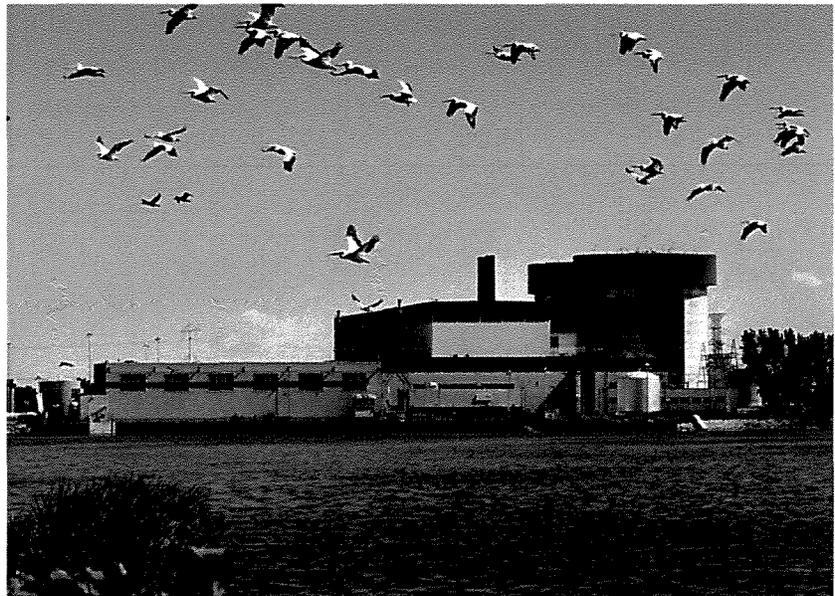


2018

# Braidwood Nuclear Power Station

## Annual Radioactive Effluent Release Report (ARERR)



UNIT 1 AND 2 (Docket Numbers 50-456 and 50-457)  
ISFSI (Docket Number 72-73)

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

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**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.

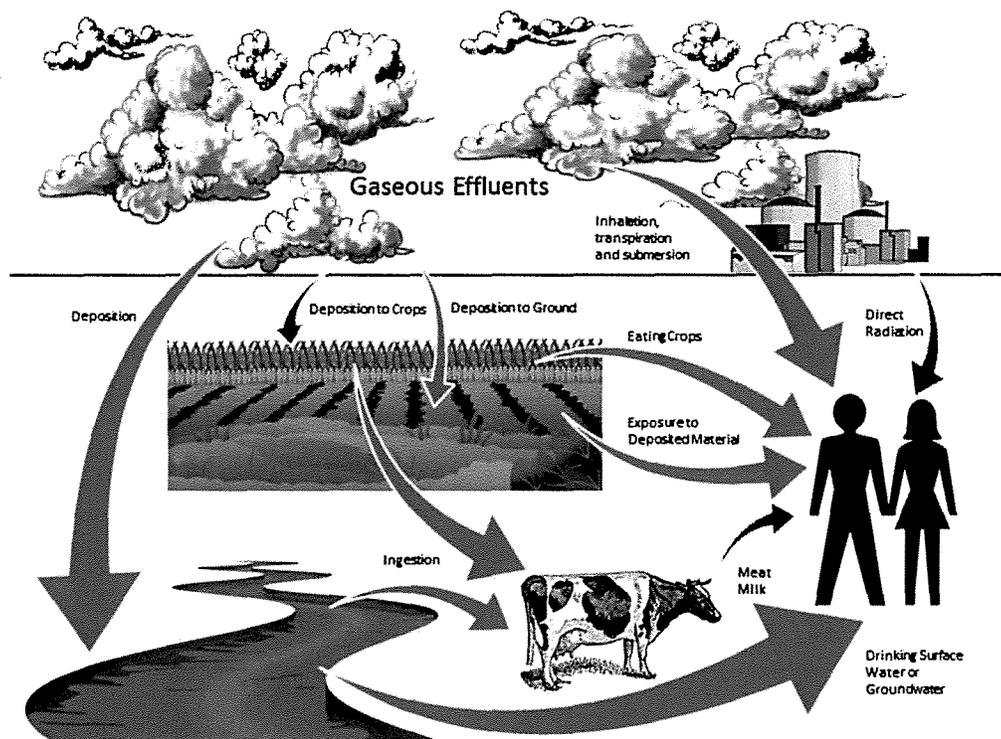
Annual Reports

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*



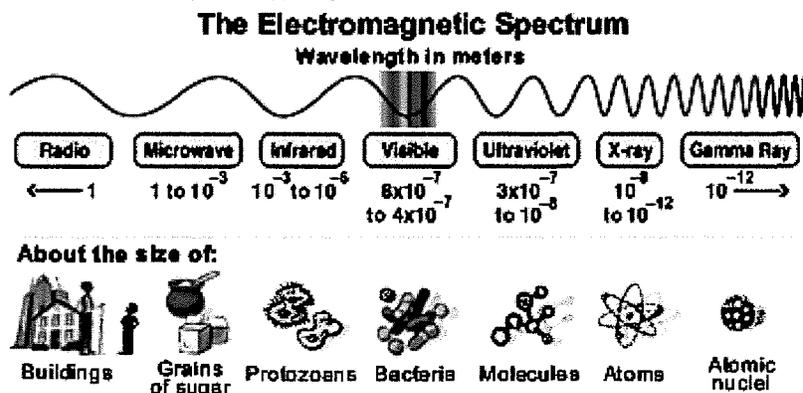
Graphic 1 demonstrates some potential exposure pathways from Braidwood Nuclear Power Station. The ARERR and AREOR together ensure Nuclear Power Plants are operating in a manner that is within established regulatory commitments meant to adequately protect the public.

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Understanding Radiation

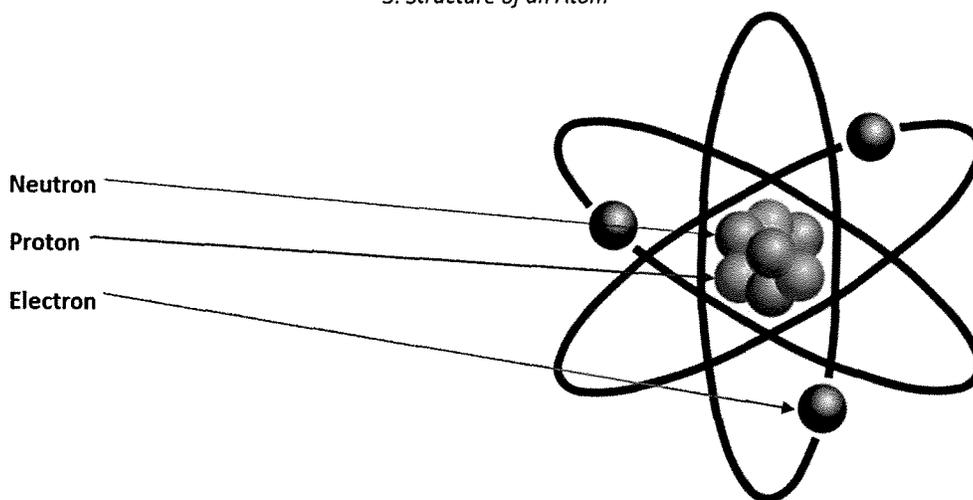
Generally radiation is defined as emitted energy in the form of waves or particles. If radiation has enough energy to displace electrons from an atom it is termed "ionizing", otherwise it is "non-ionizing". Non-ionizing radiation includes light, heat given off from a stove, radiowaves and microwaves.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

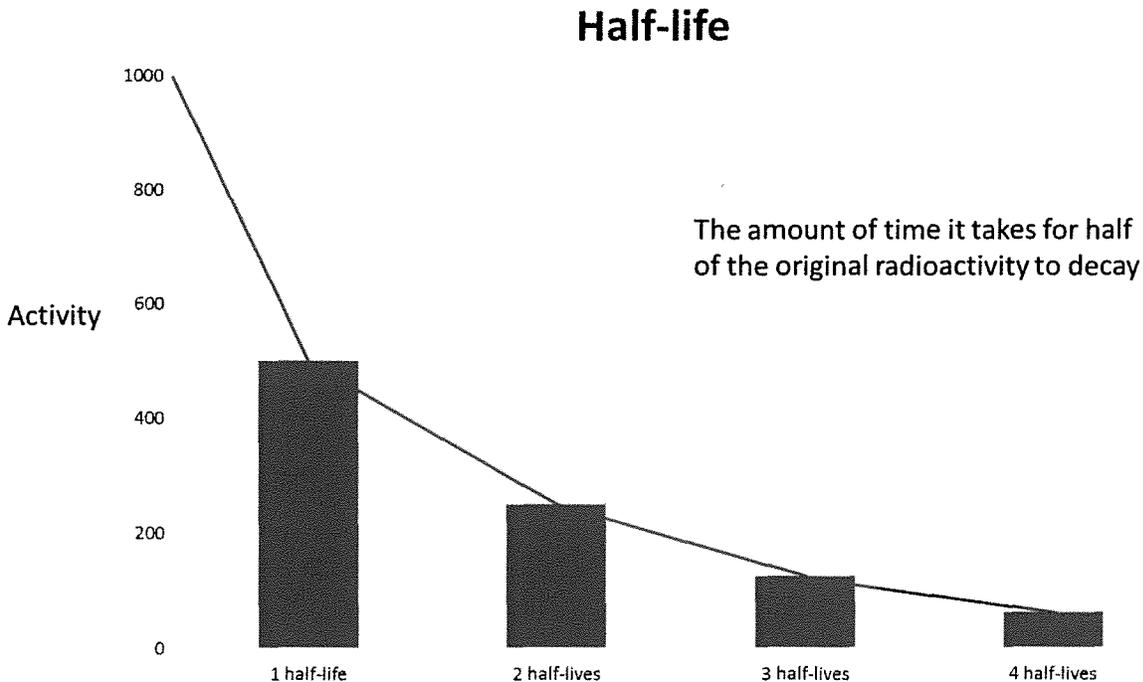
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There are two basic ways that radionuclides are produced at a nuclear power plant. The first is fission, which creates radionuclides that are called *fission products*. Fission occurs when a very large atom, such as uranium-235 (U-235) or plutonium-239 (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.

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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.

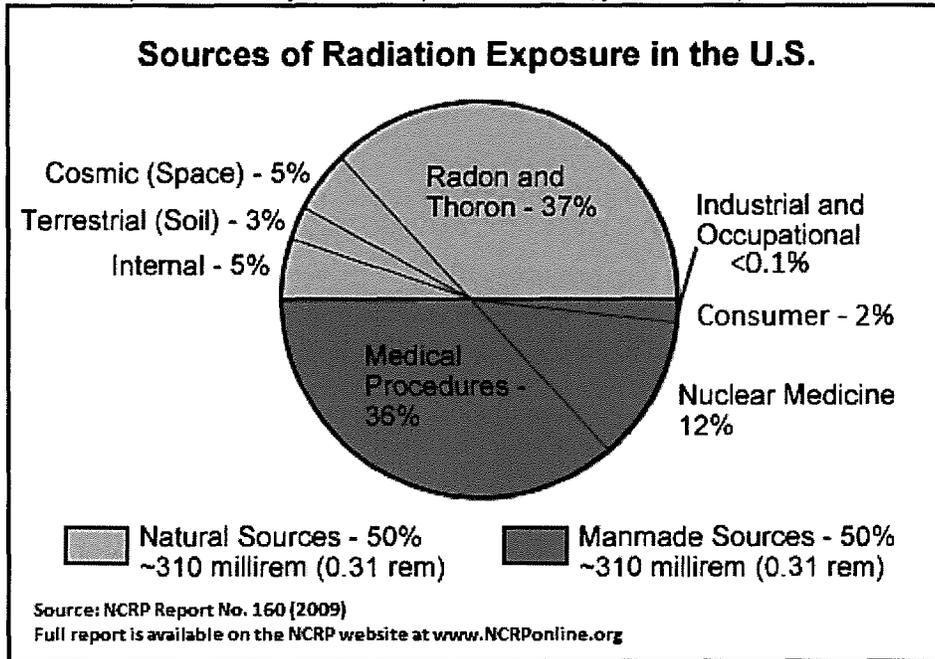
- Radioactivity refers to the amount of ionizing radiation released by a material. The units of measure for radioactivity used within the AREOR and ARERR are the Curie (Ci). Small fractions of the Ci often have a prefix, such as the microcurie ( $\mu\text{Ci}$ ), which means 1/1,000,000 of a Curie.
-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

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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*



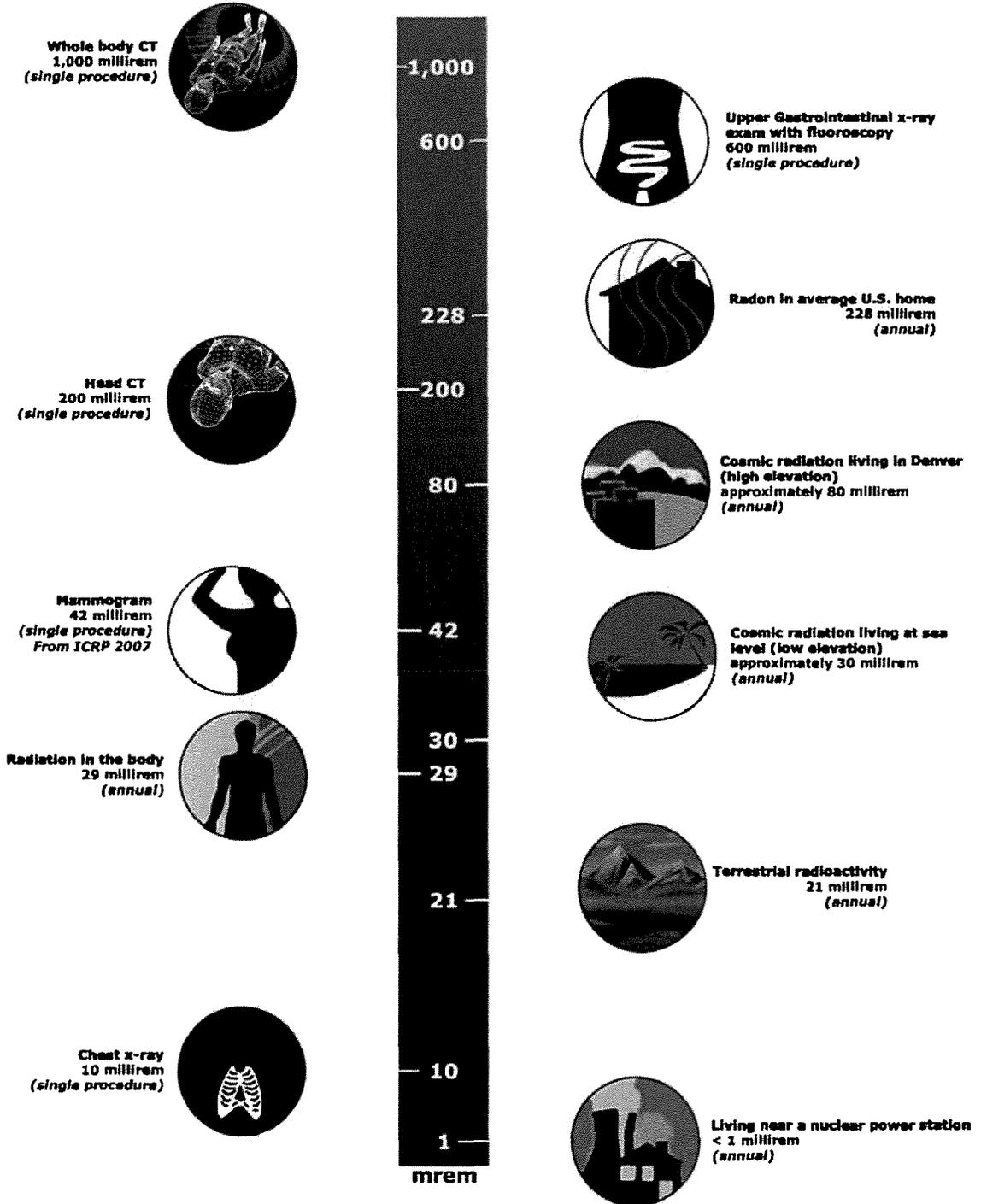
The radiation from a nuclear power plant is included in the chart as part of the "Industrial and Occupational" fraction, <0.1%. The largest natural source of radiation is from radon, because radon gas travels in the air we breathe. Perhaps you know someone who had a CT scan at a hospital to check his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

