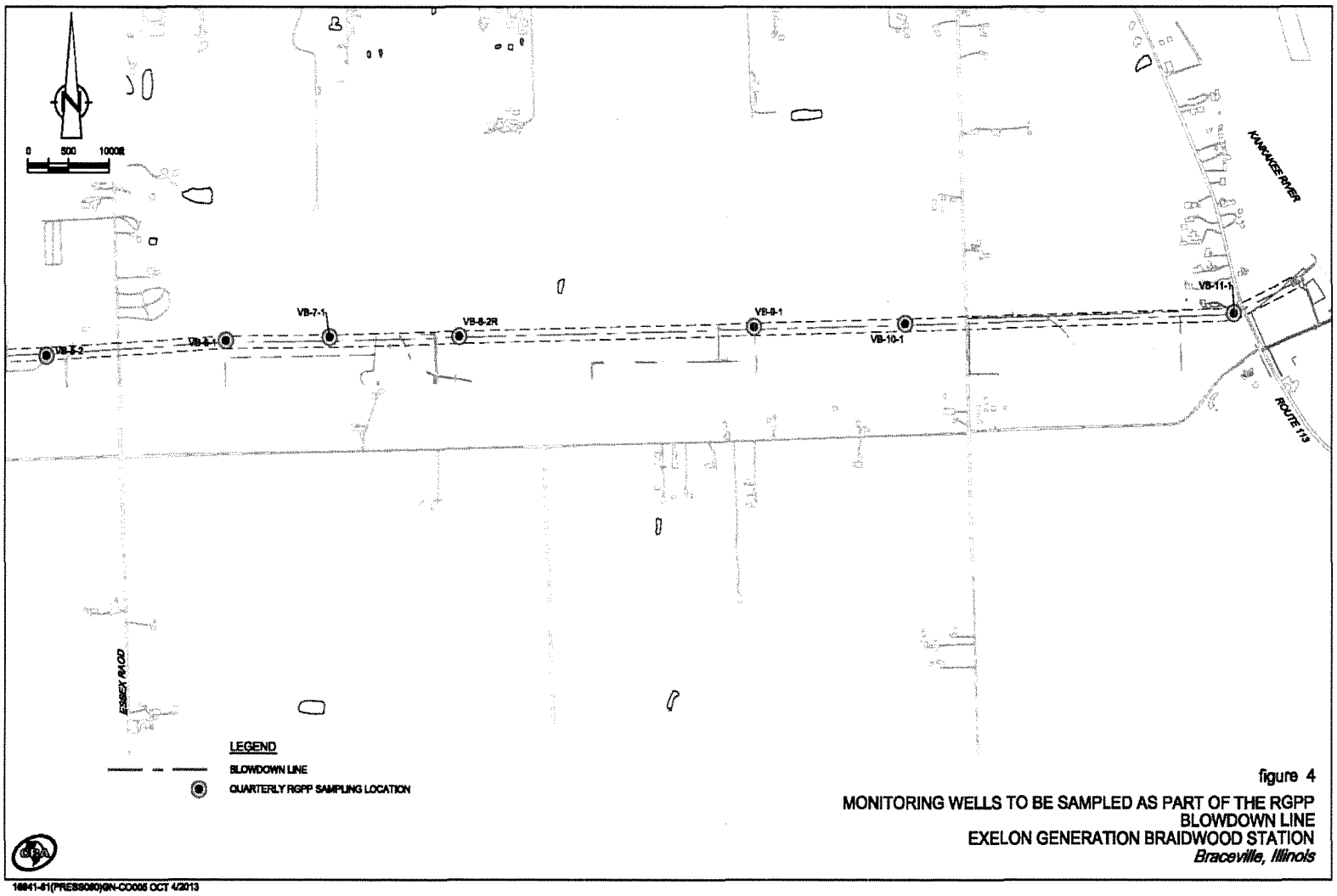


Figure A-4
RGPP Blowdown Line Monitoring Well Sample Locations
Braidwood Station, 2017

