



Post Office Box 2000, Spring City, Tennessee 37381

WBL-22-019

April 29, 2022

10 CFR 50.36a(a)(2)
10 CFR 72.104(a)

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

Watts Bar Nuclear Plant, Unit 1 and Unit 2
Facility Operating License Nos. NPF-90 and NPF-96
NRC Docket Nos. 50-390, 50-391, and 72-1048

Subject: Watts Bar Nuclear Plant 2021 Annual Radioactive Effluent Release Report

The purpose of this letter is to provide the Tennessee Valley Authority (TVA) Watts Bar Nuclear Plant (WBN) Annual Radioactive Effluent Release Report (ARERR) for the period of January 1, 2021 to December 31, 2021. The enclosed annual report is being submitted to the Nuclear Regulatory Commission (NRC) in accordance with Title 10 of the Code of Federal Regulations (10 CFR) 50.36a and the WBN, Unit 1 and Unit 2, Technical Specification (TS) 5.9.3, that requires the ARERR be submitted prior to May 1st of each year.

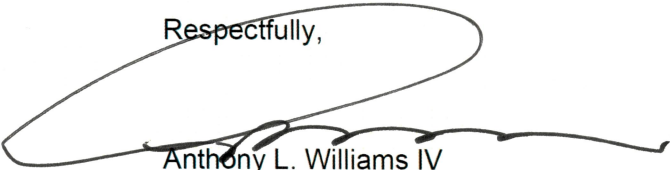
The enclosure provides the required effluent release data. The enclosure includes information related to the Independent Spent Fuel Storage Installation (ISFSI), documents any deviations which have occurred from Offsite Dose Calculation Manual (ODCM) requirements, addresses any radioactive effluent monitoring instrumentation which was inoperable for greater than 30 days, and provides corrections to previous annual reports. Revision 6 of the Two-Unit ODCM, dated November 16, 2020, remains in the current revision.

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Changes to the Process Control Program (PCP) are reported in conjunction with the ARERR in accordance with Section 3.4 of the PCP. Revision 4 of the PCP was effective on March 23, 2021.

There are no new regulatory commitments associated with this letter. Please direct any questions concerning this matter to Jonathan Johnson, WBN Licensing Manager at jtjohnson0@tva.gov.

Respectfully,



Anthony L. Williams IV
Site Vice President
Watts Bar Nuclear Plant

Enclosure

Tennessee Valley Authority - Watts Bar Nuclear Plant – 2021 Annual Radioactive
Effluent Release Report

cc: (w/ Enclosure)

NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Watts Bar Nuclear Plant
NRC Project Manager - Watts Bar Nuclear Plant
NRC Director - Division of Fuel Management, NMSS

Enclosure

TENNESSEE VALLEY AUTHORITY

WATTS BAR NUCLEAR PLANT

2021 Annual Radioactive Effluent Release Report

Watts Bar Nuclear Power Plant

Tennessee Valley Authority

Annual Radioactive Effluent Release Report

2021



Watts Bar Nuclear Power Plant
Units 1 and 2
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I. Introduction

The Annual Radioactive Effluent Release Report covering the operation of both units is submitted pursuant to Watts Bar Nuclear Plant Technical Specification 5.9.3 and Offsite Dose Calculation Manual 5.2.

II. Supplemental Information

A. Regulatory Limits

1. Gaseous Effluents

Dose rates due to radioactivity released in gaseous effluents from the site to areas at and beyond the unrestricted area boundary shall be limited to the following:

Noble gases

- Less than or equal to 500 mrem/year to the total body.
- Less than or equal to 3000 mrem/year to the skin.

Iodines, tritium and particulates with half-lives greater than eight days

- Less than or equal to 1500 mrem/year to any organ.

Dose to a member of the public shall be limited to the following:

Iodines, tritium and particulates with half-lives greater than eight days

- Less than or equal to 7.5 mrem to any organ during any calendar quarter.
- Less than or equal to 15 mrem to any organ during any calendar year.

Air dose due to noble gases

- Less than or equal to 5 mrad for gamma radiation and less than or equal to 10 mrad for beta radiation during any calendar quarter.
- Less than or equal to 10 mrad for gamma radiation and less than or equal to 20 mrad for beta radiation during any calendar year.

2. Liquid Effluents

The concentration of radioactivity released in liquid effluents to unrestricted areas shall be limited to 10 times the concentration specified in Title 10 of the Code of Federal Regulations (CFR), Part 20 (Standards for Protection against Radiation), Appendix B, Table 2, Column 2, for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2.0E-04 $\mu\text{Ci/ml}$ total activity.

The dose or dose commitment to a member of the public from radioactivity in liquid effluents released to unrestricted areas shall be limited to less than or equal to 1.5 mrem to the total body during any calendar quarter, less than or equal to 5 mrem to any organ during any calendar quarter, less than or equal to 3 mrem to the total body during any calendar year and less than or equal to 10 mrem to any organ during any calendar year.

B. Effluent Concentration Limits

1. Gaseous Effluents

Concentration limits for gaseous releases are met through compliance with the maximum permissible dose rates for gaseous releases as defined in plant Offsite Dose Calculation Manual (ODCM) and presented in Section II subsection A.1 of this report.

2. Liquid Effluents

The effluent concentration limits (ECL) for liquids are those listed in 10 CFR 20, Appendix B, Table 2, Column 2. For dissolved and entrained gases, the ECL of $2.0\text{E-}04$ $\mu\text{Ci/ml}$ is applied. This ECL is based on the Xe-135 concentration in air (submersion dose) converted to an equivalent concentration in water as discussed in the International Commission on Radiological Protection (ICRP), Publication 2.