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*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)



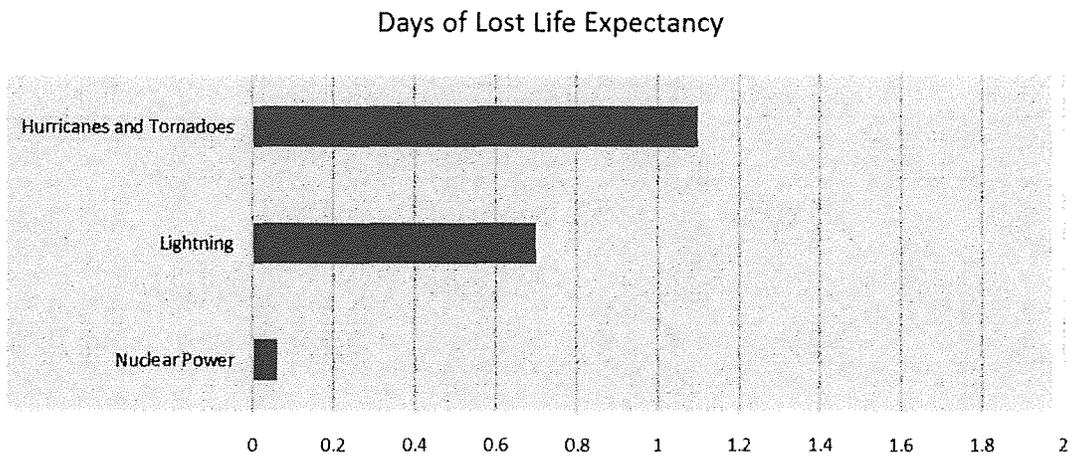
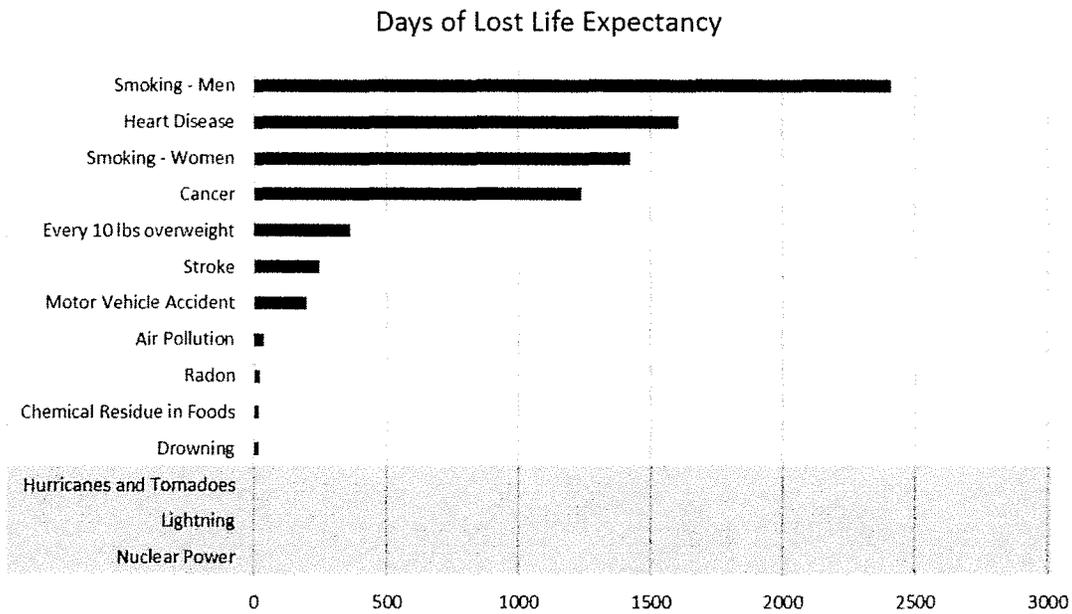
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Radiation Risk

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*



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## Introduction

This report quantifies the radioactive gaseous, liquid, solid radioactive waste (radwaste) releases, and summarizes the local meteorological data for the period from January 01, 2018 through December 31, 2018. This report has been prepared utilizing the methodology and parameters specified in the calculation of offsite doses resulting from radioactive gaseous and liquid effluents found in Braidwood's Offsite Dose Calculation Manual (ODCM). It has been formatted consistent with Exelon Procedure CY-AA-170-2000 "ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT" and exceeds the requirements specified in Regulatory Guide 1.21 Revision 1, "MEASURING, EVALUATING, AND REPORTING RADIOACTIVITY IN SOLID WASTES AND RELEASES OF RADIOACTIVE MATERIALS IN LIQUID AND GASEOUS EFFLUENTS FROM LIGHT-WATER-COOLED NUCLEAR POWER PLANTS."

The quantity of radioactive material released from Braidwood Nuclear Power Plant was determined from in-house and vendor laboratory analysis of continuous inline sampling media and batch sample media from all ODCM specified effluent pathways. These pathways include continuous releases from the Unit 1 and 2 Station Vent Stack, Condensate Polisher Sump, Waste Water Treatment, and Circulating Water Blowdown. The ODCM specified effluent pathways also include batch releases from the Unit 1 and Unit 2 Primary Containments, Waste Gas Decay Tanks, and Liquid Radwaste Batch Release Tanks. The quantification of radioactive material released from Braidwood Nuclear Power Plant also includes non-routine planned discharges from two remediation wells, RW-11 and RW-12, installed in 2017 at the Circulating Water Blowdown House, that are not listed as ODCM effluent pathways. These two remediation wells have been discontinued as of April 1, 2019.

The volume and quantity of radioactive waste shipped offsite from Braidwood Nuclear Power Plant for processing and disposal were determined from data maintained in the radwaste shipping database. Radwaste processed for shipment was in accordance with Exelon procedure RW-AA-100, "PROCESS CONTROL PROGRAM FOR RADIOACTIVE WASTES" and consistent with the UFSAR.

Meteorological data was obtained from the 320-foot meteorological tower located on the Braidwood Station premises.

### A. Supplemental Information

#### 1. Regulatory Limits

##### a. Fission and Activation Gases:

###### Dose Rate

- 1) Less than 500 mrem/year to the whole body (instantaneous limit, per site).
- 2) Less than 3,000 mrem/year to the skin (instantaneous limit, per site).

###### Dose Gamma Radiation

- 1) Less than or equal to 5 mrad/quarter (per unit).
- 2) Less than or equal to 10 mrad/year (per unit).

###### Dose Beta Radiation

- 1) Less than or equal to 10 mrad/quarter (per unit).
- 2) Less than or equal to 20 mrad/year (per unit).

##### b. Iodine: (summed with particulate, see below)

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c. Particulates with half-lives > 8 days:

Dose Rate

1) Less than 1,500 mrem/year to any organ (instantaneous limit, per site).

Dose

1) Less than or equal to 7.5 mrem/quarter to any organ (per unit).

2) Less than or equal to 15 mrem/year to any organ (per unit).

d. Liquid Effluents

Dose

1) Less than or equal to 1.5 mrem to the whole body during any calendar quarter (per unit).

2) Less than or equal to 5 mrem to any organ during any calendar quarter (per unit).

3) Less than or equal to 3 mrem to the whole body during any calendar year (per unit).

4) Less than or equal to 10 mrem to any organ during any calendar year (per unit).

2. Effluent Concentration Limits

a. Fission and Activation Gases: 10CFR20 Appendix B Table 2

b. Iodine: 10CFR20 Appendix B Table 2

c. Particulates: 10CFR20 Appendix B Table 2

d. Liquid Effluents: 10 X 10CFR20 Appendix B Table 2

3. Average Energy

The ODCM limits the dose equivalent rates due to the release of noble gases to less than or equal to 500 mrem/yr to the total body, and less than or equal to 3,000 mrem/yr to the skin. Therefore, the average beta and gamma energies ( $\bar{E}$ ) for gaseous effluents as described in Regulatory Guide 1.21 are not applicable.

4. Measurements and Approximations of Total Radioactivity

a. Fission and activation gases:

Before being discharged, containment batch releases are analyzed for noble gas via gamma spectroscopy. Gaseous decay tanks are analyzed for noble gases before being discharged via gamma spectroscopy. Released activity is normally calculated using volume of release, which is determined by purge flow rate times the duration of the discharge.

The Auxiliary Building ventilation exhaust system is continually monitored for radioactive iodines (radioiodines) and particulates. These samples are pulled every seven days and analyzed via gamma spectroscopy.

Noble gas samples are pulled and analyzed weekly by gamma spectroscopy. The average flow at the release points and nuclide specific activity concentrations are used to calculate the activity released.

Volumes and activities of effluents discharged from systems that are common to both units are divided between both units.

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b. Iodines:

Radioiodines in the Auxiliary Building ventilation exhaust system are continually being collected via activated charcoal cartridges in the diverted sample process flow. The iodine cartridges are pulled weekly and analyzed via gamma spectroscopy. Radioiodine concentrations greater than the lower limit of detection (LLD) are multiplied by the volume of air discharged during the sampling timeframe.

Radioiodines are analyzed in liquid effluent streams through performance of batch release tank grab samples and weekly liquid effluent composite samples. The analyses are performed via gamma spectroscopy of the liquid samples.

Volumes and activities of effluents discharged from systems that are common to both units are divided between both units. Effluents that are unit specific are assigned to the appropriate unit.

c. Particulates, half-lives > 8 days:

Particulates in the Auxiliary Building ventilation exhaust system are continually being collected via filter media in the diverted sample process flow. Particulate filter media is pulled weekly and analyzed via gamma spectroscopy. Particulate concentrations greater than LLD are multiplied by the volume of air discharged during the sampling timeframe. A composite sample is created from 3 month's particulate sample media for Sr-89/90, Fe-55, Ni 63, and gross alpha analysis by an offsite vendor. The vendor supplied data is utilized in conjunction with the volume of air released through the Auxiliary Building ventilation to quantify Sr-89/90, Fe-55, Ni-63, and gross alpha releases.

Volumes and activities of effluents discharged from systems that are common to both units are divided between both units. Effluents that are unit specific are assigned to the appropriate unit.

d. Tritium:

Before being discharged, containment batch releases are analyzed for tritium via a liquid scintillation counter (LSC). Tritium is sampled using a flow-through bubbler system. Released activity is calculated using volume of release, which is determined by purge flow rate multiplied by the duration of the discharge.

The Auxiliary Building ventilation exhaust system is monitored for tritium using a flow-through bubbler system. Tritium is sampled every seven days and analyzed by LSC.

The secondary sides of both units contain tritium. Minimal amounts of tritium are continually released to the atmosphere from secondary components through packing leaks, tank vents, the main condenser, etc. Bounding calculations have been performed to show that large leaks (1000 gallons/day (gpd)) for extended periods (1 month) at normal secondary tritium concentrations would provide an insignificant increase (1.00E-5 mrem) in offsite dose.

e. Gross alpha

Gross alpha is analyzed in both the gaseous and liquid effluent pathways. Weekly gaseous particulate media is composited for offsite vendor analysis. Gross alpha activity greater than vendor LLD values are assigned to the applicable timeframe and gaseous volume released. Liquid effluent gross alpha analysis is performed through compositing monthly discharges and gas flow proportional counting.

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f. Carbon-14

Carbon-14 (C-14) is assessed in continuous gaseous effluents using Electric Power Research Institute's (EPRI) industry accepted production mechanism and production rate study 1021106. C-14 production is a function of each unit's full power operation and gaseous volume released. C-14 is not evaluated through laboratory sample analysis.

g. Liquid effluents:

Liquid effluents are categorized as either batch release or continuous release. All liquid releases are analyzed for principal gamma emitters, radioiodines, dissolved and entrained gases, gross alpha, and tritium onsite via gamma spectroscopy, gas flow proportional counting, or liquid scintillation, as appropriate. An offsite laboratory analyzes liquid composites for Sr-89/90, Fe-55 and Ni-63. Vendor results are applied to the applicable volume of liquids discharged during the timeframe. Volumes and activities of effluents discharged from systems or locations are divided between both units.

h. Estimated Total Error Present

Procedure CY-AA-170-2100, Estimated Errors of Effluent Measurements provides the methodology to obtain an overall estimate of the error associated with radioactive effluents. Estimated total error is calculated periodically and communicated as part of Appendix A Effluent and Waste Disposal Summary.

i. Lower Limit of Detection (LLD)

Samples are analyzed such that the Offsite Dose Calculation Manual (ODCM) LLD requirements are met. When a nuclide is not detected during the quarter then <LLD is reported. The ODCM required lower limit of detection for airborne and liquid releases are as follows:

*Table 4.i ODCM Effluent LLD Values*

<b>Airborne:</b>	<b>LLD</b>
Gross Alpha, Sr-89, Sr-90	1.00E-11 $\mu$ Ci/cc
H-3	1.00E-07 $\mu$ Ci/cc
I-131 in Charcoal Samples	1.00E-12 $\mu$ Ci/cc
I-133 in Charcoal Samples	1.00E-10 $\mu$ Ci/cc
Principal Gamma Emitters (Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, I-131, Ce-141, Ce-144) in Grab Samples	1.00E-04 $\mu$ Ci/cc
Principal Gamma Emitters (Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, I-131, Ce-141, Ce-144) in Particulate Samples	1.00E-11 $\mu$ Ci/cc
Noble Gas (Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135, Xe-138), Gross Beta or Gamma	1.00E-06 $\mu$ Ci/cc

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*Table 4.i ODCM Effluent LLD Values (continued)*

<b>Liquid:</b>	<b>LLD</b>
Principal Gamma Emitters except Ce-144 (Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141)	5.00E-07 $\mu$ Ci/ml
Ce-144	5.00E-06 $\mu$ Ci/ml
I-131	1.00E-06 $\mu$ Ci/ml
Entrained Gases (Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135, Xe-138)	1.00E-05 $\mu$ Ci/ml
H-3	1.00E-05 $\mu$ Ci/ml
Gross Alpha	1.00E-07 $\mu$ Ci/ml
Sr-89, Sr-90	5.00E-08 $\mu$ Ci/ml
Fe-55	1.00E-06 $\mu$ Ci/ml

This list does not mean that only these nuclides are considered, but this list is used to ensure acceptable detection standards. Braidwood tests and maintains LLD records in accordance with procedure CY-AA-130-201 "Radiochemistry Quality Control."