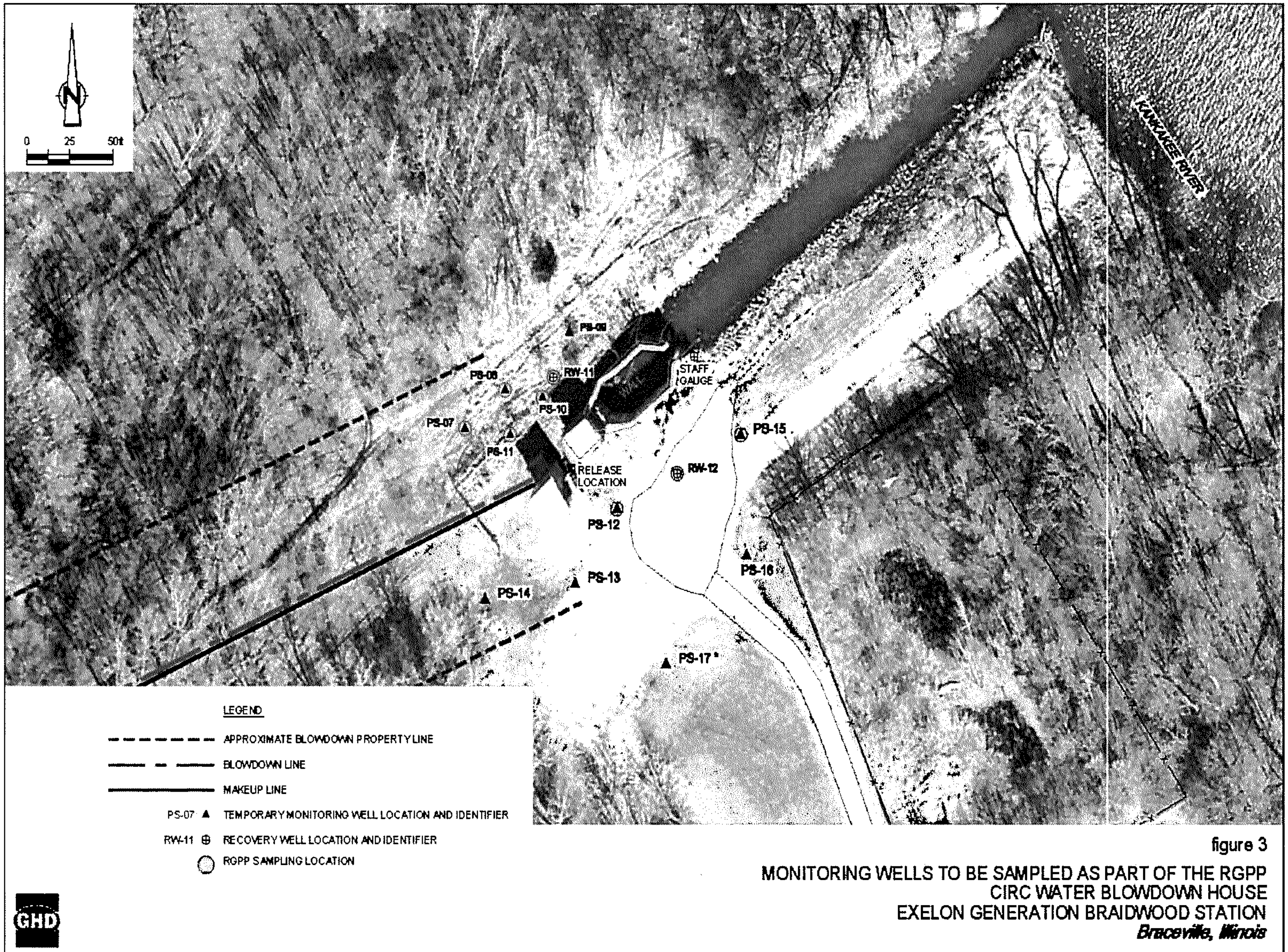


Figure A-5
RGPP CWBD Monitoring Water Sample
Locations Braidwood Station, 2017

Intentionally left blank

APPENDIX B

DATA TABLES

Intentionally left blank

TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA, AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITIY OF BRAIDWOOD STATION, 2017**