C. Average Energy

Watts Bar Nuclear Plant's (WBN) ODCM limits the dose equivalent rates due to the release of noble gases to less than or equal to 500 mrem/year to the total body and less than or equal to 3000 mrem/year to the skin. Therefore, the average beta and gamma energies (E) for gaseous effluents as described in Regulatory Guide 1.21 Revision 1, "Measuring, Evaluation, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants," are not applicable.

D. Measurements & Approximations of Total Radioactivity

Radioactivity measurements performed in support of the Watt Bar Nuclear Power Plant ODCM meet the Lower Limit of Detection requirements given in ODCM Table 2.2-1 and Table 2.2-2.

1. Gaseous Effluents

Fission and Activation Gases

Airborne effluent gaseous activity is continuously monitored and recorded. Weekly grab samples from the auxiliary building and monthly grab samples from the service building are taken and analyzed to determine the quantity of noble gas activity released based on the total flows for the sample period. Also, noble gas samples are collected and evaluated following startup, shutdown or rated thermal power change exceeding 15 percent within one hour. Sampling is only required if dose equivalent I-131 concentration in the primary coolant has increased more than a factor of three or if the noble gas activity monitor indicates that the containment activity has increased more than a factor of three.

The concentration of noble gases released through the shield building exhausts due to purging containment is determined by using the purge monitor response in combination with containment air samples obtained prior to each purge. The quantity of activity released during the purge is determined using the duration, flowrate, and concentration of noble gases for each purge. Also, noble gas samples are collected and evaluated for ongoing containment purges following startup, shutdown, or rated thermal power change exceeding 15 percent within one hour. Sampling is only required if DEI concentration in the primary coolant has increased more than a factor of three or if the noble gas activity monitor shows that the containment activity has increased more than a factor of three.

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The quantity of noble gases released through the shield building exhausts due to the batch release of waste gas decay tanks are determined by sampling each tank prior to release. Total activity released is determined from total tank pressure change recorded during the release.

Iodines and Particulates in Gaseous Releases

Iodine and particulate activity are continuously sampled. Weekly charcoal and particulate samples are taken from the shield building exhausts and auxiliary building exhaust and from the condenser vacuum exhausts during periods of primary to secondary leakage. These samples are analyzed at least weekly to determine the total activity released from the plant based on the total vent flows recorded for the sampling period. Also, particulate and charcoal samples are taken from the shield building exhausts, auxiliary building exhaust, and (when a primary to secondary leak exists) condenser vacuum exhausts once per 24 hours for 7 days following startup, shutdown, or a rated thermal power change exceeding 15 percent within one hour if dose equivalent I-131 concentration in the primary coolant or the noble gas activity monitor shows that the containment activity has increased more than a factor of three.

Carbon-14 in Gaseous Releases

The Carbon-14 production and effluent source term estimates were based on EPRI methodology provided in EPRI Report 1021106, "Estimation of Carbon-14 in Nuclear Power Plant Gaseous Effluents," dated December 2010. It was determined in 2021 that 9.43 curies of Carbon-14 was generated from Unit 1 and 9.63 curies of Carbon-14 was generated from Unit 2. However, only 98% is considered released as gas and only the carbon dioxide form (20%) of that is used in the gaseous dose calculations.

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2. Liquid Effluents

Batch (Radwaste and Condensate Demineralizer Drains)

Total gamma isotopic and tritium concentrations are determined on each radwaste batch tank prior to release. The total activity of a batch release is obtained by determining the concentration of each nuclide and then multiplying by the volume discharged to arrive at the curie activity for each nuclide. The curies of each nuclide are then summed. Composite samples are maintained and analyzed monthly for gross alpha and quarterly for iron-55, strontium-89, and strontium-90. During periods of no significant identified primary to secondary leakage, composite samples are not maintained for batch releases from the condensate demineralizer tank releases. During periods of no significant identified primary to secondary leakage or when the condensate demineralizer tanks are discharged to the turbine building station sump, the feedwater tritium concentrations are used to determine the curies of tritium released from condensate demineralizer tank.

Continuous Releases (Turbine Building Station Sump (TBSS), Steam Generator Blowdowns (SGB), and Groundwater Sump (GWS))

During periods of no significant identified primary to secondary leakage, the volume released from the TBSS and SGB's are obtained. The TBSS tritium concentration is determined via weekly grab samples. The feedwater tritium concentrations are used to determine the curies of tritium released from SGB's. The GWS is sampled monthly and analyzed for gross gamma and tritium on a monthly basis, and for Sr-89, Sr-90, and Ni-63 on a quarterly basis. The total activity released is obtained by determining the concentration of each nuclide and then multiplying by the volume discharged to arrive at the curie activity for each nuclide.

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E. Batch Releases

1. Gaseous

Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
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1. Gaseous

1. Number of Batch Releases		22	24	26	27	99
2. Total duration of batch releases	minutes	3.81E+04	2.71E+04	1.31E+05	7.84E+04	2.75E+05
3. Maximum batch release duration	minutes	4.87E+03	4.75E+03	5.67E+04	3.29E+04	5.67E+04
4. Average batch release duration	minutes	1.73E+03	1.13E+03	5.04E+03	2.90E+03	2.77E+03
5. Minimum batch release duration	minutes	4.00E+00	5.00E+00	1.40E+01	2.10E+01	4.00E+00

2. Liquid

Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
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1. Liquids

1. Number of Batch Releases		15	25	31	35	106
2. Total duration of batch releases	minutes	3.79E+03	7.10E+03	7.95E+03	1.23E+04	3.11E+04
3. Maximum batch release duration	minutes	5.02E+02	9.55E+02	4.35E+02	3.31E+03	3.31E+03
4. Average batch release duration	minutes	2.53E+02	2.84E+02	2.56E+02	3.51E+02	2.94E+02
5. Minimum batch release duration	minutes	1.50E+02	2.50E+01	1.35E+02	9.00E+01	2.50E+01

F. Abnormal Releases

1. Gaseous

Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
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1. Gaseous

1. Number of Abnormal Releases		0	1	0	1	2
2. Total activity of abnormal releases	Ci	0.00E+00	1.11E-03	0.00E+00	5.96E-04	3.92E-03

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Unit 1 Steam Generator PORVs (10/29/21 through 12/01/21)

This evaluation is for the release to the environment that occurred from the Unit 1 Steam Generator PORVs during Unit 1 Refueling Outage 17. The PORV valves were opened and closed during this period of time.