5. Batch Releases

<b>a. Liquid Batch Releases</b>	1 <sup>st</sup> Qtr	2 <sup>nd</sup> Qtr	3 <sup>rd</sup> Qtr	4 <sup>th</sup> Qtr.	Total
1. Total Number of Batch Releases	28	25	21	29	103
2. Total Time Period for Batch Releases (minutes)	4.46E+04	3.54E+04	8.26E+04	6.56E+04	2.28E+05
3. Maximum Time Period for a Batch Release (minutes)	2.86E+03	1.88E+03	9.36E+03	5.54E+03	9.36E+03
4. Average Time Period for a Batch Release (minutes)	1.59E+03	1.42E+03	3.93E+03	2.26E+03	2.22E+03
5. Minimum Time Period for a Batch Release (minutes)	3.42E+02	6.72E+02	4.44E+02	1.05E+02	1.05E+02
6. Average Stream Flow During Periods of Release of Effluent into a Flowing Stream (Liters/min) <sup>1</sup>	1.57E+07	9.76E+06	2.44E+06	7.37E+06	8.63E+06

<b>b. Gaseous Batch Releases</b>	1 <sup>st</sup> Qtr	2 <sup>nd</sup> Qtr	3 <sup>rd</sup> Qtr	4 <sup>th</sup> Qtr.	Total
1. Total Number of Batch Releases	108	126	117	81	432
2. Total Time Period for Batch Releases (minutes)	1.08E+05	1.24E+05	1.19E+05	2.72E+04	3.78E+05
3. Maximum Time Period for a Batch Release (minutes)	2.40E+03	3.36E+03	2.33E+03	7.00E+03	7.00E+03
4. Average Time Period for a Batch Release (minutes)	9.98E+02	9.87E+02	1.01E+03	3.35E+02	8.75E+02
5. Minimum Time Period for a Batch Release (minutes)	4.00E+00	1.00E+00	3.40E+01	7.00E+00	1.00E+00

<sup>1</sup> Kankakee River Flows obtained from US Geological Survey website from daily average flow data.

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6. Abnormal Releases

There was one abnormal gaseous release that occurred in 2018. It is described below:

On June 4<sup>th</sup>, 2018 at 0918, the U1 Steam Generator (SG) Pressure Operated Relief Valves (PORVs) opened for 20-30 seconds immediately following the Unit 1 Reactor trip. This was an unanticipated plant response for a reactor trip without complications. The saturated steam release to the atmosphere was included in an unplanned Gaseous Release Permit, G-20180604-918-B, using the U1 SG tritium result of 1.626 e-5 uCi/ml from 6-4-18 0830. This permit was given a conservative duration of 1 minute and included as part of the gaseous effluent releases in this report.

7. Non-Routine, Planned Discharges

The CWBD remediation continued with discharges from two remediation wells, RW-11 and RW-12, installed in June 2017 at the Circulating Water Blowdown House. These two remediation wells were temporary and treated as non-routine planned discharges. They were sampled regularly and permitted in the same manner as ODCM pathways. The corresponding activity values and doses are included as part of the continuous liquid effluent releases in this report. These two remediation wells have been discontinued as of April 1, 2019.

8. Radioactive Waste Treatment System Changes

There were no changes to the gaseous radioactive waste treatment system, the ventilation exhaust treatment system, or the liquid radioactive waste treatment system in 2018.

9. Changes to the Annual Land Use Census

The 2018 Land Use Survey was performed on September 5, 2018. The major change indicated on the Land Use Census was the loss of BD-17, milk indicator. During June 2018, the station was notified that the milk indicator BD-17 was selling all dairy cows. The station required changes to the Radiological Environmental Program (REMP) section of the ODCM. Revision 10 of the ODCM removed BD-17 and added the broadleaf vegetation sampling requirements when no milk indicator is available.

10. Radioactive Effluent Monitoring Instrumentation Out of Service for More than 30 Days

There were no radioactive effluent monitoring instruments out of service for more than 30 days in 2018.

11. Revisions to the ODCM

Revision 10 of the ODCM was issued in August of 2018. The revision incorporated four changes. The first change was to REMP sampling. The ODCM now stipulates monthly samples of vegetation will be collected during growing season and if no indicator milk sample is available, the vegetation samples will be collected. The second change explains an update to sampling point names for administrative purposes. The third change was the removal of groundwater remediation pathways where remediation has been completed. The fourth change included the addition of dose factors for gaseous pathways. A completed copy of the ODCM can be found in Attachment 1.

12. Independent Spent Fuel Storage Installation (ISFSI)

An Independent Spent Fuel Storage Installation (ISFSI) was placed in service at Braidwood Station in 2011. The ISFSI is a closed system and the only exposure would be due to direct radiation, which is measured by Optically Stimulated Luminescent Dosimetry (OSLD). In 2018 the dose to the

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nearest resident from the ISFSI was estimated to be 2.50E-01 mrem. This estimate was determined using environmental dosimeters from the Radiological Environmental Monitoring Program and extrapolating the dose from the ISFSI environmental dosimeters.

### 13. ERRATA

An error to the 2016 ARERR was identified during a RETS check in self-assessment that was performed. The 2016 ARERR was reviewed and found to have reported Cd-109 in three gaseous batch permits. Cd-109 is a shielded nuclide therefore there are no means to possible activation, fission or decay scheme that could produce this given our fuel composition. This nuclide is only present in commercially produced calibration sources. This misidentified Cd-109 at 88 keV should have been identified as naturally occurring Pb-212 or Pb-214. Despite the identification of Cd-109 and its inclusion is post release permit, no dose was calculated by the effluent management software therefore no doses reported in the 2016 ARERR were incorrect.

### 14. Sampling and Instrumentation Issues

- a. On March 16, 2018, the 2B Auxiliary Feedwater Pump was run for monthly testing. An Essential Service water leak occurred spraying the particulate and iodine air sampler that was set up for sampling the Auxiliary Feedwater Pump air intake and wetting the samples. The samples were ruined, and the air sampler pump was unplugged due to the leak. The wetted samples were discarded which had been continuously monitoring since 3-13-18. The two ODCM required samples for particulate and iodine were missed for the 1B and 2B Auxiliary Feedwater pump runs on 3-16-18 prior to the samples being wetted and discarded. A trend of the weeks prior to and after this event had all particulate and iodine results <LLD.
- b. On April 4, 2018, the RW-11 remediation piping had become uncoupled prior to the flow totalizer. The uncoupled area would allow remediation water to discharge directly into the canal and bypass the flow totalizer and sipper jug that the sample compositor withdrew from for the sample. Maintenance performed the repair when notified and compositor indicated no missed samples during the period in question, however the totalizer value may have been low even though the trend appeared to be normal.
- c. On May 27, 2018, the RW-11 remediation piping had become uncoupled prior to the flow totalizer. The uncoupled area would allow remediation water to discharge directly into the canal and bypass the flow totalizer and sipper jug that the sample compositor withdrew from for the sample. Operations secured the remediation pump 11 to avoid any missed totalizer gallons. Maintenance performed the repair on May 29<sup>th</sup>, 2018 and the remediation was reinstated. The totalizer value was low due to remediation suspended during the timeframe of the break and repair.
- d. On July 2, 2018, the automatic composite sampler for CWBD was found with a "full bottle error" during the weekly sample, preventing further continuous composite sampling. The bottle had been previously checked on 6-28-18 and was approximately half-full, therefore only a few if any samples were missed on 7-2-18. An issue with the sample volume and pressure was identified and a work request was created for maintenance to fix the valves upstream of the compositor. Chemistry started exchanging the compositor sample bottle out mid-week to ensure that no full bottle errors would inhibit sampling.
- e. On September 4, 2018, the automatic composite sampler for CWBD was found with a "full bottle error" during the weekly sample, preventing further continuous composite sampling. The bottle had been previously checked on 9-3-18 and the bottle was not full, therefore only a few if any samples were missed on 9-4-18. An issue with the sample volume and pressure was identified

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and the parts for the valves were still on order for maintenance so that the valves upstream of the compositor could be replaced. Chemistry continued exchanging the compositor sample bottle out mid-week to ensure that no full bottle errors would inhibit sampling.

- f. On September 24, 2018, the automatic composite sampler for CWBD was found with an empty compositor sample bottle and sampling hose outside of the compositor jug during the weekly check. The bottle had been previously swapped on 9-20-18 and a grab sample was obtained on day shift 9-24-18, therefore there were missed samples from Thursday, 9-20-18 afternoon to 9-23-18. The sample hose was reconnected to the compositor sample jug and normal sampling resumed on 9-24-18.
- g. On October 8, 2018, the weekly RW-11 totalizer was recorded with a change of 100 gallons since the previous reading, however no sample was available in the overflow jug or compositor. The compositor is read and then a x100 factor is applied to the reading, so the change was in the lowest indication. Data was trended and the previous 10 weeks no discharge was made from RW-11. The indication could have potentially been mechanical agitation since there was no sign that any water had been discharged.

B. Gaseous Effluents

Gaseous radioactive releases for 2018 captured in Tables 1A, 1B-1, and 1B-2 in Appendix A for Units 1 and 2 combined. Radioactive noble gases released for the timeframe totaled 3.33E-01 Curies. Releases of all radioiodines, halogens, and particulates totaled 9.72E-03 Curies. Gaseous tritium releases totaled 4.29E+02 Curies. Gaseous carbon-14 was calculated to total 8.25E+00 Curies. No gross alpha was detected in gaseous effluents.

C. Liquid Effluents

Liquid radioactive releases for 2018 are captured in Tables 2A, 2B-1, and 2B-2 in Appendix A for Units 1 and 2 combined. One hundred three (103) liquid batch releases occurred during the reporting period. The continuous and batch release discharges contained a total of 2.45E+03 Curies of tritium, 4.81E-02 Curies of fission and activation products, and 3.77E-05 Curies of dissolved and entrained noble gases.

D. Radiological Impact on Man

1. Dose to Members of the Public at or Beyond Site Boundary

Per ODCM Chapter 6.1 the Annual Radioactive Effluent Release Report shall include an assessment of radiation doses to the hypothetically highest exposed MEMBER OF THE PUBLIC from reactor releases, ISFSI and other nearby uranium fuel cycle sources (including doses from primary effluent pathways and direct radiation) for the previous calendar year. The ODCM does not require population doses to be calculated. For purposes of calculation, the following assumptions were made per the ODCM:

- Long term annual average meteorology X/Q and D/Q and actual gaseous effluent releases were used.
- Gamma air dose, Beta air dose, Total Body and Skin doses were attributed to noble gas releases.
- Critical organ and age group dose attributed to iodine, particulate, carbon-14 and tritium releases.
- A 0.7 shielding factor was assumed to account for shielding due to occupancy of structures

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- Doses, Design Objective Limit, and Dose Limit comparisons reported combined for the site (Units 1 and 2 together).
- Dosimetry measurements obtained from the highest station values in the Radiological Environmental Monitoring Program were used to calculate dose to the nearest residence from the Independent Spent Fuel Storage Installation (ISFSI). The dose measured at the station was extrapolated to the residence location.
- The highest doses from the critical organ and critical age group for each release pathway was summed and added to the net dosimetry measurement from nearest residence to the ISFSI for 40CFR190 and 10CFR72.104 dose compliance.
- Evaluation of 40CFR190 and 10CFR72.104 dose is used to demonstrate compliance to 10CFR 20 and satisfy station RETS and Technical Specifications.

a. Gaseous Releases

The critical age-organ was the child-bone. Calculated total body dose was 4.10E-01 mrem and organ dose was 1.74E+00 mrem.

b. Liquid Releases

The critical age-organ was the child-GI-LLI. Calculated total body dose was 7.81E-02 mrem and organ dose was 7.96E-02 mrem.

c. 40CFR190 and 10CFR72.104 Compliance

The Braidwood ODCM defines the total dose for the uranium fuel cycle as the sum of doses due to radioactivity in airborne and liquid effluents and the doses due to direct radiation from contained sources at the nuclear power station (ODCM A.4.2 Total Dose, Equation A-25). The total dose,  $D^{TOT}$ , in the unrestricted area to a member of the public due to plant operations is given by:

$$D^{TOT} = D^{Ex} + D_{aj}^{Liq} + D_{aj}^{NNG}$$

Where:

$D^{TOT}$  Total Dose to Member of Public [mrem]

Total off-site dose to a member of public due to plant operations.

$D^{Ex}$  Total External Total Body Dose [mrem]

Total body dose due to external exposure to noble gases, N-16 skyshine and on-site storage facilities.

$D_{aj}^{Liq}$  Liquid Effluent Dose [mrem]

Dose due to liquid effluents to age group *a* and organ *j*. The age group and organ with the highest dose from liquid effluents is used.

$D_{aj}^{NNG}$  Non-Noble Gaseous Effluent Dose [mrem]

Dose due to non-noble gaseous effluents to age group *a* and organ *j*. The age group and organ with the highest dose from non-noble gas effluents is used.

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The maximum calculated dose to a real individual would not exceed 7.38E-01 mrem (total body), 2.07E+00 mrem (organ), or 8.66E-01 mrem (thyroid).