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-2	03/23/17	290 ± 129						
MW-2	04/22/17	477 ± 145	< 4.8	< 0.8	< 1.1	< 0.4	4.3 ± 0.9	< 1.4
MW-2	09/08/17	347 ± 124						
MW-2	10/30/17	< 187						
MW-4	01/25/17	485 ± 144						
MW-4	05/15/17	1050 ± 180	< 6.7	< 0.6	< 1.3	< 0.6	2.4 ± 1.0	< 1.4
MW-4	08/25/17	729 ± 146						
MW-4	10/30/17	515 ± 138						
MW-5	03/17/17	478 ± 134						
MW-5	04/22/17	587 ± 148	< 9.6	< 0.8	< 0.8	< 0.4	1.5 ± 0.7	< 1.4
MW-5	09/27/17	356 ± 124						
MW-5	11/16/17	205 ± 122						
MW-6	01/25/17	862 ± 161						
MW-6	04/22/17	861 ± 161	< 5.3	< 0.7	< **4.3**	< 0.4	3.5 ± 1.6	< 1.4
MW-6	09/08/17	1270 ± 195						
MW-6	10/30/17	1320 ± 201						
MW-7	01/25/17	408 ± 142						
MW-7	05/15/17	539 ± 144	< 6.8	< 0.7	< 1.1	< 0.6	4.0 ± 1.1	< 1.4
MW-7	08/25/17	368 ± 123						
MW-7	10/31/17	386 ± 133						
MW-11	03/09/17	< 184						
MW-11	04/20/17	248 ± 131	< 4.4	< 0.6	< 1.3	< 0.4	2.9 ± 1.1	< 1.4
MW-11	08/25/17	< 178						
MW-11	11/21/17	< 180						
MW-102R	01/24/17	< 196						
MW-102R	04/23/17	< 191						
MW-102R	09/27/17	< 170	< 3.7	< 0.6	< 0.7	< 0.9	< 0.9	< 1.6
MW-102R	11/14/17	< 181						
MW-141D	03/23/17	391 ± 138						
MW-141D	04/22/17	361 ± 137	< 4.3	< 0.8	< **6.9**	< 2.1	17.0 ± 5.5	< 4.0
MW-141D	09/06/17	544 ± 134						
MW-141D	10/30/17	430 ± 133						
MW-142D	03/17/17	1190 ± 187						
MW-142D	05/15/17	1190 ± 186	< 9.2	< 0.8	< **3.9**	< 0.8	21.9 ± 2.3	< 1.7
MW-142D	09/26/17	1430 ± 201						
MW-142D	10/31/17	1440 ± 209						
MW-143D	03/09/17	< 194						
MW-143D	04/20/17	< 193	< 5.3	< 0.8	< 2.3	< 0.3	12.4 ± 1.7	< 1.6
MW-143D	09/06/17	297 ± 118						
MW-143D	09/26/17	< 171						
MW-143D	12/19/17	< 183						
MW-144D	03/17/17	549 ± 147						
MW-144D	04/22/17	578 ± 148	< 5.1	< 0.8	< 1.0	< 0.3	4.9 ± 0.9	< 1.6
MW-144D	09/27/17	665 ± 138						
MW-144D	10/31/17	546 ± 139						
MW-145D	03/14/17	< 186						
MW-145D	05/25/17	< 184	< 7.7	< 0.7	< 0.9	< 0.5	< 1.0	< 1.5
MW-145D	08/29/17	< 188						
MW-145D	11/28/17	< 187						
MW-154	01/24/17	< 200						
MW-154	05/13/17	< 191	< 6.2	< 0.6	< 0.4	< 0.6	1.4 ± 0.6	< 1.4
MW-154	09/28/17	< 173						
MW-154	10/07/17	< 171						
MW-155	01/24/17	< 197						
MW-155	05/13/17	< 188	< 5.5	< 0.7	< 0.4	< 0.6	< 0.8	< 1.4
MW-155	09/28/17	< 168						
MW-155	10/07/17	< 172						
MW-159D	03/09/17	262 ± 131						
MW-159D	04/20/17	< 196	< 5.3	< 0.8	< **3.8**	1.0 ± 0.6	8.7 ± 1.7	< 1.6
MW-159D	08/25/17	208 ± 117						

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

TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA, AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITIY OF BRAIDWOOD STATION, 2017**

