

Docket No: 50-456
50-457

BRAIDWOOD STATION

UNIT 1 and UNIT 2

Annual Radiological
Environmental Operating Report

1 January through 31 December 2020

Prepared By
Teledyne Brown Engineering
Environmental Services



Braidwood Station
Braceville, IL 60407

May 2021

Intentionally left blank

Table Of Contents

I. Preface	1
II. Summary and Conclusions	8
III. Introduction.....	10
A. Objectives of the REMP.....	10
B. Implementation of the Objectives	10
IV. Program Description	11
A. Sample Collection.....	11
B. Sample Analysis	12
C. Data Interpretation.....	13
D. Program Exceptions	14
E. Program Changes	15
V. Results and Discussion	16
A. Aquatic Environment	16
1. Surface Water	16
2. Public Water.....	16
3. Ground/Well Water	17
4. Fish	18
5. Sediment.....	18
B. Atmospheric Environment	19
1. Airborne	19
a. Air Particulates	19
b. Airborne Iodine.....	19
C. Terrestrial Environment	20
1. Milk.....	20
2. Food Products.....	20
D. Ambient Gamma Radiation	20
E. Land Use Survey	21
F. Errata Data.....	21
G. Summary of Results – Inter-laboratory Comparison Program	21

Appendices

Appendix A Radiological Environmental Monitoring Report Annual Summary

Tables

Table A-1 Radiological Environmental Monitoring Program Annual Summary for Braidwood Station, 2020

Appendix B Location Designation, Distance & Direction, and Sample Collection & Analytical Methods

Tables

Table B-1 Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Braidwood Station, 2020

Table B-2 Radiological Environmental Monitoring Program - Summary of Sample Collection and Analytical Methods, Braidwood Station, 2020

Figures

Figure B-1 Inner Ring and Other OSLD Locations of Braidwood Station, 2020

Figure B-2 Fixed Air Sampling and Outer Ring OSLD Locations of Braidwood Station, 2020

Figure B-3 Ingestion and Waterborne Exposure Pathway Sample Locations of Braidwood Station, 2020

Appendix C Data Tables and Figures - Primary Laboratory

Tables

Table C-I.1 Concentrations of Gross Beta in Surface Water Samples Collected in the Vicinity of Braidwood Station, 2020

Table C-I.2 Concentrations of Tritium in Surface Water Samples Collected in the Vicinity of Braidwood Station, 2020

Table C-I.3 Concentrations of Nickel-63 in Surface Water Samples Collected in the Vicinity of Braidwood Station, 2020

Table C-I.4 Concentrations of Iron-55 in Surface Water Samples Collected in the Vicinity of Braidwood Station, 2020

Table C-I.5 Concentrations of Gamma Emitters in Surface Water Samples Collected in the Vicinity of Braidwood Station, 2020

Table C-II.1 Concentrations of Gross Beta in Public Water Samples Collected in the Vicinity of Braidwood Station, 2020

Table C-II.2	Concentrations of Tritium in Public Water Samples Collected in the Vicinity of Braidwood Station, 2020
Table C-II.3	Concentrations of I-131 in Public Water Samples Collected in the Vicinity of Braidwood Station, 2020
Table C-II.4	Concentrations of Nickel-63 in Public Water Samples Collected in the Vicinity of Braidwood Station, 2020
Table C-II.5	Concentrations of Iron-55 in Public Water Samples Collected in the Vicinity of Braidwood Station, 2020
Table C-II.6	Concentrations of Gamma Emitters in Public Water Samples Collected in the Vicinity of Braidwood Station, 2020
Table C-III.1	Concentrations of Tritium in Ground/Well Water Samples Collected in the Vicinity of Braidwood Station, 2020
Table C-III.2	Concentrations of Gamma Emitters in Ground/Well Water Samples Collected in the Vicinity of Braidwood Station, 2020
Table C-IV.1	Concentrations of Iron-55, Nickel-63 and Gamma Emitters in Fish Samples Collected in the Vicinity of Braidwood Station, 2020
Table C-V.1	Concentrations of Iron-55, Nickel-63 and Gamma Emitters in Sediment Samples Collected in the Vicinity of Braidwood Station, 2020
Table C-VI.1	Concentrations of Gross Beta in Air Particulate Samples Collected in the Vicinity of Braidwood Station, 2020
Table C-VI.2	Monthly and Yearly Mean Values of Gross Beta Concentrations in Air Particulate Samples Collected in the Vicinity of Braidwood Station, 2020
Table C-VI.3	Concentrations of Gamma Emitters in Air Particulate Samples Collected in the Vicinity of Braidwood Station, 2020
Table C-VII.1	Concentrations of I-131 in Air Iodine Samples Collected in the Vicinity of Braidwood Station, 2020
Table C-VIII.1	Concentrations of I-131 in Milk Samples Collected in the Vicinity of Braidwood Station, 2020
Table C-VIII.2	Concentrations of Gamma Emitters in Milk Samples Collected in the Vicinity of Braidwood Station, 2020
Table C-VIII.3	Concentrations of Gamma Emitters in Grass Samples Collected in the Vicinity of Braidwood Station, 2020
Table C-IX.1	Concentrations of Gamma Emitters in Vegetation Samples Collected in the Vicinity of Braidwood Station, 2020
Table C-X.1	Quarterly OSLD Results for Braidwood Station, 2020
Table C-X.2	Mean Quarterly OSLD Results for the Inner Ring, Outer Ring, Other, Control, and Independent Spent Fuel Storage Installation (ISFSI) Locations for Braidwood Station, 2020

Table C-X.3 Summary of the Ambient Dosimetry Program for Braidwood Station, 2020

Figures

- Figure C-1 Surface Water - Gross Beta – Stations BD-10 and BD-25 (Control (C)) Collected in the Vicinity of Braidwood Station, 2000 - 2020
- Figure C-2 Surface Water - Gross Beta – Stations BD-38 and BD-40 Collected in the Vicinity of Braidwood Station, 2007 - 2020
- Figure C-3 Surface Water - Gross Beta – Stations BD-55 and BD-56 Collected in the Vicinity of Braidwood Station, 2007 - 2020
- Figure C-4 Surface Water - Tritium – Stations BD-10 and BD-25 (C) Collected in the Vicinity of Braidwood Station, 2000 - 2020
- Figure C-5 Surface Water - Tritium – Stations BD-38 and BD-40 Collected in the Vicinity of Braidwood Station, 2006 - 2020
- Figure C-6 Surface Water - Tritium – Stations BD-55 and BD-56 Collected in the Vicinity of Braidwood Station, 2007 - 2020
- Figure C-7 Public Water - Gross Beta – Station BD-22 Collected in the Vicinity of Braidwood Station, 2000 - 2020
- Figure C-8 Public Water - Tritium – Station BD-22 Collected in the Vicinity of Braidwood Station, 2000 - 2020
- Figure C-9 Ground/Well Water - Tritium – Stations BD-13 and BD-34 Collected in the Vicinity of Braidwood Station, 2000 - 2020
- Figure C-10 Ground/Well Water - Tritium – Stations BD-35 and BD-36 Collected in the Vicinity of Braidwood Station, 2000 - 2020
- Figure C-11 Ground/Well Water - Tritium – Station BD-37 Collected in the Vicinity of Braidwood Station, 2000 - 2020
- Figure C-12 Ground/Well Water – Tritium – Stations BD-50 and BD-51 Collected in the Vicinity of Braidwood Station, 2007 - 2020
- Figure C-13 Ground/Well Water – Tritium – Stations BD-53 and BD-54 Collected in the Vicinity of Braidwood Station, 2007 - 2020
- Figure C-14 Air Particulate - Gross Beta – Stations BD-03 (C) and BD-06 Collected in the Vicinity of Braidwood Station, 2000 - 2020
- Figure C-15 Air Particulate - Gross Beta – Stations BD-19 and BD-20 Collected in the Vicinity of Braidwood Station, 2000 - 2020
- Figure C-16 Air Particulate - Gross Beta – Station BD-21 Collected in the Vicinity of Braidwood Station, 2000 - 2020
- Figure C-17 Air Particulate - Gross Beta – Stations BD-02 and BD-04 Collected in the Vicinity of Braidwood Station, 2005 - 2020

Figure C-18 Air Particulate - Gross Beta – Station BD-05 Collected in the Vicinity of Braidwood Station, 2005 - 2020

Appendix D Inter-Laboratory Comparison Program

Tables

Table D-1 Analytics Environmental Radioactivity Cross Check Program
Teledyne Brown Engineering Environmental Services, 2020

Table D-2 DOE's Mixed Analyte Performance Evaluation Program (MAPEP)
Teledyne Brown Engineering Environmental Services, 2020

Table D-3 ERA Environmental Radioactivity Cross Check Program
Teledyne Brown Engineering Environmental Services, 2020

Appendix E Errata Data

Appendix F Annual Radiological Groundwater Protection Program Report (ARGPPR)

Intentionally left blank

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.

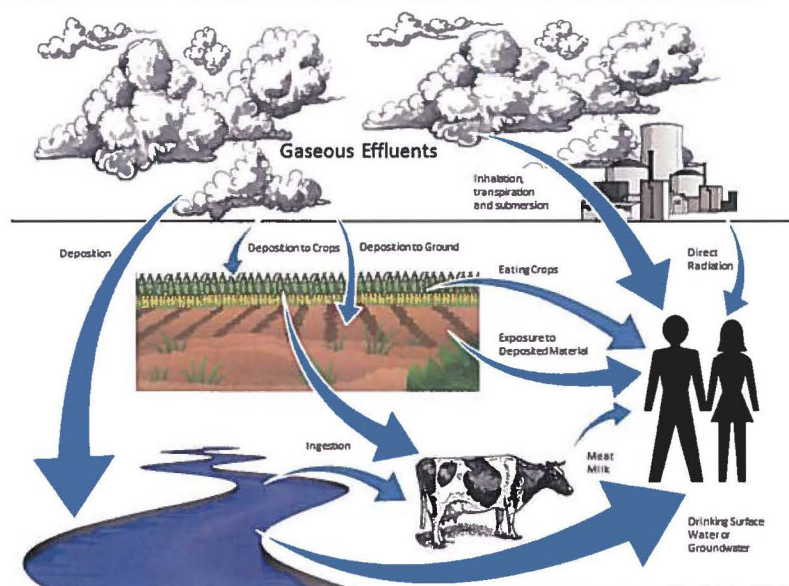
Annual Reports

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 to the 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

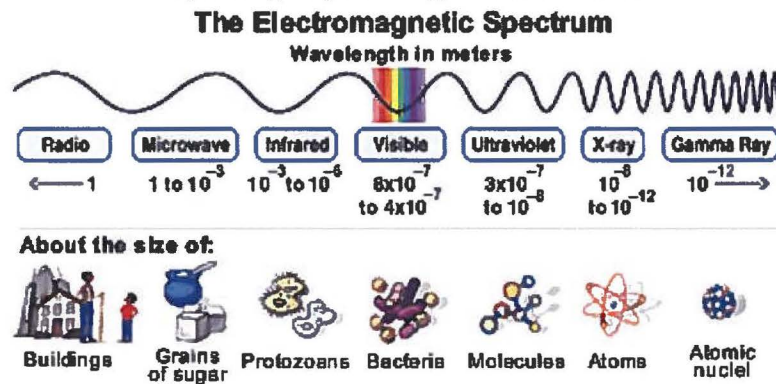


Graphic 1 demonstrates some potential exposure pathways from Braidwood Nuclear Power Station. The ARERR and AREOR together ensure Nuclear Power Plants are operating in a manner that is within established regulatory commitments meant to adequately protect the public.

Understanding Radiation

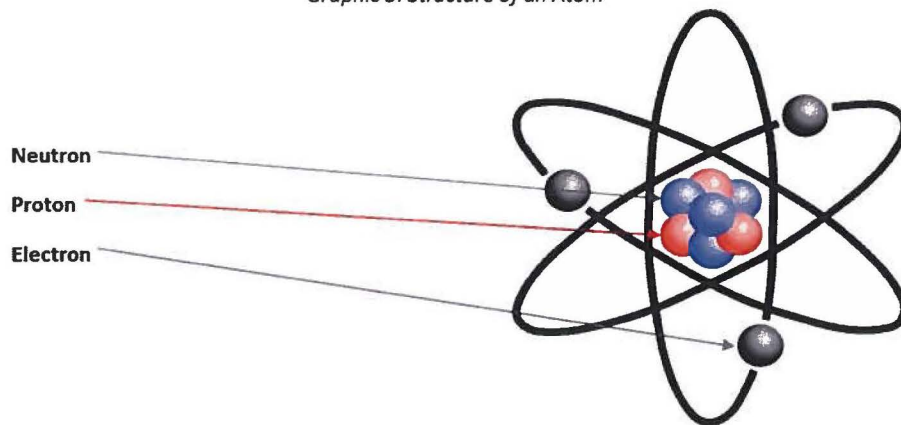
Generally radiation is defined as emitted energy in the form of waves or particles. If radiation has enough energy to displace electrons from an atom it is termed "ionizing", otherwise it is "non-ionizing". Non-ionizing radiation includes light, heat given off from a stove, radiowaves and microwaves. 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

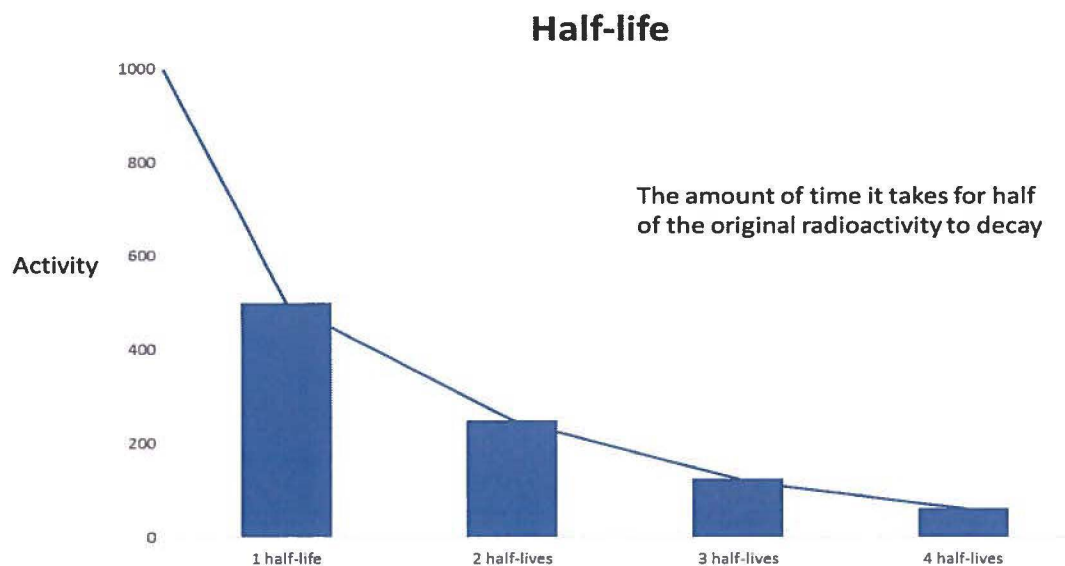
radioactive. A radioactive isotope can emit radiation because it contains excess energy in its nucleus. Radioactive atoms and isotopes are also referred to as radionuclides and radioisotopes.

There are two basic ways that radionuclides are produced at a nuclear power plant. The first is fission, which creates radionuclides 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-occurring

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

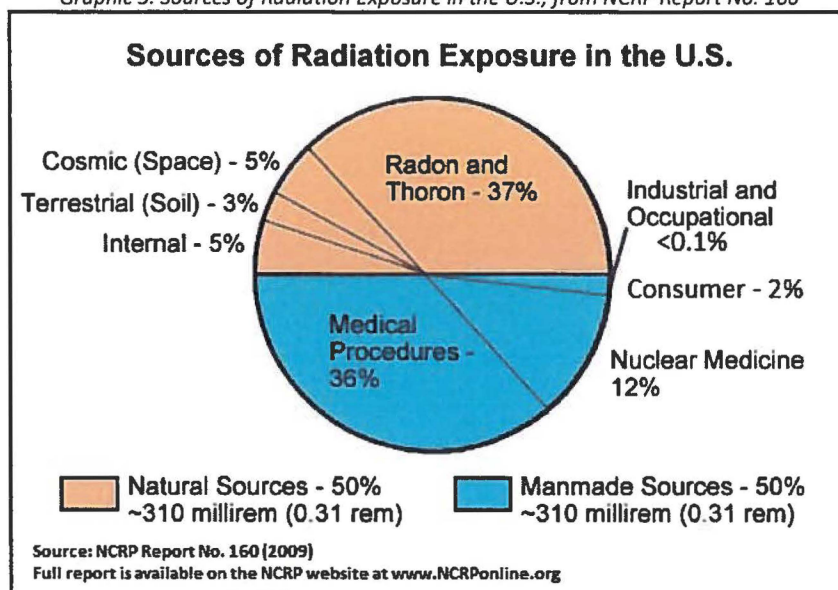
There are four different but interrelated units for measuring radioactivity, exposure, absorbed dose, and dose equivalent. Together, they are used to scientifically report the amount of radiation and its effects on humans.

- 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

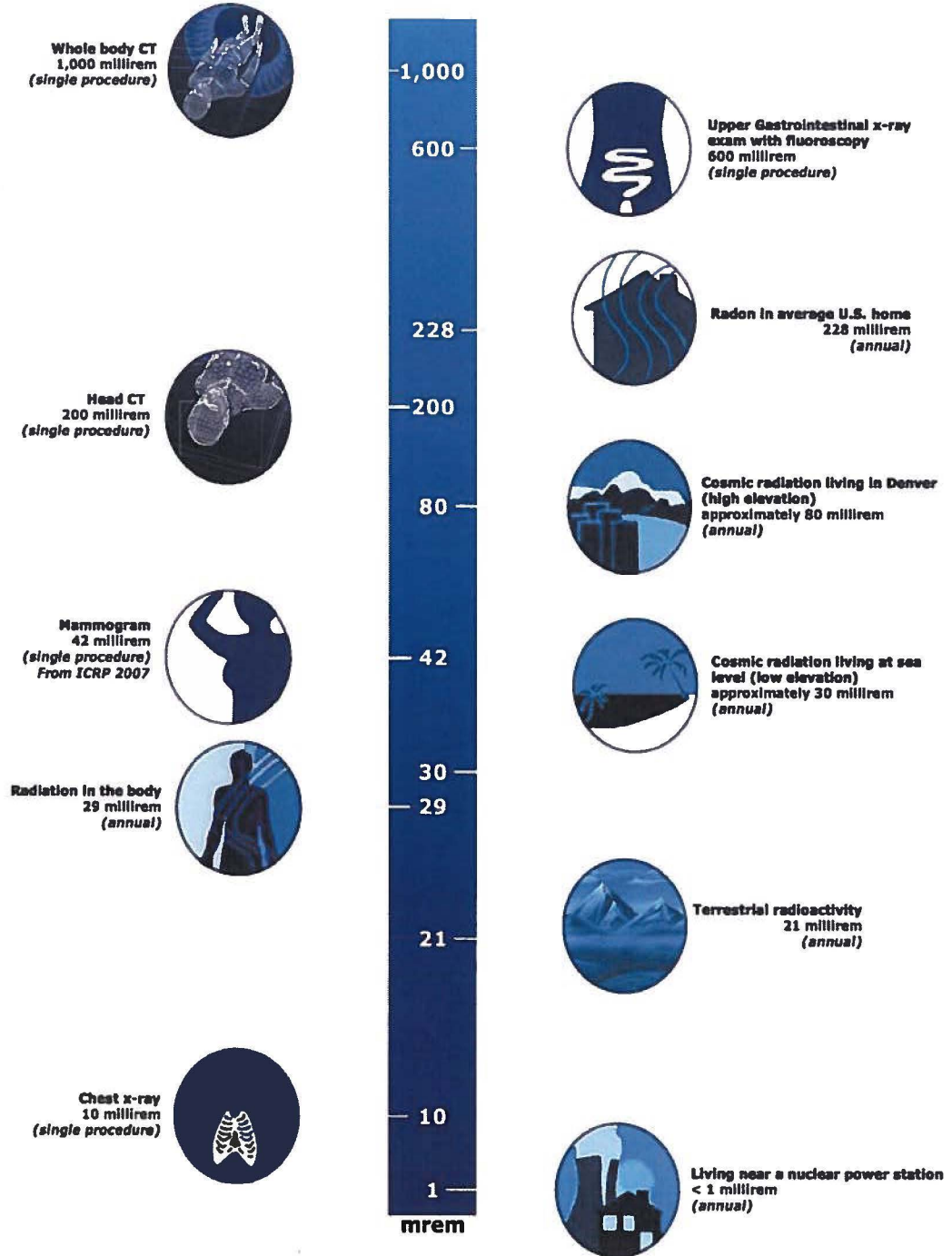


The radiation from a nuclear power plant is included in the chart as part of the "Industrial and Occupational" fraction, <0.1%. The largest natural source of radiation is from radon, because radon gas travels in the air we breathe. Perhaps you know someone who had a CT scan at a hospital to check his 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

RELATIVE DOSES FROM RADIATION SOURCES

All doses from the National Council on Radiation Protection & Measurements, Report No. 160 (unless otherwise denoted)

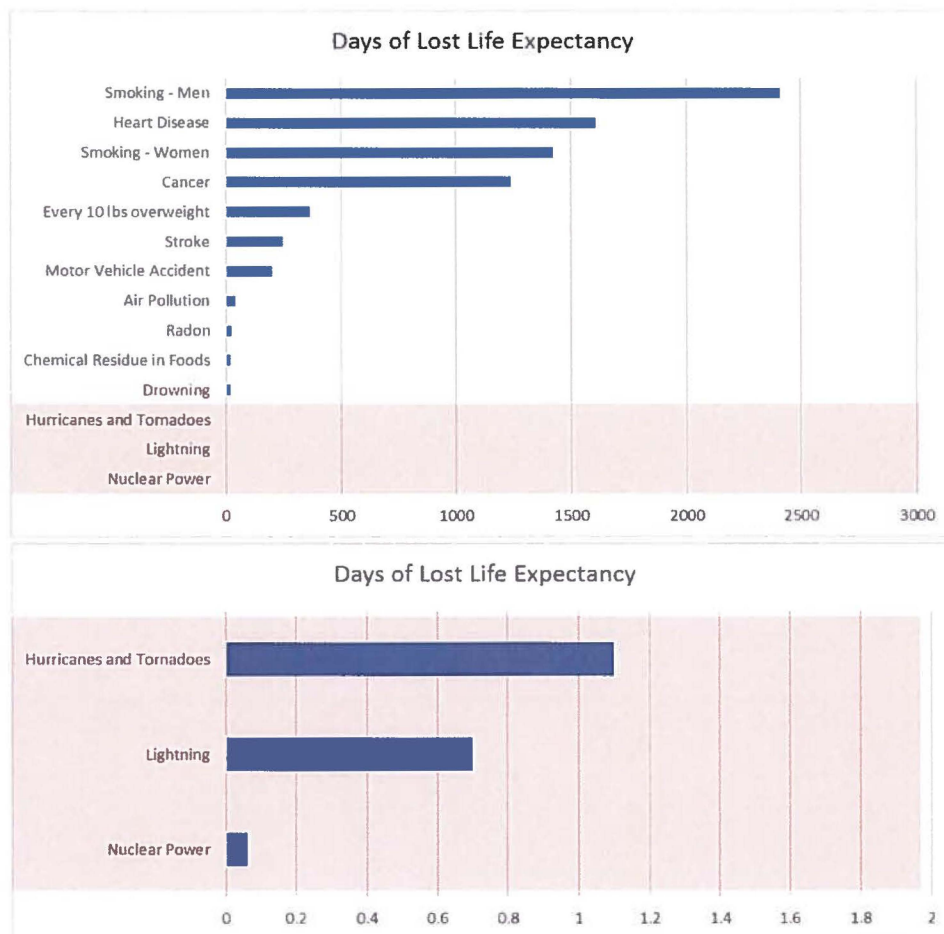


Radiation Risk

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, 2020 through December 31, 2020. During that time period 1,558 analyses were performed on 1,238 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. Nickel-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. 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 in any samples and all required LLDs (Lower Limit of Detection) were met.

Food Product samples were analyzed for concentrations of gamma emitting nuclides. No fission or activation products were found in any samples and all required LLDs were met.

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). A dose evaluation was performed by taking the highest readings at the ISFSI pad and extrapolating dose to the nearest resident. The dose to the nearest resident was estimated to be 3.30E-01 mrem in 2020.

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, 2020 through December 31, 2020.

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 2020. 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 (C)), 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 quillback, golden redhorse, flathead catfish, smallmouth bass, channel catfish, largemouth bass and common carp were collected semiannually at three locations, BD-25 (C), BD-28 and BD-41. Sediment samples composed of recently deposited substrate were collected at three locations semiannually, BD-10, BD-25 (C), 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 (C), 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 installed. The pumps were run continuously and sampled air at the rate of approximately one cubic foot per minute. The air particulate filters and air iodine cartridges were replaced weekly and sent to the laboratory for analysis.

Terrestrial Environment

The terrestrial environment was evaluated by performing radiological analyses on food product samples. Food products and broadleaf vegetation were collected at six locations (BD-Control, BD-Quad 1, BD-Quad 2, BD-Quad 3, BD-Quad 4, BWD-G1 and BWD-G2). 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 two 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 sixteen 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 sixteen 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 set located at the eight fixed air sampling locations (BD-02, BD-3 (C), BD-04, BD-05, BD-06, BD-19, BD-20 and BD-21).

An ISFSI set consisting of six locations (BD-ISFSI-104-3, BD-ISFSI-104-4, BD-ISFSI-105-3, BD-ISFSI-105-4, BD-ISFSI-110-3 and BD-ISFSI-110-4).

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 2020. 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, grass, 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 water, public water, ground/well water, air particulate/radioiodine, milk, vegetation and fish, twelve nuclides, Mn-54, Co-58, Fe-59, Co-60, Zn-65, Nb-95, Zr-95, I-131, Cs-134, Cs-137, Ba-140 and La-140 were reported.

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

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

D. Program Exceptions

For 2020, the Braidwood Station REMP had a sample recovery rate in excess of 99%. Sample anomalies and missed samples are listed in the tables below:

Table D-1 LISTING OF SAMPLE ANOMALIES

Sample Type	Location Code	Collection Date	Reason
BS	BD-10, BD-25 & BD-57	May 2020	Sediments collected during the first week of June due to dangerously high water levels.
APAI	BD-02	05/28/20	Lower reading of 146.8 hrs during 7-day period, possibly due to a power failure. NOTE: during the 06/04/20 collection, the timer indicated 161.4 hrs - normal time for the collection period.
AP/AI	BD-04	07/30/20	Pump flow rate showed 54 cfh due to heavy residue of dust on the AP filter. Pump indicated normal cfh flow rate after a fresh filter installed. NOTE: during the 08/06/20 collection, the flow meter indicated correct rate of 60 cfh.
APAI	BD-02	08/13/20	Lower reading of 120.5 hrs due to power outages caused by winds & severe thunderstorms in the area.
APAI	BD-03	08/13/20	Lower reading of 134.4 hrs due to power outages caused by winds & severe thunderstorms in the area.
APAI	BD-04	08/13/20	Lower reading of 164.5 hrs due to power outages caused by winds & severe thunderstorms in the area.
APAI	BD-06	08/13/20	Lower reading of 154.8 hrs due to power outages caused by winds & severe thunderstorms in the area.
AP/AI	BD-02	10/29/20	Lower reading of 157.4 hrs due to a power outage. NOTE: during the collection on 11/05/20, the timer indicated 162.6 hrs - normal time for the collection period.
M	BD-18	12/03/20	Milk not available; farmer stopped milking cows before calving.
AP/AI	BD-02	12/17/20	Lower reading of 157.4 hrs due to a power outage. NOTE: during the collection on 12/23/20, the timer indicated 144.6 hrs - normal value for the 6-day collection period.
OSLD	BD-305-2	12/31/20	Both OSLD samples were mistakenly put together with the charcoal samples and sent to the Teledyne Laboratory. OSLDs returned to EIML and delivered to the Braidwood management.

Table D-2 LISTING OF MISSED SAMPLES

Sample Type	Location Code	Collection Date	Reason
SW	BD-25	01/16/20 01/23/20 02/06/20 02/13/20	Sample not collected due to snow accumulation and road closure
SW	BD-55	01/23/20 -02/20/20	No sample; lake frozen
SW	BD-56	01/23/20 01/30/20 02/13/20 02/20/20	No sample; lake frozen
SW	BD-25	03/19/20 - 04/30/20	No sample collected due to location being closed (state of health emergency)
VE	Quad 1, Quad 2, Quad 3, Quad 4 & Control,	June 2020	No vegetables available- too early in the season
VE(M)	BWD-G1, BWD-G2	06/18/20 07/02/18	Vegetation samples too small to collect
VE (M)	BWD-G2	07/16/20 07/30/20	Vegetation samples too small to collect
VE	Control	July - September 2020	No root vegetables available
VE	Quad 2, Quad 3	August - September 2020	Unable to collect samples - no suitable vegetables found; farmers not open due to health emergency
M	BD-18	12/03/20	Milk not available; farmer stopped milking cows before calving season
OSLD	BD-04	12/31/20	OLD found missing during exchange, possibly dislodged by snowplowing activity; premises searched unsuccessfully
SW	BD-10, BD-56	12/31/20	No sample; water frozen
SW	BD-25	12/31/20	No sample; access road closed due to snow and ice accumulation

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 were no program changes in 2020.