*Table D.1 Summary of Gaseous and Liquid Effluent Doses to Members of the Public at the Highest Dose Receptors vs 10 CFR50 Design Objectives*

Maximum Individual Noble Gas	Applicable Dose	Estimated Dose	Age Group	% of Applicable Limit	Design Objective Limit (per year, combined)	Unit
Nearest Residence	Gamma Air Dose	1.11E-05	All	5.55E-05	20	mrad
Nearest Residence	Beta Air Dose	5.56E-05	All	1.39E-04	40	mrad
Nearest Residence	Total Body	1.03E-05	All	1.03E-04	10	mrem
Nearest Residence	Skin	3.87E-05	All	1.29E-04	30	mrem
<b>Non-Noble Gas</b>						
Nearest Residence	Bone	1.74E+00	Child	5.80E+00	30	mrem
<b>Liquid</b>						
Nearest Residence	Total Body	7.81E-02	Child	1.30E+00	6	mrem
Nearest Residence	GI-LLI	7.96E-02	Child	3.98E-01	20	mrem

*Table D.2 Summary of Doses to Members of the Public at the Highest Dose Receptors for 40CFR190 and 10CFR74.104 Compliance*

Highest Dose Receptors	Non-Noble Gas	Liquid Effluents	External Direct Radiation	Total	% of Applicable Limit	Limit	Unit
Total Body Dose	4.10E-01	7.81E-02	2.50E-01	7.38E-01	2.95E+00	25	mrem
Organ Dose	1.74E+00	7.96E-02	2.50E-01	2.07E+00	8.28E+00	25	mrem
Thyroid Dose	5.38E-01	7.81E-02	2.50E-01	8.66E-01	1.15E+00	75	mrem

E. Meteorological Data

The Braidwood Station meteorological monitoring program produced 52,186 hours of valid data out of a possible 52,560 parameter hours during 2018 (365 days x 24 hours/day x 8 measured priority parameters), which represents an overall data recovery rate of 99.3%. Priority parameters are all parameters except dew point temperature and precipitation. For the year, winds measured at 34 ft. most frequently came from the East-Northeast (9.43%) and fell into the 3.6 - 7.5 mph wind speed class (41.58%). Calms (wind speeds at or below the sensor threshold) were measured 0.00% of the time and speeds greater than 24.5 mph were measured 0.00% of the time. Stability based on the 199 - 30 ft. differential temperature most frequently fell into the slightly stable classification (37.24%).

Appendix C contains the Joint Frequency Distribution tables from the Meteorological Data collected in 2018.

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F. Offsite Ambient Radiation Measurements

Review of the Braidwood Optically Stimulated Luminescent Dosimetry (OSLD) data showed statistical increases above background at only locations related to the ISFSI pad. A dose evaluation was performed taking the highest readings and extrapolating dose to the nearest resident. The dose to the resident was estimated to be 2.50E-01 mrem in 2018.

G. Radioactive Solid Waste Disposal

Radioactive wastes shipped offsite are captured in the table titled, "Solid Wastes Shipped Offsite for Burial or Disposal (Not irradiated fuel)." Approximately 4.22E+02 cubic meters of solid waste were shipped offsite containing approximately 5.44E+02 Curies during the 2018 reporting period. Appendix B contains tables and detailed information about the Solid Waste Disposal program.

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**APPENDIX A: EFFLUENT AND WASTE DISPOSAL SUMMARY**

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TABLE 1A  
 GASEOUS EFFLUENTS- – SUMMATION OF ALL RELEASES UNIT 1 AND 2

Unit	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total	Est. Total Error%
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**A. Fission and Activation Gas Releases**

1. Total Release Activity	Ci	<LLD	8.13E-02	1.22E-01	1.30E-01	3.33E-01	7.59E+00
2. Average Release Rate	μCi/sec	<LLD	1.03E-02	1.53E-02	1.63E-02	1.05E-02	
3. Percent of ODCM Limit – gamma	%	N/A	8.18E-06	6.70E-05	3.59E-05	5.56E-05	
4. Percent of ODCM Limit - beta	%	N/A	5.61E-05	1.16E-04	1.05E-04	1.39E-04	

**B. Iodine Releases**

1. Total Iodine-131	Ci	1.70E-03	3.18E-03	3.88E-03	3.33E-04	9.71E-03	3.32E+01
2. Average Release Rate	μCi/sec	2.18E-04	4.84E-04	4.88E-04	4.19E-05	3.08E-04	
3. Percent of ODCM Limit <sup>1</sup>	%	2.98E+00	2.61E+00	3.12E+00	2.86E+00	5.79E+00	

**C. Particulate (> 8-day half-life) Releases**

1. Particulates with half-lives > 8 days	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	1.98E+01
2. Average Release Rate	μCi/sec	<LLD	<LLD	<LLD	<LLD	<LLD	
3. Percent of ODCM Limit <sup>1</sup>	%	2.98E+00	2.61E+00	3.12E+00	2.86E+00	5.79E+00	

**D. Tritium Releases**

1. Total Release Activity	Ci	2.00E+02	1.40E+02	5.94E+01	2.99E+01	4.29E+02	8.07E+00
2. Average Release Rate	μCi/sec	2.57E+01	1.79E+01	7.48E+00	3.76E+00	1.36E+01	
3. Percent of ODCM Limit <sup>1</sup>	%	2.98E+00	2.61E+00	3.12E+00	2.86E+00	5.79E+00	

**E. Gross Alpha Releases**

1. Total Release Activity	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	1.98E+01
2. Average Release Rate	μCi/sec	N/A	N/A	N/A	N/A	N/A	
3. Percent of ODCM limit <sup>1</sup>	%	N/A	N/A	N/A	N/A	N/A	

**F. Carbon-14 Releases**

1. Total Release Activity	Ci	2.13E+00	1.86E+00	2.22E+00	2.04E+00	8.25E+00
2. Average Release Rate	μCi/sec	2.74E-01	2.37E-01	2.79E-01	2.57E-01	2.62E-01
3. Percent of ODCM limit <sup>1</sup>	%	2.98E+00	2.61E+00	3.12E+00	2.86E+00	5.79E+00

Note: ODCM LLD threshold values are included in Table 4.i of this report.

Note: The ODCM Limit is a dose-based limit combined for Iodines, Particulate, Tritium and C-14.

<sup>1</sup> Combined Limit per 10CFR50 Appendix I for Organ Dose Due to Specified Non-Noble Gas Radionuclides.

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TABLE 1B-1  
GASEOUS EFFLUENTS – MIXED MODE RELEASES – CONTINUOUS MODE UNIT 1 AND 2

Nuclides Released	Unit	Continuous Mode				
		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
<b>A. Fission Gases</b>						
Ar-41	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-131m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
<b>B. Iodines / Halogens</b>						
Br-82	Ci	1.30E-04	9.93E-05	1.04E-04	<LLD	3.33E-04
I-131	Ci	5.45E-05	1.08E-04	9.05E-05	1.50E-05	2.68E-04
I-132	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-133	Ci	3.83E-04	3.68E-04	5.53E-04	2.90E-05	1.33E-03
I-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-135	Ci	1.56E-04	<LLD	1.00E-04	<LLD	2.56E-04
Total for Period	Ci	7.24E-04	5.76E-04	8.47E-04	4.40E-05	2.19E-03
<b>C. Particulates</b>						
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-57	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD

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TABLE 1B-1 (Cont.)  
GASEOUS EFFLUENTS – MIXED MODE RELEASES – CONTINUOUS MODE UNIT 1 AND 2

Nuclides Released	Unit	Continuous Mode				
		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
<b>C. Particulates (Cont.)</b>						
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
<b>D. Tritium</b>						
	Ci	9.64E+01	6.72E+01	3.95E+01	2.75E+01	2.31E+02
<b>E. Gross Alpha</b>						
	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
<b>F. Carbon-14</b>						
	Ci	2.13E+00	1.86E+00	2.22E+00	2.04E+00	8.25E+00

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TABLE 1B-2  
GASEOUS EFFLUENTS – MIXED MODE RELEASES – BATCH MODE UNIT 1 AND 2

Nuclides Released	Unit	Batch Mode				
		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
<b>A. Fission Gases</b>						
Ar-41	Ci	<LLD	1.26E-06	2.84E-02	1.12E-02	3.96E-02
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-131m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	7.65E-02	9.33E-02	1.10E-01	2.80E-01
Xe-133m	Ci	<LLD	<LLD	<LLD	2.31E-06	2.31E-06
Xe-135	Ci	<LLD	4.80E-03	<LLD	8.53E-03	1.33E-02
Xe-135m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	8.13E-02	1.22E-01	1.30E-01	3.33E-01
<b>B. Iodines / Halogens</b>						
Br-80	Ci	<LLD	2.02E-03	9.59E-04	<LLD	2.98E-03
Br-82	Ci	1.07E-04	1.14E-04	1.23E-04	1.87E-05	3.63E-04
I-131	Ci	5.01E-05	6.01E-05	8.88E-05	1.18E-05	2.11E-04
I-132	Ci	1.17E-04	1.69E-04	3.04E-04	4.62E-05	6.35E-04
I-133	Ci	2.78E-04	3.78E-04	6.25E-04	8.24E-05	1.36E-03
I-134	Ci	1.25E-04	6.59E-05	1.85E-04	3.22E-05	4.08E-04
I-135	Ci	2.98E-04	4.27E-04	7.44E-04	9.79E-05	1.57E-03
Total for Period	Ci	9.75E-04	3.23E-03	3.03E-03	2.89E-04	7.52E-03
<b>C. Particulates</b>						
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-57	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD

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TABLE 1B-2 (Cont.)  
GASEOUS EFFLUENTS – MIXED MODE RELEASES – BATCH MODE UNIT 1 AND 2

Nuclides Released	Unit	Batch Mode				
		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
<b>C. Particulates (Cont.)</b>						
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
<b>D. Tritium</b>						
	Ci	1.03E+02	7.33E+01	2.00E+01	2.35E+00	1.99E+02
<b>E. Gross Alpha</b>						
	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
<b>F. Carbon-14</b>						
	Ci	<LLD	<LLD	<LLD	<LLD	<LLD

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TABLE 2A  
 LIQUID EFFLUENTS-- SUMMATION OF ALL RELEASES UNIT 1 AND 2

Unit	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total	Est. Total Error %
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**A. Fission and Activation Products**

1. Total Release	Ci	1.03E-02	1.30E-02	3.26E-03	2.15E-02	4.81E-02	2.64E+00
2. Average Diluted Concentration	μCi/mL	6.74E-10	1.01E-09	1.83E-10	1.36E-09	7.78E-10	
3. Percent of applicable limit	%	*	*	*	*	*	

**B. Tritium**

1. Total Release	Ci	9.70E+02	5.28E+02	3.69E+02	5.81E+02	2.45E+03	5.85E+00
2. Average Diluted Concentration	μCi/mL	6.33E-05	4.12E-05	2.07E-05	3.67E-05	3.96E-05	
3. % of Limit (1E-2 μCi/ml)	%	6.33E-01	4.12E-01	2.07E-01	3.67E-01	3.96E-01	

**C. Dissolved Noble Gases**

1. Total Release	Ci	3.77E-05	<LLD	<LLD	<LLD	3.77E-05	2.64E+00
2. Average Diluted Concentration	μCi/mL	2.46E-12	N/A	N/A	N/A	6.09E-13	
3. % of Limit (2E-4 μCi/ml)	%	1.23E-06	N/A	N/A	N/A	3.05E-07	

**D. Gross Alpha**

1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	1.47E+01
2. Average Diluted Concentration	μCi/ml	N/A	N/A	N/A	N/A	N/A	

**E. Volume of Waste Released  
(prior to dilution)**

Liters	1.08E+10	9.72E+09	1.00E+10	1.08E+10	4.14E+10
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**F. Volume of Dilution Water**

Liters	4.52E+09	3.09E+09	7.84E+09	5.03E+09	2.05E+10
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**G. Average Stream Flow<sup>1</sup>**

m <sup>3</sup> /s	2.62E+02	1.63E+02	4.07E+01	1.23E+02	1.44E+02
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Note: ODCM LLD threshold values are included in Table 4.i of this report.

\* This limit is equal to 10 times the concentration values in Appendix B, Table 2, Column 2 to 10CFR20.1001-20.2402, except for Dissolved Noble Gases. The limits for Dissolved Noble Gases are found the Braidwood Station ODCM, Table C-6 of ODCM Appendix C for Noble Gases.

<sup>1</sup> Kankakee River Flows obtained from US Geological Survey website from daily average flow data.

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TABLE 2B-1  
LIQUID EFFLUENTS – CONTINUOUS MODE UNIT 1 AND 2

Nuclides Released		Continuous Mode				
<b>A. Fission and Activation Products</b>	<b>Unit</b>	<b>Quarter 1</b>	<b>Quarter 2</b>	<b>Quarter 3</b>	<b>Quarter 4</b>	<b>Total</b>
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-55	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
<b>B. Tritium</b>	<b>Unit</b>	<b>Quarter 1</b>	<b>Quarter 2</b>	<b>Quarter 3</b>	<b>Quarter 4</b>	<b>Total</b>
	Ci	3.43E+01	2.27E+01	1.17E+01	6.90E+00	7.56E+01
<b>C. Dissolved and Entrained Gases</b>	<b>Unit</b>	<b>Quarter 1</b>	<b>Quarter 2</b>	<b>Quarter 3</b>	<b>Quarter 4</b>	<b>Total</b>
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
<b>D. Gross Alpha</b>	<b>Unit</b>	<b>Quarter 1</b>	<b>Quarter 2</b>	<b>Quarter 3</b>	<b>Quarter 4</b>	<b>Total</b>
	Ci	<LLD	<LLD	<LLD	<LLD	<LLD

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TABLE 2B-2  
LIQUID EFFLUENTS – BATCH MODE UNIT 1 AND 2

Nuclides Released	Unit	Batch Mode				
		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
<b>A. Fission and Activation Products</b>						
Cr-51	Ci	<LLD	1.68E-03	<LLD	1.32E-03	3.01E-03
Mn-54	Ci	9.78E-05	5.58E-05	1.08E-04	1.78E-04	4.39E-04
Fe-55	Ci	2.54E-03	<LLD	<LLD	5.01E-03	7.55E-03
Fe-59	Ci	<LLD	1.85E-04	<LLD	1.14E-04	2.99E-04
Co-57	Ci	4.14E-06	1.24E-04	2.47E-06	3.04E-05	1.60E-04
Co-58	Ci	4.21E-04	4.36E-03	6.44E-04	9.33E-03	1.48E-02
Co-60	Ci	4.17E-03	3.71E-03	2.25E-03	4.13E-03	1.43E-02
Zr-95	Ci	<LLD	<LLD	<LLD	3.27E-05	3.27E-05
Nb-95	Ci	<LLD	1.46E-04	9.50E-06	1.75E-04	3.30E-04
Nb-97	Ci	8.84E-05	2.14E-04	2.52E-05	4.15E-04	7.42E-04
Ag-110m	Ci	7.37E-05	1.73E-04	5.21E-05	3.99E-04	6.98E-04
Sn-113	Ci	1.10E-05	1.57E-05	1.61E-05	5.42E-05	9.70E-05
Sb-124	Ci	<LLD	<LLD	8.91E-06	<LLD	8.91E-06
Sb-125	Ci	4.60E-04	2.26E-03	1.47E-04	3.60E-04	3.23E-03
Te-123m	Ci	<LLD	3.11E-05	<LLD	2.58E-07	3.13E-05
Te-125m	Ci	2.45E-03	<LLD	<LLD	<LLD	2.45E-03
Cs-134	Ci	2.15E-05	<LLD	<LLD	<LLD	2.15E-05
Cs-136	Ci	<LLD	4.60E-06	<LLD	<LLD	4.60E-06
Cs-137	Ci	<LLD	1.59E-05	<LLD	<LLD	1.59E-05
Total for Period	Ci	1.03E-02	1.30E-02	3.27E-03	2.15E-02	4.81E-02
<b>B. Tritium</b>	<b>Unit</b>	<b>Quarter 1</b>	<b>Quarter 2</b>	<b>Quarter 3</b>	<b>Quarter 4</b>	<b>Total</b>
	Ci	9.36E+02	5.05E+02	3.57E+02	5.75E+02	2.37E+03
<b>C. Dissolved and Entrained Gases</b>	<b>Unit</b>	<b>Quarter 1</b>	<b>Quarter 2</b>	<b>Quarter 3</b>	<b>Quarter 4</b>	<b>Total</b>
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	3.77E-05	<LLD	<LLD	<LLD	3.77E-05
Xe-133m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	3.77E-05	<LLD	<LLD	<LLD	3.77E-05

TABLE 2B-2 (Cont.)