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-159D	11/16/17		194 ± 122						
MW-162D	03/23/17		569 ± 148						
MW-162D	05/07/17		592 ± 142	< 8.4	< 0.6	0.8 ± 0.5	< 0.4	2.3 ± 0.8	< 1.3
MW-162D	09/27/17		220 ± 116						
MW-162D	11/21/17		627 ± 142						
MW-BW-201S	03/17/17		238 ± 130						
MW-BW-201S	05/07/17		361 ± 134	< 9.0	< 0.7	< 0.6	< 0.3	5.8 ± 1.1	< 1.2
MW-BW-201S	09/27/17		487 ± 128						
MW-BW-201S	11/20/17		< 186						
MW-BW-202S	01/25/17		252 ± 132						
MW-BW-202S	04/20/17		205 ± 130	< 5.0	< 0.9	< **3.3**	< 0.3	16.2 ± 1.9	< 1.6
MW-BW-202S	09/06/17		258 ± 120						
MW-BW-202S	11/20/17		276 ± 125						
MW-BW-203S	03/07/17		< 192						
MW-BW-203S	05/07/17		295 ± 131	< 7.1	< 0.7	< 1.1	< 0.3	6.7 ± 1.3	< 1.2
MW-BW-203S	09/27/17		210 ± 115						
MW-BW-203S	11/20/17		< 187						
MW-BW-207I	03/09/17		979 ± 168						
MW-BW-207I	05/17/17		1110 ± 180	< 4.7	< 0.6	< 1.0	< 0.6	3.1 ± 1.0	< 1.4
MW-BW-207I	09/08/17		1040 ± 172						
MW-BW-207I	10/31/17		965 ± 167						
0WM31P	03/09/17		< 188						
0WM31P	05/10/17		< 187	< 5.7	< 0.5	14.3 ± 2.6	< 0.4	49.0 ± 2.6	< 1.6
0WM31P	09/27/17		< 171						
0WM31P	10/08/17		< 169						
PS-7	06/13/17		< 185						
PS-7	06/20/17		< 185						
PS-7	06/27/17		< 175						
PS-7	07/06/17		< 170						
PS-7	07/11/17	*Original*	1350 ± 196						
PS-7	07/11/17	*Recount*	1430 ± 202						
PS-7	07/23/17		519 ± 144						
PS-7	07/25/17		287 ± 126						
PS-7	07/31/17		< 187						
PS-7	08/13/17		< 180						
PS-7	08/16/17		< 192						
PS-7	08/24/17		< 190						
PS-7	08/30/17		< 188						
PS-7	10/26/17		< 178						
PS-7	11/17/17		< 175						
PS-7	12/19/17		< 181						
PS-8	06/13/17		784 ± 152						
PS-8	06/20/17		749 ± 151						
PS-8	06/27/17		240 ± 117						
PS-8	07/06/17		216 ± 114						
PS-8	07/11/17		< 180						
PS-8	07/23/17		650 ± 152						
PS-8	07/25/17		1040 ± 176						
PS-8	07/31/17		456 ± 136						
PS-8	08/16/17		< 189						
PS-8	08/26/17		< 190						
PS-8	10/26/17	*Original*	1960 ± 257						
PS-8	10/26/17	*Recount*	2030 ± 268						
PS-8	10/26/17	*Reanalysis*	1860 ± 249						
PS-8	11/28/17		436 ± 127						
PS-8	12/19/17		234 ± 123						
PS-9	06/13/17		787 ± 151						
PS-9	06/20/17		1640 ± 224						
PS-9	06/27/17		241 ± 118						
PS-9	07/06/17		< 167						

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

TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA, AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITIY OF BRAIDWOOD STATION, 2017**