V. Results and Discussion

A. Aquatic Environment

1. Surface Water (SW)

Samples were taken weekly and composited monthly at six locations (BD-10, BD-25 (C), 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 56 of 71 samples. The values ranged from 2.7 to 13.3 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 1 of 24 samples at a concentration of 448 ± 129 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. Ni-63 was not detected and the required LLD was met. (Table C-I.3, Appendix C)

Iron-55

Monthly samples were analyzed for Ni-63 activity. Fe-55 was not detected and the required LLD was met. (Table C-I.4, Appendix C)

Gamma Spectrometry

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

2. Public Water (PW)

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 11 of 12 samples. The values ranged from 2.1 to 8.4 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 9 of 12 samples. Concentrations ranged from 203 to 1,500 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. Iodine was not detected in any samples and the required LLD was met. (Table C-II.3, Appendix C)

Nickel-63

Monthly samples were analyzed for Ni-63 activity. Ni-63 was not detected and the required LLD was met. (Table C-II.4, Appendix C)

Iron-55

Monthly samples were analyzed for Fe-55 activity. Fe-55 was not detected and the required LLD was met. (Table C-II.5, Appendix C)

Gamma Spectrometry

Samples from the location were analyzed for gamma emitting nuclides. No nuclides were detected and all required LLDs were met. (Table C-II.6, Appendix C)

3. Ground/Well Water (WW)

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. No nuclides were detected and all required LLDs were met. (Table C-II.3, Appendix C)

4. Fish

Fish samples comprising the flesh of quillback, golden redhorse, flathead catfish, smallmouth bass, channel catfish, largemouth bass and common carp 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:

Iron-55

The edible portion of fish samples from all three locations was analyzed for Fe-55 activity. Fe-55 was not detected and the required LLD was met. (Table C-II.3, Appendix C)

Nickel-63

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

Gamma Spectrometry

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

5. Sediment (BS)

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

Iron-55

Sediment samples from all three locations was analyzed for Fe-55 activity. Fe-55 was not detected and the required LLD was met. (Table C-V.1, Appendix C)

Nickel-63

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

Gamma Spectrometry

Sediment samples from the location were analyzed for gamma emitting nuclides. No fission or activation products were found and all required LLDs were met. (Table C-V.1, Appendix C)

B. Atmospheric Environment

1. Airborne (AP/AI)

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 6E-03 to 32E-03 pCi/m³ with a mean of 16E-03 pCi/m³. The results from the far field (Group II) ranged from 6E-03 to 34E-03 pCi/m³ with a mean of 16E-03 pCi/m³. The results from the Control location (Group III) ranged from 8E-03 to 31E-03 pCi/m³ with a mean of 17E-03 pCi/m³. Comparison of the 2020 air particulate data with previous years' data indicate no effects from the operation of Braidwood Station. Additionally, a comparison of the weekly values for 2020 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. No nuclides were detected and all required LLDs were met. (Table C–VI.3, Appendix C)

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

C. Terrestrial Environment

1. Milk (MI)

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

Gamma Spectrometry

Each milk sample was analyzed for concentrations of gamma emitting nuclides. No nuclides were detected and all required LLDs were met. (Table C–VIII.2 & Table C-VIII.3, Appendix C)

2. Food Products (VE)

Food product samples were collected at eight locations: BD-Control, BD-Quad 1, BD-Quad 2, BD-Quad 3, BD-Quad 4, BWD-N1 and BWD-N2 when available. The following analysis was performed:

Gamma Spectrometry

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

D. Ambient Gamma Radiation

Ambient gamma radiation levels were measured utilizing Optically Stimulated Luminescence Dosimeter (OSLD). Forty-eight OSLD locations were established around the site, each with two OSLD's installed for measurement. The data was analyzed using methods acceptable for demonstrating compliance with the Environmental Protection Agency (EPA) 40 CFR 190, "Environmental Radiation Protection Standards for Nuclear Power Operations". It incorporates the concepts of ANSI/HPS N13.37, "Environmental Dosimetry". Results of OSLD measurements are listed in Tables C–X.1 to C–X.3, Appendix C.

All OSLD measurements had a range of 4.8 to 38.2 mrem/std. 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.

Annual Facility Dose was reported for station BD-ISFSI-105-4. The direct

dose to the nearest resident was estimated to be 0.33 mrem for the year.

E. Land Use Survey

A Land Use Survey conducted during August 29, 2020, 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 ft² in each of the sixteen 22 ½ degree sectors around the site. For dose calculation, a garden is assumed at the nearest residence. There were no notable changes to the 2020 land use census. 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	0.60	-	-
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	4.00	5.3	-
L	SW	0.40	-	-
M	WSW	0.45	-	-
N	W	0.35	1.6	8.7
P	WNW	0.40	-	-
Q	NW	0.40	-	-
R	NNW	0.40	-	-

F. Errata Data

There was no errata data for 2020 REMP.

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 $\pm 20\%$ of the reference value
- Acceptable with Warning (flag = "W") - result falls in the $\pm 20\%$ to $\pm 30\%$ 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, 126 out of 133 analyses performed met the specified acceptance criteria. Seven analyses did not meet the specified acceptance criteria for the following reasons and were addressed through the TBE Corrective Action Program. A summary is found below:

1. The MAPEP February 2020 AP U-233/234 and U-238 results were evaluated as *Not Acceptable*. The reported value for U-233/234 was 0.0416 ± 0.0102 Bq/sample and the known result was 0.075 Bq/sample (acceptance range 0.053 - 0.098). The reported value for U-238 was 0.0388 ± 0.00991 Bq/sample and the known result was 0.078 Bq/sample (acceptance range 0.055 - 0.101). This sample was run as the workgroup duplicate and had RPD's of 10.4% (U-234) and 11.7% (U-

238). After the known results were obtained, the sample was relogged. The filter was completely digested with tracer added originally; the R1 results were almost identical. It was concluded that the recorded tracer amount was actually double, causing the results to be skewed. Lab worksheets have been modified to verify actual tracer amount vs. LIMS data. TBE changed vendors for this cross-check to ERA MRAD during the 2nd half of 2020. Results were acceptable at 97.8% for U-234 and 106% for U-238. (NCR 20-13)

2. The Analytics September 2020 milk Sr-89 result was evaluated as *Not Acceptable*. The reported value was 62.8 pCi/L and the known result was 95.4 (66%). All QC data was reviewed and there were no anomalies. This was the first failure for milk Sr-89 since 2013 and there have only been 3 upper/lower boundary warnings since that time. It is believed that there may have been some Sr-89 loss during sample prep. The December 2020 result was at 92% of the known. (NCR 20-19)
3. The ERA October 2020 water I-131 result was evaluated as *Not Acceptable*. The reported value was 22.9 pCi/L and the known result was 28.2 (acceptance range 23.5 - 33.1). The reported result was 81% of the known, which passes TBE QC criteria. This was the first failure for water I-131. (NCR 20-17)
4. The ERA October 2020 water Gross Alpha and Gross Beta results were evaluated as *Not Acceptable*. The reported/acceptable values and ranges are as follows:

	<u>Reported</u>	<u>Known</u>	<u>Range</u>
Gross Alpha	40.0	26.2	13.3 - 34.7
Gross Beta	47.5	69.1	48.0 - 76.0

All QC data was reviewed with no anomalies and a cause for failure could not be determined. This was the first failure for water Gross Beta. A Quick Response follow-up cross-check was analyzed as soon as possible with acceptable results at 96.8% for Gross Alpha and 102% for Gross Beta. (NCR 20-18)

5. The MAPEP August 2020 soil Ni-63 result was evaluated as *Not Acceptable*. The reported value was 438 ± 21.1 Bq/kg and the known result was 980 Bq/kg (acceptance range 686 - 1274). It is believed that some Ni-63 loss occurred during the sample prep step. (NCR 20-20)

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, 2020

NAME OF FACILITY: BRAIDWOOD				DOCKET NUMBERS: 50-456 & 50-457					
LOCATION OF FACILITY: BRACEVILLE, IL				REPORTING PERIOD: 2020					
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 (PC/LITER)	GR-B	71	4	6.4 (47/60) 2.7 - 13.3	5 (9/11) 4.3 - 6.0	8.7 (12/12) 5.3 - 12.4	BD-40 INDICATOR BRAIDWOOD STATION COOLING LAKE ONSITE	0	
	H-3	24	200	448 (1/20)	<LLD	448 (1/4)	BD-10 INDICATOR KANKAKEE RIVER DOWNSTREAM 5.4 MILES NE OF SITE	0	
	NI-63	23	30	<LLD	<LLD	-		0	
	FE-55	23	200	<LLD	<LLD	-		0	
	GAMMA	71							
		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 (PC/LITER)	GR-B	12	4	4.2 (11/12) 2.1 - 8.4	NA	4.2 (11/12) 2.1 - 8.4	BD-22 INDICATOR WILMINGTON 6.0 MILES NE OF SITE	0	
	H-3	12	200	584 (9/12) 203 - 1500	NA	584 (9/12) 203 - 1500	BD-22 INDICATOR WILMINGTON 6.0 MILES NE OF SITE	0	
	I-131	12	1	<LLD	NA	-		0	
	NI-63	12	30	<LLD	<LLD	-		0	
	FE-55	12	200	<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, 2020

NAME OF FACILITY: BRAIDWOOD			DOCKET NUMBERS: 50-456 & 50-457				
LOCATION OF FACILITY: BRACEVILLE, IL			REPORTING PERIOD: 2020				
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 (PC/LITER)	GAMMA	12					
		MN-54	15	<LLD	NA	-	0
		CO-58	15	<LLD	NA	-	0
		FE-59	30	<LLD	NA	-	0
		CO-60	15	<LLD	NA	-	0
		ZN-65	30	<LLD	NA	-	0
		NB-95	15	<LLD	NA	-	0
		ZR-95	30	<LLD	NA	-	0
		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 (PC/LITER)	GAMMA	32	200	<LLD	NA	-	0
		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 (PC/KG WET)	FE-55	12	260	<LLD	<LLD	-	0
		NI-63	12	260	<LLD	<LLD	-

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

A-2

TABLE A-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR BRAIDWOOD STATION, 2020

NAME OF FACILITY: BRAIDWOOD			DOCKET NUMBERS: 50-456 & 50-457						
LOCATION OF FACILITY: BRACEVILLE, IL			REPORTING PERIOD: 2020						
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 (PCI/KG WET)	GAMMA	12							
		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)	FE-55	6	2000	<LLD	<LLD	-		0	
	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	<LLD	<LLD	-		0			
BA-140	NA	<LLD	<LLD	-		0			
LA-140	NA	<LLD	<LLD	-		0			

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

TABLE A-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR BRAIDWOOD STATION, 2020

NAME OF FACILITY: BRAIDWOOD DOCKET NUMBERS: 50-456 & 50-457
 LOCATION OF FACILITY: BRACEVILLE, IL REPORTING PERIOD: 2020

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 (E-3 PC/CU.METER)	GR-B	424	10	16 (370/371) 6 - 34	17 (53/53) 8 - 31	17 (53/53) 8 - 31	BD-03 CONTROL COUNTY LINE ROAD 6.2 MILES ESE OF SITE	0
	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 (E-3 PC/CU.METER)	GAMMA	424						
	I-131		70	<LLD	<LLD	-	0	
MILK (PC/LITER)	I-131	19	1	<LLD	<LLD	-	0	
	GAMMA	19						
	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.

A-4

TABLE A-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR BRAIDWOOD STATION, 2020

NAME OF FACILITY: BRAIDWOOD			DOCKET NUMBERS: 50-456 & 50-457					
LOCATION OF FACILITY: BRACEVILLE, IL			REPORTING PERIOD: 2020					
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
GRASS (PCI/KG WET)	GAMMA	0						
	MN-54		NA					0
	CO-58		NA					0
	FE-59		NA					0
	CO-60		NA					0
	ZN-65		NA					0
	NB-95		NA					0
	ZR-95		NA					0
	CS-134		60					0
	CS-137		60					0
	BA-140		80					0
LA-140		NA					0	
			NA					0
VEGETATION (PCI/KG WET)	GAMMA	55						
	MN-54		NA	<LLD	<LLD	-		0
	CO-58		NA	<LLD	<LLD	-		0
	FE-59		NA	<LLD	<LLD	-		0
	CO-60		NA	<LLD	<LLD	-		0
	ZN-65		NA	<LLD	<LLD	-		0
	NB-95		NA	<LLD	<LLD	-		0
	ZR-95		NA	<LLD	<LLD	-		0
	I-131		60	<LLD	<LLD	-		0
	CS-134		60	<LLD	<LLD	-		0
	CS-137		80	<LLD	<LLD	-		0
BA-140		NA	<LLD	<LLD	-		0	
LA-140		NA	<LLD	<LLD	-		0	
DIRECT RADIATION (MILLIREM/QTR.)	OSLD-QUARTERLY	183	NA	14 (179/179) 4.8 - 38.2	14 (4/4) 8.7 - 22.3	32.7 (4/4) 29.4 - 38.2	BD-ISFSI-105-4 INDICATOR 0.20 MILES SE	0

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

A-5

Intentionally left blank

APPENDIX B

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

Intentionally left blank

TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Braidwood Station, 2020

Location	Location Description	Distance & Direction From Site
<u>A. Surface Water</u>		
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 (1.0 mile E)
BD-55	North Pond Fatlan Site (indicator)	0.6 miles NE
BD-56	South Pond Fatlan Site (indicator)	0.6 miles NE
<u>B. Drinking (Potable) Water</u>		
BD-22	Wilmington (indicator)	6.0 miles NE
<u>C. Ground/Well Water</u>		
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
<u>D. Milk - Bi-Weekly / Monthly</u>		
BD-18	Biros' Farm (control)	8.7 miles W
<u>E. Air Particulates / Air Iodine</u>		
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
<u>F. Fish</u>		
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)	Onsite (1.0 mile E)
<u>G. Sediment</u>		
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
<u>H. Food Products</u>		
BWD-G1	Nearsite NE	0.54 miles NE
BWD-G2	Nearsite W	0.21 miles W
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

TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Braidwood Station, 2020

Location	Location Description	Distance & Direction From Site
<u>I. Environmental Dosimetry - OSLD</u>		
<u>Inner Ring</u>		
BD-101		0.5 miles N
BD-102		1.1 miles NNE
BD-103		1.0 mile NE
BD-104		0.7 miles ENE
BD-105		2.2 miles E
BD-106		2.5 miles ESE
BD-107		3.2 miles SE
BD-108		3.2 miles SSE
BD-109		3.8 miles S
BD-110		2.8 miles SSW
BD-111a		1.4 miles SW
BD-112		0.7 miles WSW
BD-113a		0.5 miles W
BD-114		0.4 miles WNW
BD-115		0.3 miles NW
BD-116		0.4 miles NNW
<u>Outer Ring</u>		
BD-201		4.2 miles N
BD-202		4.8 miles NNE
BD-203		4.9 miles NE
BD-204		4.3 miles ENE
BD-205		4.0 miles E
BD-206		4.5 miles ESE
BD-207		4.5 miles SE
BD-208		4.5 miles SSE
BD-209		4.8 miles S
BD-210		5.3 miles SSW
BD-211		4.8 miles SW
BD-212		5.0 miles WSW
BD-213		4.8 miles W
BD-214		4.3 miles WNW
BD-215		4.5 miles NW
BD-216		4.0 miles NNW
<u>Other</u>		
BD-02	Custer Park (indicator)	5.0 miles E
BD-03	13000 W. 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
<u>ISFSI</u>		
BD-ISFSI-104-3		0.11 miles E
BD-ISFSI-104-4		0.13 miles E
BD-ISFSI-105-3		0.23 miles SE
BD-ISFSI-105-4		0.20 miles SE
BD-ISFSI-110-3		0.18 miles SE
BD-ISFSI-110-4		0.15 miles SE

TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Braidwood Station, 2020

Distance in Miles from the Braidwood Station ISFSI Pad, 2020		
Sector		Residence Miles
N	WNW	0.7
P	WNW	0.7
Q	NW	0.7
R	NNW	0.7

Distance in Miles from the Braidwood Station Reactor Buildings, 2020				
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	-
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, 2020

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	Iron-55	Monthly composite from weekly grab samples	TBE, TBE-2006 Iron-55 Activity in Various Matrices
Surface Water	Nickel-63	Monthly composite from weekly grab samples	TBE, TBE-2013 Radionickel Activity in Various Matrices
Surface Water	Tritium	Quarterly composite from weekly grab samples	TBE, TBE-2011 Tritium Analysis in Drinking Water by Liquid Scintillation
Drinking Water	Gamma Spectroscopy	Monthly composite from weekly composite samples	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis TBE. TBE-2023 Compositing of Samples
Drinking Water	Gross Beta	Monthly composite from weekly composite samples	TBE, TBE-2008 Gross Alpha and/or Gross Beta Activity in Various Matrices TBE. TBE-2023 Compositing of Samples
Drinking Water	Iodine	Monthly composite from weekly composite samples	TBE, TBE-2012 Radioiodine in Various Matrices TBE. TBE-2023 Compositing of Samples
Drinking Water	Iron-55	Monthly composite from weekly grab samples	TBE, TBE-2006 Iron-55 Activity in Various Matrices
Drinking Water	Nickel-63	Monthly composite from weekly grab samples	TBE, TBE-2013 Radionickel Activity in Various Matrices
Drinking Water	Tritium	Monthly composite from weekly composite samples	TBE, TBE-2011 Tritium Analysis in Drinking Water by Liquid Scintillation TBE. TBE-2023 Compositing of Samples
Ground/ Well Water	Gamma Spectroscopy	Quarterly grab sample	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
Ground/ Well Water	Tritium	Quarterly grab sample	TBE, TBE-2011 Tritium analysis in Drinking Water by Liquid Scintillation
Fish	Gamma Spectroscopy	Semi-annual samples collected via electro-shocking or other techniques	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
Fish	Iron-55	Semi-annual samples collected via electro-shocking or other techniques	TBE, TBE-2006 Iron-55 Activity in Various Matrices
Fish	Nickel-63	Semi-annual samples collected via electroshocking or other techniques	TBE, TBE-2013 Radionickel Activity in Various Matrices
Sediment	Gamma Spectroscopy	Semi-annual grab samples	TBE-2007 Gamma-Emitting Radioisotope Analysis
Sediment	Iron-55	Semi-annual grab samples	TBE, TBE-2006 Iron-55 Activity in Various Matrices
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 TBE. TBE-2023 Compositing of Samples
Air Iodine	I-131	Weekly composite of continuous air sampling through charcoal filter	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
Milk	Gamma Spectroscopy	Bi-weekly grab sample May through October. Monthly all other times	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
Food Products	Gamma Spectroscopy	Grab samples during the growing season	TBE, TBE-2007 Gamma-Emitting Radioisotope Analysis
OSLD	Optically Stimulated Luminescence Dosimetry	Quarterly OSLDs comprised of two Al ₂ O ₃ :C Landauer Incorporated elements.	Landauer Incorporated



Figure B-1
 Inner Ring and Other OSLD Locations
 of Braidwood Station, 2020

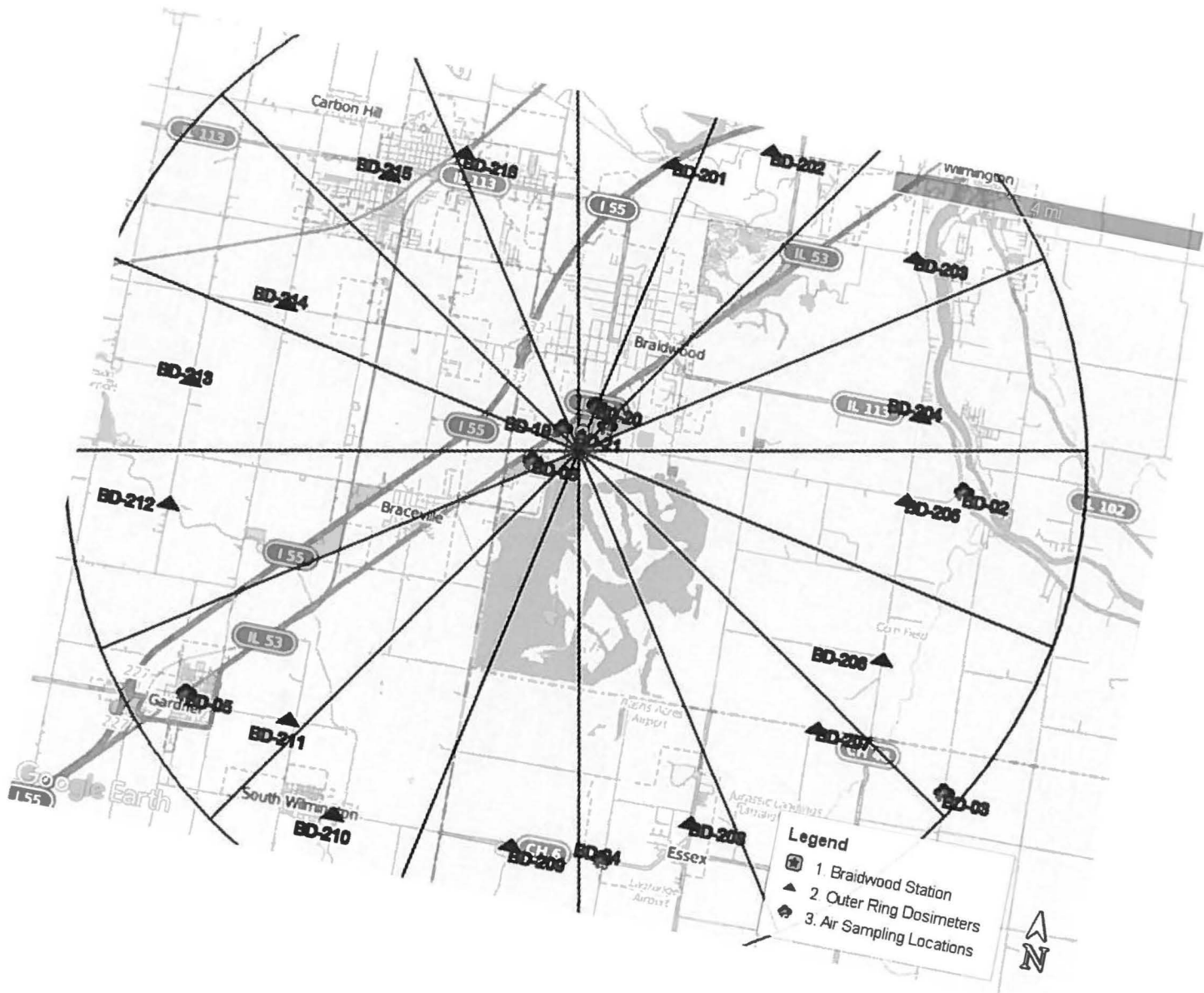


Figure B-2
 Fixed Air Sampling and Outer Ring
 OSLD Locations of Braidwood Station, 2020

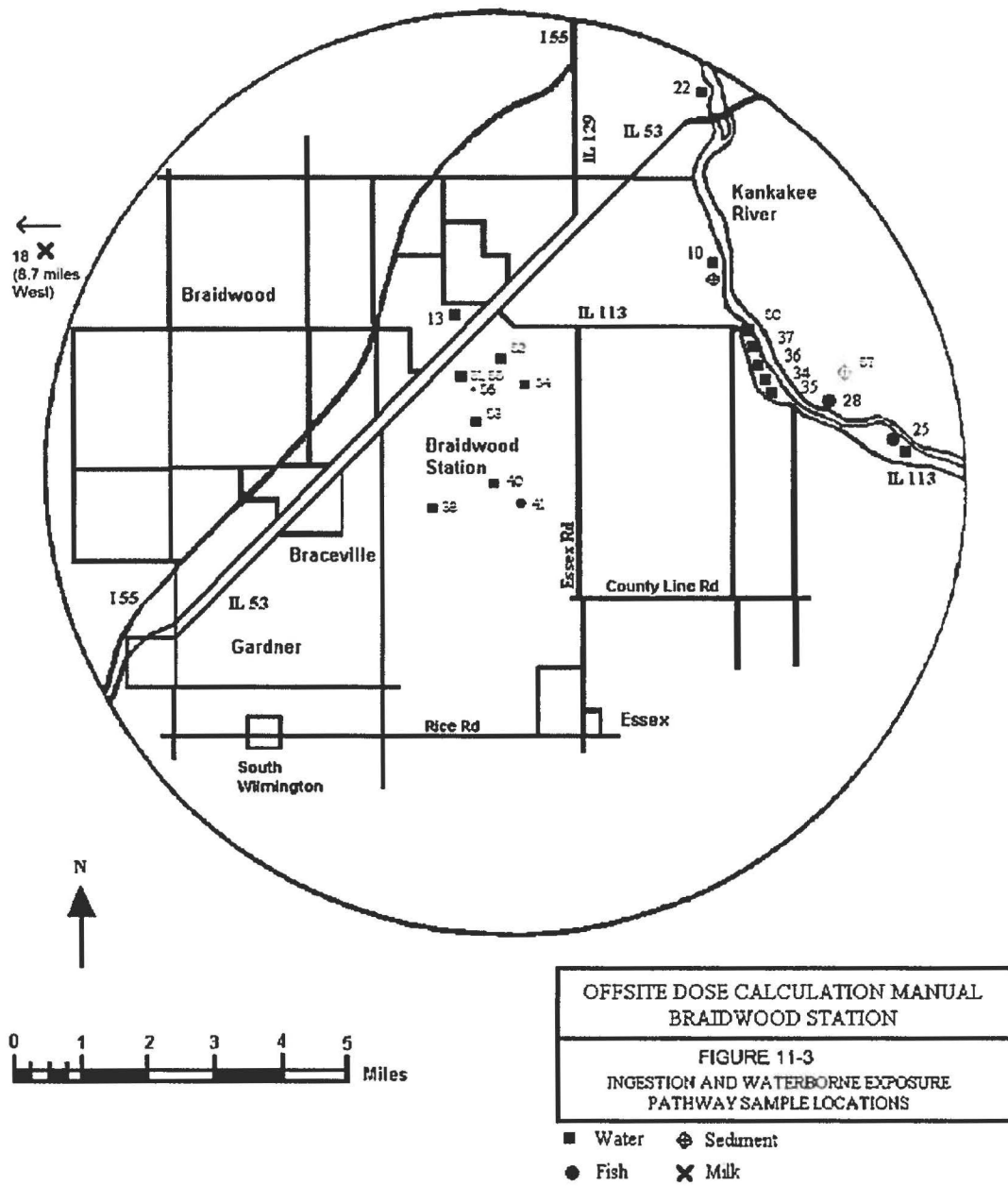


Figure B-3
Ingestion and Waterborne Exposure Pathway
Sample Locations of Braidwood Station, 2020

Intentionally left blank

APPENDIX C

DATA TABLES AND FIGURES

Intentionally left blank

Table C-I.1 CONCENTRATIONS OF GROSS BETA IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF PCI/LITER \pm 2 SIGMA

COLLECTION PERIOD	BD-10	BD-25	BD-38	BD-40	BD-55	BD-56
01/03/20 - 01/16/20	4.8 \pm 1.8	4.8 \pm 1.9	7.1 \pm 2.4	9.1 \pm 2.4	4.0 \pm 1.6	4.5 \pm 1.8
02/06/20 - 02/27/20	3.5 \pm 1.8	4.5 \pm 1.9	13.3 \pm 2.7	9.0 \pm 2.4	4.8 \pm 1.8	< 2.6
03/05/20 - 03/26/20	< 3.2	4.6 \pm 2.3	5.0 \pm 2.7	9.8 \pm 3.2	3.7 \pm 2.0	< 3.4
04/02/20 - 04/30/20	6.3 \pm 2.0	(1)	7.1 \pm 2.4	7.8 \pm 2.5	5.4 \pm 1.7	4.8 \pm 2.0
05/07/20 - 05/28/20	< 3.6	< 3.6	3.4 \pm 1.4	5.7 \pm 1.6	< 3.3	< 4.0
06/04/20 - 06/25/20	< 3.1	< 3.0	4.7 \pm 2.4	6.8 \pm 2.5	< 2.6	< 2.9
07/02/20 - 07/30/20	3.8 \pm 2.0	5.6 \pm 2.1	4.1 \pm 2.5	5.3 \pm 2.1	< 2.3	< 2.7
08/06/20 - 08/27/20	5.5 \pm 1.9	6.0 \pm 2.0	7.0 \pm 2.5	9.2 \pm 2.5	3.8 \pm 1.5	3.3 \pm 1.7
09/03/20 - 09/24/20	4.8 \pm 2.0	5.4 \pm 2.1	8.8 \pm 2.8	8.4 \pm 2.7	< 2.2	4.2 \pm 2.2
10/01/20 - 10/29/20	4.1 \pm 2.0	5.3 \pm 2.3	7.3 \pm 2.8	12.4 \pm 3.2	2.7 \pm 1.7	< 3.0
11/05/20 - 11/25/20	4.9 \pm 2.0	4.3 \pm 1.9	12.4 \pm 2.9	8.8 \pm 2.5	3.7 \pm 1.6	4.8 \pm 2.0
12/03/20 - 12/23/20	7.4 \pm 2.4	4.9 \pm 2.2	11.8 \pm 3.0	12.4 \pm 3.1	3.7 \pm 1.8	4.3 \pm 2.2
MEAN \pm 2 STD DEV	5.0 \pm 2.5	5.0 \pm 1.1	7.6 \pm 6.6	8.7 \pm 4.4	4.0 \pm 1.6	4.3 \pm 1.1

Table C-I.2 CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF PCI/LITER \pm 2 SIGMA

COLLECTION PERIOD	BD-10	BD-25	BD-38	BD-40	BD-55	BD-56
01/03/20 - 03/26/20	< 198	< 195	< 194	< 193	< 193	< 190
04/02/20 - 06/25/20	< 180	< 181	< 180	< 178	< 181	< 180
07/02/20 - 09/24/20	< 184	< 189	< 187	< 187	< 187	< 186
10/01/20 - 12/23/20	448 \pm 129	< 181	< 191	< 189	< 183	< 182
MEAN \pm 2 STD DEV	448 \pm 0	-	-	-	-	-

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

**Table C-I.3 CONCENTRATIONS OF NICKEL-63 IN SURFACE WATER
 SAMPLES COLLECTED IN THE VACINITY OF
 BRAIDWOOD STATION, 2020**
 RESULTS IN UNITS OF PCI/LITER \pm 2 SIGMA

COLLECTION PERIOD	BD-10	BD-25
01/03/20 - 01/30/20	< 20	< 21
02/20/20 - 02/27/20	< 23	< 23
03/05/20 - 03/12/20	< 20	< 20
04/02/20 - 04/30/20	< 19	(1)
05/07/20 - 05/28/20	< 22	< 20
06/04/20 - 06/25/20	< 24	< 21
07/02/20 - 07/30/20	< 21	< 19
08/06/20 - 08/27/20	< 23	< 23
09/03/20 - 09/24/20	< 15	< 22
10/01/20 - 10/29/20	< 23	< 25
11/05/20 - 11/25/20	< 21	< 25
12/03/20 - 12/23/20	< 20	< 19
MEAN	-	-

**Table C-I.4 CONCENTRATIONS OF IRON-55 IN SURFACE WATER
 SAMPLES COLLECTED IN THE VACINITY OF
 BRAIDWOOD STATION, 2020**
 RESULTS IN UNITS OF PCI/LITER \pm 2 SIGMA

COLLECTION PERIOD	BD-10	BD-25
01/03/20 - 01/30/20	< 153	< 102
02/20/20 - 02/27/20	< 59	< 65
03/05/20 - 03/12/20	< 67	< 83
04/02/20 - 04/30/20	< 136	(1)
05/07/20 - 05/28/20	< 90	< 64
06/04/20 - 06/25/20	< 64	< 94
07/02/20 - 07/30/20	< 69	< 80
08/06/20 - 08/27/20	< 104	< 121
09/03/20 - 09/24/20	< 159	< 53
10/01/20 - 10/29/20	< 92	< 107
11/05/20 - 11/25/20	< 80	< 71
12/03/20 - 12/23/20	< 59	< 112
MEAN	-	-

(1) SEE PROGRAM EXCEPTIONS FOR EXPLANATION

Table C-I.5

**CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED
IN THE VICINITY OF BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA**