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LIQUID EFFLUENTS – BATCH MODE UNIT 1 AND 2

Nuclides Released		Batch Mode				
D. Gross Alpha	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
	Ci	<LLD	<LLD	<LLD	<LLD	<LLD

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**APPENDIX B: SOLID WASTE AND IRRADIATED FUEL SHIPMENTS**

BRAIDWOOD NUCLEAR POWER STATION  
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A. Solid Waste Shipped Offsite for Burial or Disposal (Not Irradiated Fuel)

1. Low-Level Waste

<b>Resins, Filters, And Evaporator Bottoms</b>			
<b>Waste Class</b>	<b>Volume</b>		<b>Curies Shipped</b>
	<b>ft<sup>3</sup></b>	<b>m<sup>3</sup></b>	
A	3.20E+03	9.06E+01	1.33E+01
B	6.35E+02	1.80E+01	5.29E+02
C	0.00E+00	0.00E+00	0.00E+00
<b>All</b>	<b>3.83E+03</b>	<b>1.09E+02</b>	<b>5.43E+02</b>
Major Nuclides for the Above Table: H-3, C-14, Mn-54, Fe-55, Co-58, Co-60, Ni-59, Ni-63, Zn-65, Sr-90, Tc-99, Sb-125, I-129, Cs-137, Pu-238, Pu-239, Pu-241, Am-241, Cm-243, Cm-244			

<b>Dry Active Waste (DAW)</b>			
<b>Waste Class</b>	<b>Volume</b>		<b>Curies Shipped</b>
	<b>ft<sup>3</sup></b>	<b>m<sup>3</sup></b>	
A	1.02E+04	2.88E+02	1.58E+00
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
<b>All</b>	<b>1.02E+04</b>	<b>2.88E+02</b>	<b>1.58E+00</b>
Major Nuclides for the Above Table: H-3, C-14, Cr-51, Mn-54, Fe-55, Co-58, Co-60, Ni-59, Ni-63, Sr-90, Zr-95, Nb-95, Tc-99, Sb-125, I-129, Cs-137, Pu-238, Pu-241, Am-241, Cm-242, Cm-243, Cm-244			

<b>Irradiated Components</b>			
<b>Waste Class</b>	<b>Volume</b>		<b>Curies Shipped</b>
	<b>ft<sup>3</sup></b>	<b>m<sup>3</sup></b>	
A	0.00E+00	0.00E+00	0.00E+00
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
<b>All</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>
Major Nuclides for the Above Table: None			

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1. Low-Level Waste (continued)

<b>Other Waste</b>			
<b>Waste Class</b>	<b>Volume</b>		<b>Curies Shipped</b>
	<b>ft<sup>3</sup></b>	<b>m<sup>3</sup></b>	
A	8.89E+02	2.52E+01	2.24E-02
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
<b>All</b>	8.89E+02	2.52E+01	2.24E-02

Major Nuclides for the Above Table:  
 C-14, Cr-51, Mn-54, Fe-55, Co-58, Co-60, Ni-59, Ni-63, Sr-90, Zr-95, Nb-95, Tc-99, Sb-125, I-129, Cs-137, Pu-238, Pu-241, Am-241, Cm-242, Cm-243, Cm-244

<b>Sum of All Low-Level Waste Shipped from Site</b>			
<b>Waste Class</b>	<b>Volume</b>		<b>Curies Shipped</b>
	<b>ft<sup>3</sup></b>	<b>m<sup>3</sup></b>	
A	1.43E+04	4.04E+02	1.49E+01
B	6.35E+02	1.80E+01	5.29E+02
C	0.00E+00	0.00E+00	0.00E+00
<b>All</b>	1.49E+04	4.22E+02	5.44E+02

Major Nuclides for the Above Table:  
 H-3, C-14, Cr-51, Mn-54, Fe-55, Co-58, Co-60, Ni-59, Ni-63, Zn-65, Sr-90, Zr-95, Nb-95, Tc-99, Sb-125, I-129, Cs-137, Pu-238, Pu-239, Pu-241, Am-241, Cm-242, Cm-243, Cm-244

2. Estimate of Major Nuclide Composition (By Waste Type and Class)

a. Category A – Spent Resins, Filter Sludges, Evaporator Bottoms, etc.

<b>Isotope</b>	<b>Waste Class A Curies</b>	<b>Percent Abundance</b>	<b>Waste Class B Curies</b>	<b>Percent Abundance</b>
H-3	4.90E+00	36.81%	1.60E+01	3.03%
C-14	1.96E-03	0.01%	4.74E-01	0.09%
Cr-51	3.80E-04	0.00%	2.08E-01	0.04%
Mn-54	2.19E-01	1.64%	1.89E+01	3.58%
Fe-55	1.25E+00	9.43%	8.97E+01	16.94%
Co-57	2.66E-02	0.20%	1.48E+00	0.28%
Co-58	1.26E+00	9.43%	1.27E+01	2.41%
Co-60	1.81E+00	13.59%	1.52E+02	28.79%
Ni-59	3.48E-02	0.26%	2.76E+00	0.52%
Ni-63	3.59E+00	26.97%	2.16E+02	40.88%
Zn-65	1.01E-01	0.76%	3.96E+00	0.75%

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Isotope (continued)	Waste Class A Curies	Percent Abundance	Waste Class B Curies	Percent Abundance
Sr-89	5.17E-04	0.00%	5.32E-03	0.00%
Sr-90	1.36E-03	0.01%	8.15E-02	0.02%
Zr-95	1.30E-03	0.01%	0.00E+00	0.00%
Nb-95	4.03E-03	0.03%	0.00E+00	0.00%
Tc-99	6.78E-03	0.05%	2.89E-02	0.01%
Sn-113	3.48E-03	0.03%	1.06E-01	0.02%
Sb-125	4.88E-02	0.37%	7.88E+00	1.49%
Cs-134	1.50E-02	0.11%	9.86E-01	0.19%
Cs-137	4.44E-02	0.33%	5.14E+00	0.97%
Ce-144	1.07E-03	0.01%	6.95E-03	0.00%
Pu-238	1.42E-04	0.00%	1.17E-03	0.00%
Pu-239	3.75E-05	0.00%	4.28E-04	0.00%
Pu-241	1.06E-03	0.01%	3.07E-02	0.01%
Am-241	3.90E-05	0.00%	5.78E-04	0.00%
Cm-243	1.73E-06	0.00%	1.91E-03	0.00%
Cm-244	8.13E-05	0.00%	1.38E-03	0.00%

b. Category B – Dry Compressible Waste, Contaminated Equip, etc.

Isotope	Waste Class A Curies	Percent Abundance
H-3	8.31E-02	5.27%
C-14	0.00E+00	0.00%
Cr-51	5.78E-03	0.37%
Mn-54	1.44E-02	0.92%
Fe-55	4.35E-01	27.64%
Co-57	2.07E-03	0.13%
Co-58	6.42E-02	4.07%
Co-60	3.38E-01	21.43%
Ni-59	4.26E-03	0.27%
Ni-63	5.72E-01	36.32%
Zn-65	3.27E-03	0.21%
Sr-90	1.06E-03	0.07%
Zr-95	6.77E-03	0.43%
Nb-95	7.59E-03	0.48%
Tc-99	3.68E-03	0.23%
Ag-110m	3.28E-03	0.21%
Sn-113	1.29E-03	0.08%
Sb-125	1.90E-02	1.21%
Cs-137	8.55E-03	0.54%
Ce-144	6.14E-04	0.04%
Pu-238	2.67E-05	0.00%
Pu-241	1.18E-03	0.08%
Am-241	2.74E-05	0.00%
Cm-242	5.69E-06	0.00%
Cm-243	3.32E-05	0.00%
Cm-244	6.13E-05	0.00%

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c. Category C – Irradiated Components, Control Rods, etc.

None

d. Category D – Other (Oil, Reverse Osmosis Reject Water, Soil, Lagoon Sediment)

<b>Isotope</b>	<b>Waste Class A Curies</b>	<b>Percent Abundance</b>
Cr-51	3.40E-04	1.52%
Mn-54	3.00E-04	1.34%
Fe-55	6.19E-03	27.66%
Co-57	4.63E-05	0.21%
Co-58	3.06E-03	13.68%
Co-60	4.36E-03	19.48%
Ni-59	4.95E-05	0.22%
Ni-63	6.69E-03	29.90%
Zn-65	7.74E-05	0.35%
Sr-90	1.26E-05	0.06%
Zr-95	3.34E-04	1.49%
Nb-95	3.49E-04	1.56%
Tc-99	4.28E-05	0.19%
Ag-110m	7.68E-05	0.34%
Sn-113	4.90E-05	0.22%
Sb-125	2.69E-04	1.20%
Cs-137	1.01E-04	0.45%
Ce-144	1.34E-05	0.06%
Pu-238	3.13E-07	0.00%
Pu-241	1.43E-05	0.06%
Am-241	3.19E-07	0.00%
Cm-242	1.73E-07	0.00%
Cm-243	3.94E-07	0.00%
Cm-244	7.35E-07	0.00%

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3. Solid Waste Disposition

<b>Number of Shipments</b>	<b>Mode of Transportation</b>	<b>Destination</b>
3	Hittman Transportation	Energy Solutions Services - Gallaher Rd 628 Gallaher Rd.
10	Hittman Transportation	Energy Solutions-Bear Creek Facility 1560 Bear Creek Road
3	Hittman Transportation	EnergySolutions LLC. Clive Disposal Site - Containerized Waste Facility
5	Hittman Transportation	Waste Control Specialists LLC Compact Waste Disposal Facility
2	Visionary Solutions, LLC	Energy Solutions Services - Gallaher Rd 628 Gallaher Rd.
1	Visionary Solutions, LLC	Energy Solutions-Bear Creek Facility 1560 Bear Creek Road
1	Visionary Solutions, LLC	Waste Control Specialists LLC Compact Waste Disposal Facility

B. Irradiated Fuel Shipments

None

C. Irradiated Fuel Shipments (disposition)

No irradiated fuel shipments were dispositioned at Braidwood during January through December 2018.

D. Changes to the Process Control Program (PCP)

There were no Process Control Changes in 2018.

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**APPENDIX C: WIND DIRECTION AND STABILITY CLASSES**

BRAIDWOOD NUCLEAR POWER STATION  
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Braidwood Generating Station

Period of Record: January - March 2018  
Stability Class - Extremely Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	1	0	0	0	1
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	1	0	0	0	1
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	1	1	0	0	0	2
W	0	0	3	0	0	0	3
WNW	0	0	4	0	0	0	4
NW	0	6	3	0	0	0	9
NNW	0	0	3	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	0	7	16	0	0	0	23

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 122

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Braidwood Generating Station

Period of Record: January - March 2018  
Stability Class - Moderately Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	1	2	0	0	0	3
ESE	0	0	1	0	0	0	1
SE	0	0	1	0	0	0	1
SSE	0	0	0	0	0	0	0
S	0	0	1	0	0	0	1
SSW	0	0	1	0	0	0	1
SW	0	0	1	0	0	0	1
WSW	0	0	3	0	0	0	3
W	0	1	1	0	0	0	2
WNW	0	0	7	0	0	0	7
NW	0	0	5	0	0	0	5
NNW	0	1	2	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	0	3	25	0	0	0	28

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 122

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Braidwood Generating Station

Period of Record: January - March 2018  
Stability Class - Slightly Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	1	1	0	0	0	2
E	0	6	5	0	0	0	11
ESE	0	0	2	0	0	0	2
SE	0	0	2	0	0	0	2
SSE	0	0	0	0	0	0	0
S	0	0	1	0	0	0	1
SSW	0	0	0	1	0	0	1
SW	0	0	2	3	0	0	5
WSW	0	2	4	0	0	0	6
W	0	2	2	0	0	0	4
WNW	0	0	7	0	0	0	7
NW	0	3	6	0	0	0	9
NNW	0	0	1	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	0	14	33	4	0	0	51

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 122

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: January - March 2018  
Stability Class - Neutral - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	11	12	10	0	0	34
NNE	2	7	2	11	0	0	22
NE	0	9	13	0	0	0	22
ENE	0	6	15	0	0	0	21
E	0	15	8	0	0	0	23
ESE	0	8	11	3	0	0	22
SE	0	12	12	0	0	0	24
SSE	2	9	20	0	0	0	31
S	0	6	16	6	0	0	28
SSW	2	7	9	19	1	0	38
SW	1	8	35	13	0	0	57
WSW	0	10	16	11	2	0	39
W	0	10	28	4	1	0	43
WNW	2	16	37	6	0	0	61
NW	0	13	18	0	0	0	31
NNW	0	8	36	7	0	0	51
Variable	0	0	0	0	0	0	0
Total	10	155	288	90	4	0	547