The following is data used to show no dose impact of the release:

- While all the PORVs were not open continuously during this period, the evaluation assumed the release was continuous from all four PORVs.
- There have been no gamma emitting radionuclides identified in any Secondary Coolant samples.
- The feedwater tritium results obtained on 10/25/2021 indicated a tritium concentration of 1.108E-06 $\mu\text{Ci/mL}$. This tritium concentration is assumed to have been the initial concentration with no additional tritium introduced into the steam generators during the release period. All of the tritium initially present in the steam generators was assumed to have been released through the PORVs from 10/29/2021 through 12/01/2021.

The volume of each steam generator was taken from Westinghouse Guidelines for Secondary Water Chemistry. The listed normal water level value of 4750 ft^3 was used as a conservative value. This calculation conservatively assumes that the total volume of all four generators was released and that all the tritium present in that initial volume was released. The calculation for the total tritium activity released is as follows:

$$4750 \text{ ft}^3/\text{generator} * 2.832\text{E}+04 \text{ mL/ft}^3 * 4 \text{ generators} = 5.38\text{E}+08 \text{ mL}$$
$$1.108\text{E}-06 \mu\text{Ci/mL} * 5.38\text{E}+08 \text{ mL} = 5.96\text{E}+02 \mu\text{Ci} (5.96\text{E}-04 \text{ Ci}) \text{ of H-3 for 4th quarter}$$

The activity of 5.96E-04 curies of H-3 was added to the 4th quarter Table 1-C and Table 3-D. The addition of 5.96E-04 curies of tritium did not have any impact on changing the dose values for the 4th quarter of 2021.

Individual Doses - 4th Quarter U1 Steam Generator PORV Release

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
Beta Air	0.00E+00 mrad	1.00E+01 mrad	0.00E+00	N/A
Gamma Air	0.00E+00 mrad	5.00E+00 mrad	0.00E+00	N/A
NG Skin	0.00E+00 mrad	N/A	N/A	N/A
NG Total Body	0.00E+00 mrad	N/A	N/A	N/A
Organ Doses (Iodine, Tritium, Particulates with >8-Day half-life)				
Child / Thyroid	8.93E-07 mrem	7.5 mrem	1.19E-05	SE 1409 meters
Child / Total Body	8.93E-07 mrem	7.5 mrem	1.19E-05	SE 1409 meters

Population Doses - 4th Quarter U1 Steam Generator PORV Release

Total Body Dose 4.24E-06 man-rem

Maximum Organ Dose (Organ) 4.24E-06 man-rem (Bone, GI-LLI, Kidney, Liver, Lung, Thyroid)

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Unit 2 Steam Generator PORVs (09/12/21 through 09/28/21)

This evaluation is for the release to the environment that occurred from the Unit 2 Steam Generator PORVs in 2021 due to Unit 2 midcycle outage. The PORV valves were opened and closed during these periods of time.

The following is data used to show no dose impact of the release:

- While all the PORVs were not open continuously during this period, the evaluation assumed the release was continuous from all four PORVs.
- There have been no gamma emitting radionuclides identified in any Secondary Coolant samples.
- The feedwater tritium results obtained on 09/06/2021 indicated a tritium concentration of 6.892E-06 $\mu\text{Ci/mL}$. This tritium concentration is assumed to have been the initial concentration with no additional tritium introduced into the steam generators during the release period. All of the tritium initially present in the steam generators was assumed to have been released through the PORVs from 09/12/2021 through 09/28/2021.

The volume of each steam generator was taken from Westinghouse Guidelines for Secondary Water Chemistry. The listed normal water level value of 4250 ft^3 was used as a conservative value. This calculation conservatively assumes that the total volume of all four generators was released and that all the tritium present in that initial volume was released. The calculation for the total tritium activity released is as follows:

$$4250 \text{ ft}^3/\text{generator} * 2.832\text{E}+04 \text{ mL/ft}^3 * 4 \text{ generators} = 4.81\text{E}+08 \text{ mL}$$
$$6.892\text{E}-06 \text{ }\mu\text{Ci/mL} * 4.81\text{E}+08 \text{ mL} = 3.32\text{E}+03 \text{ }\mu\text{Ci} (3.32\text{E}-03 \text{ Ci}) \text{ of H-3 for 3rd quarter}$$

The activity of 3.32E-03 curies of H-3 was added to the 3rd quarter Table 1-D and Table 3-G. The addition of 3.32E-03 curies of tritium did not have any impact on changing the dose values for the 3rd quarter of 2021.

Individual Doses - 3rd Quarter U2 Steam Generator PORV Release

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
Beta Air	0.00E+00 mrad	1.00E+01 mrad	0.00E+00	N/A
Gamma Air	0.00E+00 mrad	5.00E+00 mrad	0.00E+00	N/A
NG Skin	0.00E+00 mrad	N/A	N/A	N/A
NG Total Body	0.00E+00 mrad	N/A	N/A	N/A
Organ Doses (Iodine, Tritium, Particulates with >8-Day half-life)				
Child / Thyroid	3.53E-06 mrem	7.5 mrem	4.71E-05	NE 3661 meters
Child / Total Body	3.53E-06 mrem	7.5 mrem	4.71E-05	NE 3661 meters

Population Doses - 3rd Quarter U2 Steam Generator PORV Release

Total Body Dose 2.16E-05 man-rem

Maximum Organ Dose (Organ) 2.16E-05 man-rem (Bone, GI-LLI, Kidney, Liver, Lung, Thyroid)

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2. Liquid

In calendar year 2021 there were no abnormal liquid releases.