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)
PS-9	07/11/17		< 176						
PS-9	07/23/17		228 ± 130						
PS-9	07/25/17		< 189						
PS-9	08/01/17		< 186						
PS-9	08/10/17		< 183						
PS-9	08/16/17		< 192						
PS-9	08/24/17		< 190						
PS-9	08/30/17		< 188						
PS-10	06/13/17		1420 ± 208						
PS-10	06/18/17		12900 ± 1330	< 8.3	< 0.8	< 1.1	< 1.9	3.1 ± 0.9	3.1 ± 1.2
PS-10	06/27/17		24900 ± 2520						
PS-10	07/06/17		22900 ± 2340						
PS-10	07/10/17		22400 ± 2280						
PS-10	07/24/17		14900 ± 1530						
PS-10	07/31/17		16400 ± 1690						
PS-10	08/08/17		14100 ± 1460						
PS-10	08/10/17		15500 ± 1600						
PS-10	08/14/17		14400 ± 1490						
PS-10	08/24/17		11100 ± 1170						
PS-10	08/30/17		9550 ± 1010						
PS-10	09/05/17		8810 ± 937						
PS-10	10/26/17		4670 ± 524						
PS-10	11/30/17		3770 ± 430						
PS-10	12/21/17		4630 ± 515						
PS-11	06/13/17		< 187						
PS-11	06/20/17		< 177						
PS-11	06/27/17		7730 ± 821						
PS-11	07/06/17		20800 ± 2120						
PS-11	07/11/17		23100 ± 2340						
PS-11	07/23/17		17900 ± 1840						
PS-11	07/25/17		18200 ± 1870						
PS-11	08/01/17		8060 ± 863						
PS-11	08/13/17		7520 ± 801						
PS-11	08/16/17		5570 ± 616						
PS-11	08/24/17		5810 ± 639						
PS-11	08/30/17		5200 ± 580						
PS-11	09/07/17		4110 ± 460						
PS-11	09/14/17		1770 ± 240						
PS-11	10/26/17	*Original*	1710 ± 236						
PS-11	10/26/17	*Reanalysis*	1750 ± 231						
PS-11	11/30/17		436 ± 132						
PS-11	12/19/17		606 ± 141						
PS-12	06/13/17		20800 ± 2130						
PS-12	06/14/17		23300 ± 2380						
PS-12	06/17/17		13000 ± 1340	< 8.5	< 0.8	< 1.0	< 0.4	5.9 ± 1.2	< 1.5
PS-12	06/20/17		3560 ± 410						
PS-12	06/27/17		1910 ± 248						
PS-12	07/06/17		1410 ± 197						
PS-12	07/10/17		1020 ± 165						
PS-12	07/17/17		4580 ± 520						
PS-12	07/21/17		2760 ± 336						
PS-12	07/24/17		< 193						
PS-12	07/31/17		2250 ± 289						
PS-12	08/08/17		1810 ± 246						
PS-12	08/10/17		2870 ± 344						
PS-12	08/14/17		3850 ± 439						
PS-12	08/24/17		1130 ± 188						
PS-12	08/30/17		4400 ± 499						
PS-12	09/05/17		7680 ± 827						
PS-12	09/12/17		8580 ± 904						

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

TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA, AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITIY OF BRAIDWOOD STATION, 2017**

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)
PS-12	10/26/17	1420 ± 207						
PS-12	11/28/17	4270 ± 479						
PS-12	12/19/17	3250 ± 380						
PS-13	06/13/17	< 186						
PS-13	06/20/17	< 189						
PS-13	06/26/17	< 170						
PS-13	07/08/17	< 177						
PS-13	07/11/17	< 175						
PS-13	07/25/17	< 187						
PS-13	08/01/17	< 192						
PS-13	08/16/17	< 191						
PS-13	09/05/17	< 188						
PS-14	06/13/17	< 187						
PS-14	06/20/17	< 187						
PS-14	06/26/17	< 180						
PS-14	07/06/17	< 167						
PS-14	07/11/17	< 186						
PS-14	07/25/17	< 187						
PS-14	08/01/17	< 184						
PS-14	08/16/17	< 190						
PS-14	08/30/17	< 186						
PS-15	06/14/17	< 199						
PS-15	06/20/17	< 188						
PS-15	06/26/17	175 ± 112						
PS-15	07/06/17	2970 ± 346						
PS-15	07/11/17	5550 ± 614						
PS-15	07/18/17	8120 ± 869						
PS-15	07/25/17	2220 ± 285						
PS-15	08/01/17	4460 ± 506						
PS-15	08/13/17	4080 ± 462						
PS-15	08/16/17	3300 ± 392						
PS-15	08/26/17	3700 ± 433						
PS-15	09/05/17	3460 ± 409						
PS-15	10/26/17	381 ± 127						
PS-15	11/28/17	2220 ± 281						
PS-15	12/21/17	806 ± 151						
PS-16	06/14/17	< 199						
PS-16	06/20/17	< 185						
PS-16	06/26/17	< 170						
PS-16	07/06/17	< 166						
PS-16	07/11/17	< 190						
PS-16	07/18/17	< 189						
PS-16	07/25/17	< 184						
PS-16	08/01/17	< 191						
PS-16	08/16/17	< 187						
PS-16	09/05/17	< 186						
RW-6	03/07/17	375 ± 137						
RW-6	04/23/17	239 ± 131	< 4.6	< 0.6	**< 4.1**	< 0.4	7.3 ± 1.7	< 1.4
RW-6	09/27/17	416 ± 127						
RW-6	11/14/17	277 ± 126						
RW-11	06/20/17	4800 ± 541						
RW-11	06/26/17	2970 ± 345						
RW-11	07/07/17	3710 ± 421						
RW-11	07/10/17	5880 ± 646						
RW-11	07/19/17	6050 ± 656						
RW-11	07/24/17	2330 ± 295						
RW-11	07/31/17	2680 ± 331						
RW-11	08/08/17	2430 ± 304						
RW-11	08/14/17	2780 ± 337						
RW-11	08/24/17	4530 ± 512						