SITE	COLLECTION		Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
	PERIOD													
BD-10	01/03/20 - 01/30/20		< 6	< 7	< 11	< 8	< 14	< 6	< 8	< 10	< 6	< 8	< 26	< 8
	02/06/20 - 02/27/20		< 6	< 5	< 12	< 5	< 11	< 6	< 10	< 10	< 6	< 6	< 26	< 13
	03/05/20 - 03/26/20		< 5	< 8	< 13	< 8	< 15	< 8	< 11	< 12	< 8	< 7	< 34	< 13
	04/02/20 - 04/30/20		< 6	< 5	< 10	< 8	< 9	< 7	< 11	< 8	< 9	< 6	< 25	< 7
	05/07/20 - 05/28/20		< 5	< 6	< 10	< 5	< 9	< 5	< 8	< 14	< 6	< 5	< 33	< 11
	06/04/20 - 06/25/20		< 4	< 4	< 10	< 4	< 9	< 6	< 8	< 11	< 4	< 4	< 27	< 11
	07/02/20 - 07/30/20		< 6	< 5	< 11	< 4	< 11	< 5	< 10	< 10	< 6	< 7	< 28	< 8
	08/06/20 - 08/27/20		< 5	< 4	< 9	< 4	< 8	< 5	< 7	< 12	< 4	< 4	< 25	< 11
	09/03/20 - 09/24/20		< 7	< 6	< 10	< 6	< 13	< 7	< 7	< 9	< 7	< 8	< 26	< 10
	10/01/20 - 10/29/20		< 6	< 6	< 12	< 6	< 15	< 7	< 12	< 11	< 6	< 7	< 33	< 8
	11/05/20 - 11/25/20		< 4	< 5	< 12	< 5	< 8	< 5	< 8	< 14	< 5	< 5	< 32	< 10
	12/03/20 - 12/23/20		< 4	< 4	< 7	< 4	< 7	< 5	< 7	< 12	< 4	< 3	< 32	< 9
		MEAN		-	-	-	-	-	-	-	-	-	-	-
BD-25	01/03/20 - 01/30/20		< 3	< 3	< 7	< 4	< 8	< 4	< 6	< 6	< 4	< 3	< 16	< 6
	02/20/20 - 02/27/20		< 5	< 4	< 11	< 8	< 11	< 5	< 10	< 9	< 6	< 5	< 17	< 5
	03/05/20 - 03/12/20		< 2	< 2	< 6	< 2	< 4	< 2	< 4	< 12	< 2	< 2	< 22	< 7
	04/02/20 - 04/30/20	(1)												
	05/07/20 - 05/28/20		< 4	< 5	< 11	< 4	< 10	< 5	< 7	< 14	< 4	< 4	< 29	< 8
	06/04/20 - 06/25/20		< 4	< 5	< 9	< 4	< 8	< 5	< 8	< 11	< 5	< 4	< 28	< 9
	07/02/20 - 07/30/20		< 5	< 5	< 12	< 4	< 11	< 5	< 8	< 9	< 5	< 5	< 28	< 9
	08/06/20 - 08/27/20		< 4	< 3	< 10	< 4	< 8	< 5	< 8	< 14	< 5	< 4	< 27	< 13
	09/03/20 - 09/24/20		< 7	< 8	< 10	< 8	< 14	< 8	< 11	< 10	< 8	< 8	< 22	< 11
	10/01/20 - 10/29/20		< 7	< 7	< 14	< 6	< 15	< 7	< 12	< 12	< 7	< 7	< 32	< 7
	11/05/20 - 11/25/20		< 5	< 5	< 11	< 5	< 10	< 6	< 7	< 15	< 5	< 5	< 29	< 10
	12/03/20 - 12/23/20		< 4	< 4	< 9	< 4	< 9	< 5	< 9	< 14	< 6	< 5	< 37	< 14
		MEAN		-	-	-	-	-	-	-	-	-	-	-
BD-38	01/03/20 - 01/30/20		< 8	< 6	< 15	< 7	< 16	< 9	< 12	< 12	< 8	< 7	< 31	< 12
	02/06/20 - 02/27/20		< 7	< 6	< 14	< 7	< 14	< 7	< 11	< 13	< 7	< 7	< 37	< 8
	03/05/20 - 03/26/20		< 6	< 8	< 14	< 6	< 12	< 7	< 13	< 11	< 7	< 6	< 29	< 10
	04/02/20 - 04/30/20		< 7	< 6	< 15	< 7	< 14	< 7	< 12	< 10	< 6	< 6	< 31	< 8
	05/07/20 - 05/28/20		< 3	< 3	< 8	< 3	< 7	< 3	< 6	< 9	< 3	< 3	< 21	< 6
	06/04/20 - 06/25/20		< 5	< 6	< 11	< 6	< 15	< 5	< 8	< 14	< 7	< 6	< 44	< 12
	07/02/20 - 07/30/20		< 4	< 4	< 10	< 5	< 6	< 5	< 9	< 8	< 5	< 5	< 23	< 8
	08/06/20 - 08/27/20		< 4	< 4	< 10	< 4	< 8	< 4	< 8	< 14	< 5	< 4	< 29	< 9
	09/03/20 - 09/24/20		< 6	< 7	< 14	< 7	< 12	< 6	< 11	< 10	< 8	< 8	< 25	< 8
	10/01/20 - 10/29/20		< 5	< 5	< 11	< 7	< 10	< 5	< 11	< 8	< 7	< 5	< 32	< 8
	11/05/20 - 11/25/20		< 5	< 5	< 10	< 7	< 12	< 6	< 9	< 14	< 5	< 6	< 35	< 10
	12/03/20 - 12/31/20		< 7	< 6	< 14	< 8	< 14	< 8	< 8	< 10	< 6	< 7	< 25	< 11
		MEAN		-	-	-	-	-	-	-	-	-	-	-

C-3

(1) SEE PROGRAM EXCEPTIONS FOR EXPLANATION

Table C-I.5

**CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED
IN THE VICINITY OF BRAIDWOOD STATION, 2020**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION		Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
	PERIOD													
BD-40	01/03/20 - 01/30/20		< 7	< 5	< 18	< 7	< 18	< 10	< 12	< 12	< 8	< 8	< 37	< 13
	02/06/20 - 02/27/20		< 6	< 7	< 14	< 6	< 13	< 6	< 13	< 10	< 5	< 7	< 34	< 11
	03/05/20 - 03/26/20		< 8	< 5	< 17	< 9	< 11	< 8	< 14	< 12	< 8	< 6	< 29	< 12
	04/02/20 - 04/30/20		< 7	< 8	< 17	< 9	< 11	< 8	< 11	< 10	< 7	< 8	< 33	< 12
	05/07/20 - 05/28/20		< 5	< 5	< 12	< 5	< 9	< 5	< 8	< 15	< 5	< 5	< 27	< 12
	06/04/20 - 06/25/20		< 4	< 4	< 8	< 3	< 7	< 4	< 7	< 11	< 4	< 4	< 23	< 8
	07/02/20 - 07/30/20		< 7	< 7	< 12	< 8	< 12	< 6	< 11	< 12	< 7	< 7	< 35	< 12
	08/06/20 - 08/27/20		< 5	< 6	< 13	< 5	< 11	< 5	< 9	< 14	< 6	< 5	< 29	< 12
	09/03/20 - 09/24/20		< 6	< 7	< 15	< 5	< 14	< 7	< 10	< 10	< 6	< 6	< 24	< 8
	10/01/20 - 10/29/20		< 6	< 6	< 13	< 7	< 10	< 6	< 10	< 10	< 7	< 6	< 28	< 8
	11/05/20 - 11/25/20		< 3	< 5	< 10	< 5	< 10	< 7	< 9	< 14	< 7	< 5	< 34	< 11
	12/03/20 - 12/31/20		< 5	< 6	< 12	< 8	< 15	< 6	< 10	< 11	< 7	< 5	< 30	< 9
		MEAN		-	-	-	-	-	-	-	-	-	-	-
BD-55	01/03/20 - 01/16/20		< 2	< 3	< 6	< 2	< 5	< 3	< 5	< 12	< 2	< 2	< 23	< 8
	02/27/20 - 02/27/20		< 5	< 4	< 9	< 5	< 9	< 5	< 9	< 9	< 5	< 5	< 24	< 8
	03/05/20 - 03/26/20		< 8	< 7	< 10	< 9	< 11	< 9	< 11	< 10	< 8	< 7	< 29	< 11
	04/02/20 - 04/30/20		< 7	< 7	< 14	< 8	< 15	< 8	< 16	< 9	< 8	< 9	< 27	< 10
	05/07/20 - 05/28/20		< 3	< 4	< 8	< 4	< 7	< 4	< 7	< 11	< 4	< 3	< 24	< 9
	06/04/20 - 06/25/20		< 5	< 4	< 8	< 5	< 8	< 5	< 9	< 12	< 5	< 4	< 31	< 10
	07/02/20 - 07/30/20		< 5	< 5	< 14	< 6	< 14	< 6	< 11	< 10	< 5	< 6	< 21	< 12
	08/06/20 - 08/27/20		< 5	< 5	< 11	< 5	< 9	< 5	< 7	< 14	< 5	< 5	< 38	< 12
	09/03/20 - 09/24/20		< 7	< 7	< 15	< 7	< 13	< 6	< 10	< 10	< 8	< 6	< 25	< 10
	10/01/20 - 10/29/20		< 5	< 6	< 12	< 4	< 7	< 5	< 10	< 9	< 6	< 5	< 27	< 7
	11/05/20 - 11/25/20		< 4	< 6	< 12	< 6	< 10	< 6	< 8	< 14	< 5	< 5	< 35	< 14
	12/03/20 - 12/31/20		< 5	< 5	< 12	< 5	< 9	< 5	< 9	< 8	< 5	< 6	< 22	< 9
		MEAN		-	-	-	-	-	-	-	-	-	-	-
BD-56	01/03/20 - 01/16/20		< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 10	< 2	< 2	< 20	< 7
	02/06/20 - 02/27/20		< 5	< 7	< 12	< 5	< 14	< 7	< 12	< 12	< 7	< 6	< 32	< 13
	03/05/20 - 03/26/20		< 7	< 7	< 14	< 8	< 15	< 7	< 12	< 13	< 7	< 8	< 31	< 8
	04/02/20 - 04/30/20		< 6	< 7	< 13	< 7	< 11	< 8	< 12	< 8	< 7	< 5	< 27	< 9
	05/07/20 - 05/28/20		< 4	< 4	< 9	< 4	< 10	< 5	< 9	< 14	< 5	< 4	< 32	< 8
	06/04/20 - 06/25/20		< 5	< 6	< 11	< 6	< 10	< 6	< 8	< 13	< 6	< 5	< 28	< 10
	07/02/20 - 07/30/20		< 5	< 4	< 11	< 6	< 8	< 4	< 10	< 9	< 5	< 5	< 23	< 8
	08/06/20 - 08/27/20		< 4	< 5	< 11	< 5	< 10	< 5	< 8	< 14	< 5	< 4	< 33	< 9
	09/03/20 - 09/24/20		< 8	< 6	< 14	< 6	< 14	< 7	< 11	< 8	< 6	< 7	< 28	< 9
	10/01/20 - 10/29/20		< 6	< 6	< 9	< 8	< 14	< 4	< 10	< 9	< 7	< 6	< 29	< 10
	11/05/20 - 11/25/20		< 5	< 6	< 14	< 5	< 10	< 5	< 7	< 15	< 5	< 4	< 35	< 11
	12/03/20 - 12/23/20		< 4	< 4	< 10	< 4	< 9	< 5	< 8	< 14	< 4	< 5	< 30	< 9
		MEAN		-	-	-	-	-	-	-	-	-	-	-

C-4

Table C-II.1 CONCENTRATIONS OF GROSS BETA IN PUBLIC WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF PCI/LITER \pm 2 SIGMA

COLLECTION PERIOD	BD-22
12/26/19 - 01/30/20	4.6 \pm 1.6
01/30/20 - 02/27/20	< 2.4
02/27/20 - 03/26/20	8.4 \pm 1.7
03/26/20 - 04/30/20	2.9 \pm 1.4
04/30/20 - 05/28/20	5.2 \pm 1.6
05/28/20 - 06/25/20	2.1 \pm 1.4
06/25/20 - 07/30/20	4.0 \pm 1.5
07/30/20 - 08/27/20	3.2 \pm 1.6
08/27/20 - 09/24/20	3.5 \pm 1.7
09/24/20 - 10/29/20	4.0 \pm 1.7
10/29/20 - 11/25/20	3.9 \pm 1.7
11/25/20 - 12/31/20	4.9 \pm 1.6
<i>MEAN \pm 2 STD DEV</i>	4.2 \pm 3.3

Table C-II.2 CONCENTRATIONS OF TRITIUM IN PUBLIC WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF PCI/LITER \pm 2 SIGMA

COLLECTION PERIOD	BD-22
12/26/19 - 01/30/20	205 \pm 121
01/30/20 - 02/27/20	402 \pm 130
02/27/20 - 03/26/20	203 \pm 127
03/26/20 - 04/30/20	600 \pm 128
04/30/20 - 05/28/20	375 \pm 123
05/28/20 - 06/25/20	899 \pm 284
06/25/20 - 07/30/20	547 \pm 135
07/30/20 - 08/27/20	< 174
08/27/20 - 09/24/20	< 193
09/24/20 - 10/29/20	523 \pm 141
10/29/20 - 11/25/20	< 161
11/25/20 - 12/31/20	1500 \pm 224
<i>MEAN \pm 2 STD DEV</i>	584 \pm 809

Table C-II.3 CONCENTRATIONS OF I-131 IN PUBLIC WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF PCI/LITER \pm 2 SIGMA

COLLECTION PERIOD	BD-22
12/26/19 - 01/30/20	< 0.8
01/30/20 - 02/27/20	< 0.7
02/27/20 - 03/26/20	< 0.7
03/26/20 - 04/30/20	< 0.5
04/30/20 - 05/28/20	< 0.6
05/28/20 - 06/25/20	< 0.8
06/25/20 - 07/30/20	< 0.9
07/30/20 - 08/27/20	< 0.8
08/27/20 - 09/24/20	< 0.9
09/24/20 - 10/29/20	< 0.8
10/29/20 - 11/25/20	< 0.9
11/25/20 - 12/31/20	< 0.9
<i>MEAN</i>	-

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

**Table C-II.4 CONCENTRATIONS OF NICKEL-63 IN
PUBLIC WATER SAMPLES COLLECTED IN
THE VICINITY OF BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF PCI/LITER \pm 2 SIGMA**

COLLECTION PERIOD	BD-22
12/26/19 - 01/30/20	< 25
01/30/20 - 02/27/20	< 19
02/27/20 - 03/26/20	< 24
03/26/20 - 04/30/20	< 21
04/30/20 - 05/28/20	< 18
05/28/20 - 06/25/20	< 24
06/25/20 - 07/30/20	< 26
07/30/20 - 08/27/20	< 22
08/27/20 - 09/24/20	< 24
09/24/20 - 10/29/20	< 25
10/29/20 - 11/25/20	< 25
11/25/20 - 12/31/20	< 28
<i>MEAN</i>	-

**Table C-II.5 CONCENTRATIONS OF IRON-55 IN
PUBLIC WATER SAMPLES COLLECTED IN
THE VICINITY OF BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF PCI/LITER \pm 2 SIGMA**

COLLECTION PERIOD	BD-22
12/26/19 - 01/30/20	< 72
01/30/20 - 02/27/20	< 170
02/27/20 - 03/26/20	< 83
03/26/20 - 04/30/20	< 97
04/30/20 - 05/28/20	< 102
05/28/20 - 06/25/20	< 83
06/25/20 - 07/30/20	< 55
07/30/20 - 08/27/20	< 132
08/27/20 - 09/24/20	< 168
09/24/20 - 10/29/20	< 106
10/29/20 - 11/25/20	< 105
11/25/20 - 12/31/20	< 89
<i>MEAN</i>	-

Table C-II.6

**CONCENTRATIONS OF GAMMA EMITTERS IN PUBLIC WATER SAMPLES
COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA**

SITE	COLLECTION	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
	PERIOD											
BD-22	12/26/19 - 01/30/20	< 6	< 6	< 15	< 7	< 15	< 6	< 13	< 7	< 6	< 34	< 10
	01/30/20 - 02/27/20	< 4	< 4	< 7	< 4	< 7	< 4	< 7	< 4	< 4	< 19	< 5
	02/27/20 - 03/26/20	< 4	< 4	< 7	< 4	< 8	< 4	< 6	< 4	< 4	< 26	< 10
	03/26/20 - 04/30/20	< 6	< 6	< 15	< 6	< 12	< 6	< 14	< 6	< 6	< 29	< 10
	04/30/20 - 05/28/20	< 4	< 5	< 11	< 5	< 8	< 5	< 8	< 5	< 5	< 32	< 12
	05/28/20 - 06/25/20	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 14	< 5
	06/25/20 - 07/30/20	< 7	< 5	< 12	< 7	< 11	< 6	< 8	< 6	< 7	< 32	< 13
	07/30/20 - 08/27/20	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 18	< 5
	08/27/20 - 09/24/20	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 1	< 1	< 19	< 7
	09/24/20 - 10/29/20	< 9	< 7	< 12	< 7	< 17	< 8	< 14	< 8	< 8	< 29	< 7
	10/29/20 - 11/25/20	< 3	< 3	< 6	< 3	< 6	< 3	< 6	< 3	< 3	< 19	< 6
	11/25/20 - 12/31/20	< 7	< 7	< 18	< 8	< 14	< 8	< 12	< 9	< 9	< 33	< 10
	<i>MEAN</i>	-	-	-	-	-	-	-	-	-	-	-

Table C-III.1

**CONCENTRATIONS OF TRITIUM IN GROUND/WELL WATER SAMPLES
COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020
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
01/10/20 - 01/10/20	< 176	< 178	< 178	< 178	< 174	< 179	< 182	< 179
04/09/20 - 04/09/20	< 178	< 163	< 176	< 175	< 176	< 174	< 173	< 175
07/09/20 - 07/09/20	< 191	< 195	< 196	< 190	< 187	< 192	< 191	< 188
10/08/20 - 10/08/20	< 190	< 186	< 188	< 186	< 186	< 188	< 188	< 187
<i>MEAN</i>	-	-	-	-	-	-	-	-

Table C-III.2

**CONCENTRATIONS OF GAMMA EMITTERS IN GROUND/WELL WATER SAMPLES
COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA**

SITE	COLLECTION		Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
	PERIOD													
BD-13	01/10/20 - 01/10/20		< 9	< 7	< 20	< 6	< 12	< 9	< 12	< 11	< 8	< 8	< 36	< 13
	04/09/20 - 04/09/20		< 7	< 5	< 15	< 6	< 13	< 6	< 11	< 10	< 6	< 7	< 27	< 8
	07/09/20 - 07/09/20		< 7	< 9	< 17	< 10	< 12	< 8	< 15	< 11	< 7	< 9	< 39	< 12
	10/08/20 - 10/08/20		< 5	< 5	< 9	< 5	< 11	< 5	< 9	< 8	< 6	< 6	< 21	< 7
	<i>MEAN</i>		-	-	-	-	-	-	-	-	-	-	-	-
BD-34	01/10/20 - 01/10/20		< 7	< 8	< 9	< 6	< 12	< 7	< 11	< 8	< 8	< 7	< 30	< 12
	04/09/20 - 04/09/20		< 6	< 6	< 16	< 10	< 17	< 8	< 11	< 11	< 7	< 7	< 36	< 10
	07/09/20 - 07/09/20		< 7	< 9	< 17	< 9	< 16	< 9	< 12	< 12	< 9	< 9	< 32	< 7
	10/08/20 - 10/08/20		< 4	< 4	< 10	< 5	< 8	< 4	< 9	< 6	< 5	< 5	< 19	< 7
	<i>MEAN</i>		-	-	-	-	-	-	-	-	-	-	-	-
BD-35	01/10/20 - 01/10/20		< 7	< 6	< 11	< 6	< 17	< 9	< 11	< 9	< 7	< 7	< 25	< 12
	04/09/20 - 04/09/20		< 6	< 6	< 15	< 7	< 18	< 8	< 13	< 8	< 8	< 7	< 21	< 13
	07/09/20 - 07/09/20		< 7	< 8	< 16	< 8	< 17	< 8	< 13	< 11	< 7	< 8	< 35	< 10
	10/08/20 - 10/08/20		< 5	< 5	< 8	< 4	< 9	< 5	< 8	< 7	< 5	< 5	< 22	< 7
	<i>MEAN</i>		-	-	-	-	-	-	-	-	-	-	-	-
BD-36	01/10/20 - 01/10/20		< 4	< 4	< 8	< 3	< 9	< 5	< 7	< 6	< 4	< 4	< 18	< 6
	04/09/20 - 04/09/20		< 7	< 7	< 14	< 9	< 23	< 8	< 15	< 12	< 8	< 10	< 32	< 14
	07/09/20 - 07/09/20		< 8	< 8	< 18	< 9	< 13	< 7	< 16	< 9	< 8	< 8	< 32	< 9
	10/08/20 - 10/08/20		< 6	< 6	< 11	< 7	< 12	< 7	< 8	< 8	< 5	< 6	< 24	< 8
	<i>MEAN</i>		-	-	-	-	-	-	-	-	-	-	-	-
BD-37	01/10/20 - 01/10/20		< 6	< 6	< 17	< 8	< 16	< 7	< 13	< 10	< 7	< 7	< 25	< 11
	04/09/20 - 04/09/20		< 5	< 7	< 13	< 7	< 15	< 7	< 12	< 9	< 9	< 8	< 31	< 10
	07/09/20 - 07/09/20		< 6	< 5	< 10	< 6	< 13	< 6	< 13	< 9	< 6	< 7	< 30	< 9
	10/08/20 - 10/08/20		< 5	< 5	< 10	< 5	< 9	< 5	< 8	< 6	< 5	< 5	< 19	< 4
	<i>MEAN</i>		-	-	-	-	-	-	-	-	-	-	-	-

Table C-III.2

**CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWELL WATER SAMPLES
COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA**

SITE	COLLECTION		Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
	PERIOD													
BD-50	01/10/20 - 01/10/20		< 9	< 7	< 16	< 6	< 13	< 8	< 15	< 11	< 9	< 8	< 38	< 7
	04/09/20 - 04/09/20		< 6	< 6	< 10	< 6	< 13	< 7	< 8	< 7	< 7	< 7	< 21	< 8
	07/09/20 - 07/09/20		< 6	< 8	< 10	< 9	< 17	< 9	< 15	< 9	< 6	< 6	< 30	< 8
	10/08/20 - 10/08/20		< 5	< 5	< 12	< 6	< 10	< 5	< 8	< 7	< 4	< 5	< 23	< 7
		<i>MEAN</i>		-	-	-	-	-	-	-	-	-	-	-
BD-51	01/10/20 - 01/10/20		< 6	< 5	< 15	< 7	< 11	< 9	< 11	< 10	< 6	< 6	< 29	< 10
	04/09/20 - 04/09/20		< 7	< 7	< 15	< 7	< 14	< 7	< 11	< 10	< 8	< 8	< 32	< 9
	07/09/20 - 07/09/20		< 6	< 7	< 16	< 8	< 13	< 6	< 12	< 9	< 8	< 7	< 35	< 10
	10/08/20 - 10/08/20		< 7	< 5	< 10	< 7	< 10	< 6	< 10	< 6	< 6	< 5	< 19	< 9
		<i>MEAN</i>		-	-	-	-	-	-	-	-	-	-	-
BD-54	01/10/20 - 01/10/20		< 7	< 7	< 17	< 10	< 14	< 7	< 15	< 10	< 9	< 8	< 36	< 13
	04/09/20 - 04/09/20		< 5	< 6	< 12	< 6	< 13	< 8	< 12	< 10	< 7	< 7	< 26	< 8
	07/09/20 - 07/09/20		< 6	< 5	< 9	< 5	< 7	< 7	< 10	< 10	< 6	< 6	< 29	< 8
	10/08/20 - 10/08/20		< 6	< 5	< 13	< 6	< 13	< 8	< 9	< 10	< 7	< 7	< 33	< 12
		<i>MEAN</i>		-	-	-	-	-	-	-	-	-	-	-

Table C-IV.1

**CONCENTRATIONS OF IRON-55, NICKEL-63 AND GAMMA EMITTERS IN FISH SAMPLES
COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA**

SITE	COLLECTION		Fe-55	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
	PERIOD															
BD-25																
<i>Quillback</i>	05/13/20		< 98	< 45	< 41	< 38	< 98	< 37	< 90	< 43	< 61	< 63	< 46	< 41	< 212	< 84
<i>Golden Redhorse</i>	05/13/20		< 196	< 52	< 35	< 31	< 70	< 43	< 77	< 38	< 63	< 52	< 43	< 38	< 187	< 53
<i>Flathead Catfish</i>	10/08/20		< 81	< 222	< 72	< 80	< 144	< 74	< 112	< 63	< 153	< 115	< 73	< 67	< 336	< 104
<i>Smallmouth Bass</i>	10/08/20		< 160	< 167	< 61	< 45	< 127	< 75	< 93	< 53	< 81	< 87	< 41	< 54	< 280	< 77
	<i>MEAN</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-
BD-28																
<i>Golden Redhorse</i>	05/13/20		< 252	< 65	< 56	< 56	< 116	< 60	< 125	< 56	< 107	< 98	< 60	< 62	< 275	< 80
<i>Quillback</i>	05/13/20		< 218	< 70	< 49	< 42	< 80	< 50	< 99	< 45	< 87	< 91	< 60	< 54	< 231	< 71
<i>Smallmouth Bass</i>	10/08/20		< 250	< 166	< 63	< 57	< 155	< 90	< 191	< 77	< 128	< 134	< 76	< 62	< 324	< 103
<i>Channel Catfish</i>	10/08/20		< 247	< 183	< 35	< 53	< 139	< 51	< 117	< 64	< 108	< 81	< 73	< 52	< 264	< 98
	<i>MEAN</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-
BD-41																
<i>Channel Catfish</i>	05/13/20		< 248	< 38	< 34	< 28	< 68	< 33	< 66	< 34	< 56	< 68	< 36	< 35	< 180	< 37
<i>Largemouth Bass</i>	05/13/20		< 250	< 30	< 45	< 54	< 109	< 61	< 112	< 71	< 70	< 112	< 59	< 54	< 231	< 82
<i>Common Carp</i>	10/08/20		< 132	< 232	< 69	< 61	< 122	< 74	< 141	< 67	< 100	< 93	< 70	< 48	< 258	< 99
<i>Largemouth Bass</i>	10/08/20		< 228	< 201	< 39	< 53	< 102	< 53	< 110	< 61	< 72	< 85	< 53	< 62	< 259	< 52
	<i>MEAN</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C-V.1

**CONCENTRATIONS OF IRON-55, NICKEL-63 AND GAMMA EMITTERS IN SEDIMENT SAMPLES
COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020**

RESULTS IN UNITS OF PCI/KG DRY \pm 2 SIGMA

SITE	COLLECTION		Fe-55	Ni-63	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
	PERIOD														
BD-10	06/08/20		< 2000	< 248	< 93	< 82	< 176	< 109	< 243	< 110	< 156	< 119	< 131	< 378	< 137
	10/13/20		< 833	< 243	< 78	< 61	< 179	< 74	< 184	< 82	< 114	< 74	< 102	< 316	< 114
		<i>MEAN</i>	-	-	-	-	-	-	-	-	-	-	-	-	-
BD-25	06/08/20		< 1917	< 186	< 97	< 90	< 170	< 92	< 194	< 97	< 176	< 111	< 123	< 389	< 144
	10/13/20		< 1642	< 192	< 51	< 46	< 102	< 65	< 137	< 64	< 107	< 64	< 57	< 326	< 68
		<i>MEAN</i>	-	-	-	-	-	-	-	-	-	-	-	-	-
BD-57	06/08/20		< 1867	< 237	< 102	< 92	< 227	< 102	< 272	< 103	< 193	< 121	< 149	< 431	< 118
	10/13/20		< 1735	< 193	< 58	< 65	< 158	< 64	< 198	< 92	< 126	< 76	< 81	< 342	< 98
		<i>MEAN</i>	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C-VI.1

**CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES
COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF E-3 PCI/CU METER \pm 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
12/26/19 - 01/03/20	24 \pm 4	20 \pm 4	22 \pm 4	24 \pm 4	20 \pm 4	19 \pm 4	24 \pm 4	21 \pm 4
01/03/20 - 01/10/20	14 \pm 4	13 \pm 4	12 \pm 4	14 \pm 4	12 \pm 4	13 \pm 4	14 \pm 4	14 \pm 4
01/10/20 - 01/16/20	15 \pm 4	19 \pm 4	15 \pm 4	15 \pm 4	15 \pm 4	15 \pm 4	14 \pm 4	14 \pm 4
01/16/20 - 01/23/20	19 \pm 4	18 \pm 4	17 \pm 4	18 \pm 4	19 \pm 5	21 \pm 5	14 \pm 4	20 \pm 5
01/23/20 - 01/30/20	12 \pm 4	13 \pm 4	13 \pm 4	12 \pm 3	12 \pm 4	15 \pm 4	11 \pm 4	15 \pm 4
01/30/20 - 02/06/20	10 \pm 3	10 \pm 3	10 \pm 3	12 \pm 4	8 \pm 3	8 \pm 3	12 \pm 4	12 \pm 4
02/06/20 - 02/13/20	14 \pm 4	12 \pm 4	12 \pm 4	11 \pm 4	12 \pm 4	10 \pm 3	13 \pm 4	13 \pm 4
02/13/20 - 02/20/20	13 \pm 4	15 \pm 4	15 \pm 4	12 \pm 4	11 \pm 4	14 \pm 4	15 \pm 4	14 \pm 4
02/20/20 - 02/27/20	19 \pm 4	22 \pm 4	20 \pm 4	20 \pm 4	22 \pm 5	21 \pm 5	19 \pm 4	21 \pm 5
02/27/20 - 03/05/20	7 \pm 3	11 \pm 4	9 \pm 3	11 \pm 4	10 \pm 4	10 \pm 4	14 \pm 4	11 \pm 4
03/05/20 - 03/12/20	15 \pm 4	15 \pm 4	16 \pm 4	17 \pm 4	13 \pm 4	15 \pm 4	14 \pm 4	16 \pm 4
03/12/20 - 03/19/20	11 \pm 4	13 \pm 4	17 \pm 4	13 \pm 4	14 \pm 4	14 \pm 4	16 \pm 4	15 \pm 4
03/19/20 - 03/26/20	16 \pm 4	14 \pm 4	13 \pm 4	15 \pm 4	15 \pm 4	15 \pm 4	13 \pm 4	16 \pm 4
03/26/20 - 04/02/20	11 \pm 4	12 \pm 4	10 \pm 4	8 \pm 4	7 \pm 3	10 \pm 4	10 \pm 4	10 \pm 4
04/02/20 - 04/09/20	13 \pm 4	17 \pm 4	18 \pm 4	13 \pm 4	17 \pm 4	22 \pm 5	17 \pm 4	13 \pm 4
04/09/20 - 04/16/20	9 \pm 4	11 \pm 4	13 \pm 4	12 \pm 4	10 \pm 4	11 \pm 4	10 \pm 4	13 \pm 4
04/16/20 - 04/23/20	14 \pm 4	17 \pm 4	15 \pm 4	16 \pm 4	13 \pm 4	15 \pm 4	15 \pm 4	19 \pm 5
04/23/20 - 04/30/20	13 \pm 4	12 \pm 4	12 \pm 4	13 \pm 4	11 \pm 3	18 \pm 4	16 \pm 4	13 \pm 4
04/30/20 - 05/07/20	8 \pm 4	9 \pm 4	11 \pm 4	9 \pm 4	7 \pm 4	8 \pm 4	8 \pm 4	11 \pm 4
05/07/20 - 05/14/20	12 \pm 4	11 \pm 4	11 \pm 4	14 \pm 4	12 \pm 3	11 \pm 4	12 \pm 4	11 \pm 4
05/14/20 - 05/21/20	8 \pm 4	6 \pm 4	7 \pm 4	< 5	6 \pm 4	7 \pm 4	7 \pm 4	8 \pm 4
05/21/20 - 05/28/20	9 \pm 4	8 \pm 4	8 \pm 4	7 \pm 4	11 \pm 4	10 \pm 4	12 \pm 4	8 \pm 4
05/28/20 - 06/04/20	10 \pm 4	11 \pm 4	12 \pm 4	11 \pm 4	11 \pm 4	10 \pm 4	13 \pm 4	13 \pm 4
06/04/20 - 06/11/20	15 \pm 4	16 \pm 4	15 \pm 4	17 \pm 4	16 \pm 4	16 \pm 4	14 \pm 4	16 \pm 4
06/11/20 - 06/18/20	11 \pm 4	11 \pm 4	16 \pm 5	14 \pm 4	14 \pm 4	16 \pm 4	16 \pm 5	14 \pm 4
06/18/20 - 06/25/20	17 \pm 4	20 \pm 5	21 \pm 5	20 \pm 4	20 \pm 4	21 \pm 5	19 \pm 4	25 \pm 5
06/25/20 - 07/02/20	13 \pm 4	15 \pm 4	16 \pm 4	15 \pm 4	14 \pm 4	13 \pm 4	16 \pm 4	12 \pm 4
07/02/20 - 07/09/20	24 \pm 5	22 \pm 5	21 \pm 5	20 \pm 5	21 \pm 5	24 \pm 5	19 \pm 4	29 \pm 5
07/09/20 - 07/16/20	17 \pm 4	17 \pm 4	13 \pm 4	13 \pm 4	18 \pm 4	17 \pm 4	17 \pm 4	16 \pm 4
07/16/20 - 07/23/20	14 \pm 4	19 \pm 4	20 \pm 5	17 \pm 4	16 \pm 4	16 \pm 4	17 \pm 4	16 \pm 4
07/23/20 - 07/30/20	11 \pm 4	13 \pm 4	13 \pm 4	15 \pm 4	15 \pm 4	14 \pm 5	14 \pm 4	16 \pm 5
07/30/20 - 08/06/20	12 \pm 4	9 \pm 4	12 \pm 4	11 \pm 4	9 \pm 4	8 \pm 4	12 \pm 4	13 \pm 4
08/06/20 - 08/13/20	22 \pm 5	19 \pm 4	22 \pm 5	19 \pm 4	24 \pm 6	19 \pm 4	20 \pm 4	16 \pm 5
08/13/20 - 08/20/20	16 \pm 4	16 \pm 4	20 \pm 4	18 \pm 4	17 \pm 4	19 \pm 4	17 \pm 4	15 \pm 4
08/20/20 - 08/27/20	17 \pm 4	23 \pm 5	26 \pm 5	21 \pm 4	23 \pm 5	23 \pm 5	21 \pm 5	21 \pm 4
08/27/20 - 09/03/20	18 \pm 4	19 \pm 4	18 \pm 4	15 \pm 4	20 \pm 4	20 \pm 4	19 \pm 4	19 \pm 4
09/03/20 - 09/10/20	11 \pm 4	9 \pm 4	8 \pm 3	10 \pm 4	11 \pm 3	8 \pm 3	10 \pm 3	11 \pm 4
09/10/20 - 09/17/20	13 \pm 4	13 \pm 4	13 \pm 4	15 \pm 4	13 \pm 4	12 \pm 4	13 \pm 4	13 \pm 4
09/17/20 - 09/24/20	23 \pm 5	24 \pm 5	22 \pm 4	24 \pm 5	23 \pm 4	27 \pm 4	25 \pm 5	28 \pm 5
09/24/20 - 10/01/20	17 \pm 4	18 \pm 4	17 \pm 4	16 \pm 4	13 \pm 4	14 \pm 4	12 \pm 4	17 \pm 4
10/01/20 - 10/08/20	15 \pm 4	14 \pm 4	12 \pm 4	15 \pm 4	14 \pm 4	13 \pm 4	11 \pm 4	15 \pm 4
10/08/20 - 10/15/20	24 \pm 5	22 \pm 5	23 \pm 5	18 \pm 4	19 \pm 4	19 \pm 4	20 \pm 4	24 \pm 5
10/15/20 - 10/22/20	19 \pm 5	16 \pm 5	22 \pm 5	17 \pm 5	18 \pm 4	18 \pm 4	16 \pm 4	18 \pm 5
10/22/20 - 10/29/20	14 \pm 4	17 \pm 4	14 \pm 4	15 \pm 4	14 \pm 4	15 \pm 4	17 \pm 4	17 \pm 4
10/29/20 - 11/05/20	27 \pm 5	21 \pm 5	27 \pm 5	23 \pm 5	24 \pm 5	22 \pm 5	23 \pm 5	24 \pm 5
11/05/20 - 11/12/20	12 \pm 4	14 \pm 4	14 \pm 4	17 \pm 4	14 \pm 4	14 \pm 4	14 \pm 4	17 \pm 4
11/12/20 - 11/19/20	25 \pm 5	25 \pm 5	24 \pm 4	20 \pm 4	20 \pm 4	19 \pm 4	20 \pm 4	21 \pm 4
11/19/20 - 11/25/20	21 \pm 5	21 \pm 5	22 \pm 5	20 \pm 5	19 \pm 5	20 \pm 5	21 \pm 5	17 \pm 5
11/25/20 - 12/03/20	18 \pm 4	13 \pm 3	15 \pm 3	17 \pm 3	17 \pm 3	16 \pm 3	14 \pm 3	13 \pm 3
12/03/20 - 12/10/20	28 \pm 5	30 \pm 5	32 \pm 5	30 \pm 5	32 \pm 5	34 \pm 5	34 \pm 5	31 \pm 5
12/10/20 - 12/17/20	21 \pm 4	17 \pm 4	17 \pm 4	15 \pm 4	15 \pm 4	17 \pm 4	18 \pm 4	16 \pm 4
12/17/20 - 12/23/20	31 \pm 6	32 \pm 6	29 \pm 5	31 \pm 6	28 \pm 5	30 \pm 5	33 \pm 6	30 \pm 5
12/23/20 - 12/31/20	15 \pm 4	18 \pm 4	15 \pm 4	19 \pm 4	18 \pm 4	21 \pm 4	18 \pm 4	23 \pm 5
MEAN \pm 2 STD DEV	16 \pm 11	16 \pm 11	16 \pm 11	16 \pm 10	16 \pm 11	16 \pm 11	16 \pm 10	17 \pm 11

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, 2020**

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
12/26/19 - 01/30/20	12	24	16 ± 8	12/26/19 - 01/30/20	11	24	16 ± 8	12/26/19 - 01/30/20	14	21	17 ± 7
01/30/20 - 02/27/20	10	22	14 ± 8	01/30/20 - 02/27/20	8	22	14 ± 10	01/30/20 - 02/27/20	12	21	15 ± 8
02/27/20 - 03/26/20	7	17	13 ± 6	02/27/20 - 03/26/20	10	16	13 ± 4	02/27/20 - 03/26/20	11	16	14 ± 5
03/26/20 - 04/30/20	8	18	13 ± 5	03/26/20 - 04/30/20	7	22	13 ± 8	03/26/20 - 04/30/20	10	19	13 ± 7
04/30/20 - 06/04/20	6	14	10 ± 4	04/30/20 - 06/04/20	6	13	10 ± 5	04/30/20 - 06/04/20	8	13	10 ± 4
06/04/20 - 06/25/20	11	21	16 ± 6	06/04/20 - 06/25/20	14	21	17 ± 5	06/04/20 - 06/25/20	14	25	18 ± 11
06/25/20 - 07/30/20	11	24	16 ± 7	06/25/20 - 07/30/20	13	24	17 ± 6	06/25/20 - 07/30/20	12	29	18 ± 13
07/30/20 - 09/03/20	9	26	18 ± 9	07/30/20 - 09/03/20	8	24	18 ± 10	07/30/20 - 09/03/20	13	21	17 ± 7
09/03/20 - 09/24/20	8	24	15 ± 12	09/03/20 - 09/24/20	8	27	16 ± 14	09/03/20 - 09/24/20	11	28	17 ± 18
09/24/20 - 10/29/20	12	24	17 ± 6	09/24/20 - 10/29/20	11	20	15 ± 6	09/24/20 - 10/29/20	15	24	18 ± 7
10/29/20 - 12/03/20	12	27	20 ± 9	10/29/20 - 12/03/20	14	24	18 ± 7	10/29/20 - 12/03/20	13	24	18 ± 8
12/03/20 - 12/31/20	15	32	24 ± 14	12/03/20 - 12/31/20	15	34	25 ± 15	12/03/20 - 12/31/20	16	31	25 ± 14
12/26/19 - 12/31/20	6	32	16 ± 11	12/26/19 - 12/31/20	6	34	16 ± 11	12/26/19 - 12/31/20	8	31	17 ± 11

C-14

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, 2020**

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	12/26/19 - 03/26/20	< 3	< 2	< 3	< 3	< 5	< 2	< 5	< 2	< 3	< 18	< 5
	03/26/20 - 06/25/20	< 2	< 3	< 5	< 3	< 6	< 2	< 3	< 2	< 2	< 15	< 6
	06/25/20 - 09/24/20	< 3	< 4	< 8	< 5	< 10	< 4	< 8	< 4	< 3	< 51	< 18
	09/24/20 - 12/31/20	< 2	< 2	< 5	< 3	< 6	< 2	< 4	< 3	< 2	< 13	< 5
	MEAN	-	-	-	-	-	-	-	-	-	-	-
BD-03	12/26/19 - 03/26/20	< 2	< 2	< 4	< 2	< 5	< 2	< 3	< 2	< 2	< 14	< 6
	03/26/20 - 06/25/20	< 2	< 2	< 5	< 2	< 3	< 2	< 5	< 2	< 1	< 15	< 6
	06/25/20 - 09/24/20	< 3	< 2	< 5	< 3	< 6	< 2	< 4	< 3	< 2	< 25	< 11
	09/24/20 - 12/31/20	< 2	< 2	< 3	< 2	< 4	< 2	< 3	< 2	< 2	< 10	< 4
	MEAN	-	-	-	-	-	-	-	-	-	-	-
BD-04	12/26/19 - 03/26/20	< 2	< 2	< 4	< 2	< 5	< 3	< 4	< 2	< 2	< 13	< 6
	03/26/20 - 06/25/20	< 3	< 3	< 7	< 3	< 7	< 2	< 5	< 3	< 3	< 27	< 10
	06/25/20 - 09/24/20	< 1	< 2	< 6	< 2	< 5	< 3	< 3	< 2	< 2	< 27	< 8
	09/24/20 - 12/31/20	< 2	< 2	< 3	< 2	< 4	< 2	< 4	< 2	< 2	< 8	< 4
	MEAN	-	-	-	-	-	-	-	-	-	-	-
BD-05	12/26/19 - 03/26/20	< 3	< 3	< 9	< 4	< 8	< 4	< 8	< 3	< 3	< 25	< 7
	03/26/20 - 06/25/20	< 4	< 4	< 8	< 4	< 6	< 4	< 8	< 4	< 4	< 39	< 15
	06/25/20 - 09/24/20	< 2	< 2	< 8	< 2	< 7	< 3	< 4	< 2	< 2	< 23	< 11
	09/24/20 - 12/31/20	< 3	< 3	< 5	< 2	< 6	< 3	< 5	< 2	< 2	< 14	< 5
	MEAN	-	-	-	-	-	-	-	-	-	-	-
BD-06	12/26/19 - 03/26/20	< 3	< 3	< 4	< 2	< 6	< 2	< 4	< 3	< 2	< 17	< 5
	03/26/20 - 06/25/20	< 2	< 2	< 5	< 2	< 8	< 3	< 4	< 2	< 2	< 21	< 8
	06/25/20 - 09/24/20	< 3	< 3	< 7	< 3	< 8	< 4	< 6	< 3	< 2	< 42	< 12
	09/24/20 - 12/31/20	< 3	< 4	< 7	< 3	< 9	< 3	< 7	< 4	< 4	< 20	< 5
	MEAN	-	-	-	-	-	-	-	-	-	-	-

Table C-VI.3

**CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES
COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020**

RESULTS IN UNITS OF E-3 PCI/CU METER \pm 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	12/26/19 - 03/26/20	< 2	< 2	< 3	< 2	< 6	< 2	< 5	< 1	< 2	< 9	< 8
	03/26/20 - 06/25/20	< 2	< 3	< 6	< 2	< 6	< 3	< 4	< 3	< 2	< 18	< 3
	06/25/20 - 09/24/20	< 2	< 2	< 7	< 2	< 7	< 3	< 5	< 2	< 2	< 34	< 11
	09/24/20 - 12/31/20	< 2	< 2	< 3	< 2	< 4	< 2	< 3	< 2	< 2	< 10	< 3
	<i>MEAN</i>	-	-	-	-	-	-	-	-	-	-	-
BD-20	12/26/19 - 03/26/20	< 2	< 2	< 6	< 3	< 4	< 2	< 4	< 3	< 3	< 18	< 7
	03/26/20 - 06/25/20	< 3	< 3	< 5	< 3	< 5	< 3	< 4	< 3	< 2	< 25	< 7
	06/25/20 - 09/24/20	< 4	< 5	< 11	< 4	< 12	< 5	< 8	< 4	< 4	< 58	< 22
	09/24/20 - 12/31/20	< 2	< 2	< 4	< 3	< 5	< 2	< 3	< 2	< 2	< 9	< 5
	<i>MEAN</i>	-	-	-	-	-	-	-	-	-	-	-
BD-21	12/26/19 - 03/26/20	< 2	< 2	< 6	< 2	< 5	< 2	< 3	< 2	< 2	< 14	< 4
	03/26/20 - 06/25/20	< 4	< 3	< 11	< 4	< 9	< 4	< 7	< 5	< 3	< 30	< 16
	06/25/20 - 09/24/20	< 2	< 3	< 5	< 3	< 4	< 2	< 4	< 3	< 2	< 28	< 10
	09/24/20 - 12/31/20	< 2	< 2	< 5	< 3	< 6	< 2	< 3	< 2	< 2	< 15	< 4
	<i>MEAN</i>	-	-	-	-	-	-	-	-	-	-	-

**Table C-VII.1 CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED
IN THE VICINITY OF BRAIDWOOD STATION, 2020
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
12/26/19 - 01/03/20	< 16	< 15	< 15	< 15	< 19	< 18	< 18	< 18
01/03/20 - 01/10/20	< 54	< 54	< 54	< 23	< 28	< 30	< 53	< 28
01/10/20 - 01/16/20	< 33	< 31	< 31	< 31	< 28	< 30	< 27	< 29
01/16/20 - 01/23/20	< 39	< 38	< 38	< 38	< 26	< 28	< 26	< 26
01/23/20 - 01/30/20	< 34	< 33	< 13	< 32	< 26	< 28	< 27	< 27
01/30/20 - 02/06/20	< 24	< 12	< 26	< 26	< 25	< 25	< 25	< 12
02/06/20 - 02/13/20	< 35	< 34	< 35	< 35	< 28	< 30	< 28	< 29
02/13/20 - 02/20/20	< 50	< 49	< 49	< 48	< 32	< 34	< 32	< 34
02/20/20 - 02/27/20	< 27	< 13	< 26	< 28	< 45	< 49	< 46	< 48
02/27/20 - 03/05/20	< 32	< 32	< 31	< 34	< 38	< 38	< 39	< 39
03/05/20 - 03/12/20	< 46	< 45	< 46	< 48	< 28	< 30	< 28	< 29
03/12/20 - 03/19/20	< 32	< 32	< 31	< 34	< 42	< 43	< 41	< 43
03/19/20 - 03/26/20	< 29	< 28	< 28	< 28	< 50	< 53	< 55	< 51
03/26/20 - 04/02/20	< 23	< 22	< 22	< 24	< 24	< 24	< 25	< 24
04/02/20 - 04/09/20	< 36	< 38	< 37	< 38	< 45	< 49	< 47	< 47
04/09/20 - 04/16/20	< 34	< 34	< 34	< 14	< 51	< 54	< 52	< 52
04/16/20 - 04/23/20	< 37	< 39	< 39	< 40	< 34	< 36	< 36	< 36
04/23/20 - 04/30/20	< 63	< 63	< 63	< 62	< 37	< 38	< 38	< 36
04/30/20 - 05/07/20	< 18	< 32	< 34	< 33	< 44	< 44	< 46	< 44
05/07/20 - 05/14/20	< 39	< 41	< 39	< 40	< 23	< 25	< 24	< 25
05/14/20 - 05/21/20	< 27	< 27	< 29	< 28	< 40	< 41	< 40	< 41
05/21/20 - 05/28/20	< 43	< 46	< 45	< 45	< 50	< 47	< 47	< 46
05/28/20 - 06/04/20	< 27	< 27	< 28	< 29	< 45	< 43	< 47	< 46
06/04/20 - 06/11/20	< 48	< 48	< 49	< 21	< 25	< 28	< 27	< 26
06/11/20 - 06/18/20	< 44	< 45	< 47	< 47	< 35	< 36	< 15	< 36
06/18/20 - 06/25/20	< 37	< 21	< 22	< 21	< 35	< 38	< 37	< 17
06/25/20 - 07/02/20	< 37	< 38	< 39	< 39	< 67	< 68	< 70	< 68
07/02/20 - 07/09/20	< 55	< 57	< 57	< 57	< 29	< 32	< 30	< 31
07/09/20 - 07/16/20	< 27	< 27	< 28	< 28	< 46	< 47	< 48	< 47
07/16/20 - 07/23/20	< 36	< 36	< 38	< 38	< 46	< 49	< 47	< 47
07/23/20 - 07/30/20	< 41	< 42	< 42	< 43	< 50	< 56	< 52	< 54
07/30/20 - 08/06/20	< 30	< 15	< 31	< 30	< 35	< 33	< 36	< 35
08/06/20 - 08/13/20	< 35	< 33	< 33	< 28	< 23	< 42	< 41	< 51
08/13/20 - 08/20/20	< 22	< 21	< 21	< 21	< 44	< 45	< 45	< 44
08/20/20 - 08/27/20	< 28	< 29	< 29	< 29	< 11	< 26	< 26	< 26
08/27/20 - 09/03/20	< 59	< 61	< 62	< 61	< 59	< 59	< 63	< 62
09/03/20 - 09/10/20	< 48	< 45	< 45	< 47	< 38	< 32	< 39	< 39
09/10/20 - 09/17/20	< 46	< 19	< 47	< 46	< 41	< 41	< 41	< 41
09/17/20 - 09/24/20	< 49	< 47	< 47	< 48	< 50	< 20	< 52	< 52
09/24/20 - 10/01/20	< 58	< 56	< 23	< 57	< 27	< 27	< 28	< 29
10/01/20 - 10/08/20	< 35	< 35	< 35	< 36	< 31	< 31	< 32	< 32
10/08/20 - 10/15/20	< 40	< 18	< 41	< 41	< 42	< 42	< 42	< 42
10/15/20 - 10/22/20	< 47	< 48	< 47	< 47	< 45	< 45	< 47	< 47
10/22/20 - 10/29/20	< 49	< 47	< 48	< 49	< 46	< 43	< 46	< 44
10/29/20 - 11/05/20	< 55	< 56	< 56	< 57	< 39	< 37	< 42	< 40
11/05/20 - 11/12/20	< 36	< 35	< 35	< 36	< 29	< 31	< 31	< 31
11/12/20 - 11/19/20	< 41	< 42	< 41	< 41	< 31	< 32	< 17	< 32
11/19/20 - 11/25/20	< 61	< 59	< 60	< 61	< 29	< 30	< 31	< 31
11/25/20 - 12/03/20	< 56	< 52	< 54	< 53	< 24	< 23	< 27	< 25
12/03/20 - 12/10/20	< 53	< 52	< 53	< 54	< 44	< 46	< 46	< 47
12/10/20 - 12/17/20	< 34	< 32	< 32	< 33	< 24	< 23	< 23	< 23
12/17/20 - 12/23/20	< 51	< 51	< 50	< 51	< 19	< 42	< 44	< 43
12/23/20 - 12/31/20	< 52	< 51	< 52	< 53	< 33	< 33	< 36	< 40
MEAN	-	-	-	-	-	-	-	-

**Table C-VIII.1 CONCENTRATIONS OF I-131 IN MILK SAMPLES COLLECTED
IN THE VICINITY OF BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA**

COLLECTION PERIOD	CONTROL FARM BD-18
01/02/20	< 0.6
02/06/20	< 0.7
03/04/20	< 0.9
04/01/20	< 0.5
05/01/20	< 0.7
05/06/20	< 0.9
05/21/20	< 0.9
06/03/20	< 0.9
06/18/20	< 0.9
07/01/20	< 0.7
07/16/20	< 0.9
07/29/20	< 0.7
08/13/20	< 0.9
08/27/20	< 0.9
09/10/20	< 0.9
09/24/20	< 0.9
10/07/20	< 0.8
10/22/20	< 0.8
11/04/20	< 0.9
12/2020	(1)
MEAN	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-VIII.2

**CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES
COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF PCI/LITER \pm 2 SIGMA**

SITE	COLLECTION		Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
	PERIOD												
BD-18	01/02/20		< 8	< 8	< 18	< 8	< 17	< 8	< 14	< 9	< 8	< 30	< 7
	02/06/20		< 7	< 7	< 11	< 7	< 15	< 6	< 10	< 7	< 6	< 22	< 10
	03/04/20		< 8	< 7	< 19	< 8	< 17	< 8	< 13	< 10	< 9	< 38	< 11
	04/01/20		< 4	< 4	< 9	< 5	< 10	< 5	< 8	< 5	< 5	< 18	< 6
	05/01/20		< 5	< 7	< 17	< 8	< 13	< 6	< 13	< 8	< 8	< 30	< 10
	05/06/20		< 8	< 8	< 17	< 11	< 17	< 9	< 16	< 8	< 9	< 33	< 12
	05/21/20		< 7	< 8	< 22	< 6	< 18	< 8	< 14	< 7	< 8	< 36	< 12
	06/03/20		< 8	< 7	< 18	< 9	< 20	< 9	< 11	< 9	< 8	< 33	< 13
	06/18/20		< 8	< 8	< 20	< 8	< 20	< 8	< 12	< 9	< 8	< 33	< 9
	07/01/20		< 6	< 6	< 14	< 11	< 13	< 7	< 12	< 7	< 6	< 25	< 7
	07/16/20		< 7	< 10	< 15	< 8	< 20	< 9	< 13	< 10	< 8	< 35	< 8
	07/29/20		< 7	< 9	< 13	< 10	< 17	< 8	< 16	< 10	< 8	< 39	< 10
	08/13/20		< 8	< 7	< 16	< 10	< 19	< 9	< 15	< 8	< 7	< 43	< 10
	08/27/20		< 6	< 9	< 21	< 6	< 19	< 7	< 15	< 8	< 7	< 35	< 9
	09/10/20		< 8	< 8	< 12	< 7	< 15	< 8	< 12	< 8	< 7	< 25	< 11
	09/24/20		< 9	< 8	< 21	< 7	< 22	< 8	< 14	< 10	< 8	< 38	< 12
	10/07/20		< 9	< 9	< 16	< 10	< 17	< 9	< 15	< 9	< 10	< 34	< 11
10/22/20		< 8	< 8	< 19	< 8	< 21	< 8	< 13	< 10	< 9	< 30	< 11	
11/04/20		< 5	< 6	< 11	< 6	< 13	< 6	< 10	< 7	< 6	< 26	< 8	
12/2020	(1)												
	MEAN		-	-	-	-	-	-	-	-	-	-	-

Table C-VIII.3

**CONCENTRATIONS OF GAMMA EMITTERS IN GRASS SAMPLES
COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF PCI/KG WET \pm 2 SIGMA**

SITE	COLLECTION		Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
	PERIOD													

No Substitute Grass Samples Taken in 2020

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-IX.1

**CONCENTRATIONS OF GAMMA EMITTERS IN VEGETATION SAMPLES
COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA**

COLLECTION													
SITE	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-CONTROL													
<i>Swiss/Green Chard</i>	07/29/20	< 26	< 36	< 80	< 40	< 68	< 37	< 60	< 45	< 39	< 33	< 157	< 39
<i>Cabbage</i>	07/29/20	< 40	< 40	< 96	< 44	< 72	< 41	< 76	< 56	< 46	< 38	< 161	< 27
<i>Collard Greens</i>	07/29/20	< 40	< 34	< 84	< 37	< 88	< 31	< 56	< 50	< 38	< 40	< 145	< 46
<i>Cabbage</i>	08/27/20	< 48	< 29	< 72	< 60	< 112	< 50	< 62	< 59	< 51	< 41	< 179	< 39
<i>Cabbage</i>	09/24/20	< 31	< 29	< 74	< 36	< 76	< 43	< 67	< 43	< 38	< 43	< 150	< 36
<i>Collard Greens</i>	09/24/20	< 43	< 43	< 78	< 50	< 85	< 51	< 88	< 56	< 51	< 33	< 179	< 49
<i>Turnip</i>	09/24/20	< 32	< 29	< 67	< 30	< 77	< 33	< 58	< 42	< 32	< 27	< 132	< 39
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
BD-QUAD 2													
<i>Cabbage Leaves</i>	07/30/20	< 40	< 42	< 85	< 32	< 89	< 32	< 60	< 55	< 47	< 48	< 179	< 43
<i>Onions</i>	07/30/20	< 29	< 32	< 66	< 36	< 75	< 33	< 49	< 52	< 29	< 32	< 128	< 42
<i>Green Cabbage</i>	09/03/20	< 14	< 17	< 32	< 14	< 37	< 19	< 27	< 26	< 18	< 15	< 78	< 22
<i>Red Cabbage</i>	09/03/20	< 30	< 24	< 60	< 27	< 55	< 29	< 48	< 50	< 28	< 30	< 113	< 45
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
BD-QUAD 3													
<i>Red Beet Leaves</i>	07/30/20	< 36	< 35	< 81	< 39	< 77	< 38	< 62	< 58	< 42	< 38	< 168	< 49
<i>Red Beets</i>	07/30/20	< 35	< 36	< 64	< 50	< 87	< 40	< 71	< 42	< 35	< 43	< 134	< 50
<i>Cabbage Leaves</i>	07/30/20	< 28	< 26	< 58	< 33	< 39	< 27	< 50	< 35	< 19	< 23	< 102	< 23
<i>Cabbage Leaves</i>	09/03/20	< 40	< 32	< 81	< 38	< 78	< 35	< 65	< 54	< 43	< 35	< 181	< 53
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
BD-QUAD 4													
<i>Red Beet Leaves</i>	07/30/20	< 68	< 64	< 136	< 72	< 145	< 69	< 113	< 121	< 74	< 69	< 298	< 99
<i>Beets</i>	07/30/20	< 30	< 33	< 64	< 35	< 70	< 33	< 60	< 51	< 32	< 35	< 166	< 52
<i>Kohlrabi</i>	07/30/20	< 28	< 24	< 50	< 41	< 70	< 30	< 58	< 50	< 29	< 35	< 158	< 42
<i>Kohlrabi</i>	09/03/20	< 24	< 29	< 61	< 31	< 51	< 32	< 51	< 46	< 33	< 32	< 131	< 44
<i>Red Beets</i>	09/03/20	< 31	< 31	< 70	< 31	< 66	< 34	< 57	< 57	< 37	< 32	< 153	< 45
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