G. Non-routine, Planned Discharges

In calendar year 2021 there were no non-routine planned discharges.

H. Radioactive Waste System Treatment Changes

In calendar year 2021 there were no changes to the radwaste system. The process control program was revised to include correct references for the Concentration Averaging and Encapsulation Branch Technical Position revision 1 Volume 1 U.S. Nuclear Regulatory Commission Office of Nuclear Material Safety and Safeguard February 2015.

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I. Land Use Census Changes

Receptor Number	Receptor Type*	Sector	Distance (m)	Terrain Adj. Factor
1	NR	N	4474	1.5
2	NR	NNE	3556	1.8
3	NR	NE	3399	2.3
4	NR	ENE	3072	1.9
5	NR	E	4388	1.6
6	NR	ESE	4654	1.8
7	NR	SE	1409	1.5
8	NR	SSE	1646	1.5
9	NR	S	1550	1.8
10	NR	SSW	1832	1.9
11	NR	SW	4223	2.0
12	NR	WSW	2422	1.7
13	NR	W	2901	1.1
14	NR	WNW	1448	2.5
15	NR	NW	1903	1.6
16	NR	NNW	4376	1.0
17	NG	N	6295	1.1
18	NG	NNE	5030	1.6
19	NG	NE	3661	2.2
20	NG	ENE	4623	1.7
21	NG	E	4712	1.6
22	NG	ESE	6916	1.7
23	NG	SE	1409	1.5
24	NG	SSE	8100	1.0
25	NG	S	3568	2.0
26	NG	SSW	2286	2.0
27	NG	SW	8100	1.7
28	NG	WSW	2422	1.7
29	NG	W	3701	1.0
30	NG	WNW	2110	2.9
31	NG	NW	2065	1.5
32	NG	NNW	4406	1.0
33	MC	ESE	6706	1.7

Note Changes from previous years land use file are marked in **bold**

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J. Effluent Monitoring Instrument Inoperability > 30 Days

Date	Instrument	Explanation
12/16/20	ODCM 1/2.1.2 Control 1.1.2 Table 1.1-2 Item 4.a,b	1-RM-90-400 (Unit 1 Shield Building Exhaust Radiation Monitor) was declared inoperable on 12/16/20 at 02:02 due to the sample pump intermittently tripping (CR #1659169). 1-RM-90-400 was declared operable on 1/20/21 at 09:13 after power was restored and the database was reloaded. CR #1664633 was written to document inoperability exceeding 30 days.
1/24/21	ODCM 1/2.1.1 Control 1.1.1 Table 1.1-1 Item 2.a	0-RM-90-134 (ERCW effluent header radiation monitor) was declared inoperable on 1/24/21 at 12:30 for 1-RM-90-119 replacement (DCP 18-160), with 0-RM-90-141 already inoperable. 0-RM-90-134 was declared operable on 3/2/21 at 17:25 after the power supply to the new radiation monitor had been restored. CR #1673920 was written to document inoperability exceeding 30 days.
1/24/21	ODCM 1/2.1.2 Control 1.1.2 Table 1.1-2 Item 2.a	1-RM-90-119 (U1 Condenser Vacuum Exhaust radiation monitor) was declared inoperable on 1/24/21 at 12:30 for radiation monitor replacement (DCP 18-160). 1-RM-90-119 was declared operable after the power supply to the new radiation monitor had been restored. CR #1673918 was written to document inoperability exceeding 30 days.
3/17/21	ODCM 1/2.1.1 Control 1.1.1 Table 1.1-1 Item 1.a	0-RM-90-212 (Turbine Building Sump effluent radiation monitor) was declared inoperable on 3/17/21 at 12:20 due to instrument malfunction alarm caused by the junction box getting flooded and detector damage during the Unit 2 plant trip (see CR #1679452). Repair of the monitor has been delayed due to unavailability of parts. CR #1687006 was written to document inoperability exceeding 30 days.

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J. Effluent Monitoring Instrument Inoperability > 30 Days (Continued)

Date	Instrument	Explanation
3/26/21	ODCM 1/2.1.2 Control 1.1.2 Table 1.1-2 Item 4.c	0-FI-90-300/1B (Auxiliary Building Ventilation System effluent flow rate measuring device) was declared inoperable on 3/26/21 at 05:27 due to failed flow transmitter (see CR #1681672). Action B (flow estimates once per four hours) was entered and remained in place until 4/14/21. After the flow transmitter was repaired (WO #122033719), 0-FI-90-300/1B remained inoperable due to exhaust fan malfunction resulting in effluent flowrate less than 100,000 scfm. On 4/14/21 at 14:55, sample loop 0-LPF-90-300 flowrate was manually adjusted to 20 scfm, at which point ODCM Action L was entered, and Action B was exited. WO #121823233 is in place to repair the exhaust fan, which will allow restoration of 0-FI-90-300/1B to operable and exiting ODCM actions. 0-FI-90-300/1B was declared operable on 5/13/21 at 20:45 following MIG restoration of sample flow to auto and two trains of Aux Building Exhaust in service. CR #1693376 was written to document inoperability exceeding 30 days.
10/5/21	ODCM 1/2.1.2 Control 1.1.2 Table 1.1-2 Item 2.c	2-FE-2-256 (Unit 2 Condenser Vacuum Exhaust Flow Rate Monitor) was declared inoperable on 10/5/21 at 21:43 due to erratic flow (see CR #1726176). CR #1734451 was written to document inoperability exceeding 30 days.
11/6/21	ODCM 1/2.1.2 Control 1.1.2 Table 1.1-2 Item 4.a,b,c	1-RM-90-400 (Unit 1 Shield Building Exhaust Radiation Monitor) and 1-FI-90-400 (Unit 1 Shield Building Exhaust Effluent Flow Rate Measuring Device) were declared inoperable on 11/6/21 at 16:45 for DCN WBN-18-160. 1-RM-90-400 and 1-FI-90-400 declared operable following replacement of radiation monitor and calibration on 2/8/22 at 14:30. CR #1741909 was written to document inoperability exceeding 30 days.
11/14/21	ODCM 1/2.1.2 Control 1.1.2 Table 1.1-2 Item 4.b	0-RE-90-101 (Auxiliary Building Ventilation System iodine/particulate sampler) was declared inoperable on 11/14/21 at 00:48 due to instrument malfunction annunciator lit and lack of response from source check (CR #1735781). 0-RE-90-101 was declared operable on 12/31/21 at 08:00 after the particulate channel operate light was lit and the instrument malfunction was cleared. CR #1735781 was written to document inoperability exceeding 30 days.