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

TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA, AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITIY OF BRAIDWOOD STATION, 2017**

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)
RW-11	08/30/17	4530 ± 514						
RW-11	09/05/17	5160 ± 576						
RW-11	09/12/17	6270 ± 674						
RW-11	10/26/17	3340 ± 390						
RW-11	11/17/17	1020 ± 168						
RW-11	12/19/17	916 ± 161						
RW-12	06/20/17	188 ± 119						
RW-12	06/26/17	5350 ± 588						
RW-12	07/07/17	7270 ± 774						
RW-12	07/10/17	6770 ± 733						
RW-12	07/19/17	6690 ± 723						
RW-12	07/24/17	5400 ± 599						
RW-12	07/31/17	5560 ± 614						
RW-12	08/08/17	4410 ± 498						
RW-12	08/14/17	4160 ± 471						
RW-12	08/24/17	4190 ± 480						
RW-12	08/30/17	3730 ± 432						
RW-12	09/05/17	4560 ± 516						
RW-12	09/12/17	4410 ± 490						
RW-12	10/26/17	3000 ± 358						
RW-12	11/17/17	1730 ± 233						
RW-12	12/19/17	962 ± 162						
VB1-1	01/24/17	< 198						
VB1-1	05/13/17	< 196						
VB1-1	09/29/17	< 171	< 3.8	< 0.9	< 2.0	< 0.9	13.0 ± 1.6	< 1.6
VB1-1	10/07/17	< 169						
VB2-5DR	01/31/17	< 189						
VB2-5DR	03/21/17	< 195						
VB3-2	01/24/17	< 195						
VB3-2	04/23/17	< 196						
VB3-2	09/28/17	< 169	< 5.2	< 0.8	< 1.3	< 0.9	7.3 ± 1.2	< 1.6
VB3-2	11/14/17	< 185						
VB5-2	03/14/17	< 189						
VB5-2	05/25/17	< 185	< 7.0	< 0.8	< 1.1	< 1.1	< 1.1	< 2.3
VB5-2	08/29/17	< 186						
VB5-2	11/28/17	< 187						
VB6-1	03/14/17	< 187						
VB6-1	05/25/17	< 185	< 5.8	< 0.8	< 1.0	< 0.7	1.5 ± 0.8	< 1.4
VB6-1	08/29/17	< 188						
VB6-1	11/28/17	< 189						
VB7-1	03/14/17	< 189						
VB7-1	05/25/17	< 188	< 5.8	< 0.8	< 1.1	< 0.7	7.9 ± 1.2	< 1.4
VB7-1	08/29/17	< 187						
VB7-1	11/28/17	< 186						
VB8-2R	03/14/17	< 185						
VB8-2R	05/25/17	< 185	< 7.5	< 0.9	< 1.5	< 0.7	20.6 ± 1.6	< 1.4
VB8-2R	08/29/17	< 190						
VB8-2R	11/28/17	< 189						
VB9-1	03/14/17	< 187						
VB9-1	05/25/17	< 185	< 5.7	< 0.9	< 1.9	< 0.7	< 2.0	< 1.4
VB9-1	08/29/17	< 187						
VB9-1	11/28/17	< 189						
VB10-1R	03/14/17	< 193						
VB10-1R	05/25/17	< 189	< 7.0	< 0.9	< 1.9	< 0.7	5.4 ± 1.4	< 1.4
VB10-1R	08/29/17	< 189						
VB10-1R	11/28/17	< 186						
VB11-1	03/14/17	< 191						
VB11-1	05/25/17	< 184	< 7.4	< 0.8	< 1.3	< 0.8	2.2 ± 1.1	< 1.5
VB11-1	08/29/17	< 189						
VB11-1	11/28/17	< 187						