BOLD = Detection Limit not met due to limited sample volume

Table C-IX.1

**CONCENTRATIONS OF GAMMA EMITTERS IN VEGETATION SAMPLES
COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA**

		COLLECTION											
SITE	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
BWD-G1													
<i>Kale</i>	07/16/20	< 31	< 30	< 66	< 31	< 66	< 36	< 49	< 52	< 39	< 35	< 147	< 36
<i>Kale</i>	07/30/20	< 34	< 29	< 58	< 34	< 63	< 32	< 55	< 49	< 33	< 32	< 133	< 28
<i>Cabbage</i>	07/30/20	< 21	< 24	< 41	< 28	< 43	< 25	< 38	< 34	< 23	< 27	< 104	< 24
<i>Kale</i>	08/13/20	< 18	< 19	< 35	< 21	< 42	< 20	< 37	< 26	< 22	< 22	< 77	< 23
<i>Cabbage</i>	08/13/20	< 29	< 28	< 67	< 33	< 63	< 31	< 51	< 37	< 30	< 31	< 155	< 16
<i>Swiss Chard</i>	08/13/20	< 35	< 30	< 68	< 38	< 78	< 41	< 66	< 39	< 38	< 38	< 153	< 46
<i>Kohlrabi</i>	08/13/20	< 34	< 33	< 65	< 40	< 65	< 40	< 54	< 47	< 39	< 35	< 141	< 39
<i>Cabbage</i>	08/27/20	< 32	< 34	< 58	< 26	< 85	< 32	< 44	< 44	< 40	< 37	< 158	< 56
<i>Kale</i>	08/27/20	< 39	< 32	< 62	< 29	< 52	< 36	< 53	< 56	< 46	< 44	< 198	< 37
<i>Kohlrabi</i>	08/27/20	< 31	< 34	< 64	< 38	< 73	< 35	< 54	< 52	< 39	< 34	< 156	< 30
<i>Kale</i>	09/10/20	< 28	< 29	< 56	< 33	< 77	< 30	< 52	< 51	< 36	< 39	< 148	< 32
<i>Cabbage</i>	09/10/20	< 18	< 20	< 38	< 15	< 45	< 26	< 31	< 30	< 23	< 24	< 98	< 26
<i>Kohlrabi</i>	09/10/20	< 30	< 35	< 63	< 30	< 78	< 33	< 50	< 34	< 32	< 36	< 139	< 60
<i>Kale</i>	09/24/20	< 31	< 34	< 61	< 28	< 78	< 40	< 57	< 44	< 38	< 32	< 116	< 58
<i>Cabbage</i>	09/24/20	< 23	< 19	< 33	< 23	< 45	< 23	< 40	< 29	< 26	< 25	< 76	< 28
<i>Kohlrabi</i>	09/24/20	< 30	< 27	< 69	< 29	< 79	< 28	< 67	< 41	< 29	< 28	< 112	< 36
<i>Chard</i>	09/24/20	< 42	< 41	< 82	< 41	< 67	< 38	< 61	< 60	< 44	< 38	< 169	< 45
<i>Kale</i>	10/08/20	< 23	< 22	< 31	< 16	< 44	< 20	< 33	< 29	< 24	< 22	< 102	< 18
<i>Kohlrabi</i>	10/08/20	< 23	< 22	< 50	< 29	< 56	< 27	< 40	< 32	< 29	< 29	< 92	< 32
<i>Cabbage</i>	10/08/20	< 19	< 20	< 42	< 21	< 42	< 25	< 28	< 36	< 22	< 25	< 96	< 21
<i>Kale</i>	10/22/20	< 30	< 27	< 49	< 34	< 52	< 29	< 59	< 34	< 34	< 29	< 117	< 2
<i>Cabbage</i>	10/22/20	< 21	< 20	< 45	< 18	< 48	< 28	< 34	< 32	< 24	< 21	< 93	< 30
	<i>MEAN</i>	-	-	-	-	-	-	-	-	-	-	-	-
BWD-G2													
<i>Kale</i>	08/13/20	< 37	< 39	< 72	< 40	< 88	< 42	< 79	< 51	< 38	< 46	< 151	< 39
<i>Cabbage</i>	08/13/20	< 30	< 35	< 53	< 24	< 50	< 29	< 49	< 40	< 35	< 33	< 114	< 31
<i>Kale</i>	08/27/20	< 36	< 31	< 81	< 48	< 93	< 36	< 67	< 54	< 43	< 46	< 176	< 46
<i>Cabbage</i>	08/27/20	< 37	< 33	< 67	< 33	< 64	< 29	< 56	< 56	< 31	< 44	< 133	< 39
<i>Kohlrabi</i>	09/10/20	< 32	< 35	< 57	< 38	< 62	< 44	< 61	< 54	< 41	< 40	< 167	< 51
<i>Kale</i>	09/10/20	< 39	< 42	< 72	< 35	< 96	< 40	< 70	< 55	< 40	< 53	< 169	< 57
<i>Cabbage</i>	09/10/20	< 20	< 19	< 37	< 18	< 46	< 18	< 28	< 28	< 19	< 19	< 75	< 26
<i>Kale</i>	09/24/20	< 35	< 43	< 82	< 45	< 67	< 46	< 78	< 53	< 33	< 42	< 173	< 45
<i>Cabbage</i>	09/24/20	< 21	< 27	< 62	< 29	< 68	< 21	< 36	< 41	< 37	< 31	< 134	< 37
<i>Kale</i>	10/08/20	< 27	< 27	< 30	< 24	< 53	< 28	< 36	< 39	< 34	< 31	< 123	< 35
<i>Cabbage</i>	10/08/20	< 26	< 23	< 57	< 27	< 38	< 24	< 45	< 30	< 27	< 24	< 111	< 18
<i>Kale</i>	10/22/20	< 38	< 36	< 68	< 36	< 87	< 33	< 60	< 43	< 32	< 37	< 164	< 52
<i>Cabbage</i>	10/22/20	< 20	< 21	< 41	< 21	< 46	< 26	< 40	< 27	< 23	< 25	< 84	< 19
	<i>MEAN</i>	-	-	-	-	-	-	-	-	-	-	-	-

Table C-X.1

QUARTERLY OSLD RESULTS FOR BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF MREM/QUARTER ± 2 STANDARD DEVIATIONS

2020	Monitoring Location	Location Quarterly Baseline, B _Q (mrem)	B _Q + MDD _Q (mrem)	2019 Normalized Net Dose, MQx (mrem/std. Qtr.)				Quarterly Facility Dose, F _Q (mrem)				Annual Baseline, B _A (mrem)	B _A + MDD _A (mrem)	Normalized Annual Dose, M _A (mrem/yr)	Annual Facility Dose, F _A
				1	2	3	4	1	2	3	4				
				Control	BD-03	9.60	16.86	13.8	22.3	8.7	11.2				
Ind - Far	BD-02	9.40	16.66	13.2	20.5	7.2	10.4	ND	11.1	ND	ND	37.40	59.18	51.25	ND
	BD-04	8.50	15.76	11.9	20.1	5.9	(1)	ND	11.6	ND	NA	34.10	55.88	37.94	ND
	BD-05	9.60	16.86	15.7	21.9	7.6	10.5	ND	12.3	ND	ND	38.30	60.08	55.65	ND
Ind - Inner	BD-101	9.10	16.36	14.2	21.3	5.8	9.4	ND	12.2	ND	ND	36.60	58.38	50.73	ND
	BD-102	9.00	16.26	12.2	18.3	5.2	8.2	ND	9.3	ND	ND	36.10	57.88	43.93	ND
	BD-103	9.00	16.26	12.9	22.2	7.1	9.4	ND	13.2	ND	ND	35.90	57.68	51.55	ND
	BD-104	8.00	15.26	11.8	19.6	5.6	8.3	ND	11.6	ND	ND	32.00	53.78	45.33	ND
	BD-105	8.30	15.56	12.4	19.5	6.0	8.4	ND	11.2	ND	ND	33.10	54.88	46.34	ND
	BD-106	7.90	15.16	12.2	19.6	4.9	8.9	ND	11.7	ND	ND	31.70	53.48	45.62	ND
	BD-107	8.20	15.46	13.4	20.1	6.5	9.2	ND	11.9	ND	ND	32.60	54.38	49.24	ND
	BD-108	8.70	15.96	12.4	20.5	5.7	8.6	ND	11.8	ND	ND	34.90	56.68	47.23	ND
	BD-109	11.80	19.06	16.5	24.4	9.4	12.7	ND	12.6	ND	ND	47.10	68.88	62.97	ND
	BD-110	7.90	15.16	11.2	19.9	7.2	7.6	ND	12	ND	ND	31.70	53.48	45.85	ND
	BD-111a	8.60	15.86	12.5	18.3	6.0	9.0	ND	9.7	ND	ND	34.40	56.18	45.84	ND
	BD-112	7.90	15.16	12.3	17.3	5.9	8.2	ND	9.4	ND	ND	31.80	53.58	43.74	ND
	BD-113a	9.10	16.36	13.4	20.3	5.2	8.6	ND	11.2	ND	ND	36.50	58.28	47.53	ND
	BD-114	8.80	16.06	14.0	19.9	6.3	11.7	ND	11.1	ND	ND	35.30	57.08	51.94	ND
BD-115	8.90	16.16	14.4	21.7	4.9	7.5	ND	12.8	ND	ND	35.70	57.48	48.52	ND	
Ind - Outer	BD-116	9.60	16.86	13.2	23.0	8.0	11.0	ND	13.4	ND	ND	38.20	59.98	55.16	ND
	BD-201	12.20	19.46	16.2	27.4	11.6	12.9	ND	15.2	ND	ND	44.00	65.78	68.10	24.1
	BD-202	9.10	16.36	13.7	20.5	7.7	9.5	ND	11.4	ND	ND	36.30	58.08	51.35	ND
	BD-203	8.80	16.06	14.2	20.7	7.0	11.2	ND	11.9	ND	ND	35.10	56.88	53.05	ND
	BD-204	7.90	15.16	12.4	18.3	5.2	8.2	ND	10.4	ND	ND	31.60	53.38	44.13	ND
	BD-205	8.20	15.46	12.7	19.9	5.1	10.4	ND	11.7	ND	ND	32.90	54.68	48.13	ND
	BD-206	8.80	16.06	13.5	20.1	6.0	9.1	ND	11.3	ND	ND	35.40	57.18	48.74	ND
	BD-207	7.80	15.06	11.9	19.8	4.8	8.2	ND	12	ND	ND	31.10	52.88	44.72	ND
	BD-208	8.70	15.96	14.7	20.6	6.6	9.8	ND	11.9	ND	ND	34.90	56.68	51.74	ND
	BD-209	13.20	20.46	16.5	24.2	9.8	12.9	ND	11	ND	ND	52.90	74.68	63.38	ND
	BD-210	10.70	17.96	16.0	24.8	10.0	11.7	ND	14.1	ND	ND	42.60	64.38	62.48	ND
	BD-211	13.20	20.46	18.3	25.7	9.0	14.7	ND	12.5	ND	ND	52.70	74.48	67.67	ND
	BD-212	11.30	18.56	13.1	21.3	4.9	8.5	ND	10	ND	ND	45.10	66.88	47.82	ND
	BD-213	7.70	14.96	12.7	20.0	5.0	7.6	ND	12.3	ND	ND	31.00	52.78	45.33	ND
BD-214	10.10	17.36	16.0	23.7	7.8	11.2	ND	13.6	ND	ND	40.40	62.18	58.66	ND	
Ind- Near	BD-215	8.40	15.66	13.5	20.9	5.3	9.9	ND	12.5	ND	ND	33.50	55.28	49.63	ND
	BD-216	10.80	18.06	15.3	22.2	8.9	11.3	ND	11.4	ND	ND	43.10	64.88	57.67	ND
	BD-06	8.50	15.76	13.1	20.8	6.3	9.4	ND	12.3	ND	ND	33.80	55.58	49.64	ND
	BD-19	9.80	17.06	15.7	23.3	7.9	9.0	ND	13.5	ND	ND	39.20	60.98	55.86	ND
Other (ISFSI)	BD-20	9.50	16.76	13.8	21.9	7.2	9.8	ND	12.4	ND	ND	37.90	59.68	52.65	ND
	BD-21	8.90	16.16	13.8	20.9	7.0	8.9	ND	12	ND	ND	35.60	57.38	50.55	ND
	BD-ISFSI-104-3	12.80	20.06	17.5	25.1	10.5	12.6	ND	12.3	ND	ND	51.10	72.88	65.69	ND
	BD-ISFSI-104-4	12.80	20.06	18.2	26	11.0	15.6	ND	13.2	ND	ND	51.4	73.2	70.8	ND
	BD-ISFSI-105-3	13.20	20.46	15.4	28.4	12.6	16.8	ND	15.2	ND	ND	52.8	74.6	73.2	ND
	BD-ISFSI-105-4	17.10	24.36	33.4	38.2	29.4	30.0	16.3	21.1	12.3	12.9	68.4	90.2	131.0	62.6
BD-ISFSI-110-3	11.40	18.66	17.4	25.2	11.8	14.5	ND	13.8	ND	ND	45.8	67.6	68.9	23.1	
BD-ISFSI-110-4	13.20	20.46	23.4	28.6	16.0	22.0	10.2	15.4	ND	8.8	52.8	74.6	90.0	37.2	

(1) SEE PROGRAM EXCEPTIONS SECTIONS FOR EXPLANATION

ND= Non-Detect

C-22

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, 2020
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	13.1 ± 2.5	14.4 ± 3.6	13.9 ± 2.8	13.8 ± 0.0	20.9 ± 13.4
APR-JUN	20.4 ± 3.6	21.9 ± 5.1	21.3 ± 2.2	22.3 ± 0.0	28.6 ± 9.9
JUL-SEP	6.2 ± 2.4	7.2 ± 4.3	7.0 ± 1.3	8.7 ± 0.0	15.2 ± 14.4
OCT-DEC	9.2 ± 2.9	10.4 ± 4.0	9.7 ± 1.4	11.2 ± 0.0	18.6 ± 12.9

TABLE C-X.3 SUMMARY OF THE AMBIENT DOSIMETRY PROGRAM FOR BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF MREM/QUARTER ± 2 STANDARD DEVIATION

LOCATION	SAMPLES ANALYZED	PERIOD MINIMUM	PERIOD MAXIMUM	PERIOD MEAN ± 2 S.D.
SITE BOUNDARY	64	4.9	24.4	12.2 ± 11.0
INTERMEDIATE DISTANCE	64	4.8	27.4	13.5 ± 11.8
OTHER	27	5.9	23.3	13.1 ± 11.3
CONTROL	4	8.7	22.3	14.0 ± 11.8
ISFSI	24	10.5	38.2	20.8 ± 15.6

SITE BOUNDARY STATIONS - 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, BD-116

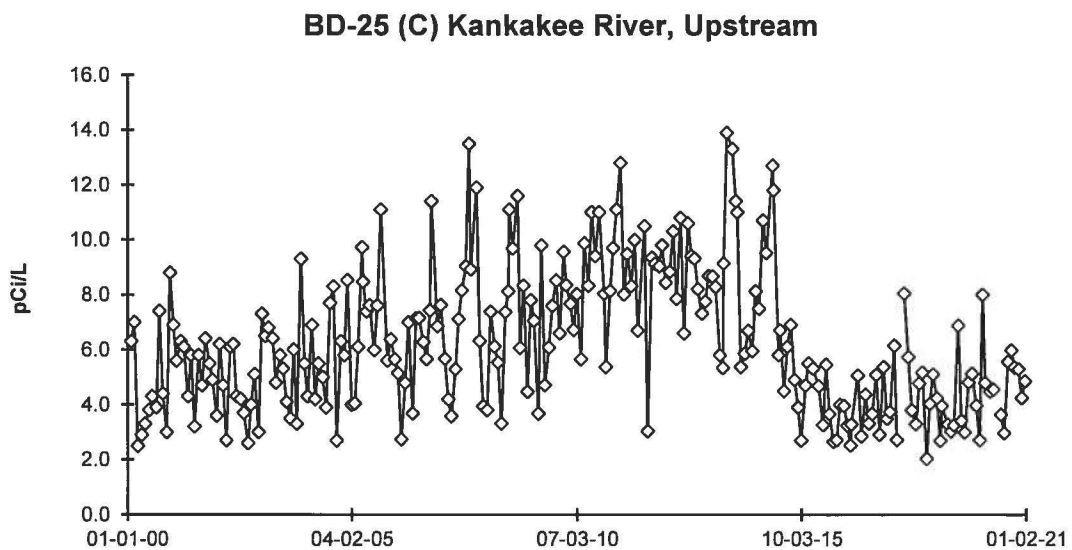
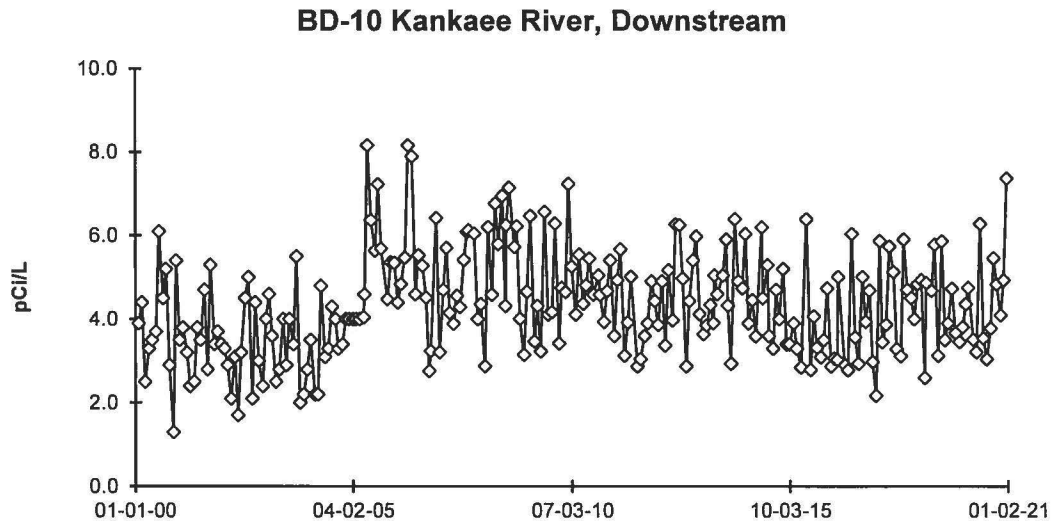
INTERMEDIATE DISTANCE STATIONS - BD-201, BD-202, BD-203, BD-204, BD-205, BD-206, BD-207, BD-208, BD-209, BD-210, BD-211, BD-212, BD-213, BD-214, BD-215, BD-216

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

CONTROL STATION - BD-03

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

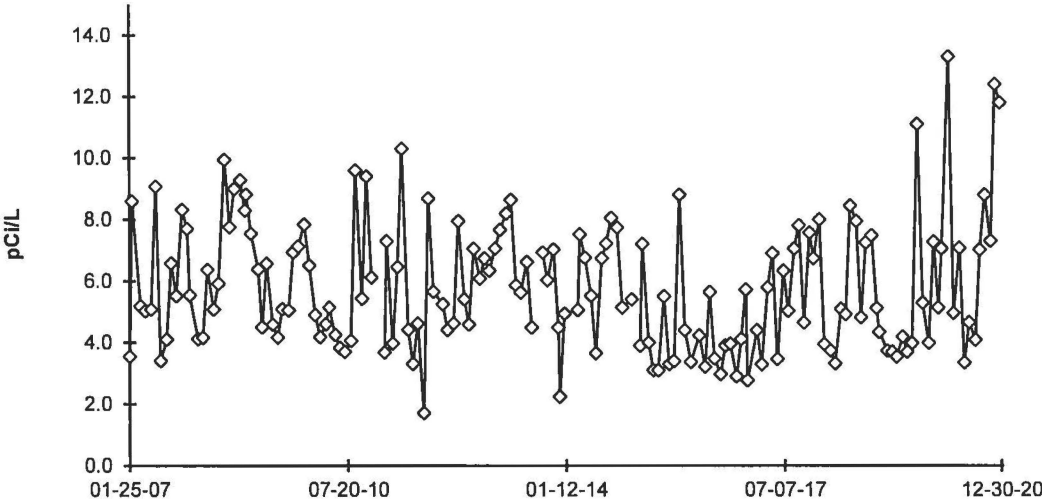
FIGURE C-1
Surface Water - Gross Beta - Stations BD-10 and BD-25 (C)
Collected in the Vicinity of Braidwood Station, 2000 - 2020



*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, 2006 - 2020

BD-38 Main Drainage Ditch



BD-40 Braidwood Station Cooling Lake

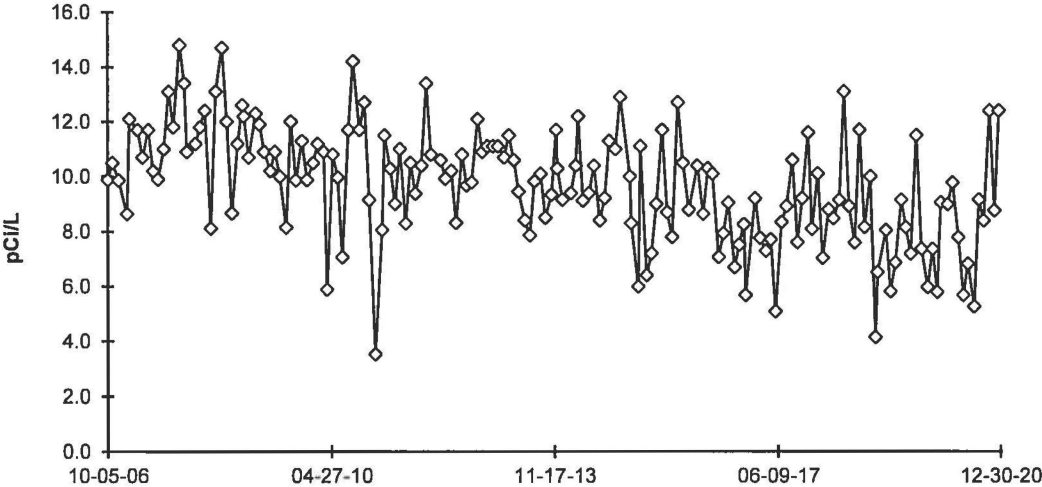
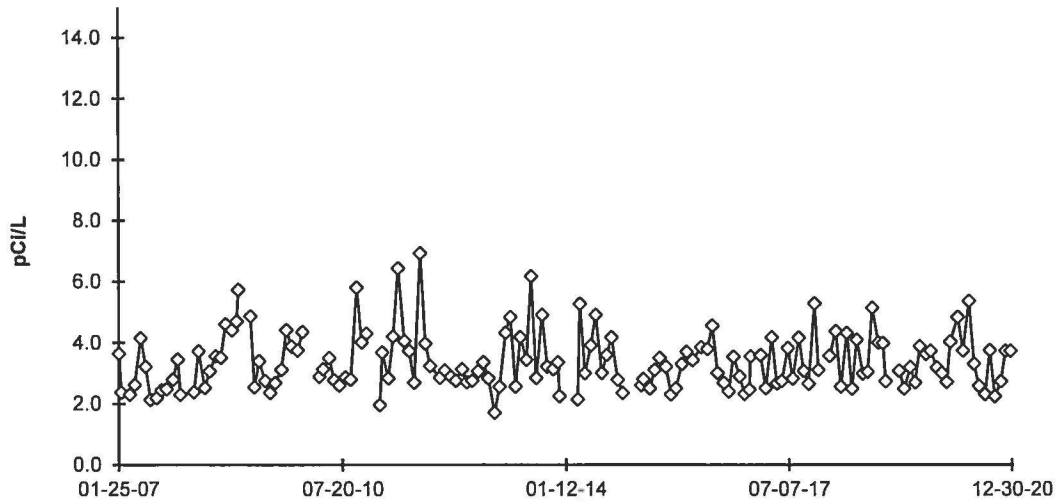
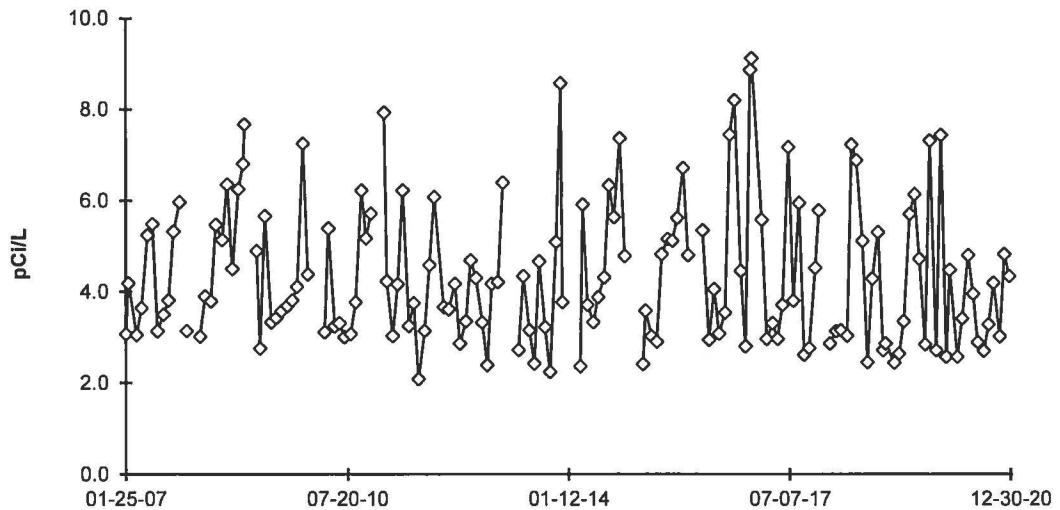


FIGURE C-3
Surface Water - Gross Beta - Stations BD-55 and BD-56
Collected in the Vicinity of Braidwood Station, 2007 - 2020

BD-55 North Pond Fatlan Site

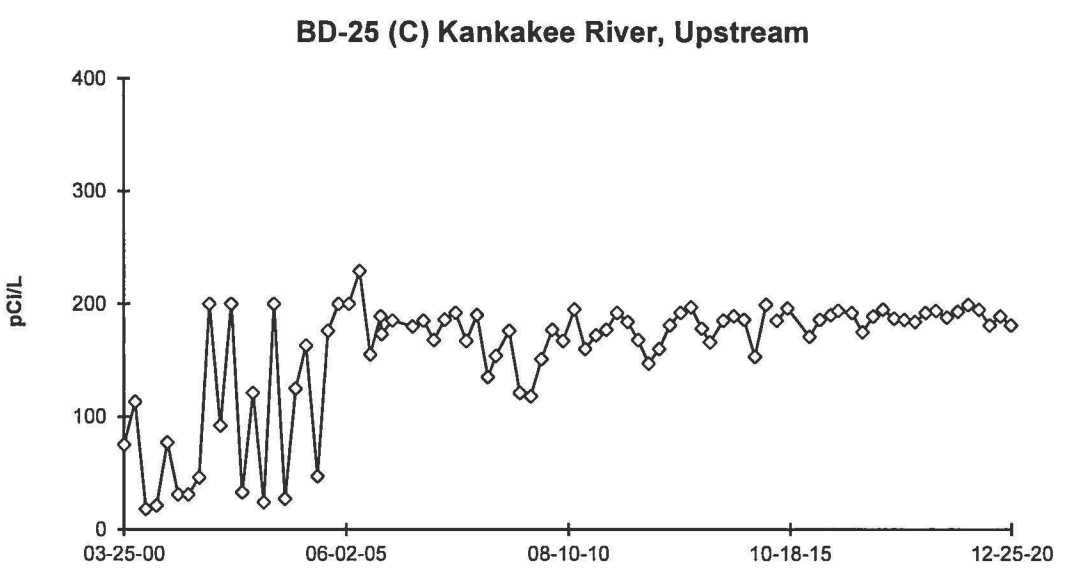
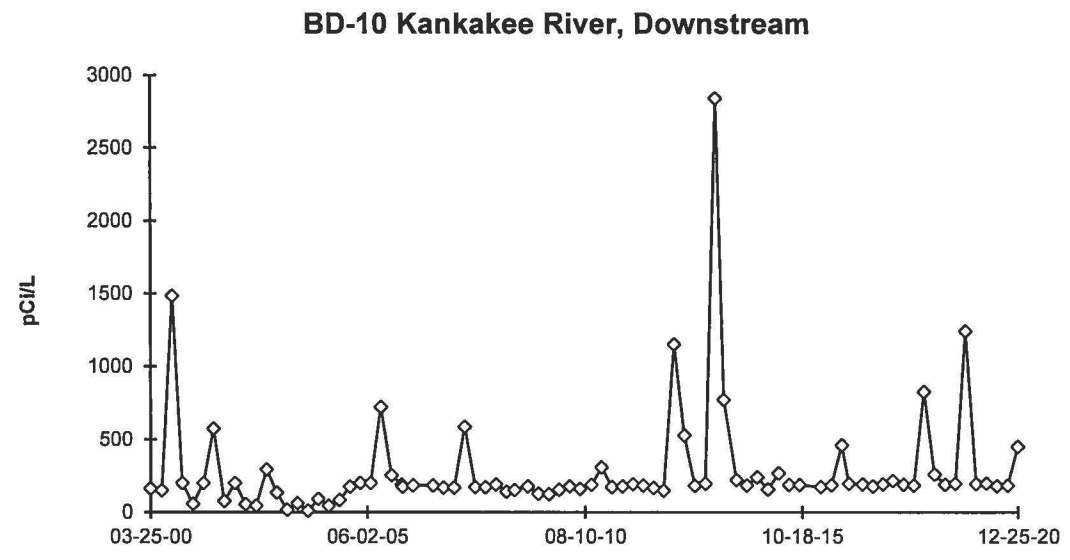


BD-56 South Pond Fatlan Site



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

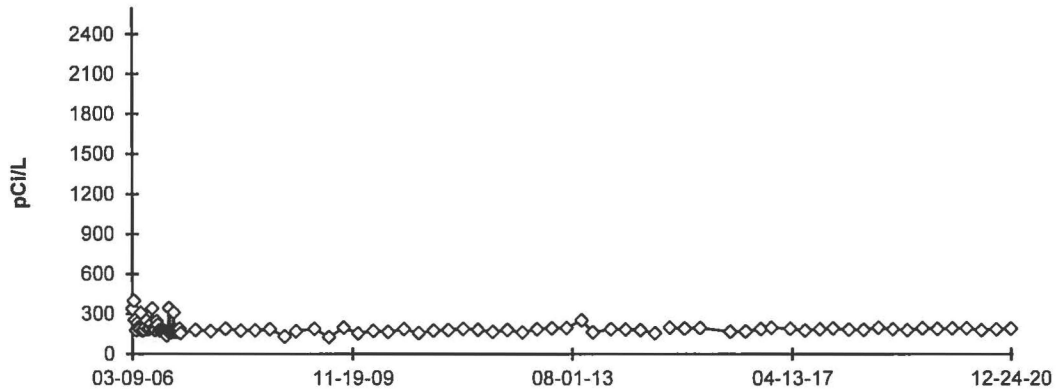
FIGURE C-4
Surface Water - Tritium - Stations BD-10 and BD-25 (C)
Collected in the Vicinity of Braidwood Station, 2000 - 2020



*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 - 2020

BD-38 Main Drainage Ditch



BD-40 Braidwood Station Cooling Lake

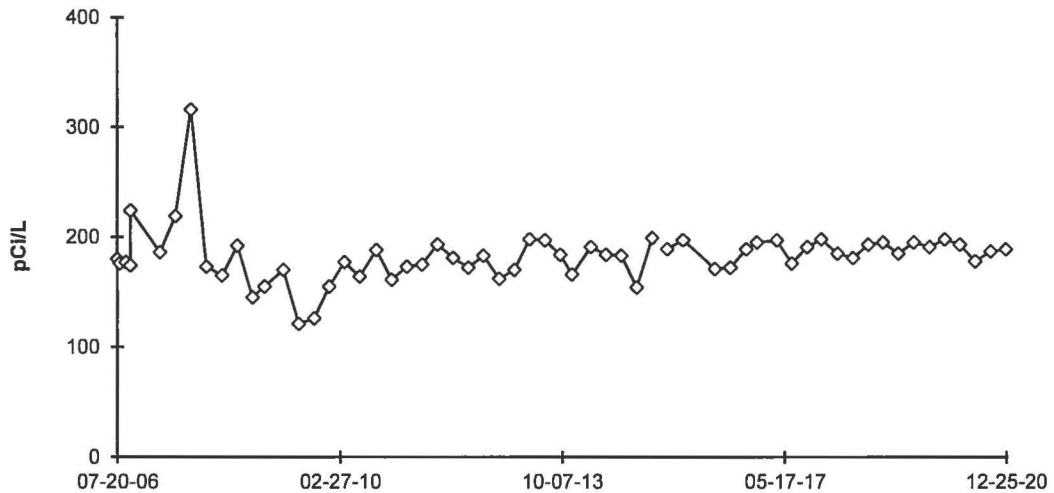


FIGURE C-6
Surface Water - Tritium - Stations BD-55 and BD-56
Collected in the Vicinity of Braidwood Station, 2007 - 2020