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K. Effluent Monitoring Equipment Sample Deviation

Date	Instrument	Explanation
1/19/21	ODCM 1/2.1.1 Control 1.1.1 Table 1.1-1 Item 2.a	On 1/19/21 at 14:23, ODCM Action C was entered for inoperability of 0-RM-90-133 & 0-RM-90-140, requiring grab samples to be sampled and analyzed for gamma activity once per 12 hours. Per 0-ODI-90-4, samples are required to be obtained from the ERCW side of CCS HX B and CCS HX C. A sample was obtained from CCS HX B as required on 1/19/21 at 21:00, but no sample was obtained from CCS HX C until 1/20/21 at 10:00, 19.6 hours after entry into ODCM Action C, exceeding the required sample time of once per 12 hours. The missed sample was discovered during effluents chemist review of 0-ODI-90-4. This is a deviation from the ODCM and will require reporting in the 2021 Annual Radioactive Effluent Release Report.

L. Offsite Dose Calculation Manual Changes

In calendar year 2021 there was no revisions to the Offsite Dose Calculation Manual. Revision 06 is attached.

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M.Groundwater Monitoring Program (NEI 07-07)

Monitoring Wells

Watts Bar has six (6) radiological environmental monitoring program (REMP) on-site groundwater monitoring wells and 22 non-REMP monitoring wells. These wells support monitoring the onsite groundwater plume for the presence or increase of radioactivity. WBN contracts ARCADIS to perform investigations of the impact tritium has on groundwater and to perform site characterizations, area of impact, and preliminary human health and ecological risk screening.

The non-REMP monitoring wells are sampled at least semi-annually for gamma and tritium. No gamma activity was detected in any groundwater wells in 2021. In September 2021, the quarterly Well R and S samples indicated tritium activity above the Nuclear Energy Institute Groundwater Protection Initiative voluntary communication threshold of 20,000 pCi/L. Voluntary communication was initiated to the State of Tennessee and local officials. The cause was identified as the Liquid Radiological Waste (LRW) line. On October 22, 2021, TVA stopped releasing water through the LRW line. A temporary line was set up until a new permanent line can be constructed.

All other groundwater monitoring wells continue to exhibit a stable trend and historical average tritium decreasing over time. MW-09 and Well K,R,S were also analyzed for Sr-89, Sr-90, Fe-55, and Ni-63, with no detectable activity.

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Monitoring Well Sample Results (pCi/L)

Well ID	March 2021	June 2021	September 2021	December 2021
D	< 297	< 294	< 239	-
E	< 295	< 301	< 242	-
G	< 289	-	< 259	-
I	< 295	< 315	503	593
J	< 268	< 282	< 297	-
K	1860	1490	1170	1200
L	705	< 313	529	2350
M	< 276	< 308	< 286	-
O	< 305	< 310	1240	-
P	< 291	-	400	364
Q	< 277	< 309	< 293	-
R	258	308	1.57E+05	1.82E+05
S	318	-	7.47E+05	3.36E+05
V	< 271	-	< 281	-
MW-06	436	467	< 256	< 339
MW-08	< 294	-	< 243	-
MW-09	8240	4720	5550	6780
MW-10	< 290	< 324	642 < 248*	< 337
MW-11i	< 296	-	< 246	-
MW-11s	< 305	-	< 238	-
MW-12	< 299	< 307	< 258	< 336
MW-13	< 298	-	< 246	-

* MW-10 was resampled on 10/28/21.

Doses from I-131 Water Ingestion Pathway

The REMP specified in Table 3.12-1 from NUREG 1301, "Offsite Does Calculation Manual Guidance: Standard Radiological Effluent Controls for Pressurized Water Reactors," April 1991, requires an I-131 specific analysis for drinking water pathway samples if the annual dose from I-131 is greater than 1 mrem. To evaluate the need for implementation of this additional analysis, the drinking water pathway dose from I-131 to the maximum organ and age group was evaluated. Therefore, the evaluation confirms that the drinking water pathway dose from I-131 was less than the 1 mrem limit and that the performance of the I-131 specific analysis is not required for WBN REMP drinking water samples.

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
I-131 Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Child/Thyroid (mrem)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Population/Thyroid (mrem)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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N. Errata/Corrections to Previous ARERRs

There are no correction to previous ARERRs.