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

TABLE B-I.2

CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017

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-2	04/22/17	< 28	< 32	< 3	< 3	< 7	< 3	< 6	< 4	< 6	< 13	< 3	< 3	< 24	< 8
MW-4	05/15/17	< 59	< 148	< 8	< 8	< 20	< 8	< 16	< 8	< 15	< 13	< 9	< 8	< 35	< 14
MW-5	04/22/17	< 33	< 30	< 3	< 4	< 8	< 3	< 7	< 4	< 7	< 13	< 4	< 3	< 26	< 7
MW-6	04/22/17	< 33	< 30	< 3	< 4	< 9	< 3	< 7	< 4	< 6	< 15	< 4	< 3	< 28	< 11
MW-7	05/15/17	< 69	< 170	< 7	< 8	< 15	< 8	< 13	< 7	< 14	< 14	< 7	< 6	< 36	< 14
MW-11	04/20/17	< 23	< 22	< 2	< 2	< 5	< 2	< 5	< 3	< 4	< 12	< 3	< 2	< 20	< 7
MW-102R	09/27/17	< 10	< 7	< 1	< 1	< 3	< 1	< 2	< 1	< 2	< 14	< 1	< 1	< 16	< 5
MW-141D	04/22/17	< 35	< 27	< 3	< 4	< 7	< 3	< 6	< 4	< 6	< 14	< 4	< 4	< 28	< 9
MW-142D	05/15/17	< 43	< 80	< 5	< 5	< 8	< 4	< 11	< 5	< 9	< 10	< 5	< 5	< 27	< 6
MW-143D	04/20/17	< 29	< 26	< 3	< 3	< 6	< 3	< 6	< 3	< 6	< 13	< 3	< 3	< 25	< 8
MW-144D	04/22/17	< 25	< 22	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 11	< 3	< 3	< 22	< 7
MW-145D	05/25/17	< 45	< 113	< 5	< 4	< 11	< 6	< 12	< 5	< 10	< 12	< 6	< 6	< 27	< 10
MW-154	01/24/17	< 24	< 22	< 2	< 2	< 6	< 2	< 4	< 3	< 5	< 15	< 2	< 2	< 24	< 8
MW-154	05/13/17	< 52	< 59	< 5	< 5	< 10	< 6	< 11	< 6	< 9	< 13	< 7	< 6	< 34	< 8
MW-155	01/24/17	< 20	< 31	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 13	< 2	< 2	< 22	< 6
MW-155	05/13/17	< 53	< 93	< 7	< 6	< 16	< 8	< 14	< 6	< 12	< 14	< 6	< 6	< 35	< 11
MW-159D	03/09/17	< 8	< 5	< 1	< 1	< 2	< 1	< 1	< 1	< 2	< 20	< 1	< 1	< 19	< 6
MW-159D	04/20/17	< 28	61 ± 32	< 3	< 3	< 7	< 3	< 5	< 3	< 5	< 14	< 3	< 3	< 24	< 8
MW-162D	05/07/17	< 56	< 98	< 5	< 7	< 12	< 7	< 11	< 6	< 9	< 13	< 7	< 6	< 35	< 14
MW-BW-201S	05/07/17	< 47	< 111	< 4	< 5	< 9	< 6	< 11	< 5	< 10	< 13	< 5	< 5	< 29	< 9
MW-BW-202S	04/20/17	< 27	< 64	< 2	< 3	< 6	< 2	< 5	< 3	< 5	< 13	< 3	< 3	< 25	< 8
MW-BW-203S	05/07/17	< 51	< 60	< 6	< 6	< 11	< 6	< 13	< 7	< 11	< 14	< 7	< 5	< 33	< 13
MW-BW-207I	05/17/17	< 49	< 53	< 6	< 6	< 11	< 5	< 16	< 6	< 11	< 10	< 7	< 6	< 26	< 9
0WM31P	05/10/17	< 63	< 71	< 7	< 8	< 17	< 6	< 14	< 7	< 13	< 14	< 7	< 8	< 31	< 15
PS-10	06/18/17	< 15	< 9	< 1	< 1	< 4	< 1	< 3	< 2	< 3	< 15	< 1	< 1	< 21	< 7
PS-12	06/17/17	< 15	< 44	< 1	< 2	< 4	< 1	< 3	< 1	< 3	< 15	< 1	< 1	< 20	< 8
RW-6	04/23/17	< 33	< 32	< 3	< 4	< 8	< 3	< 7	< 4	< 6	< 13	< 4	< 3	< 27	< 8
VB1-1	09/29/17	< 12	< 11	< 1	< 1	< 3	< 1	< 2	< 2	< 2	< 15	< 1	< 1	< 20	< 7
VB3-2	09/28/17	< 11	< 8	< 1	< 1	< 3	< 1	< 2	< 1	< 2	< 14	< 1	< 1	< 18	< 5
VB5-2	05/25/17	< 62	< 131	< 8	< 7	< 18	< 6	< 16	< 7	< 15	< 13	< 8	< 7	< 38	< 13
VB6-1	05/25/17	< 58	< 79	< 5	< 6	< 13	< 6	< 12	< 6	< 12	< 13	< 8	< 8	< 39	< 9
VB7-1	05/25/17	< 66	< 104	< 7	< 7	< 20	< 9	< 17	< 8	< 15	< 14	< 11	< 9	< 39	< 15
VB8-2R	05/25/17	< 65	< 141	< 8	< 7	< 17	< 8	< 16	< 8	< 11	< 13	< 8	< 7	< 38	< 15
VB9-1	05/25/17	< 55	< 102	< 6	< 5	< 11	< 6	< 15	< 7	< 10	< 13	< 7	< 6	< 32	< 9
VB10-1R	05/25/17	< 81	< 165	< 9	< 7	< 19	< 10	< 19	< 10	< 15	< 14	< 10	< 9	< 40	< 15
VB11-1	05/25/17	< 62	< 94	< 7	< 6	< 12	< 6	< 15	< 7	< 12	< 15	< 7	< 7	< 35	< 10