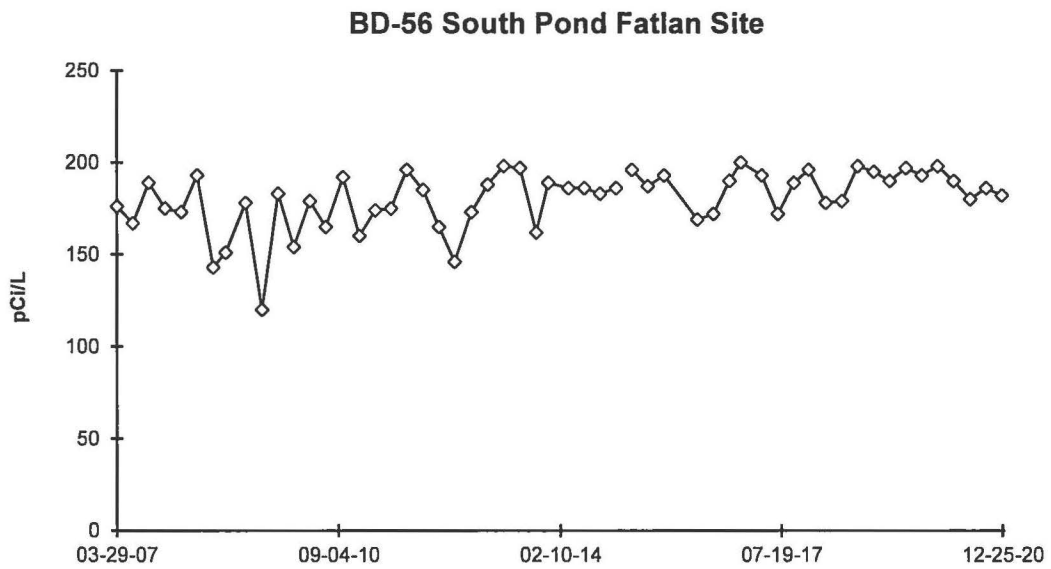
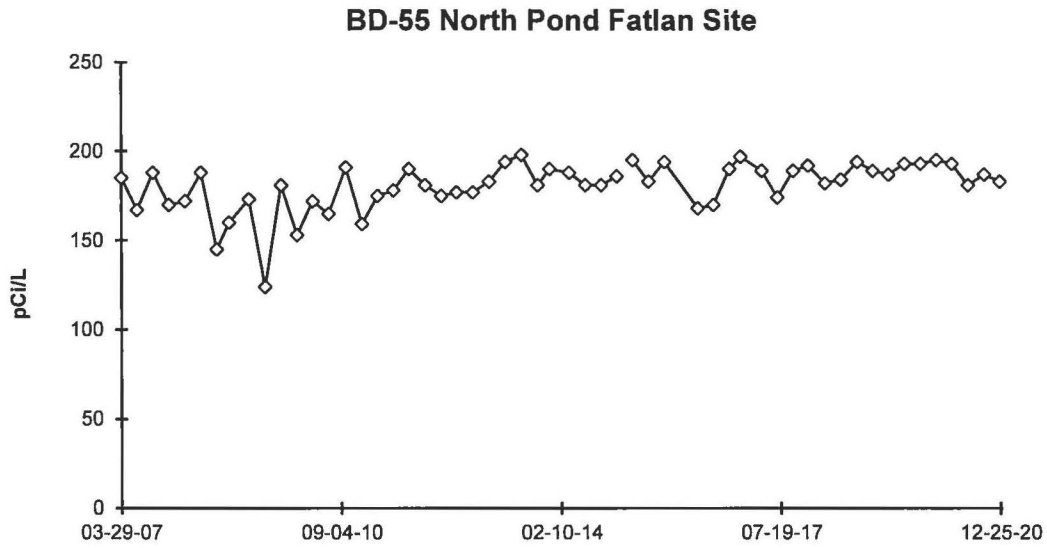
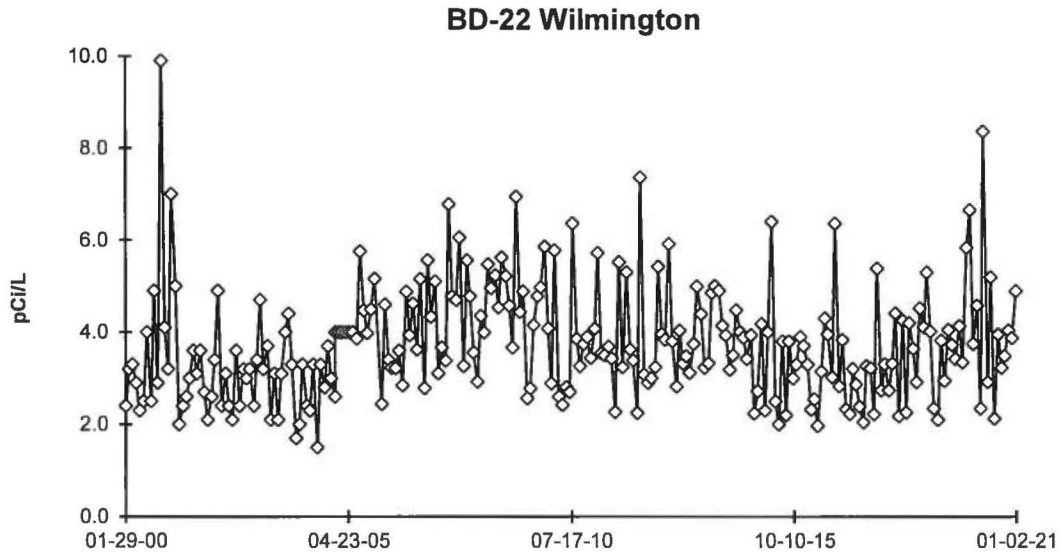
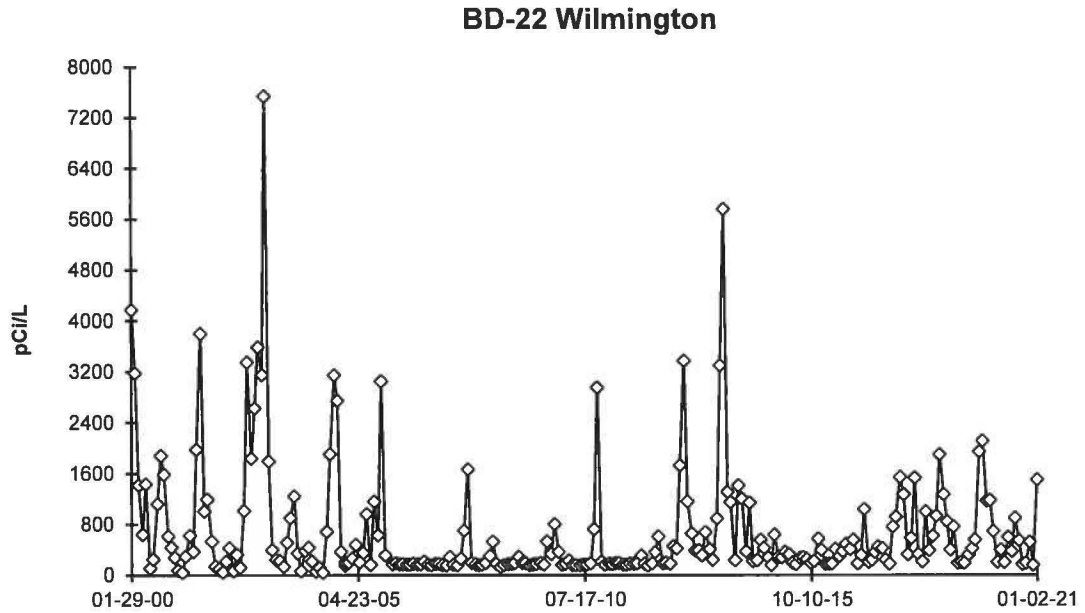


FIGURE C-7
Public Water - Gross Beta - Station BD-22
Collected in the Vicinity of Braidwood Station, 2000 - 2020



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

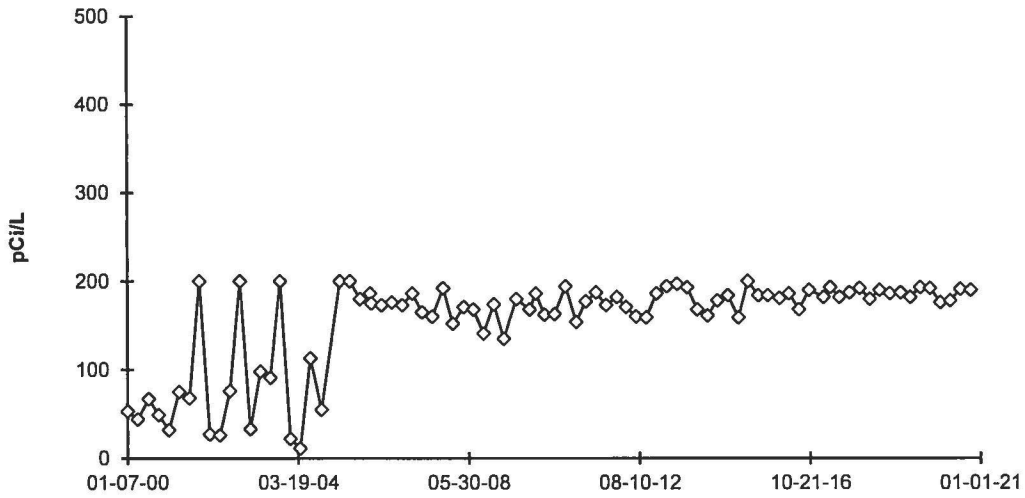
FIGURE C-8
Public Water - Tritium - Station BD-22
Collected in the Vicinity of Braidwood Station, 2000 - 2020



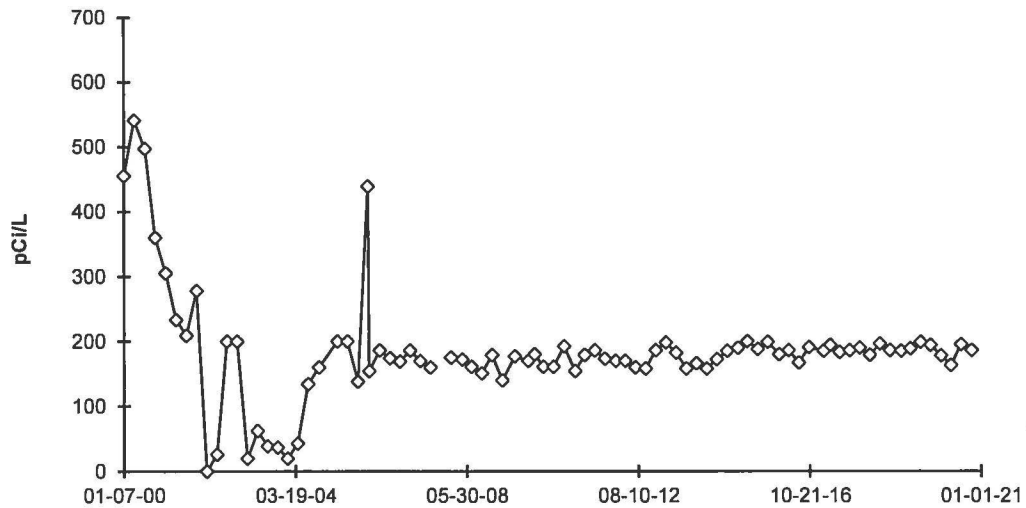
*DUE TO VENDOR CHANGE, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005
AND MDC VALUES AFTER JUNE 2005*

FIGURE C-9
Ground/Well Water - Tritium - Stations BD-13 and BD-34
Collected in the Vicinity of Braidwood Station, 2000 - 2020

BD-13 Braidwood City Hall Well

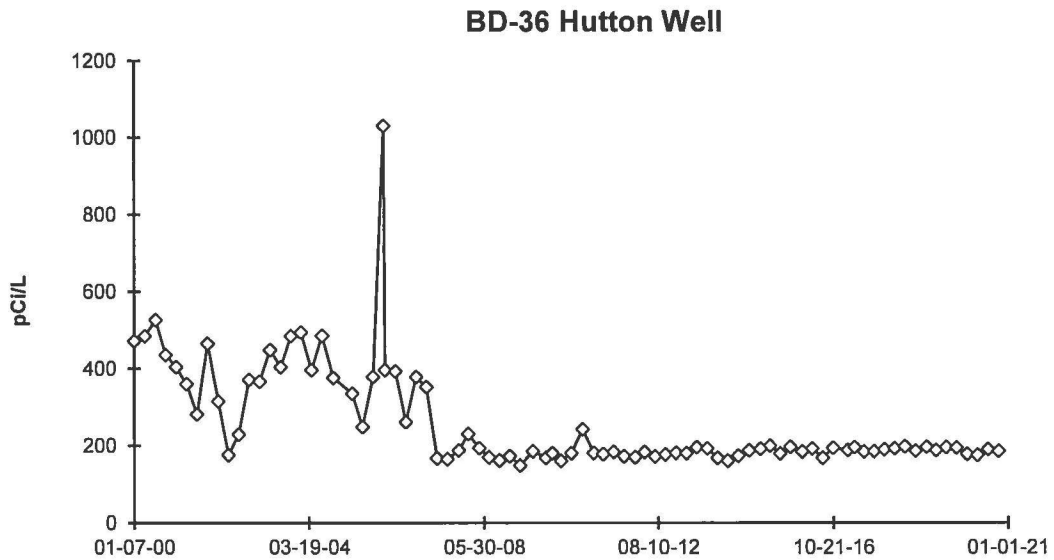
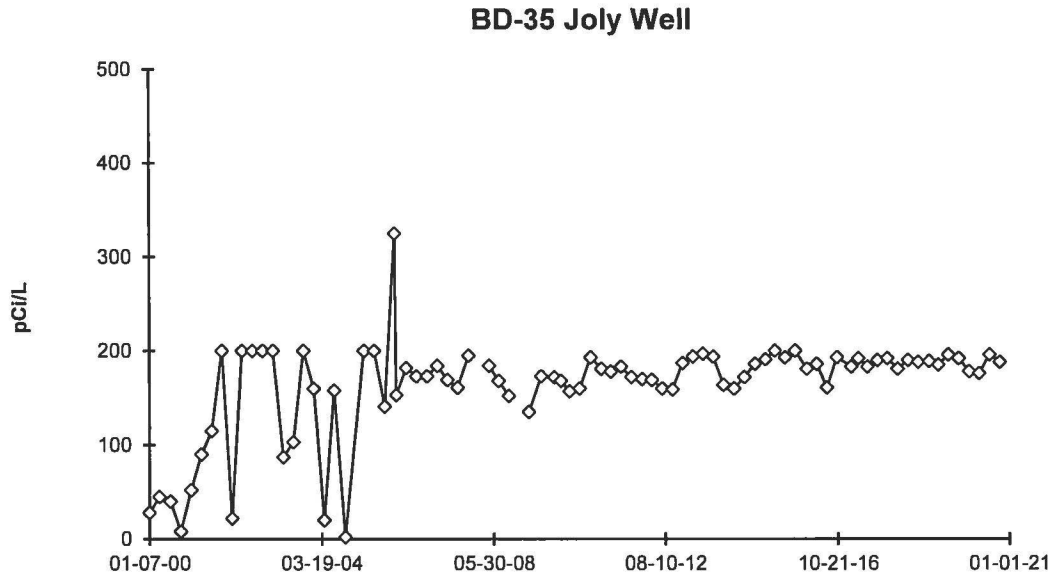


BD-34 Gibson Well



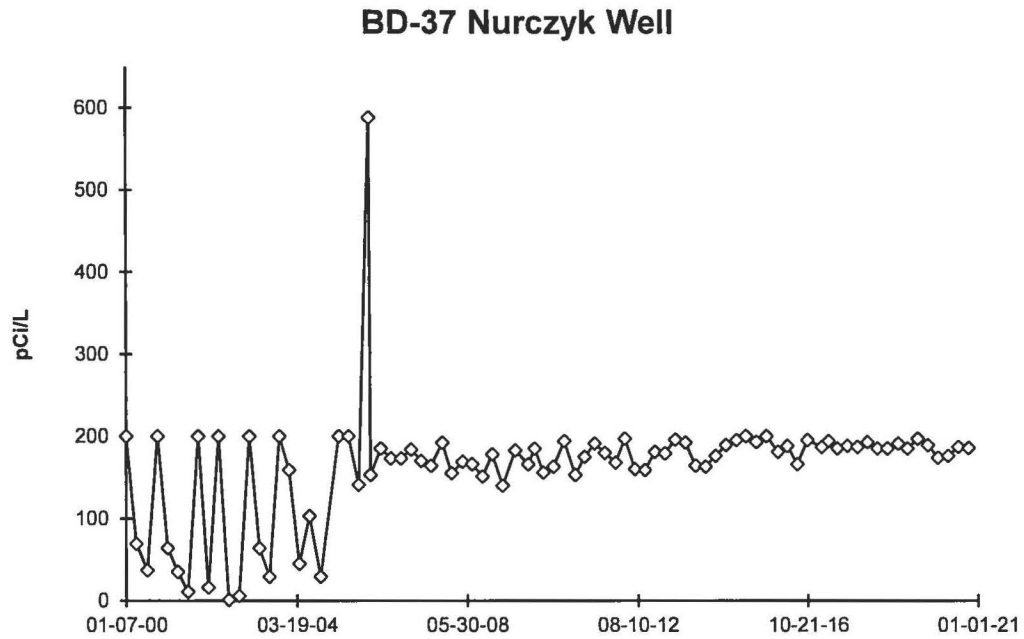
*DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005
 AND MDC VALUES AFTER JULY.*

FIGURE C-10
Ground/Well Water - Tritium - Stations BD-35 and BD-36
Collected in the Vicinity of Braidwood Station, 2000 - 2020



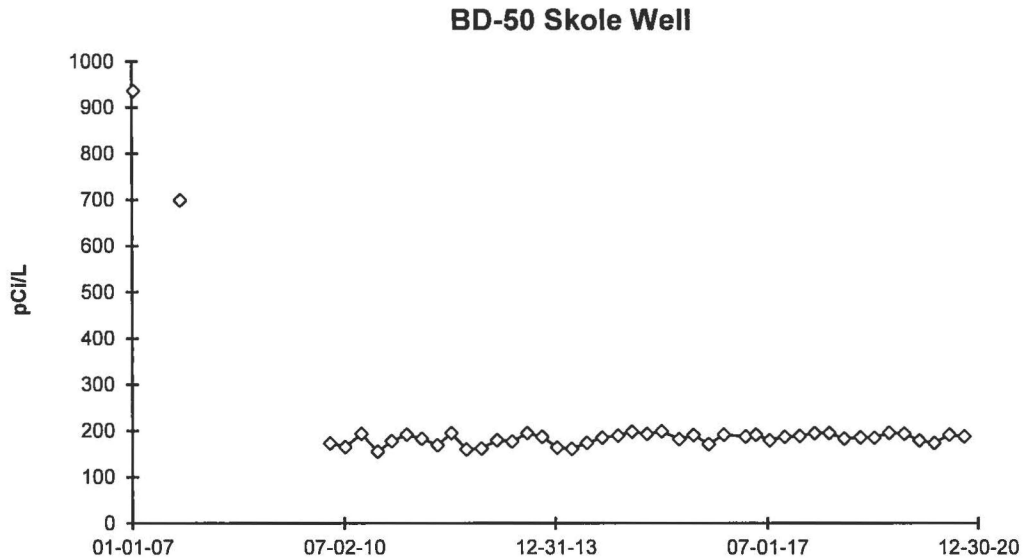
*DUE TO VENDOR CHANGE IN 2005, < VALUES ARE LLD VALUES JANUARY THROUGH JUNE 2005
 AND MDC VALUES AFTER JULY.*

FIGURE C-11
Ground/Well Water - Tritium - Station BD-37
Collected in the Vicinity of Braidwood Station, 2000 - 2020



*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 - 2020



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

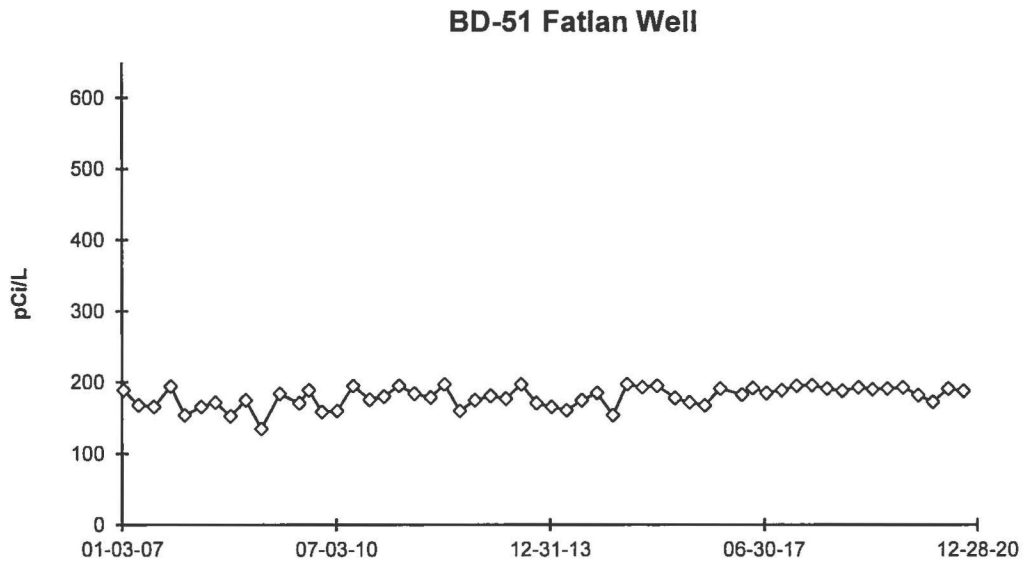


FIGURE C-13
Ground/Well Water - Tritium - Station BD-54
Collected in the Vicinity of Braidwood Station, 2007 - 2020

BD-54 Cash Well

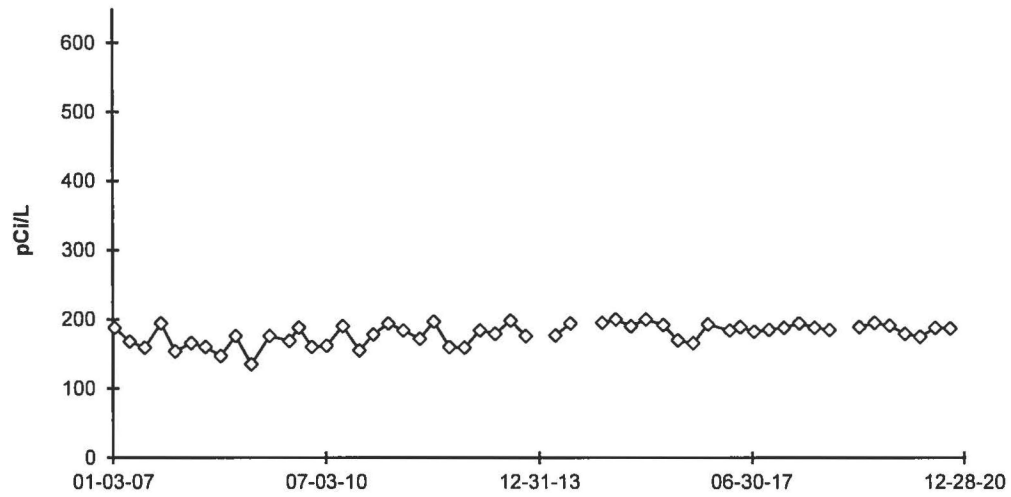


FIGURE C-14
Air Particulate - Gross Beta- Stations BD-03 (C) and BD-06
Collected in the Vicinity of Braidwood Station, 2000 - 2020

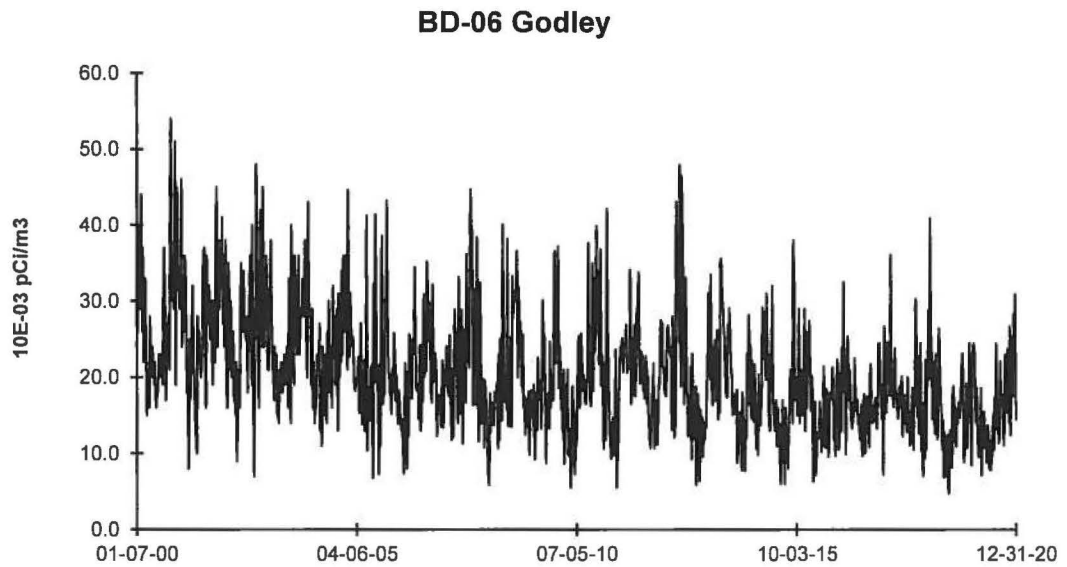
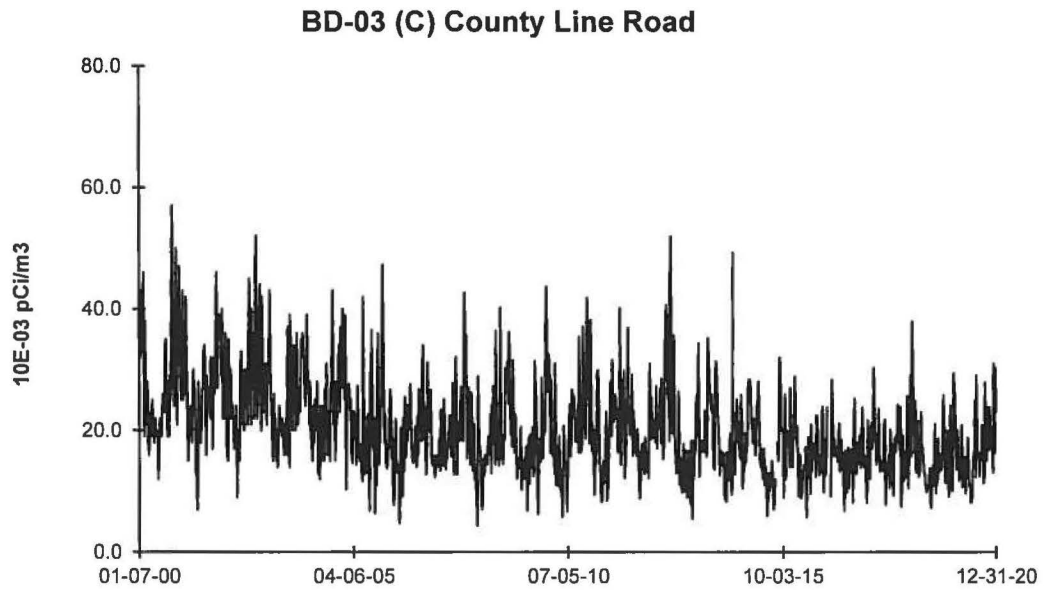
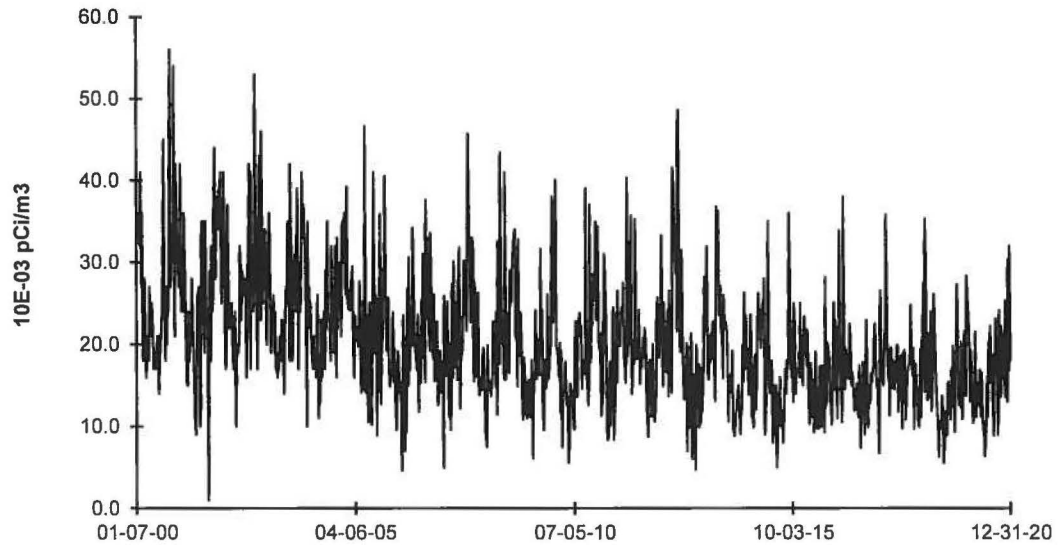


FIGURE C-15
Air Particulate - Gross Beta- Stations BD-19 and BD-20
Collected in the Vicinity of Braidwood Station, 2000 - 2020

BD-19 Near Field, NW



BD-20 Near Field, N

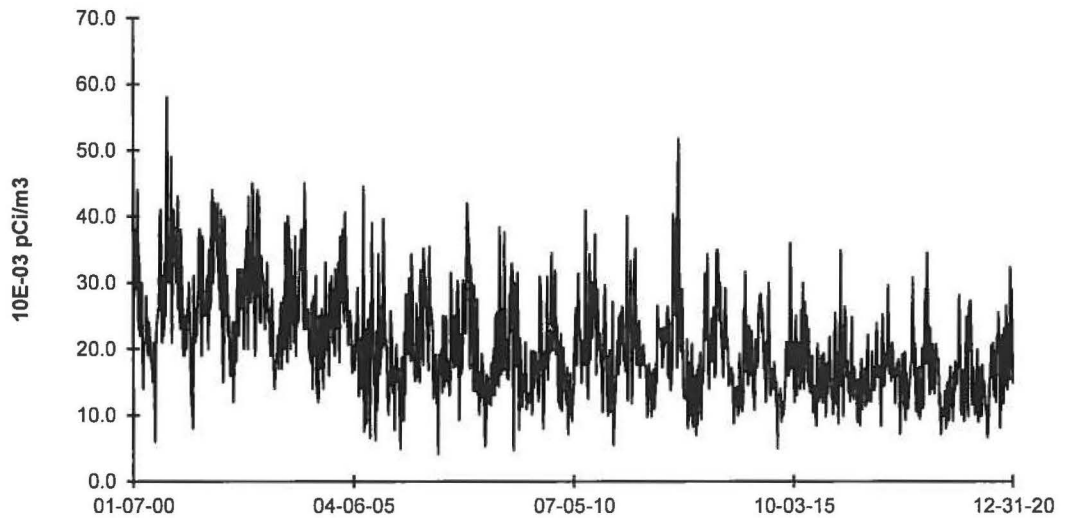


FIGURE C-16
Air Particulate - Gross Beta- Station BD-21
Collected in the Vicinity of Braidwood Station, 2000 - 2020