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III. Gaseous Effluents

Table 1-A Gaseous Effluents - Summation of all Releases for Unit 1

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total	Error %
A. Fission and Activation Gases							
1. Total Release	Curies	2.00E+01	8.95E+00	1.03E+01	8.42E+00	4.76E+01	22%
2. Average Release Rate for Period	uCi/sec	2.57E+00	1.14E+00	1.29E+00	1.06E+00	1.51E+00	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	
B. Iodines							
1. Total Release	Curies	4.29E-06	8.30E-06	5.07E-06	7.45E-06	2.51E-05	12%
2. Average Release Rate for Period	uCi/sec	5.51E-07	1.06E-06	6.38E-07	9.37E-07	7.96E-07	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	
C. Particulates							
1. Total Release	Curies	7.86E-06	2.43E-05	1.65E-07	1.15E-04	1.47E-04	15%
2. Average Release Rate for Period	uCi/sec	1.01E-06	3.09E-06	2.07E-08	1.44E-05	4.66E-06	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	
D. Tritium							
1. Total Release	Curies	1.51E+01	1.83E+01	5.26E+01	4.37E+01	1.29E+02	11%
2. Average Release Rate for Period	uCi/sec	1.94E+00	2.32E+00	6.61E+00	5.50E+00	4.11E+00	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	
4. Tritium from Operating as a Tritium Producing Core (TPC)	Curies	1.25E+01	1.51E+01	4.36E+01	3.63E+01	1.07E+02	
5. Adjusted Tritium without TPC Contribution	Curies	2.56E+00	3.10E+00	8.94E+00	7.43E+00	2.20E+01	
E. Gross Alpha							
1. Total Release	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	N/A
2. Average Release Rate for Period	uCi/sec	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	
F. Carbon-14							
1. Total Release	Curies	2.84E+00	2.87E+00	2.90E+00	0.82E+00	9.43E+00	N/A
2. Average Release Rate for Period	uCi/sec	3.65E-01	3.65E-01	3.65E-01	1.03E-01	3.00E-00	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	

*Applicable limits are expressed in terms of dose. See Table 3-A through 3-D of this report.

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Table 1-B Gaseous Effluents - Summation of all Releases for Unit 2

Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total	Error %
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A. Fission and Activation Gases

1. Total Release	Curies	3.95E+00	2.17E+00	1.25E+01	2.22E+01	4.08E+01	22%
2. Average Release Rate for Period	uCi/sec	5.08E-01	2.76E-01	1.58E+00	2.79E+00	1.29E+00	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	

B. Iodines

1. Total Release	Curies	2.14E-06	5.98E-06	7.91E-06	7.09E-06	2.31E-05	12%
2. Average Release Rate for Period	uCi/sec	2.75E-07	7.60E-07	9.95E-07	8.92E-07	7.33E-07	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	

C. Particulates

1. Total Release	Curies	7.79E-06	2.43E-05	0.00E+00	1.15E-04	1.47E-04	15%
2. Average Release Rate for Period	uCi/sec	1.00E-06	3.09E-06	0.00E+00	1.44E-05	4.65E-06	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	

D. Tritium

1. Total Release	Curies	4.25E+00	5.15E+00	1.48E+01	1.23E+01	3.65E+01	11%
2. Average Release Rate for Period	uCi/sec	5.46E-01	6.55E-01	1.87E+00	1.55E+00	1.16E+00	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	
4. Tritium from Operating as a Tritium Producing Core (TPC)	Curies	2.55E+00	3.09E+00	8.90E+00	7.39E+00	2.19E+01	
5. Adjusted Tritium without TPC Contribution	Curies	1.70E+00	2.06E+00	5.93E+00	4.93E+00	1.46E+01	

E. Gross Alpha

1. Total Release	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	N/A
2. Average Release Rate for Period	uCi/sec	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	

F. Carbon-14

1. Total Release	Curies	2.47E+00	2.52E+00	1.99E+00	2.65E+00	9.63E+00	N/A
2. Average Release Rate for Period	uCi/sec	3.17E-01	3.21E-01	2.50E-01	3.33E-01	3.05E-01	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	

*Applicable limits are expressed in terms of dose. See Table 3-E through 3-H of this report.

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Table 1-C Gaseous Effluents – Ground Level Release from Unit 1 (Batch)

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
1. Fission and Activation Gases						
Ar-41	Ci	1.76E+01	8.11E+00	9.10E+01	8.09E+00	4.29E+01
Kr-85m	Ci	1.07E-02	2.61E-06	9.79E-03	5.81E-03	2.63E-02
Kr-87	Ci	0.00E+00	2.07E-02	0.00E+00	0.00E+00	2.07E-02
Kr-88	Ci	0.00E+00	0.00E+00	0.00E+00	3.19E-05	3.19E-05
Xe-133m	Ci	0.00E+00	2.20E-05	3.03E-04	4.54E-04	7.79E-04
Xe-133	Ci	2.13E+00	7.33E-01	1.13E+00	1.55E-01	4.15E+00
Xe-135m	Ci	7.94E-02	4.50E-02	0.00E+00	0.00E+00	1.15E-01
Xe-135	Ci	1.19E-01	3.60E-02	8.53E-03	4.02E-02	2.05E-01
Xe-138	Ci	1.95E-02	3.66E-02	9.45E-06	1.32E-01	1.70E-01
Total For Period	Ci	2.00E+01	8.95E+00	1.03E+01	8.42E+00	4.76E+01
2. Iodines						
Total For Period	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3. Particulates						
Total For Period	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4. Gross Alpha						
Gross Alpha	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5. Tritium						
H-3	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6. Carbon-14						
C-14 (Total)	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C-14 (CO2 Form)	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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Table 1-C Gaseous Effluents – Ground Level Releases from Unit 1 (Continuous)