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 122

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: January - March 2018  
Stability Class - Slightly Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	8	43	22	2	0	0	75
NNE	4	27	13	3	0	0	47
NE	3	25	30	7	0	0	65
ENE	17	53	23	3	0	0	96
E	14	33	16	0	0	0	63
ESE	4	15	17	2	0	0	38
SE	3	29	17	2	0	0	51
SSE	3	27	18	1	0	0	49
S	5	24	46	25	2	0	102
SSW	1	6	44	36	15	0	102
SW	1	9	57	13	2	0	82
WSW	7	34	9	2	0	0	52
W	9	32	10	5	3	0	59
WNW	15	48	8	1	0	0	72
NW	20	40	20	0	0	0	80
NNW	12	35	23	1	0	0	71
Variable	0	0	0	0	0	0	0
Total	126	480	373	103	22	0	1104

Hours of calm in this stability class: 1  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 122

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: January - March 2018  
Stability Class - Moderately Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	3	2	0	0	0	0	5
NNE	1	0	0	0	0	0	1
NE	1	1	0	0	0	0	2
ENE	17	0	0	0	0	0	17
E	9	2	0	0	0	0	11
ESE	5	0	0	0	0	0	5
SE	0	0	0	0	0	0	0
SSE	0	1	0	0	0	0	1
S	0	0	0	0	0	0	0
SSW	1	2	4	0	0	0	7
SW	4	3	5	0	0	0	12
WSW	2	19	0	0	0	0	21
W	21	40	0	0	0	0	61
WNW	36	9	0	0	0	0	45
NW	9	5	0	0	0	0	14
NNW	3	3	0	0	0	0	6
Variable	0	0	0	0	0	0	0
Total	112	87	9	0	0	0	208

Hours of calm in this stability class: 4  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 122

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: January - March 2018  
Stability Class - Extremely Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	1	0	0	0	0	0	1
NE	3	0	0	0	0	0	3
ENE	4	0	0	0	0	0	4
E	7	0	0	0	0	0	7
ESE	0	0	0	0	0	0	0
SE	2	0	0	0	0	0	2
SSE	0	0	0	0	0	0	0
S	1	0	0	0	0	0	1
SSW	2	0	2	0	0	0	4
SW	3	0	0	0	0	0	3
WSW	0	1	0	0	0	0	1
W	5	9	0	0	0	0	14
WNW	21	2	0	0	0	0	23
NW	2	0	0	0	0	0	2
NNW	1	1	0	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	52	13	2	0	0	0	67

Hours of calm in this stability class: 5  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 122

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: January - March 2018  
Stability Class - Extremely Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	1	0	0	1
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	1	0	0	0	1
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	2	0	0	0	2
WSW	0	0	1	0	0	0	1
W	0	0	1	4	0	0	5
WNW	0	0	3	2	2	0	7
NW	0	0	4	2	0	0	6
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	12	9	2	0	23

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 122

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: January - March 2018  
Stability Class - Moderately Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	2	1	0	0	3
ESE	0	0	0	2	0	0	2
SE	0	0	0	0	0	0	0
SSE	0	0	1	0	0	0	1
S	0	0	1	0	0	0	1
SSW	0	0	0	1	0	0	1
SW	0	0	3	0	0	0	3
WSW	0	1	0	0	0	0	1
W	0	0	1	2	0	0	3
WNW	0	0	1	3	2	0	6
NW	0	0	4	3	0	0	7
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	1	13	12	2	0	28

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 122

BRAIDWOOD NUCLEAR POWER STATION  
 RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
 UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: January - March 2018  
 Stability Class - Slightly Unstable - 199Ft-30Ft Delta-T (F)  
 Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	8	7	0	0	15
ESE	0	0	0	2	0	0	2
SE	0	0	0	0	0	0	0
SSE	0	0	1	0	0	0	1
S	0	0	0	0	0	0	0
SSW	0	0	1	3	2	0	6
SW	0	1	3	1	0	0	5
WSW	0	1	1	2	0	0	4
W	0	0	0	3	0	0	3
WNW	0	0	2	6	1	0	9
NW	0	0	2	1	2	0	5
NNW	0	0	0	1	0	0	1
Variable	0	0	0	0	0	0	0
Total	0	2	18	26	5	0	51

Hours of calm in this stability class: 0  
 Hours of missing wind measurements in this stability class: 0  
 Hours of missing stability measurements in all stability classes: 122

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: January - March 2018  
Stability Class - Neutral - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	7	10	2	8	0	27
NNE	0	1	5	8	3	0	17
NE	0	2	11	5	0	0	18
ENE	0	4	10	13	0	0	27
E	0	1	11	6	4	3	25
ESE	0	4	11	10	0	0	25
SE	0	5	4	12	0	0	21
SSE	1	5	7	18	9	0	40
S	1	3	4	9	15	5	37
SSW	2	5	5	24	10	1	47
SW	1	2	15	17	2	0	37
WSW	0	9	7	24	5	3	48
W	1	4	7	18	4	0	34
WNW	0	8	14	22	10	2	56
NW	0	3	10	29	6	1	49
NNW	1	5	6	14	13	0	39
Variable	0	0	0	0	0	0	0
Total	7	68	137	231	89	15	547

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 122

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: January - March 2018  
Stability Class - Slightly Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	2	14	42	14	3	0	75
NNE	1	7	28	8	0	0	44
NE	2	3	27	35	7	3	77
ENE	0	13	44	20	0	0	77
E	1	6	27	27	21	3	85
ESE	1	5	5	13	7	1	32
SE	0	4	28	25	10	0	67
SSE	1	6	13	17	19	2	58
S	0	2	15	43	45	34	139
SSW	1	7	4	46	31	3	92
SW	0	8	24	17	0	1	50
WSW	1	5	16	13	3	6	44
W	3	4	24	13	1	0	45
WNW	4	9	18	28	4	0	63
NW	3	10	41	38	6	0	98
NNW	1	18	25	15	0	0	59
Variable	0	0	0	0	0	0	0
Total	21	121	381	372	157	53	1105

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 122

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: January - March 2018  
Stability Class - Moderately Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	2	3	1	0	0	0	6
NNE	0	1	0	0	0	0	1
NE	1	2	1	0	0	0	4
ENE	1	6	8	2	0	0	17
E	0	2	8	3	0	0	13
ESE	0	2	0	1	0	0	3
SE	0	2	0	0	0	0	2
SSE	0	0	1	1	0	0	2
S	1	0	1	1	0	0	3
SSW	0	1	1	6	0	0	8
SW	0	1	3	4	0	0	8
WSW	0	2	13	8	0	0	23
W	0	1	28	12	0	0	41
WNW	1	5	27	12	0	0	45
NW	0	3	22	4	0	0	29
NNW	0	0	4	3	0	0	7
Variable	0	0	0	0	0	0	0
Total	6	31	118	57	0	0	212

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 122

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: January - March 2018  
Stability Class - Extremely Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	1	0	0	0	1
NNE	0	0	0	0	0	0	0
NE	1	0	3	1	0	0	5
ENE	0	1	1	0	0	0	2
E	0	2	1	1	0	0	4
ESE	3	1	0	0	0	0	4
SE	0	2	0	0	0	0	2
SSE	3	1	0	0	0	0	4
S	0	2	0	0	0	0	2
SSW	0	1	0	1	0	0	2
SW	0	2	0	1	0	0	3
WSW	1	4	5	0	0	0	10
W	0	0	4	2	0	0	6
WNW	0	2	5	3	0	0	10
NW	0	2	4	6	0	0	12
NNW	0	3	0	2	0	0	5
Variable	0	0	0	0	0	0	0
Total	8	23	24	17	0	0	72

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 122

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: April - June 2018  
Stability Class - Extremely Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	3	0	0	0	0	3
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	2	0	0	0	2
NW	0	1	3	0	0	0	4
NNW	0	0	2	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	0	4	7	0	0	0	11

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 0

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: April - June 2018  
Stability Class - Moderately Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	1	0	0	0	0	1
NE	0	2	2	0	0	0	4
ENE	0	0	0	0	0	0	0
E	0	0	1	0	0	0	1
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	1	0	0	0	1
S	0	0	0	0	0	0	0
SSW	0	0	2	2	0	0	4
SW	0	0	0	0	0	0	0
WSW	0	0	2	0	0	0	2
W	0	0	1	3	0	0	4
WNW	0	1	6	0	0	0	7
NW	0	2	3	0	0	0	5
NNW	0	0	4	0	0	0	4
Variable	0	0	0	0	0	0	0
Total	0	6	22	5	0	0	33

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 0

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: April - June 2018  
Stability Class - Slightly Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	3	0	0	0	3
NNE	0	0	1	0	0	0	1
NE	0	0	5	0	0	0	5
ENE	0	2	3	0	0	0	5
E	0	2	2	0	0	0	4
ESE	0	5	0	0	0	0	5
SE	0	3	1	0	0	0	4
SSE	0	1	1	0	0	0	2
S	0	0	1	0	0	0	1
SSW	0	1	0	5	0	0	6
SW	0	0	0	1	0	0	1
WSW	0	0	1	3	0	0	4
W	0	0	3	2	0	0	5
WNW	0	0	6	1	0	0	7
NW	0	5	4	0	0	0	9
NNW	0	2	9	0	0	0	11
Variable	0	0	0	0	0	0	0
Total	0	21	40	12	0	0	73

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 0

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: April - June 2018  
Stability Class - Neutral - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	2	20	11	0	0	0	33
NNE	1	21	15	1	0	0	38
NE	3	44	38	2	0	0	87
ENE	13	34	25	0	0	0	72
E	7	23	7	0	0	0	37
ESE	6	7	1	0	0	0	14
SE	1	12	6	0	0	0	19
SSE	3	27	4	0	0	0	34
S	1	23	15	0	0	0	39
SSW	3	14	12	9	0	0	38
SW	1	8	23	11	5	0	48
WSW	4	7	17	4	0	0	32
W	4	15	11	2	0	0	32
WNW	4	29	17	12	0	0	62
NW	4	22	11	1	0	0	38
NNW	5	26	8	1	0	0	40
Variable	0	0	0	0	0	0	0
Total	62	332	221	43	5	0	663

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 0

BRAIDWOOD NUCLEAR POWER STATION  
 RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
 UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: April - June 2018  
 Stability Class - Slightly Stable - 199Ft-30Ft Delta-T (F)  
 Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	8	18	2	0	0	0	28
NNE	16	33	18	2	0	0	69
NE	22	78	41	9	0	0	150
ENE	46	156	37	3	0	0	242
E	36	28	2	0	0	0	66
ESE	12	25	2	0	0	0	39
SE	5	26	4	0	0	0	35
SSE	9	26	2	0	0	0	37
S	1	39	30	5	0	0	75
SSW	2	15	21	30	1	0	69
SW	0	22	36	15	0	0	73
WSW	6	31	8	1	0	0	46
W	10	16	4	3	0	0	33
WNW	18	20	35	4	0	0	77
NW	14	21	11	0	0	0	46
NNW	7	27	10	0	0	0	44
Variable	0	0	0	0	0	0	0
Total	212	581	263	72	1	0	1129

Hours of calm in this stability class: 2  
 Hours of missing wind measurements in this stability class: 0  
 Hours of missing stability measurements in all stability classes: 0

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: April - June 2018  
Stability Class - Moderately Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	8	1	0	0	0	0	9
NNE	5	0	0	0	0	0	5
NE	6	1	0	0	0	0	7
ENE	19	3	0	0	0	0	22
E	30	1	0	0	0	0	31
ESE	10	1	0	0	0	0	11
SE	7	7	0	0	0	0	14
SSE	4	5	0	0	0	0	9
S	2	11	0	0	0	0	13
SSW	3	3	1	0	0	0	7
SW	4	1	2	0	0	0	7
WSW	7	11	0	0	0	0	18
W	18	8	0	0	0	0	26
WNW	12	1	0	0	0	0	13
NW	6	2	0	0	0	0	8
NNW	5	1	0	0	0	0	6
Variable	0	0	0	0	0	0	0
Total	146	57	3	0	0	0	206

Hours of calm in this stability class: 8  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 0

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: April - June 2018  
Stability Class - Extremely Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	2	0	0	0	0	0	2
NNE	5	0	0	0	0	0	5
NE	3	0	0	0	0	0	3
ENE	3	0	0	0	0	0	3
E	9	0	0	0	0	0	9
ESE	5	0	0	0	0	0	5
SE	1	0	0	0	0	0	1
SSE	0	0	0	0	0	0	0
S	2	0	0	0	0	0	2
SSW	2	2	0	0	0	0	4
SW	1	1	0	0	0	0	2
WSW	1	1	0	0	0	0	2
W	4	0	0	0	0	0	4
WNW	5	0	0	0	0	0	5
NW	6	0	0	0	0	0	6
NNW	2	0	0	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	51	4	0	0	0	0	55

Hours of calm in this stability class: 4  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 0

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: April - June 2018  
Stability Class - Extremely Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	2	0	0	0	0	2
ENE	0	0	1	0	0	0	1
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	2	0	0	2
NW	0	0	1	3	0	0	4
NNW	0	0	1	1	0	0	2
Variable	0	0	0	0	0	0	0
Total	0	2	3	6	0	0	11

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 0

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: April - June 2018  
Stability Class - Moderately Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	0	1	0	0	0	1
NE	0	1	0	2	0	0	3
ENE	0	1	0	0	0	0	1
E	0	0	0	1	0	0	1
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	1	0	0	1
S	0	0	0	1	0	0	1
SSW	0	0	0	2	1	0	3
SW	0	0	0	0	0	0	0
WSW	0	0	0	3	0	0	3
W	0	0	0	2	1	0	3
WNW	0	0	1	3	0	0	4
NW	0	0	5	4	0	0	9
NNW	0	0	3	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	0	2	10	19	2	0	33

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 0

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: April - June 2018  
Stability Class - Slightly Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	2	0	0	2
NNE	0	0	0	2	0	0	2
NE	0	0	0	5	0	0	5
ENE	0	3	2	1	0	0	6
E	0	1	1	3	0	0	5
ESE	0	0	4	1	0	0	5
SE	0	0	4	0	0	0	4
SSE	0	0	0	0	1	0	1
S	0	0	2	1	0	0	3
SSW	0	0	0	0	4	0	4
SW	0	0	0	0	1	0	1
WSW	0	0	1	1	1	1	4
W	0	0	0	3	1	0	4
WNW	0	0	0	3	1	1	5
NW	0	0	7	5	0	0	12
NNW	0	0	6	4	0	0	10
Variable	0	0	0	0	0	0	0
Total	0	4	27	31	9	2	73