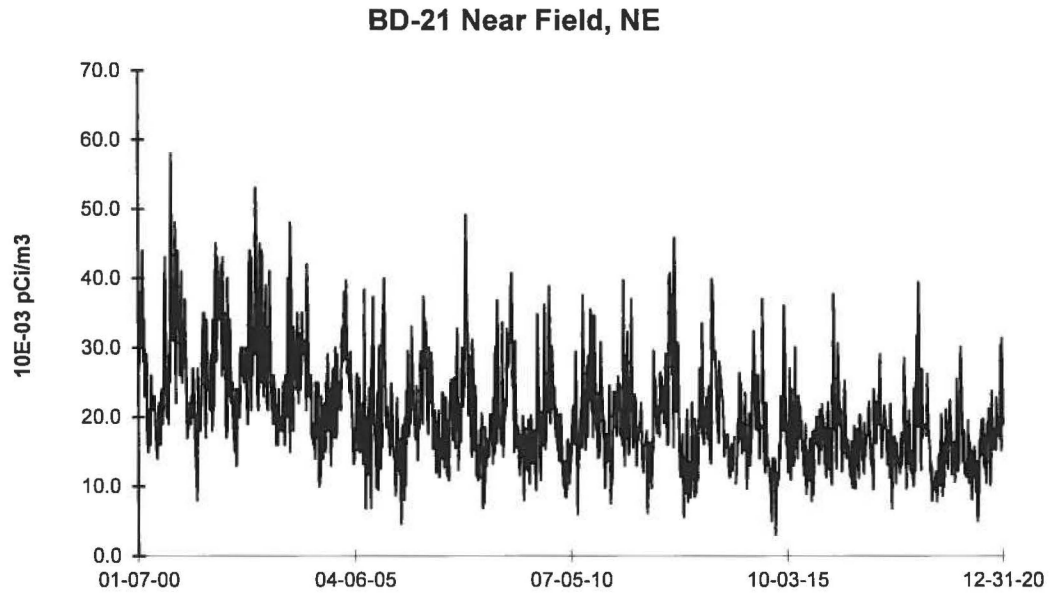


FIGURE C-17
Air Particulate - Gross Beta- Stations BD-02 and BD-04
Collected in the Vicinity of Braidwood Station, 2005 - 2020

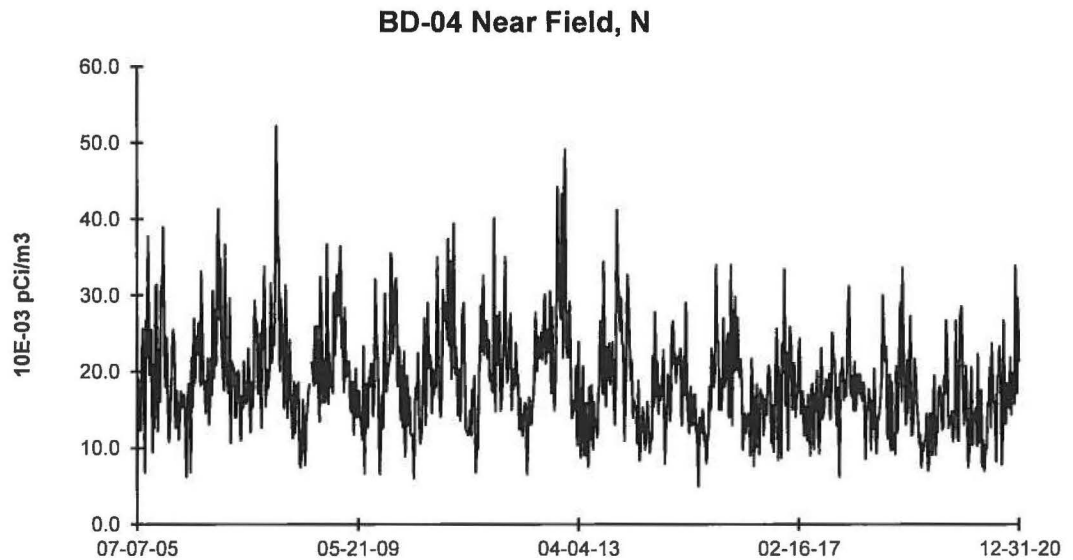
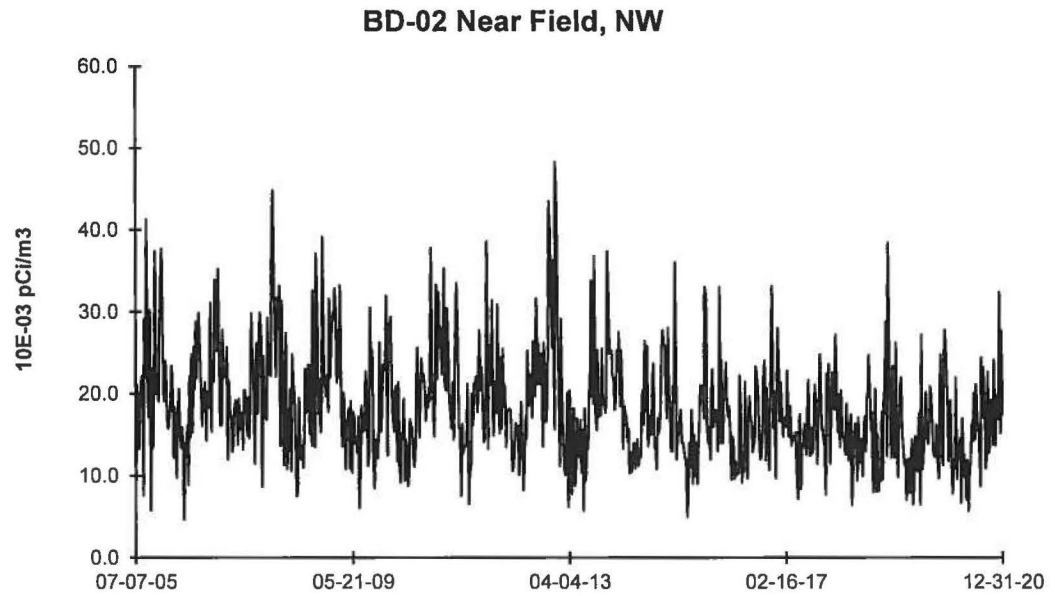
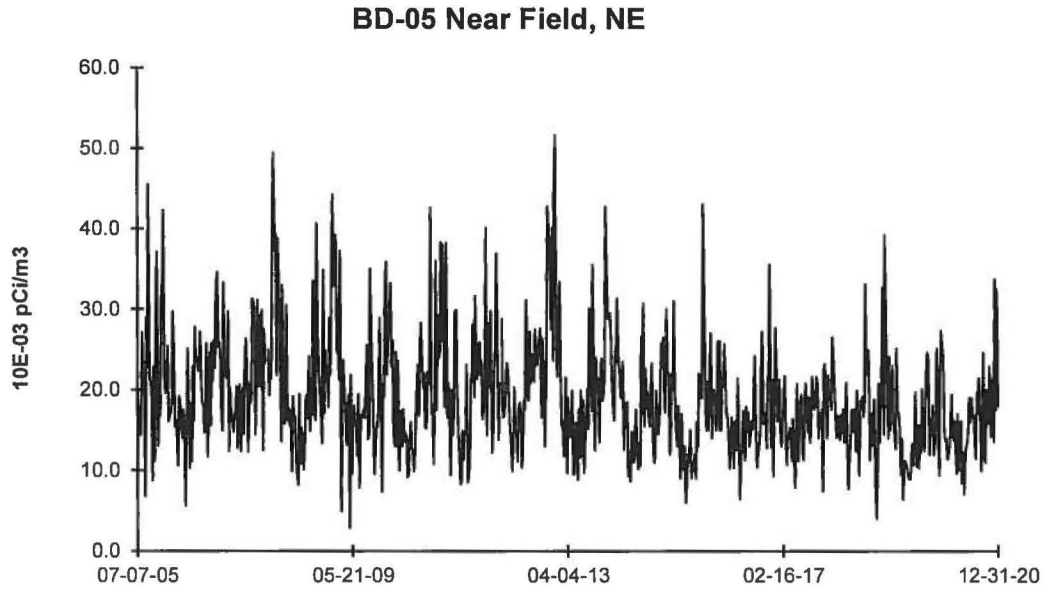


FIGURE C-18
Air Particulate - Gross Beta- Station BD-05
Collected in the Vicinity of Braidwood Station, 2005 - 2020



Intentionally left blank.

APPENDIX D

INTER-LABORATORY COMPARISON PROGRAM

Intentionally left blank

**Analytics Environmental Radioactivity Cross Check Program
Teledyne Brown Engineering Environmental Services**

Table D.1

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Value	Known Value ^(a)	Ratio of TBE to Known Result	Evaluation ^(b)		
September 2020	E13247	Milk	Sr-89	pCi/L	62.8	95.4	0.66	N ⁽¹⁾		
			Sr-90	pCi/L	12.0	12.8	0.94	A		
	E13248	Milk	Ce-141	pCi/L	156	150	1.04	A		
			Co-58	pCi/L	172	180	0.96	A		
			Co-60	pCi/L	369	379	0.97	A		
			Cr-51	pCi/L	372	372	1.00	A		
			Cs-134	pCi/L	171	200	0.85	A		
			Cs-137	pCi/L	241	250	0.96	A		
			Fe-59	pCi/L	217	200	1.08	A		
			I-131	pCi/L	84.6	95.0	0.89	A		
			Mn-54	pCi/L	175	180	0.97	A		
			Zn-65	pCi/L	252	270	0.93	A		
			E13249	Charcoal	I-131	pCi	70.2	75.8	0.93	A
			E13250	AP	Ce-141	pCi	101	101	1.00	A
					Co-58	pCi	111	120	0.92	A
Co-60	pCi	249			254	0.98	A			
Cr-51	pCi	287			249	1.15	A			
Cs-134	pCi	114			134	0.85	A			
Cs-137	pCi	159			168	0.95	A			
Fe-59	pCi	127			134	0.95	A			
Mn-54	pCi	114			121	0.94	A			
Zn-65	pCi	168	181	0.93	A					
E13251	Soil	Ce-141	pCi/g	0.241	0.191	1.26	W			
		Co-58	pCi/g	0.211	0.228	0.93	A			
		Co-60	pCi/g	0.466	0.481	0.97	A			
		Cr-51	pCi/g	0.450	0.472	0.95	A			
		Cs-134	pCi/g	0.273	0.254	1.07	A			
		Cs-137	pCi/g	0.370	0.390	0.95	A			
		Fe-59	pCi/g	0.233	0.254	0.92	A			
		Mn-54	pCi/g	0.217	0.229	0.95	A			
Zn-65	pCi/g	0.368	0.343	1.07	A					
E13252	AP	Sr-89	pCi	79.9	100.0	0.80	A			
		Sr-90	pCi	12.1	13.4	0.90	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 20-19

**Analytics Environmental Radioactivity Cross Check Program
Teledyne Brown Engineering Environmental Services**

Table D.1

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Value	Known Value ^(a)	Ratio of TBE to Known Result	Evaluation ^(b)
December 2020	E13254	Milk	Sr-89	pCi/L	82.2	89.7	0.92	A
			Sr-90	pCi/L	12.4	13.0	0.96	A
	E13255	Milk	Ce-141	pCi/L	91.1	100	0.91	A
			Co-58	pCi/L	77.5	84.3	0.92	A
			Co-60	pCi/L	147	152	0.97	A
			Cr-51	pCi/L	259	253	1.02	A
			Cs-134	pCi/L	97.1	108	0.90	A
			Cs-137	pCi/L	117	127	0.92	A
			Fe-59	pCi/L	114	112	1.02	A
			I-131	pCi/L	84.3	91.9	0.92	A
			Mn-54	pCi/L	137	143	0.96	A
			Zn-65	pCi/L	175	190	0.92	A
			E13256	Charcoal	I-131	pCi	70.2	78.2
	E13257A	AP	Ce-141	pCi	67.4	74.6	0.90	A
			Co-58	pCi	57.9	62.9	0.92	A
			Co-60	pCi	108	113	0.95	A
			Cr-51	pCi	162	189	0.86	A
			Cs-134	pCi	68.1	80.4	0.85	A
			Cs-137	pCi	82.4	95.0	0.87	A
			Fe-59	pCi	80.5	83.7	0.96	A
			Mn-54	pCi	102	107	0.95	A
	E13258	Soil	Ce-141	pCi/g	0.167	0.170	0.98	A
			Co-58	pCi/g	0.125	0.143	0.87	A
			Co-60	pCi/g	0.245	0.257	0.95	A
			Cr-51	pCi/g	0.393	0.429	0.92	A
			Cs-134	pCi/g	0.147	0.183	0.80	A
			Cs-137	pCi/g	0.260	0.288	0.90	A
			Fe-59	pCi/g	0.199	0.190	1.05	A
			Mn-54	pCi/g	0.229	0.243	0.94	A
	E13259	AP	Sr-89	pCi	85.0	78.6	1.08	A
			Sr-90	pCi	13.1	11.4	1.15	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

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

Table D.2

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Value	Known Value ^(a)	Acceptance Range	Evaluation ^(b)
February 2020	20-GrF42	AP	Gross Alpha	Bq/sample	0.676	1.24	0.37 - 2.11	A
			Gross Beta	Bq/sample	2.03	2.00	1.00 - 3.00	A
	20-MaS42	Soil	Ni-63	Bq/kg	0.01		(1)	A
			Sr-90	Bq/kg	348	340	238 - 442	A
	20-MaW42	Water	Ni-63	Bq/L	11.6	11.1	7.8 - 14.4	A
			Pu-238	Bq/L	0.926	0.94	0.66 - 1.22	A
			Pu-239/240	Bq/L	0.712	0.737	0.516 - 0.958	A
	20-RdF42	AP	U-234/233	Bq/sample	0.0416	0.075	0.053 - 0.098	N ⁽³⁾
			U-238	Bq/sample	0.0388	0.078	0.055 - 0.101	N ⁽³⁾
	20-RdV42	Vegetation	Cs-134	Bq/sample	3.23	3.82	2.67 - 4.97	A
			Cs-137	Bq/sample	2.64	2.77	1.94 - 3.60	A
			Co-57	Bq/sample	0.0281		(1)	A
			Co-60	Bq/sample	2.62	2.79	1.95 - 3.63	A
			Mn-54	Bq/sample	4.3	4.58	3.21 - 5.95	A
			Sr-90	Bq/sample	0.396	0.492	0.344 - 0.640	A
Zn-65			Bq/sample	3.93	3.79	2.65 - 4.93	A	
August 2020	20-GrF43	AP	Gross Alpha	Bq/sample	0.267	0.528	0.158 - 0.989	A
			Gross Beta	Bq/sample	0.939	0.915	0.458 - 1.373	A
	20-MaS43	Soil	Ni-63	Bq/kg	438	980	686 - 1274	N ⁽⁴⁾
			Tc-99	Bq/kg	1.11		(1)	A
	20-MaW43	Water	Ni-63	Bq/L	0.175		(1)	A
			Tc-99	Bq/L	8.8	9.4	6.6 - 12.2	A
	20-RdV43	Vegetation	Cs-134	Bq/sample	3.635	4.94	3.46 - 6.42	W
			Cs-137	Bq/sample	0.0341		(1)	A
			Co-57	Bq/sample	5.855	6.67	4.67 - 8.67	W
			Co-60	Bq/sample	3.122	4.13	2.89 - 5.37	W
			Mn-54	Bq/sample	4.524	5.84	4.09 - 7.59	A
			Sr-90	Bq/sample	1.01	1.39	0.97 - 1.81	W
	Zn-65	Bq/sample	4.706	6.38	4.47 - 8.29	W		

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

(b) DOE/MAPEP evaluation:

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

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

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

(1) False positive test

(2) Sensitivity evaluation

(3) See NCR 20-13

(4) See NCR 20-20

**ERA Environmental Radioactivity Cross Check Program
Teledyne Brown Engineering Environmental Services**

Table D.3

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Value	Known Value ^(a)	Acceptance Limits	Evaluation ^(b)	
March 2020	MRAD-32	Water	Am-241	pCi/L	52.5	45.3	31.1 - 57.9	A	
			Fe-55	pCi/L	155	152	89.3 - 221	A	
			Pu-238	pCi/L	34.0	36.4	21.9 - 47.2	A	
			Pu-239	pCi/L	30.9	33.6	20.8 - 41.4	A	
April 2020	RAD-121	Water	Ba-133	pCi/L	41.8	41.8	34.0 - 46.7	A	
			Cs-134	pCi/L	42.9	46.3	37.1 - 50.9	A	
			Cs-137	pCi/L	226	234	211 - 259	A	
			Co-60	pCi/L	52.4	50.3	45.3 - 57.9	A	
			Zn-65	pCi/L	83.3	86.8	78.1 - 104	A	
			GR-A	pCi/L	20.1	23.6	11.9 - 31.6	A	
			GR-B	pCi/L	45.6	60.5	41.7 - 67.2	A	
			U-Nat	pCi/L	18.45	18.6	14.9 - 20.9	A	
			H-3	pCi/L	14200	14100	12300 - 15500	A	
			Sr-89	pCi/L	58.0	60.1	48.3 - 67.9	A	
			Sr-90	pCi/L	34.1	44.7	33.0 - 51.2	A	
			I-131	pCi/L	27.4	28.9	24.1 - 33.8	A	
September 2020	MRAD-33	Soil	Sr-90	pCi/Kg	4360	4980	1550 - 7760	A	
			AP	Fe-55	pCi/Filter	189	407	149 - 649	A
				U-234	pCi/Filter	17.9	18.3	13.6 - 21.4	A
				U-238	pCi/Filter	19.1	18.1	13.7 - 21.6	A
		Water	Am-241	pCi/L	160	176	121 - 225	A	
			Fe-55	pCi/L	299	298	175 - 433	A	
			Pu-238	pCi/L	200	191	115 - 247	A	
			Pu-239	pCi/L	105	100	61.9 - 123	A	
October 2020	RAD-123	Water	Ba-133	pCi/L	37.1	37.0	29.8 - 41.6	A	
			Cs-134	pCi/L	50.6	52.7	42.5 - 58.0	A	
			Cs-137	pCi/L	131	131	118 - 146	A	
			Co-60	pCi/L	62.9	60.5	54.4 - 69.1	A	
			Zn-65	pCi/L	167	162	146 - 191	A	
			GR-A	pCi/L	40.0	26.2	13.3 - 34.7	N ⁽¹⁾	
			GR-B	pCi/L	47.5	69.1	48.0 - 76.0	N ⁽¹⁾	
			U-Nat	pCi/L	17.2	20.3	16.3 - 22.7	A	
			H-3	pCi/L	23800	23200	20,300 - 25,500	A	
			Sr-89	pCi/L	41.1	43.3	33.4 - 50.5	A	
			Sr-90	pCi/L	28.5	30.2	22.0 - 35.0	A	
			I-131	pCi/L	22.9	28.2	23.5 - 33.1	N ⁽²⁾	
November 2020	QR111920K	Water	GR-A	pCi/L	50.7	52.4	27.3 - 65.6	A	
			GR-B	pCi/L	24.9	24.3	15.0 - 32.3	A	

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

(b) ERA evaluation:

A = Acceptable - Reported value falls within the Acceptance Limits

N = Not Acceptable - Reported value falls outside of the Acceptance Limits

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

(2) See **NCR 20-17**

APPENDIX E

ERRATA DATA

Intentionally left blank.

There was no errata data for 2020.

Intentionally left blank

APPENDIX F

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 2020

Prepared By
Teledyne Brown Engineering
Environmental Services



Braidwood Station
Braceville, IL 60407

May 2021

Intentionally left blank

Table Of Contents

I. Summary and Conclusions	1
II. Introduction.....	2
A. Objectives of the RGPP	2
B. Implementation of the Objectives	2
C. Program Description.....	3
D. Characteristics of Tritium (H-3).....	3
III. Program Description.....	4
A. Sample Analysis	4
B. Data Interpretation	4
C. Background Analysis.....	5
IV. Results and Discussion	7
A. Missed Samples	7
B. Groundwater Results	7
C. Surface Water Results.....	7
D. Summary of Results – Inter-laboratory Comparison Program	8
E. Leaks, Spills, and Releases.....	8
F. Trends	8
G. Investigations	8
H. Actions Taken.....	8

Appendices

Appendix A Location Designation

Tables

Table A-1 Radiological Groundwater Protection Program - Sampling Locations, Braidwood Station, 2020

Figures

Figure A-1 RGPP Protected Area Monitoring Well Sample Locations Braidwood Station, 2020

Figure A-2 RGPP Surface Water Sample Locations Braidwood Station, 2020

Figure A-3 RGPP VB-1 – VB-4 Area Monitoring Well Sample Locations Braidwood Station, 2020

Figure A-4 RGPP Blowdown Line Monitoring Well Sample Locations Braidwood Station, 2020

Figure A-5 RGPP CWBD Monitoring Well Sample Locations Braidwood Station, 2020

Appendix B Data Tables

Tables

Table B-I.1 Concentrations of Tritium, Strontium and Gross Alpha in Groundwater Samples Collected in the Vicinity of Braidwood Station, 2020

Table B-I.2 Concentrations of Gamma Emitters in Groundwater Samples Collected in the Vicinity of Braidwood Station, 2020

Table B-I.3 Concentrations of Hard-To-Detects in Groundwater Samples Collected in the Vicinity of Braidwood Station, 2020

Table B-II.1 Concentrations of Tritium, Strontium and Gross Alpha in Surface Water Samples Collected in the Vicinity of Braidwood Station, 2020

Table B-II.2 Concentrations of Gamma Emitters in Surface Water Samples Collected in the Vicinity of Braidwood Station, 2020

I. Summary and Conclusions

In 2020, 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 2020. During that time period, 324 analyses were performed on 135 samples from 35 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 (H-3) was detected in any sample 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. Low levels of tritium were detected in groundwater and surface water at concentrations greater than the LLD of 200 pCi/L in 46 of 127 samples. The tritium concentrations ranged from 179 ± 116 pCi/L to $1,000 \pm 167$ 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 analyses in the dissolved and suspended fractions were performed on groundwater water samples throughout the sampling year in 2020. Gross Alpha (suspended) was detected in 1 groundwater sample with a concentration of 3.8 to 1.7 pCi/L. Gross Alpha (suspended) was not detected in any groundwater samples.

Gross Alpha analyses in the dissolved and suspended fractions were performed on surface water samples quarterly in 2020. No Gross Alpha (dissolved and suspended) was detected in surface water samples.

Hard-To-Detect analyses including 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) were performed on one sample location in 2020. U-233/234 was detected in 2 samples with concentrations ranging from 0.77 ± 0.34 pCi/L to 1.20 ± 0.38 pCi/L. U-238 was detected in 2 samples with concentrations ranging from 0.49 ± 0.27 pCi/L to 0.34 ± 0.22 pCi/L. No other HTD's were detected above the detection limit.

II. 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 Environmental Inc. Midwest Labs (EIML) on samples collected in 2020.

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 2020.

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 (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 was used as a baseline with which these operational data was 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 (\pm) 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 2020. 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. These sample results cannot be distinguished as different from background at this concentration.

IV. Results and Discussion

A. Missed Samples

There were no missed samples during 2020.

B. Groundwater Results

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 1,000 pCi/L. (Tables B-I.1, Appendix B)

Strontium

Thirty-two samples for analyzed for Sr-89 and Sr-90. 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 (dissolved and suspended)

Gross Alpha analyses in the dissolved and suspended fractions were performed on groundwater water samples throughout the sampling year in 2020. Gross Alpha (suspended) was detected in 1 groundwater sample at a concentration of 3.8 ± 1.0 pCi/L. Gross Alpha (dissolved) was not detected in any groundwater samples. (Table B-I.1, Appendix B)

Hard-To-Detect

Hard-To-Detect analyses including Am-241, Cm-242, Cm-243/244, Pu-238, Pu-239/240, U-234, U-235 and U-238 were analyzed at one location in 2020. U-233/234 was detected in 2 samples with concentrations ranging from 0.77 ± 0.34 pCi/L to 1.20 ± 0.38 pCi/L. U-238 was detected in 2 samples with concentrations ranging from 0.49 ± 0.27 pCi/L to 0.34 ± 0.22 pCi/L. No other HTD's were detected above the detection limit. (Table B-I.3, Appendix B)

Gamma Emitters

Naturally-occurring K-40 was detected in two samples with concentrations of 42 ± 28 pCi/L and 72 ± 33 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

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. Tritium values were all less than the lower limit of detection. (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 (dissolved and suspended)

Two surface water samples were analyzed for Gross Alpha in the dissolved and suspended fractions. No Gross Alpha (dissolved and suspended) was detected in any of the samples analyzed. (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 were no leaks, spills or releases to groundwater in 2020.

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

There were no new investigations in 2020.

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 groundwater remediation efforts to remove the tritium contamination from the area.

4. All remediation and support equipment were removed from Exelon Braidwood Station property due to closure of the Braidwood Generating Station Consent Order No. 06 MR 248. Consent Order No. 06 MR 248 was terminated on May 14, 2020 by the Illinois Attorney General and Illinois Environmental Protection Agency.

Intentionally left blank

APPENDIX A

LOCATION DESIGNATION

Intentionally left blank

TABLE A-1: Radiological Groundwater Protection Program Sampling Locations,
Braidwood Station, 2020

<u>Station Code</u>	<u>Sample Description</u>
OWM31P	Drinking Water
DITCH F (DS-2)	Surface Water
MW-2	Monitoring Well
MW-4	Monitoring Well
MW-5	Monitoring Well
MW-6	Monitoring Well
MW-7	Monitoring Well
MW-9	Monitoring Well
MW-11	Monitoring Well
MW-102R	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-BW-201S	Monitoring Well
MW-BW-202S	Monitoring Well
MW-BW-203S	Monitoring Well
MW-BW-207I	Monitoring Well
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
RW-6	Recovery Well
RW-11	Recovery Well
RW-12	Recovery Well
SG-BW-102 DITCH C	Surface Water
VB1-1	Monitoring Well
VB2-5DR	Monitoring Well
VB3-2	Monitoring Well
VB5-2	Monitoring Well
VB6-1	Monitoring Well
VB7-1	Monitoring Well
VB6-1	Monitoring Well
VB7-1	Monitoring Well
VB8-2R	Monitoring Well
VB9-1	Monitoring Well
VB10-1R	Monitoring Well
VB11-1	Monitoring Well

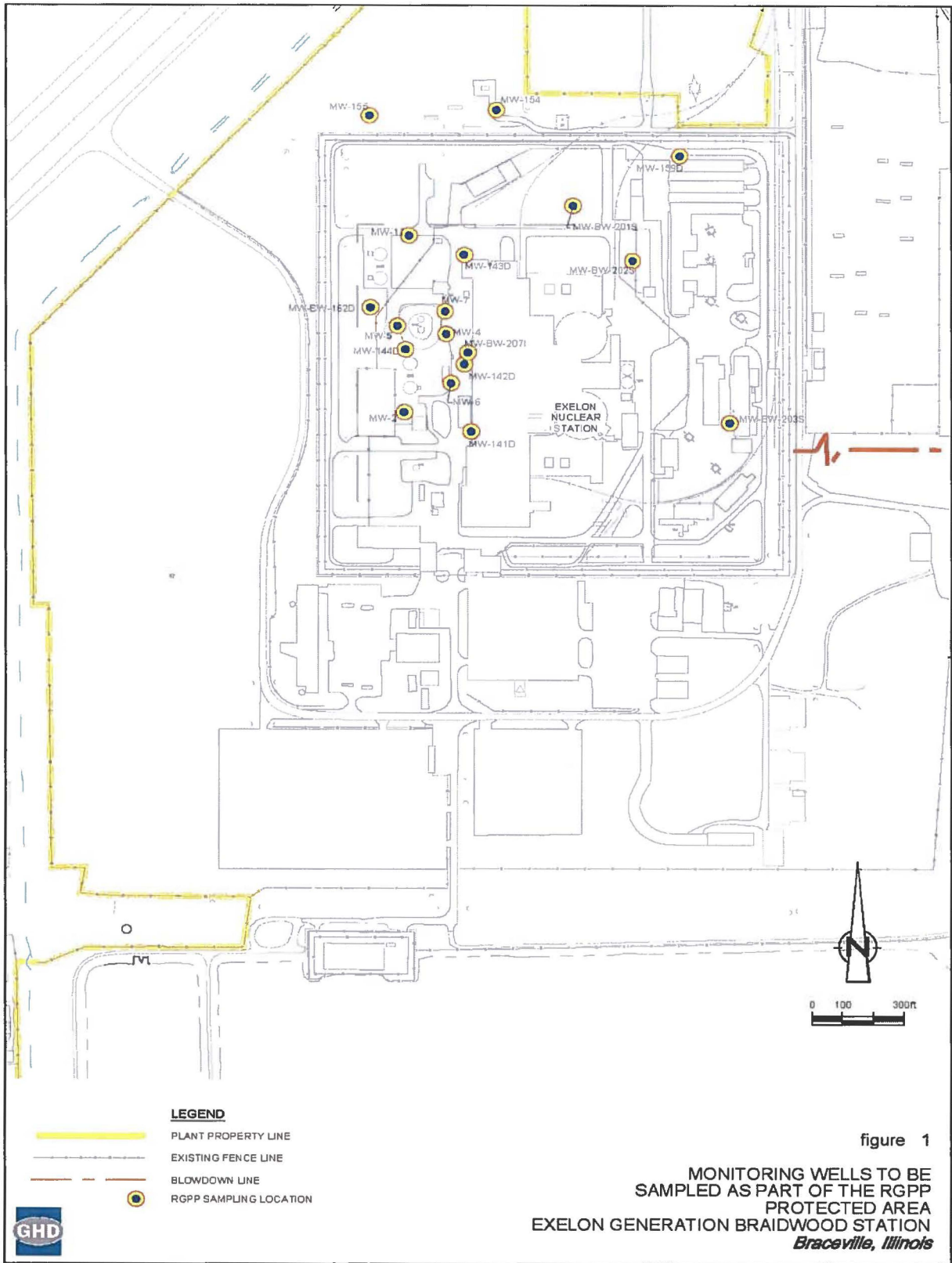


Figure A-1
 RGPP Protected Area Monitoring Well Sample Locations
 Braidwood Station, 2020