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
1. Fission and Activation Gases						
Total For Period	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2. Iodines						
Br-82	Ci	2.63E-06	3.10E-06	4.16E-06	3.25E-06	1.31E-05
I-131	Ci	5.50E-07	2.46E-07	9.11E-07	1.71E-06	3.42E-06
I-133	Ci	1.11E-06	4.96E-06	0.00E+00	2.48E-06	8.54E-06
Total For Period	Ci	4.29E-06	8.30E-06	5.07E-06	7.45E-06	2.51E-05
3. Particulates						
Cr-51	Ci	0.00E+00	0.00E+00	6.82E-08	1.97E-05	1.98E-05
Mn-54	Ci	0.00E+00	2.59E-06	0.00E+00	3.38E-06	5.97E-06
Co-57	Ci	9.52E-07	0.00E+00	0.00E+00	3.08E-07	1.26E-06
Co-58	Ci	6.65E-08	7.22E-06	8.97E-08	5.05E-05	5.79E-05
Co-60	Ci	6.84E-06	1.44E-05	6.67E-09	2.73E-05	4.86E-05
Zr-95	Ci	0.00E+00	0.00E+00	0.00E+00	3.23E-06	3.23E-06
Nb-95	Ci	0.00E+00	0.00E+00	0.00E+00	6.22E-06	6.22E-06
Sb-125	Ci	0.00E+00	0.00E+00	0.00E+00	3.86E-06	3.86E-06
Total For Period	Ci	7.86E-06	2.43E-05	1.65E-07	1.15E-04	1.47E-04
4. Gross Alpha						
Gross Alpha	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5. Tritium						
H-3	Ci	1.51E+01	1.83E+01	5.26E+01	4.370E+01	1.29E+02
6. Carbon-14						
C-14 (Total)	Ci	2.84E+00	2.87E+00	2.90E+00	8.18E-01	9.43E+00
C-14 (CO2 Form)	Ci	5.68E-01	5.75E-01	5.81E-01	1.64E-01	1.89E+00

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Table 1-D Gaseous Effluents – Ground Level Release from Unit 2 (Batch)

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
1. Fission and Activation Gases						
Ar-41	Ci	3.95E+00	2.13E+00	1.25E+01	2.22E+01	4.08E+01
Xe-131m	Ci	6.63E-05	0.00E+00	9.61E-05	0.00E+00	1.62E-04
Xe-133m	Ci	0.00E+00	0.00E+00	1.57E-04	0.00E+00	1.57E-04
Xe-133	Ci	7.68E-05	1.28E-02	1.72E-02	0.00E+00	3.01E-02
Xe-135	Ci	0.00E+00	1.38E-02	1.03E-04	0.00E+00	1.39E-02
Xe-138	Ci	0.00E+00	6.24E-03	0.00E+00	0.00E+00	6.24E-03
Total For Period	Ci	3.95E+00	2.17E+00	1.25E+01	2.22E+01	4.08E+01
2. Iodines						
Total For Period	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3. Particulates						
Total For Period	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4. Gross Alpha						
Gross Alpha	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5. Tritium						
H-3	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6. Carbon-14						
C-14 (Total)	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C-14 (CO2 Form)	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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Table 1-D Gaseous Effluents – Ground Level Releases from Unit 2 (Continuous)

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
1. Fission and Activation Gases						
Total For Period	Ci	0.00E+00	0.00E+00	1.78E+00	0.00E+00	0.00E+00
2. Iodines						
Br-82	Ci	4.82E-07	8.78E-07	6.83E-06	2.90E-06	1.11E-05
I-131	Ci	5.50E-07	2.46E-07	1.08E-06	1.71E-06	3.59E-06
I-133	Ci	1.11E-06	4.85E-06	0.00E+00	2.48E-06	8.44E-06
Total For Period	Ci	2.14E-06	5.98E-06	7.91E-06	7.09E-06	2.31E-05
3. Particulates						
Cr-51	Ci	0.00E+00	0.00E+00	0.00E+00	1.97E-05	1.97E-05
Mn-54	Ci	0.00E+00	2.59E-06	0.00E+00	3.38E-06	5.97E-06
Co-57	Ci	9.52E-07	0.00E+00	0.00E+00	3.19E-07	1.27E-06
Co-58	Ci	0.00E+00	7.22E-06	0.00E+00	5.05E-05	5.77E-05
Co-60	Ci	6.84E-06	1.44E-05	0.00E+00	2.73E-05	4.86E-05
Zr-95	Ci	0.00E+00	0.00E+00	0.00E+00	3.23E-06	3.23E-06
Nb-95	Ci	0.00E+00	0.00E+00	0.00E+00	6.22E-06	6.22E-06
Sb-125	Ci	0.00E+00	0.00E+00	0.00E+00	3.86E-06	3.86E-06
Total For Period	Ci	7.79E-06	2.43E-05	0.00E+00	1.15E-04	1.47E-04
4. Gross Alpha						
Gross Alpha	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5. Tritium						
H-3	Ci	4.25E+00	5.15E+00	1.48E+01	1.23E+01	3.65E+01
6. Carbon-14						
C-14 (Total)	Ci	2.47E+00	2.52E+00	1.99E+00	2.65E+00	9.63E+00
C-14 (CO2 Form)	Ci	4.93E-01	5.05E-01	3.98E-01	5.30E-01	1.93E+00

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IV. Liquid Effluents

Table 2-A Liquid Effluents - Summation of all Releases for Unit 1

Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total	Error %
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A. Fission and Activation Products

1. Total Release	Curies	0.00E+00	0.00E+00	0.00E+00	3.42E-02	3.42E-02	25%
2. Average Diluted Concentration	uCi/mL	0.00E+00	0.00E+00	0.00E+00	4.83E-09	5.81E-10	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	

B. Tritium

1. Total Release	Curies	4.45E+02	1.21E+03	2.22E+03	2.57E+03	6.44E+03	18%
2. Average Diluted Concentration	uCi/mL	2.30E-05	6.42E-05	1.63E-04	3.64E-04	1.09E-04	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	
4. Tritium from Operating as a Tritium Producing Core (TPC)	Curies	3.70E+02	1.05E+03	1.93E+03	2.25E+03	5.62E+03	
5. Adjusted Tritium without TPC Contribution	Curies	7.57E+01	1.54E+02	2.83E+02	3.29E+02	8.23E+02	

C. Dissolved and Entrained Noble Gases

1. Total Release	Curies	3.49E-05	6.30E-05	5.05E-04	9.70E-04	1.57E-03	39%
2. Average Diluted Concentration	uCi/mL	1.80E-12	3.35E-12	3.71E-11	1.37E-10	2.67E-11	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	

D. Gross Alpha Radioactivity

1. Total Release	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	N/A
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E. Volume of Liquid Waste to Discharge Canal (prior to dilution)	Liters	3.70E+08	4.57E+08	4.26E+08	4.86E+08	1.74E+09	2%
F. Volume of Dilution Water for Period	Liters	1.94E+10	1.88E+10	1.36E+10	7.08E+09	5.89E+10	12%

*Applicable limits are expressed in terms of dose. See Table 4-A through 4-D of this report.