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 0

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: April - June 2018  
Stability Class - Neutral - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	12	9	7	0	0	29
NNE	1	11	14	9	0	0	35
NE	1	22	29	21	3	0	76
ENE	5	21	20	19	0	0	65
E	7	22	16	8	3	0	56
ESE	4	5	3	1	1	0	14
SE	2	13	6	5	0	0	26
SSE	0	24	14	3	0	0	41
S	0	16	15	9	1	0	41
SSW	2	8	10	8	8	3	39
SW	1	5	17	7	8	3	41
WSW	1	5	9	11	3	0	29
W	1	7	15	2	2	0	27
WNW	2	15	16	8	15	6	62
NW	0	14	18	7	7	0	46
NNW	2	12	21	1	0	0	36
Variable	0	0	0	0	0	0	0
Total	30	212	232	126	51	12	663

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 0

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: April - June 2018  
Stability Class - Slightly Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	3	8	14	2	0	0	27
NNE	5	14	19	18	2	0	58
NE	7	17	78	40	10	0	152
ENE	4	47	111	41	4	0	207
E	2	31	67	6	0	0	106
ESE	5	5	22	14	0	0	46
SE	1	5	22	6	0	0	34
SSE	0	6	23	12	1	0	42
S	1	4	12	30	15	2	64
SSW	0	0	18	38	24	10	90
SW	1	5	24	25	10	1	66
WSW	1	7	19	9	1	0	37
W	0	5	15	5	1	1	27
WNW	1	17	15	34	8	3	78
NW	3	9	14	15	6	0	47
NNW	3	9	26	12	0	0	50
Variable	0	0	0	0	0	0	0
Total	37	189	499	307	82	17	1131

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 0

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: April - June 2018  
Stability Class - Moderately Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	0	3	0	0	0	4
NNE	0	4	10	0	0	0	14
NE	1	3	2	0	0	0	6
ENE	2	3	11	0	0	0	16
E	0	5	12	1	0	0	18
ESE	0	3	6	5	0	0	14
SE	1	4	6	3	0	0	14
SSE	0	5	9	5	0	0	19
S	3	0	8	4	0	0	15
SSW	1	2	3	4	0	0	10
SW	3	3	5	2	0	0	13
WSW	3	3	6	0	0	0	12
W	1	2	14	3	0	0	20
WNW	0	5	16	1	0	0	22
NW	0	5	7	1	0	0	13
NNW	1	1	2	0	0	0	4
Variable	0	0	0	0	0	0	0
Total	17	48	120	29	0	0	214

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 0

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: April - June 2018  
Stability Class - Extremely Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	2	8	0	0	0	10
NNE	0	1	4	0	0	0	5
NE	0	2	1	0	0	0	3
ENE	0	1	1	0	0	0	2
E	0	0	0	0	0	0	0
ESE	1	1	2	5	0	0	9
SE	1	2	1	0	0	0	4
SSE	0	3	1	0	0	0	4
S	1	1	0	0	0	0	2
SSW	0	2	0	0	0	0	2
SW	1	4	0	0	0	0	5
WSW	0	4	4	0	0	0	8
W	0	0	3	0	0	0	3
WNW	1	0	0	0	0	0	1
NW	0	0	0	0	0	0	0
NNW	0	1	0	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	5	24	25	5	0	0	59

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 0

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: July - September 2018  
Stability Class - Extremely Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	4	1	0	0	0	5
NNE	0	9	0	0	0	0	9
NE	2	7	2	0	0	0	11
ENE	0	8	2	0	0	0	10
E	0	6	0	0	0	0	6
ESE	0	4	0	0	0	0	4
SE	0	0	0	0	0	0	0
SSE	0	3	6	0	0	0	9
S	0	4	4	1	0	0	9
SSW	0	5	7	7	1	0	20
SW	0	5	7	5	0	0	17
WSW	0	4	20	0	0	0	24
W	0	10	9	0	0	0	19
WNW	0	7	8	0	0	0	15
NW	0	11	1	0	0	0	12
NNW	0	9	6	0	0	0	15
Variable	0	0	0	0	0	0	0
Total	2	96	73	13	1	0	185

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 1  
Hours of missing stability measurements in all stability classes: 38

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: July - September 2018  
Stability Class - Moderately Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	2	1	0	0	0	3
NNE	1	12	3	1	0	0	17
NE	1	5	4	0	0	0	10
ENE	0	15	0	0	0	0	15
E	2	11	0	0	0	0	13
ESE	0	4	0	0	0	0	4
SE	1	1	1	0	0	0	3
SSE	0	5	1	0	0	0	6
S	0	4	1	1	0	0	6
SSW	0	4	5	3	0	0	12
SW	0	5	11	4	0	0	20
WSW	1	1	2	0	0	0	4
W	1	6	3	0	0	0	10
WNW	0	8	4	0	0	0	12
NW	2	3	1	0	0	0	6
NNW	3	6	1	0	0	0	10
Variable	0	0	0	0	0	0	0
Total	12	92	38	9	0	0	151

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 38

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: July - September 2018  
Stability Class - Slightly Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	4	5	0	0	0	10
NNE	0	3	3	0	0	0	6
NE	2	10	5	0	0	0	17
ENE	8	11	0	0	0	0	19
E	1	12	0	0	0	0	13
ESE	2	8	0	0	0	0	10
SE	2	6	0	0	0	0	8
SSE	1	9	1	1	0	0	12
S	0	6	7	0	0	0	13
SSW	0	3	11	6	0	0	20
SW	0	2	8	2	0	0	12
WSW	0	3	4	0	0	0	7
W	2	7	1	0	0	0	10
WNW	3	6	1	1	0	0	11
NW	0	7	0	0	0	0	7
NNW	0	4	4	0	0	0	8
Variable	0	0	0	0	0	0	0
Total	22	101	50	10	0	0	183

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 38

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: July - September 2018  
Stability Class - Neutral - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	2	14	13	0	0	0	29
NNE	3	26	23	1	0	0	53
NE	9	34	43	0	0	0	86
ENE	21	42	4	0	0	0	67
E	11	17	0	0	0	0	28
ESE	9	14	0	0	0	0	23
SE	1	19	1	0	0	0	21
SSE	5	26	9	0	0	0	40
S	1	23	33	11	1	0	69
SSW	0	9	48	26	0	0	83
SW	1	20	24	6	0	0	51
WSW	5	7	13	1	0	0	26
W	3	14	5	2	0	0	24
WNW	5	18	3	0	0	0	26
NW	2	16	6	0	0	0	24
NNW	2	23	10	0	0	0	35
Variable	0	0	0	0	0	0	0
Total	80	322	235	47	1	0	685

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 38

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
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Braidwood Generating Station

Period of Record: July - September 2018  
Stability Class - Slightly Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	14	10	9	0	0	0	33
NNE	6	19	2	0	0	0	27
NE	15	19	4	0	0	0	38
ENE	38	18	0	0	0	0	56
E	37	14	0	0	0	0	51
ESE	20	21	0	0	0	0	41
SE	19	27	2	0	0	0	48
SSE	6	44	3	0	0	0	53
S	1	30	13	0	0	0	44
SSW	1	16	11	0	0	0	28
SW	2	14	16	0	0	0	32
WSW	6	15	2	0	0	0	23
W	12	11	8	1	0	0	32
WNW	11	5	1	0	0	0	17
NW	11	5	0	0	0	0	16
NNW	2	14	7	0	0	0	23
Variable	0	0	0	0	0	0	0
Total	201	282	78	1	0	0	562

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 38

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
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Braidwood Generating Station

Period of Record: July - September 2018  
Stability Class - Moderately Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	8	3	0	0	0	0	11
NNE	9	2	0	0	0	0	11
NE	12	1	0	0	0	0	13
ENE	23	0	0	0	0	0	23
E	56	1	0	0	0	0	57
ESE	15	5	0	0	0	0	20
SE	3	3	0	0	0	0	6
SSE	2	1	0	0	0	0	3
S	3	1	0	0	0	0	4
SSW	1	1	0	0	0	0	2
SW	6	5	0	0	0	0	11
WSW	13	11	0	0	0	0	24
W	29	1	0	0	0	0	30
WNW	17	1	0	0	0	0	18
NW	9	1	0	0	0	0	10
NNW	18	2	0	0	0	0	20
Variable	0	0	0	0	0	0	0
Total	224	39	0	0	0	0	263

Hours of calm in this stability class: 2  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 38

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
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Braidwood Generating Station

Period of Record: July - September 2018  
Stability Class - Extremely Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	12	0	0	0	0	0	12
NNE	4	1	0	0	0	0	5
NE	7	0	0	0	0	0	7
ENE	19	0	0	0	0	0	19
E	10	0	0	0	0	0	10
ESE	5	0	0	0	0	0	5
SE	1	0	0	0	0	0	1
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	1	0	0	0	0	0	1
SW	2	0	0	0	0	0	2
WSW	11	0	0	0	0	0	11
W	32	0	0	0	0	0	32
WNW	12	0	0	0	0	0	12
NW	7	0	0	0	0	0	7
NNW	9	0	0	0	0	0	9
Variable	0	0	0	0	0	0	0
Total	132	1	0	0	0	0	133

Hours of calm in this stability class: 5  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 38

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: July - September 2018  
Stability Class - Extremely Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	7	1	0	0	0	9
NNE	0	5	2	0	0	0	7
NE	1	4	3	1	0	0	9
ENE	0	2	5	0	0	0	7
E	0	4	5	0	0	0	9
ESE	0	3	1	0	0	0	4
SE	0	0	1	0	0	0	1
SSE	0	2	6	2	1	0	11
S	0	1	4	1	0	0	6
SSW	0	1	8	6	5	2	22
SW	0	2	5	8	3	0	18
WSW	0	3	13	7	0	0	23
W	0	4	6	5	0	0	15
WNW	0	4	9	5	0	0	18
NW	0	6	5	0	0	0	11
NNW	0	5	5	5	0	0	15
Variable	0	0	0	0	0	0	0
Total	2	53	79	40	9	2	185

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 1  
Hours of missing stability measurements in all stability classes: 38

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: July - September 2018  
Stability Class - Moderately Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	5	2	1	0	0	8
NNE	1	4	7	2	0	0	14
NE	0	3	4	3	0	0	10
ENE	0	6	4	0	0	0	10
E	0	12	2	0	0	0	14
ESE	0	7	1	0	0	0	8
SE	1	0	2	0	0	0	3
SSE	0	2	5	0	0	0	7
S	0	2	2	0	1	0	5
SSW	0	0	7	4	3	0	14
SW	0	0	11	8	1	0	20
WSW	0	1	0	0	0	0	1
W	1	2	4	2	0	0	9
WNW	0	6	6	2	1	0	15
NW	1	1	4	1	0	0	7
NNW	0	2	4	0	0	0	6
Variable	0	0	0	0	0	0	0
Total	4	53	65	23	6	0	151

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 38

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: July - September 2018  
Stability Class - Slightly Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	4	3	3	0	0	10
NNE	2	2	3	3	0	0	10
NE	1	7	4	3	0	0	15
ENE	1	9	1	0	0	0	11
E	1	10	5	0	0	0	16
ESE	1	11	2	0	0	0	14
SE	0	5	0	0	0	0	5
SSE	0	8	5	0	1	0	14
S	0	3	6	4	1	0	14
SSW	0	0	8	9	3	2	22
SW	0	0	8	4	0	0	12
WSW	0	2	3	0	0	0	5
W	0	3	5	0	0	0	8
WNW	0	0	6	0	2	0	8
NW	3	2	4	0	0	0	9
NNW	1	3	3	3	0	0	10
Variable	0	0	0	0	0	0	0
Total	10	69	66	29	7	2	183

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 38

BRAIDWOOD NUCLEAR POWER STATION  
 RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
 UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: July - September 2018  
 Stability Class - Neutral - 199Ft-30Ft Delta-T (F)  
 Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	7	11	10	0	0	29
NNE	0	9	11	21	1	0	42
NE	5	11	40	37	0	0	93
ENE	3	27	27	5	0	0	62
E	1	12	15	2	0	0	30
ESE	1	10	5	6	0	0	22
SE	3	16	7	1	0	0	27
SSE	0	15	13	12	0	0	40
S	0	4	19	22	13	3	61
SSW	2	1	19	60	23	1	106
SW	2	5	20	10	3	1	41
WSW	1	6	6	11	1	0	25
W	0	3	8	3	3	0	17
WNW	1	6	9	5	0	0	21
NW	1	9	16	9	0	0	35
NNW	0	6	18	9	1	0	34
Variable	0	0	0	0	0	0	0
Total	21	147	244	223	45	5	685

Hours of calm in this stability class: 0  
 Hours of missing wind measurements in this stability class: 0  
 Hours of missing stability measurements in all stability classes: 38

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: July - September 2018  
Stability Class - Slightly Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	11	9	9	0	0	29
NNE	0	6	21	3	0	0	30
NE	3	8	28	7	0	0	46
ENE	0	16	16	0	0	0	32
E	1	12	29	8	0	0	50
ESE	0	6	16	12	0	0	34
SE	0	11	27	4	0	0	42
SSE	2	11	35	10	0	0	58
S	2	5	30	18	0	0	55
SSW	0	4	20	25	0	0	49
SW	0	7	17	5	2	0	31
WSW	0	3	8	4	0	0	15
W	0	8	7	8	2	0	25
WNW	1	5	11	6	0	0	23
NW	1	1	9	2	0	0	13
NNW	0	6	13	11	0	0	30
Variable	0	0	0	0	0	0	0
Total	10	120	296	132	4	0	562

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 38

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: July - September 2018  
Stability Class - Moderately Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	2	23	0	0	0	26
NNE	0	2	6	0	0	0	8
NE	0	5	5	2	0	0	12
ENE	2	17	7	1	0	0	27
E	0	9	18	3	0	0	30
ESE	0	3	15	6	0	0	24
SE	2	9	14	0	0	0	25
SSE	2	8	4	0	0	0	14
S	0	1	4	0	0	0	5
SSW	1	4	4	0	0	0	9
SW	1	11	3	1	0	0	16
WSW	1	5	11	3	0	0	20
W	0	4	8	1	0	0	13
WNW	1	4	14	0	0	0	19
NW	0	2	3	0	0	0	5
NNW	0	6	5	1	0	0	12
Variable	0	0	0	0	0	0	0
Total	11	92	144	18	0	0	265