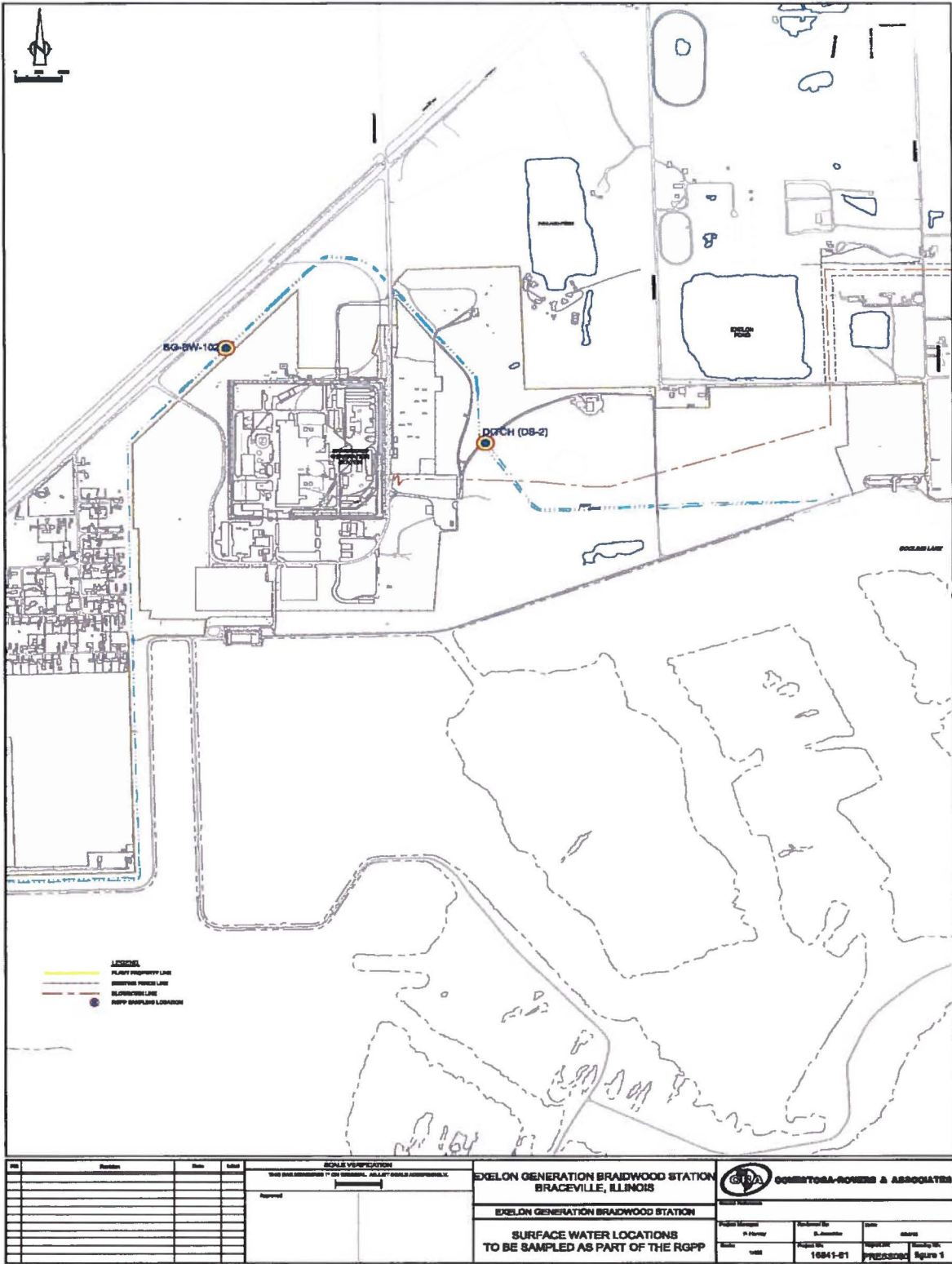


Figure A-2
 RGPP Surface Water Sample Locations
 Braidwood Station, 2020

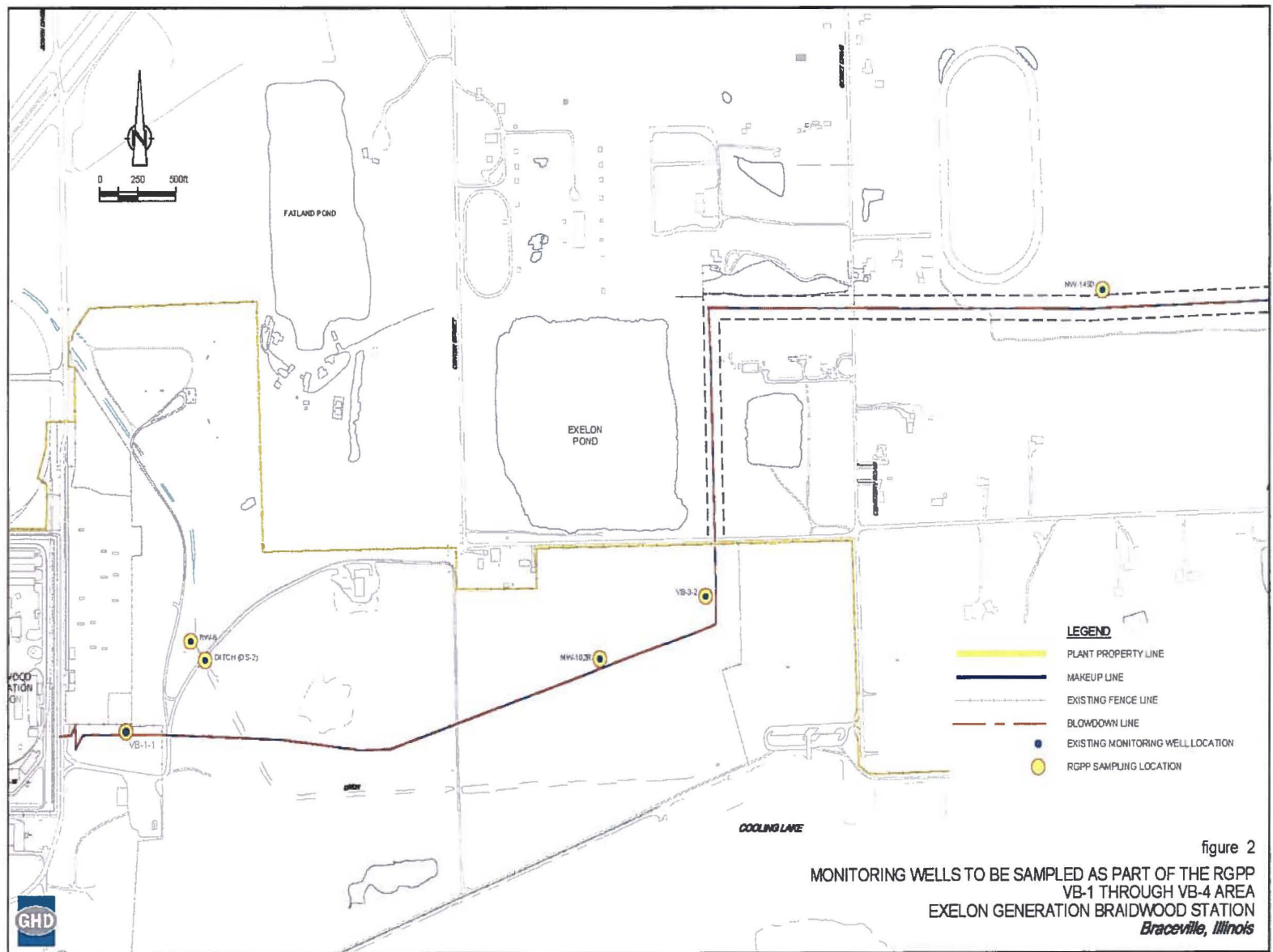


figure 2
 MONITORING WELLS TO BE SAMPLED AS PART OF THE RGPP
 VB-1 THROUGH VB-4 AREA
 EXELON GENERATION BRAIDWOOD STATION
 Braceville, Illinois

Figure A-3
 RGPP VB-1 – VB-4 Area Monitoring Well Sample Locations
 Braidwood Station, 2020

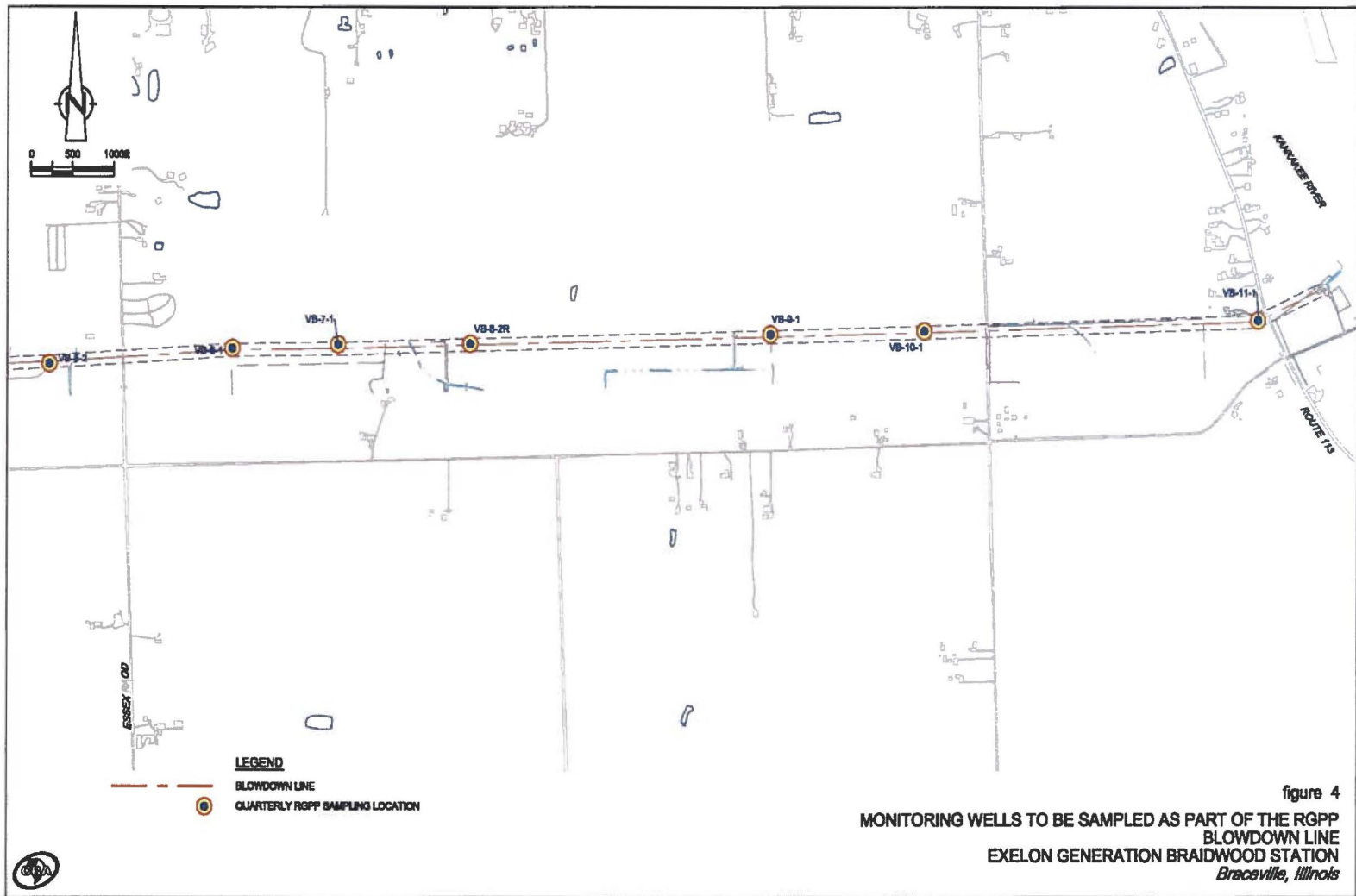


Figure A-4
RGPP Blowdown Line Monitoring Well Sample Locations
Braidwood Station, 2020

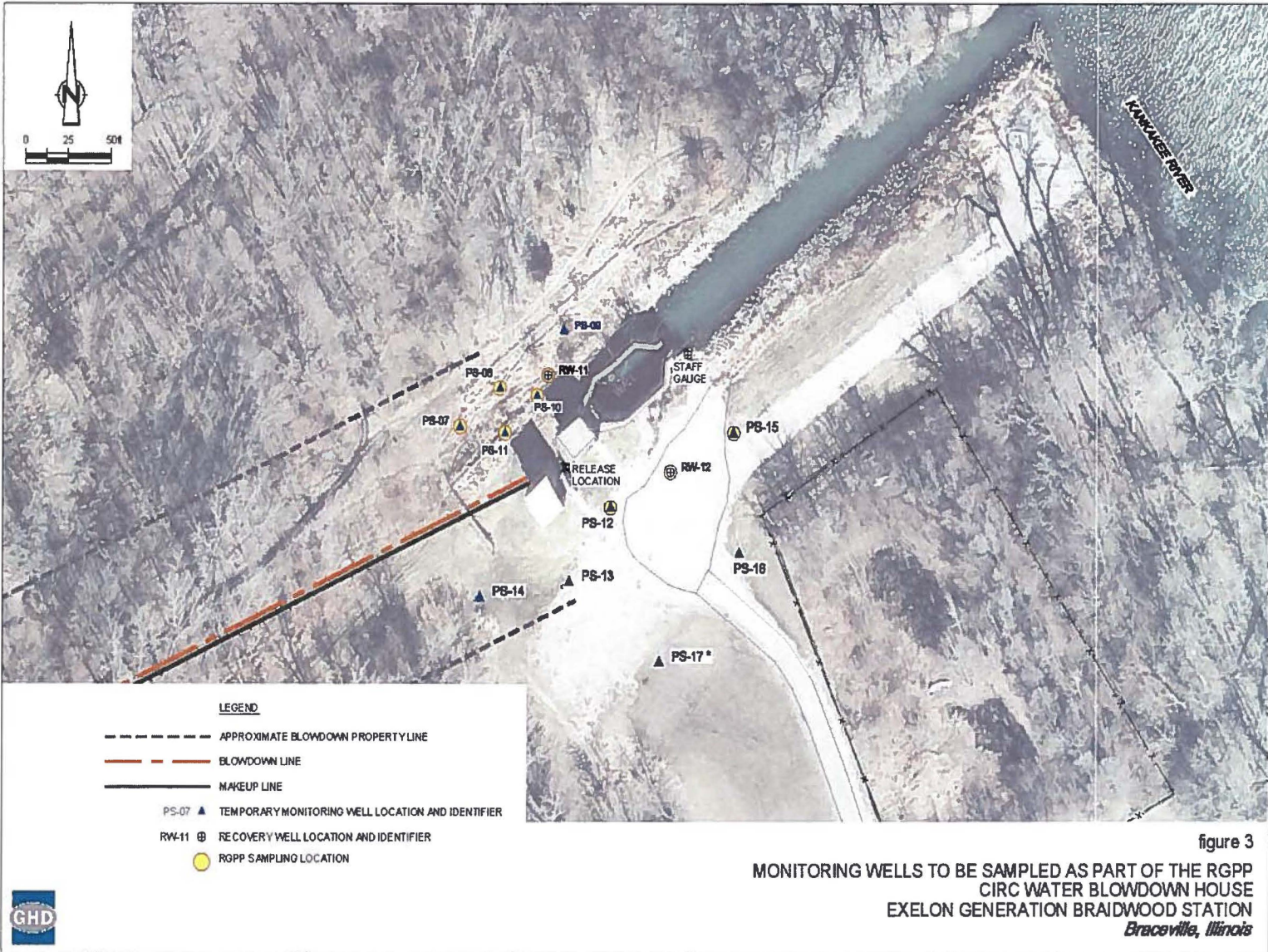


figure 3
 MONITORING WELLS TO BE SAMPLED AS PART OF THE RGPP
 CIRC WATER BLOWDOWN HOUSE
 EXELON GENERATION BRAIDWOOD STATION
 Bracøville, Illinois

Figure A-5
 RGPP CWBD Monitoring Water Sample Locations
 Braidwood Station, 2020

APPENDIX B

DATA TABLES

Intentionally left blank.

**TABLE B-1.1 CONCENTRATIONS OF TRITIUM, STRONTIUM, AND GROSS ALPHA IN GROUNDWATER
 SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020
 RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA**

SITE	COLLECTION		H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)
	DATE						
MW-2	03/20/20		336 ± 126				
MW-2	04/17/20		203 ± 119				
MW-2	09/21/20		204 ± 122	< 9.4	< 0.9	< 0.8	< 0.4
MW-2	11/30/20		209 ± 125				
MW-4	03/23/20		388 ± 133				
MW-4	04/16/20		403 ± 125				
MW-4	08/26/20		381 ± 128	< 6.6	< 0.9	< 1.7	< 1.1
MW-4	11/09/20		342 ± 124				
MW-5	03/17/20		277 ± 123				
MW-5	04/17/20		< 181				
MW-5	08/25/20		196 ± 116	< 6.5	< 0.8	< 0.6	< 0.6
MW-5	11/09/20		215 ± 121				
MW-6	03/20/20		498 ± 134				
MW-6	04/18/20		< 183				
MW-6	08/26/20		369 ± 125	< 6.7	< 0.8	< 1.5	< 1.3
MW-6	12/10/20		506 ± 137				
MW-7	03/17/20		308 ± 125				
MW-7	04/16/20		518 ± 132				
MW-7	08/26/20		301 ± 123	< 9.4	< 0.9	< 0.8	< 1.13
MW-7	11/30/20		325 ± 132				
MW-11	03/23/20		< 185				
MW-11	04/17/20		< 177				
MW-11	08/25/20		< 178	< 5.8	< 0.7	< 0.7	< 0.6
MW-11	10/27/20		239 ± 130				
MW-102R	03/24/20		< 186				
MW-102R	04/22/20		< 188				
MW-102R	08/27/20		< 177	< 6.6	< 0.7	< 0.4	< 1.1
MW-102R	12/02/20		< 190				
MW-141D	03/20/20		374 ± 125				
MW-141D	04/18/20		435 ± 129				
MW-141D	09/21/20		407 ± 131	< 5.1	< 1.0	< 7.4	< 7.0
MW-141D	12/10/20		471 ± 134			< 6.9	< 0.7
MW-142D	03/20/20		789 ± 153				
MW-142D	04/18/20		803 ± 153				
MW-142D	08/26/20		1000 ± 167	< 6.9	< 0.8	< 4.0	< 2.0
MW-142D	11/09/20		794 ± 153				
MW-143D	03/17/20		< 184				
MW-143D	04/16/20		< 183				
MW-143D	08/26/20		< 178	< 7.0	< 0.7	< 1.6	3.8 ± 1.7
MW-143D	10/27/20		< 193				
MW-144D	03/17/20		291 ± 124				
MW-144D	04/17/20		305 ± 125				
MW-144D	08/25/20		373 ± 125	< 6.6	< 0.8	< 0.7	< 0.6
MW-144D	11/09/20		293 ± 125				
MW-145D	03/25/20		< 186				
MW-145D	06/04/20		< 179				
MW-145D	09/10/20		< 189	< 7.7	< 1.0	< 0.4	< 0.9
MW-145D	12/07/20		< 181				
MW-154	02/18/20		< 166				
MW-154	04/23/20		< 162				
MW-154	09/16/20		< 179	< 4.6	< 0.9	< 0.3	< 1.0

**TABLE B-1.1 CONCENTRATIONS OF TRITIUM, STRONTIUM, AND GROSS ALPHA IN GROUNDWATER
 SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020
 RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA**

SITE	COLLECTION		H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)
	DATE						
MW-154	12/09/20		< 192				
MW-155	02/18/20		< 182				
MW-155	04/22/20		< 184				
MW-155	09/16/20		< 181	< 5.0	< 0.7	< 0.4	< 1.0
MW-155	12/09/20		< 190				
MW-159D	03/24/20		292 ± 128				
MW-159D	04/07/20		250 ± 120				
MW-159D	08/17/20		179 ± 116	< 5.2	< 0.7	< 2.1	< 0.8
MW-159D	10/27/20		< 190				
MW-162D	03/23/20		< 189				
MW-162D	04/07/20		232 ± 120				
MW-162D	08/17/20		< 180	< 7.5	< 0.8	< 0.7	< 0.6
MW-162D	10/27/20		< 193				
MW-BW-201S	03/24/20		227 ± 127				
MW-BW-201S	04/08/20		240 ± 120				
MW-BW-201S	08/25/20		190 ± 117	< 5.9	< 0.9	< 0.8	< 0.6
MW-BW-201S	10/27/20		220 ± 128				
MW-BW-202S	03/23/20		< 189				
MW-BW-202S	04/08/20		206 ± 118				
MW-BW-202S	08/17/20		321 ± 120	< 6.5	< 0.9	< 2.0	< 0.8
MW-BW-202S	10/27/20		< 195				
MW-BW-203S	03/24/20		< 188				
MW-BW-203S	08/17/20		203 ± 117	< 7.4	< 0.8	< 1.6	< 0.8
MW-BW-203S	10/27/20		< 198				
MW-BW-207I	03/20/20		767 ± 152				
MW-BW-207I	04/18/20		656 ± 141				
MW-BW-207I	08/26/20		665 ± 140	< 7.0	< 0.7	< 1.6	< 1.1
MW-BW-207I	11/30/20		617 ± 146				
OWM31P	09/21/20		< 182				
PS-10	03/24/20		< 191				
PS-10	04/23/20		< 166				
PS-10	09/14/20		< 179	< 5.3	< 0.8	< 0.5	< 1.0
PS-10	12/02/20		< 169				
PS-12	03/24/20		< 191				
PS-12	04/23/20		< 160				
PS-12	09/15/20		< 183	< 4.4	< 1.0	< 0.6	< 1.0
PS-12	12/02/20		< 170				
RW-6	06/30/20		337 ± 122	< 3.9	< 0.8	< 2.8	< 0.4
RW-6	08/27/20		257 ± 122				
RW-6	12/09/20		263 ± 129				
VB1-1	02/18/20		< 168				
VB1-1	04/22/20		< 163				
VB1-1	09/16/20		< 180	< 9.6	< 0.7	< 0.9	< 0.4
VB1-1	12/09/20		< 193				
VB3-2	03/24/20		< 187				
VB3-2	04/22/20		< 184				
VB3-2	08/27/20		< 176	< 6.7	< 0.8	< 0.6	< 1.1
VB3-2	12/02/20		< 193				
VB5-2	03/25/20		< 184				
VB5-2	06/04/20		< 182				
VB5-2	09/10/20		< 186	< 7.2	< 0.8	< 0.5	< 1.4

**TABLE B-I.1 CONCENTRATIONS OF TRITIUM, STRONTIUM, AND GROSS ALPHA IN GROUNDWATER
 SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020
 RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA**

SITE	COLLECTION		H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)
	DATE						
VB5-2	12/07/20		< 178				
VB6-1	03/25/20		< 182				
VB6-1	06/04/20		< 180				
VB6-1	09/10/20		< 190	< 6.5	< 0.7	< 0.6	< 0.9
VB6-1	12/07/20		< 179				
VB7-1	03/25/20		< 187				
VB7-1	06/04/20		< 181				
VB7-1	09/10/20		< 186	< 5.9	< 0.9	< 0.6	< 0.9
VB7-1	12/07/20		< 179				
VB8-2R	03/25/20		< 185				
VB8-2R	06/04/20		< 182				
VB8-2R	09/10/20		< 184	< 7.3	< 0.8	< 0.7	< 0.9
VB8-2R	12/07/20		< 179				
VB9-1	03/25/20		< 186				
VB9-1	06/04/20		< 185				
VB9-1	09/10/20		< 185	< 5.7	< 0.9	< 0.8	< 0.9
VB9-1	12/07/20		< 181				
VB10-1R	03/25/20		< 185				
VB10-1R	06/04/20		< 184				
VB10-1R	09/10/20		< 186	< 7.2	< 0.8	< 0.7	< 0.9
VB10-1R	12/07/20		< 181				
VB11-1	03/25/20		< 189				
VB11-1	06/04/20		< 180				
VB11-1	09/10/20		< 188	< 5.8	< 0.7	< 0.8	< 0.9
VB11-1	12/07/20		< 179				

TABLE B-I.2

**CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER SAMPLES
COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020**

RESULTS IN UNITS OF PCI/LITER \pm 2 SIGMA

COLLECTION		RESULTS IN UNITS OF PCI/LITER \pm 2 SIGMA													
SITE	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	09/21/20	< 18	< 18	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 5	< 2	< 2	< 13	< 4
MW-4	08/26/20	< 15	< 32	< 1	< 2	< 4	< 2	< 3	< 2	< 3	< 8	< 2	< 2	< 14	< 4
MW-5	08/25/20	< 22	< 27	< 2	< 3	< 5	< 3	< 5	< 3	< 4	< 5	< 3	< 3	< 15	< 5
MW-6	08/26/20	< 15	< 14	< 1	< 2	< 4	< 2	< 3	< 2	< 3	< 8	< 2	< 2	< 15	< 5
MW-7	08/26/20	< 15	< 25	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 8	< 2	< 2	< 14	< 5
MW-11	08/25/20	< 27	< 54	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 5	< 3	< 3	< 15	< 4
MW-102R	08/27/20	< 16	< 28	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 7	< 2	< 2	< 15	< 5
MW-141D	09/21/20	< 17	< 17	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 5	< 2	< 2	< 12	< 4
MW-142D	08/26/20	< 26	72 \pm 33	< 3	< 3	< 7	< 3	< 6	< 3	< 5	< 5	< 3	< 3	< 14	< 5
MW-143D	08/26/20	< 19	< 17	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 7	< 2	< 2	< 15	< 5
MW-144D	08/25/20	< 22	< 26	< 3	< 3	< 6	< 3	< 5	< 3	< 5	< 5	< 3	< 3	< 15	< 4
MW-145D	09/10/20	< 15	< 30	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 3	< 2	< 2	< 9	< 3
MW-154	09/16/20	< 17	< 15	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 7	< 2	< 2	< 14	< 5
MW-155	09/16/20	< 16	< 32	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 7	< 2	< 2	< 14	< 5
MW-159D	08/17/20	< 17	42 \pm 28	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 7	< 2	< 2	< 15	< 5
MW-162D	08/17/20	< 19	< 17	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 8	< 2	< 2	< 15	< 5
MW-BW-201S	08/25/20	< 27	< 28	< 3	< 3	< 7	< 3	< 6	< 3	< 5	< 7	< 3	< 3	< 15	< 5
MW-BW-202S	08/17/20	< 19	< 18	< 2	< 2	< 5	< 2	< 4	< 2	< 3	< 7	< 2	< 2	< 15	< 5
MW-BW-203S	08/17/20	< 18	< 18	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 7	< 2	< 2	< 15	< 4
MW-BW-207I	08/26/20	< 15	< 14	< 1	< 2	< 4	< 2	< 3	< 2	< 3	< 7	< 2	< 1	< 14	< 4
PS-10	09/14/20	< 16	< 14	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 6	< 2	< 2	< 14	< 4
PS-12	09/15/20	< 15	< 29	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 6	< 2	< 2	< 13	< 4
RW-6	06/30/20	< 16	< 33	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 7	< 2	< 2	< 14	< 5
VB1-1	09/16/20	< 15	< 25	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 7	< 2	< 2	< 13	< 5
VB3-2	08/27/20	< 16	< 21	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 8	< 2	< 2	< 14	< 5
VB5-2	09/10/20	< 14	< 16	< 1	< 2	< 3	< 2	< 3	< 2	< 3	< 3	< 2	< 2	< 7	< 2
VB6-1	09/10/20	< 14	< 16	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 3	< 2	< 2	< 8	< 3
VB7-1	09/10/20	< 17	< 17	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 3	< 2	< 2	< 9	< 3
VB8-2R	09/10/20	< 15	< 16	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 3	< 2	< 2	< 8	< 3
VB9-1	09/10/20	< 14	< 29	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 3	< 2	< 2	< 8	< 3
VB10-1R	09/10/20	< 18	< 15	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 3	< 2	< 2	< 10	< 3
VB11-1	09/10/20	< 16	< 20	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 3	< 2	< 2	< 8	< 3
VB9-1	09/17/19	< 50	< 68	< 5	< 7	< 14	< 7	< 14	< 7	< 10	< 8	< 7	< 8	< 33	< 5
VB10-1R	09/17/19	< 48	< 102	< 4	< 6	< 8	< 8	< 16	< 7	< 11	< 9	< 6	< 7	< 22	< 10
VB11-1	09/17/19	< 43	< 50	< 5	< 5	< 10	< 6	< 11	< 5	< 9	< 8	< 5	< 5	< 24	< 8

B-4

TABLE B-I.3

CONCENTRATIONS OF HARD TO DETECTS IN GROUNDWATER SAMPLES
 COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION
 PROGRAM, BRAIDWOOD STATION, 2020

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION		Am-241	Cm-242	Cm-243/244	Pu-238	Pu-239/240	U-233/234	U-235	U-238
SITE	DATE								
MW-143D	12/10/20	< 0.02	< 0.02	< 0.05	< 0.18	< 0.16	0.77 ± 0.34	< 0.06	0.49 ± 0.27
MW-143D	12/10/20 <i>Reanalysis</i>						1.03 ± 0.35	< 0.10	< 0.17
MW-143D	12/29/20						1.20 ± 0.38	< 0.12	0.34 ± 0.22

TABLE B-II.1 CONCENTRATIONS OF TRITIUM, STRONTIUM, AND GROSS ALPHA IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020
RESULTS IN UNITS OF PCI/LITER \pm 2 SIGMA

SITE	COLLECTION		H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)
	DATE						
DITCH F (DS-2)	03/24/20	<	186				
DITCH F (DS-2)	04/22/20	<	178				
DITCH F (DS-2)	08/19/20	<	175	< 6.7	< 0.7	< 0.8	< 0.9
DITCH F (DS-2)	10/26/20	<	191				
SG-BW-102 DITCH C	03/24/20	<	186				
SG-BW-102 DITCH C	04/22/20	<	185				
SG-BW-102 DITCH C	09/16/20	<	182	< 6.0	< 0.8	< 1.0	< 0.4
SG-BW-102 DITCH C	10/26/20	<	195				

TABLE B-II.2

**CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES
COLLECTED IN THE VICINITY OF BRAIDWOOD STATION, 2020**
RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION	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
	DATE														
DITCH F (DS-2)	08/19/20	< 18	< 33	< 2	< 2	< 5	< 2	< 4	< 2	< 3	< 6	< 2	< 2	< 15	< 5
SG-BW-102 DITCH C	09/16/20	< 17	< 28	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 7	< 2	< 2	< 15	< 6

Intentionally left blank