TABLE B-I.3

CONCENTRATIONS OF HARD TO DETECTS IN GROUNDWATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, BRAIDWOOD STATION, 2017

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
MW-162D	05/07/17	< 0.02	< 0.02	< 0.07	< 0.09	< 0.09	< 0.03	< 0.04	< 0.10
0WM31P	05/10/17	< 0.03	< 0.03	< 0.03	< 0.18	< 0.11	2.8 ± 0.9	< 0.13	< 0.18

TABLE B-II.1

CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA AND GROSS BETA IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017

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)
DS-2	03/07/17	< 192						
DS-2	04/23/17	< 192	< 5.0	< 0.9	< 1.8	< 0.3	5.8 ± 1.4	< 1.6
DS-2	08/27/17	< 176						
DS-2	11/14/17	< 183						
SG-BW-102 DITCH C	03/07/17	< 192						
SG-BW-102 DITCH C	05/13/17	< 191	< 6.0	< 0.5	< 1.0	< 0.6	2.7 ± 0.9	< 1.4
SG-BW-102 DITCH C	08/27/17	195 ± 116						
SG-BW-102 DITCH C	11/14/17	< 182						

TABLE B-II.2

CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2017

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
DS-2	04/23/17	< 30	< 31	< 3	< 3	< 8	< 4	< 6	< 4	< 6	< 12	< 3	< 3	< 25	< 8
SG-BW-102 DITCH C	05/13/17	< 48	< 57	< 5	< 6	< 13	< 5	< 11	< 7	< 11	< 14	< 7	< 7	< 30	< 11