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 38

BRAIDWOOD NUCLEAR POWER STATION  
 RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
 UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: July - September 2018  
 Stability Class - Extremely Stable - 199Ft-30Ft Delta-T (F)  
 Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	5	7	0	0	0	13
NNE	4	5	1	0	0	0	10
NE	2	2	2	1	0	0	7
ENE	0	4	1	0	0	0	5
E	1	2	3	0	0	0	6
ESE	2	1	6	2	0	0	11
SE	0	4	3	0	0	0	7
SSE	1	2	0	0	0	0	3
S	1	3	0	0	0	0	4
SSW	1	11	0	0	0	0	12
SW	0	9	0	0	0	0	9
WSW	1	4	5	0	0	0	10
W	1	2	6	0	0	0	9
WNW	4	1	15	0	0	0	20
NW	0	2	3	0	0	0	5
NNW	1	5	1	0	0	0	7
Variable	0	0	0	0	0	0	0
Total	20	62	53	3	0	0	138

Hours of calm in this stability class: 0  
 Hours of missing wind measurements in this stability class: 0  
 Hours of missing stability measurements in all stability classes: 38

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: October - December 2018  
Stability Class - Extremely Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	2	2	0	0	0	4
NNE	0	2	2	0	0	0	4
NE	0	1	0	0	0	0	1
ENE	0	1	0	0	0	0	1
E	0	1	0	0	0	0	1
ESE	0	2	0	0	0	0	2
SE	0	1	4	0	0	0	5
SSE	0	0	1	0	0	0	1
S	0	0	1	0	0	0	1
SSW	0	1	6	4	0	0	11
SW	0	0	7	3	0	0	10
WSW	0	2	4	1	0	0	7
W	0	4	5	0	0	0	9
WNW	0	2	13	6	0	0	21
NW	0	1	8	0	0	0	9
NNW	0	1	11	0	0	0	12
Variable	0	0	0	0	0	0	0
Total	0	21	64	14	0	0	99

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 4

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: October - December 2018  
Stability Class - Moderately Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	2	2	0	0	0	4
NNE	0	3	3	0	0	0	6
NE	0	3	0	0	0	0	3
ENE	0	2	0	0	0	0	2
E	1	4	0	0	0	0	5
ESE	1	3	1	0	0	0	5
SE	0	4	2	0	0	0	6
SSE	0	0	2	0	0	0	2
S	0	1	3	2	0	0	6
SSW	0	2	5	4	1	0	12
SW	0	5	0	3	0	0	8
WSW	0	2	6	4	0	0	12
W	0	3	6	0	0	0	9
WNW	0	2	7	6	0	0	15
NW	0	6	3	0	0	0	9
NNW	0	9	1	0	0	0	10
Variable	0	0	0	0	0	0	0
Total	2	51	41	19	1	0	114

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 4

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: October - December 2018  
Stability Class - Slightly Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	7	2	0	0	0	9
NNE	0	2	1	0	0	0	3
NE	0	6	3	0	0	0	9
ENE	2	5	0	0	0	0	7
E	1	10	0	0	0	0	11
ESE	0	5	2	0	0	0	7
SE	0	8	1	0	0	0	9
SSE	0	3	1	0	0	0	4
S	0	3	9	3	0	0	15
SSW	0	3	6	3	0	0	12
SW	0	3	5	3	2	0	13
WSW	0	8	14	6	0	0	28
W	1	5	13	3	0	0	22
WNW	0	10	16	3	0	0	29
NW	0	6	2	0	0	0	8
NNW	0	8	5	1	1	0	15
Variable	0	0	0	0	0	0	0
Total	4	92	80	22	3	0	201

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 4

BRAIDWOOD NUCLEAR POWER STATION  
 RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
 UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: October - December 2018  
 Stability Class - Neutral - 199Ft-30Ft Delta-T (F)  
 Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	7	29	15	2	1	0	54
NNE	4	37	8	2	4	0	55
NE	8	47	7	5	3	0	70
ENE	10	50	4	1	0	0	65
E	11	36	11	1	0	0	59
ESE	2	27	22	2	0	0	53
SE	1	17	28	11	0	0	57
SSE	1	23	35	12	0	0	71
S	1	10	61	10	0	0	82
SSW	1	4	28	16	2	0	51
SW	3	16	75	13	1	0	108
WSW	2	37	28	14	3	0	84
W	6	26	36	25	4	0	97
WNW	10	43	39	18	1	0	111
NW	6	51	18	1	0	0	76
NNW	8	28	52	13	0	0	101
Variable	0	0	0	0	0	0	0
Total	81	481	467	146	19	0	1194

Hours of calm in this stability class: 0  
 Hours of missing wind measurements in this stability class: 0  
 Hours of missing stability measurements in all stability classes: 4

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: October - December 2018  
Stability Class - Slightly Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	10	4	0	0	0	0	14
NNE	4	8	1	0	0	0	13
NE	4	2	0	0	0	0	6
ENE	23	5	0	0	0	0	28
E	30	4	0	0	0	0	34
ESE	5	13	0	0	0	0	18
SE	4	14	6	0	0	0	24
SSE	2	21	6	0	0	0	29
S	0	10	7	0	0	0	17
SSW	1	5	17	0	0	0	23
SW	2	5	7	0	0	0	14
WSW	4	24	2	0	0	0	30
W	14	32	4	0	0	0	50
WNW	20	15	2	0	0	0	37
NW	32	2	0	0	0	0	34
NNW	17	5	0	0	0	0	22
Variable	0	0	0	0	0	0	0
Total	172	169	52	0	0	0	393

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 4

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: October - December 2018  
Stability Class - Moderately Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	5	0	0	0	0	0	5
NNE	4	2	0	0	0	0	6
NE	9	0	0	0	0	0	9
ENE	7	0	0	0	0	0	7
E	15	3	0	0	0	0	18
ESE	3	4	0	0	0	0	7
SE	1	1	0	0	0	0	2
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	3	4	0	0	0	7
SW	3	0	0	0	0	0	3
WSW	5	15	0	0	0	0	20
W	14	14	1	0	0	0	29
WNW	24	3	0	0	0	0	27
NW	4	2	0	0	0	0	6
NNW	7	1	0	0	0	0	8
Variable	0	0	0	0	0	0	0
Total	101	48	5	0	0	0	154

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 4

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
UNIT 1, 2 and ISFSI (Docket Numbers 50-456, 50-457 and 72-73)

Braidwood Generating Station

Period of Record: October - December 2018  
Stability Class - Extremely Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 34 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	2	0	0	0	0	0	2
NE	1	0	0	0	0	0	1
ENE	4	0	0	0	0	0	4
E	6	0	0	0	0	0	6
ESE	6	0	0	0	0	0	6
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	1	0	0	0	0	0	1
WSW	1	1	0	0	0	0	2
W	6	0	0	0	0	0	6
WNW	8	0	0	0	0	0	8
NW	7	0	0	0	0	0	7
NNW	3	0	0	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	45	1	0	0	0	0	46

Hours of calm in this stability class: 3  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 4

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
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Braidwood Generating Station

Period of Record: October - December 2018  
Stability Class - Extremely Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	2	3	1	0	0	6
NNE	0	1	0	1	0	0	2
NE	0	0	1	0	0	0	1
ENE	0	1	0	0	0	0	1
E	0	0	1	0	0	0	1
ESE	0	1	1	1	0	0	3
SE	0	0	1	3	0	0	4
SSE	0	0	1	0	0	0	1
S	0	0	1	0	1	0	2
SSW	0	1	3	4	2	0	10
SW	0	0	6	1	2	0	9
WSW	0	0	4	1	2	0	7
W	0	1	5	3	0	0	9
WNW	0	0	6	9	6	1	22
NW	0	0	4	5	0	0	9
NNW	0	0	4	8	0	0	12
Variable	0	0	0	0	0	0	0
Total	0	7	41	37	13	1	99

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 4

BRAIDWOOD NUCLEAR POWER STATION  
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2018  
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Braidwood Generating Station

Period of Record: October - December 2018  
Stability Class - Moderately Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	1	2	0	0	0	3
NNE	0	3	0	3	0	0	6
NE	0	2	1	0	0	0	3
ENE	0	2	0	0	0	0	2
E	0	4	0	0	0	0	4
ESE	1	3	1	2	0	0	7
SE	0	3	1	1	0	0	5
SSE	0	0	1	1	0	0	2
S	0	2	1	5	0	0	8
SSW	0	1	4	4	2	1	12
SW	0	1	3	0	1	0	5
WSW	0	1	8	4	3	0	16
W	0	1	4	0	0	0	5
WNW	0	2	1	7	3	2	15
NW	0	6	1	2	1	1	11
NNW	0	7	2	1	0	0	10
Variable	0	0	0	0	0	0	0
Total	1	39	30	30	10	4	114

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 4

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Braidwood Generating Station

Period of Record: October - December 2018  
Stability Class - Slightly Unstable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	5	3	2	0	0	10
NNE	0	1	2	2	0	0	5
NE	0	1	5	1	0	0	7
ENE	0	6	0	0	0	0	6
E	0	9	2	0	0	0	11
ESE	0	5	4	3	0	0	12
SE	0	4	2	0	0	0	6
SSE	0	2	2	0	1	0	5
S	0	1	4	8	1	0	14
SSW	0	4	3	6	3	1	17
SW	0	1	2	6	0	1	10
WSW	0	5	13	6	7	0	31
W	1	1	11	4	2	0	19
WNW	0	3	9	7	8	0	27
NW	0	3	3	4	0	1	11
NNW	0	3	3	3	0	1	10
Variable	0	0	0	0	0	0	0
Total	1	54	68	52	22	4	201

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 4

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Braidwood Generating Station

Period of Record: October - December 2018  
Stability Class - Neutral - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	2	17	17	12	0	4	52
NNE	1	9	37	9	0	5	61
NE	2	9	38	7	3	5	64
ENE	2	22	28	3	0	0	55
E	0	13	28	17	9	0	67
ESE	0	2	13	19	17	5	56
SE	1	3	10	23	9	6	52
SSE	1	1	17	25	19	1	64
S	0	4	15	53	13	3	88
SSW	0	4	10	38	15	8	75
SW	4	10	27	59	4	0	104
WSW	1	17	22	24	18	4	86
W	2	6	20	36	14	6	84
WNW	2	8	30	35	9	9	93
NW	0	6	50	26	7	2	91
NNW	3	11	37	41	9	1	102
Variable	0	0	0	0	0	0	0
Total	21	142	399	427	146	59	1194

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 4

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Braidwood Generating Station

Period of Record: October - December 2018  
 Stability Class - Slightly Stable - 199Ft-30Ft Delta-T (F)  
 Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	9	10	0	0	0	19
NNE	0	16	1	8	0	0	25
NE	1	3	6	0	0	0	10
ENE	1	8	9	0	0	0	18
E	0	10	16	4	0	0	30
ESE	1	2	10	6	0	0	19
SE	0	4	9	14	0	0	27
SSE	0	1	18	12	0	0	31
S	0	2	8	15	0	0	25
SSW	0	1	2	14	0	0	17
SW	1	6	3	13	0	0	23
WSW	0	2	11	4	0	0	17
W	1	6	15	20	0	0	42
WNW	0	1	17	15	0	0	33
NW	0	2	20	3	0	0	25
NNW	1	10	21	0	0	0	32
Variable	0	0	0	0	0	0	0
Total	6	83	176	128	0	0	393

Hours of calm in this stability class: 0  
 Hours of missing wind measurements in this stability class: 0  
 Hours of missing stability measurements in all stability classes: 4

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Braidwood Generating Station

Period of Record: October - December 2018  
Stability Class - Moderately Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	2	8	0	0	0	11
NNE	0	4	3	4	0	0	11
NE	0	0	4	0	0	0	4
ENE	5	3	2	0	0	0	10
E	1	2	3	0	0	0	6
ESE	1	0	4	2	0	0	7
SE	0	0	5	3	0	0	8
SSE	1	4	0	1	0	0	6
S	0	2	1	0	0	0	3
SSW	0	0	1	2	0	0	3
SW	1	1	1	3	0	0	6
WSW	1	3	2	5	0	0	11
W	0	2	7	16	0	0	25
WNW	0	4	7	6	0	0	17
NW	0	2	12	1	0	0	15
NNW	1	4	6	0	0	0	11
Variable	0	0	0	0	0	0	0
Total	12	33	66	43	0	0	154

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 4

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Braidwood Generating Station

Period of Record: October - December 2018  
Stability Class - Extremely Stable - 199Ft-30Ft Delta-T (F)  
Winds Measured at 203 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	1	1	0	0	0	2
NNE	0	2	1	0	0	0	3
NE	1	1	0	0	0	0	2
ENE	0	2	0	0	0	0	2
E	0	1	1	0	0	0	2
ESE	0	3	2	0	0	0	5
SE	0	1	0	1	0	0	2
SSE	0	0	2	0	0	0	2
S	1	4	1	0	0	0	6
SSW	1	2	0	0	0	0	3
SW	0	0	0	0	0	0	0
WSW	1	0	0	1	0	0	2
W	3	0	0	0	0	0	3
WNW	1	2	0	0	0	0	3
NW	0	2	4	0	0	0	6
NNW	1	2	3	0	0	0	6
Variable	0	0	0	0	0	0	0
Total	9	23	15	2	0	0	49

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 4

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WIND STABILITY CLASSES

**Table C-4**

**Atmospheric Stability Classes**

<u>Description</u>	<u>Pasquill Stability Class</u>	<u><math>\sigma_g</math>(degrees)</u>	<u>Temperature Change with Height(<math>^{\circ}</math>C/100 m)</u>
Extremely Unstable	A	>22.5	< -1.9
Moderately Unstable	B	17.5 to 22.5	-1.9 to -1.7
Slightly Unstable	C	12.5 to 17.5	-1.7 to -1.5
Neutral	D	7.5 to 12.5	-1.5 to -0.5
Slightly Stable	E	3.8 to 7.5	-0.5 to 1.5
Moderately Stable	F	2.1 to 3.8	1.5 to 4.0
Extremely Stable	G	0 to 2.1	>4.0

$\sigma_g$  is the standard deviation of horizontal wind direction fluctuation over a period of 15 minutes to 1 hour.

From Regulatory Guide 1.21, Table 4B.

Atmospheric Stability Classes, Table C-4 from Braidwood ODCM.

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**APPENDIX D: ERRATA**

There was one error identified in 2018 in the 2016 ARERR.

An error to the 2016 ARERR was identified during a RETS check in self-assessment that was performed. The 2016 ARERR was reviewed and found to have reported Cd-109 in three gaseous batch permits. Cd-109 is a shielded nuclide therefore there are no means to possible activation, fission or decay scheme that could produce this given our fuel composition. This nuclide is only present in commercially produced calibration sources. This misidentified Cd-109 at 88 keV should have been identified as naturally occurring Pb-212 or Pb-214. Despite the identification of Cd-109 and its inclusion is post release permit, no dose was calculated by the effluent management software therefore no doses reported in the 2016 ARERR were incorrect.

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**ATTACHMENT 1: BRAIDWOOD ODCM REV 10**