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Table 2-B Liquid Effluents - Summation of all Releases for Unit 2

Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total	Error %
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A. Fission and Activation Products

1. Total Release	Curies	0.00E+00	0.00E+00	0.00E+00	3.42E-02	3.42E-02	25%
2. Average Diluted Concentration	uCi/mL	0.00E+00	0.00E+00	0.00E+00	2.48E-09	5.35E-10	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	

B. Tritium

1. Total Release	Curies	1.26E+02	3.41E+02	6.25E+02	7.26E+02	1.82E+03	18%
2. Average Diluted Concentration	uCi/mL	6.53E-06	1.72E-05	5.67E-05	5.26E-05	2.84E-05	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	
4. Tritium from Operating as a Tritium Producing Core (TPC)	Curies	7.54E+01	2.05E+02	3.75E+02	4.36E+02	1.09E+03	
5. Adjusted Tritium without TPC Contribution	Curies	5.02E+01	1.36E+02	2.50E+02	2.90E+02	7.27E+02	

C. Dissolved and Entrained Noble Gases

1. Total Release	Curies	3.49E-05	6.30E-05	5.05E-04	9.70E-04	1.57E-03	39%
2. Average Diluted Concentration	uCi/mL	1.81E-12	3.18E-12	4.58E-11	7.03E-11	2.46E-11	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	

D. Gross Alpha Radioactivity

1. Total Release	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	N/A
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E. Volume of Liquid Waste to Discharge Canal (prior to dilution)	Liters	3.83E+08	4.47E+08	3.94E+08	5.14E+08	1.74E+09	2%
F. Volume of Dilution Water for Period	Liters	1.92E+10	1.98E+10	1.10E+10	1.38E+10	6.39E+10	12%

*Applicable limits are expressed in terms of dose. See Table 4-E through 4-H of this report.

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Table 2-C Liquid Effluents – Unit 1 Batch Mode

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
1. Fission and Activation Products						
Na-24	Ci	0.00E+00	0.00E+00	0.00E+00	2.64E-06	2.64E-06
Cr-51	Ci	0.00E+00	0.00E+00	0.00E+00	2.71E-03	2.71E-03
Mn-54	Ci	0.00E+00	0.00E+00	0.00E+00	6.35E-04	6.35E-04
Mn-56	Ci	0.00E+00	0.00E+00	0.00E+00	1.44E-06	1.44E-06
Fe-59	Ci	0.00E+00	0.00E+00	0.00E+00	3.11E-05	3.11E-05
Co-58	Ci	0.00E+00	0.00E+00	0.00E+00	2.28E-02	2.28E-02
Co-60	Ci	0.00E+00	0.00E+00	0.00E+00	3.73E-03	3.73E-03
Ni-63	Ci	0.00E+00	0.00E+00	0.00E+00	1.72E-03	1.72E-03
Zn-65	Ci	0.00E+00	0.00E+00	0.00E+00	3.72E-06	3.72E-06
Zr-95	Ci	0.00E+00	0.00E+00	0.00E+00	4.42E-04	4.42E-04
Zr-97	Ci	0.00E+00	0.00E+00	0.00E+00	1.75E-06	1.75E-06
Nb-95	Ci	0.00E+00	0.00E+00	0.00E+00	6.50E-04	6.50E-04
Nb-97	Ci	0.00E+00	0.00E+00	0.00E+00	1.10E-06	1.10E-06
Mo-99	Ci	0.00E+00	0.00E+00	0.00E+00	8.70E-07	8.70E-07
Ag-110m	Ci	0.00E+00	0.00E+00	0.00E+00	2.92E-05	2.92E-05
Sn-117m	Ci	0.00E+00	0.00E+00	0.00E+00	5.30E-07	5.30E-07
Sb-124	Ci	0.00E+00	0.00E+00	0.00E+00	8.80E-05	8.80E-05
Sb-125	Ci	0.00E+00	0.00E+00	0.00E+00	1.31E-03	1.31E-03
I-135	Ci	0.00E+00	0.00E+00	0.00E+00	5.05E-06	5.05E-06
Total	Ci	0.00E+00	0.00E+00	0.00E+00	3.24E-02	3.42E-02
2. Tritium						
H-3	Ci	4.45E+02	1.21E+03	2.22E+03	2.54E+03	6.40E+03
3. Dissolved and Entrained Gases						
Ar-41	Ci	0.00E+00	0.00E+00	0.00E+00	2.79E-06	2.79E-06
Kr-85m	Ci	0.00E+00	0.00E+00	5.45E-07	0.00E+00	5.45E-07
Xe-131m	Ci	1.76E-05	0.00E+00	2.17E-05	0.00E+00	3.93E-05
Xe-133m	Ci	0.00E+00	0.00E+00	0.00E+00	1.83E-05	1.83E-05
Xe-133	Ci	1.73E-05	6.25E-05	4.75E-04	8.85E-04	1.44E-03
Xe-135m	Ci	0.00E+00	0.00E+00	0.00E+00	1.07E-05	1.07E-05
Xe-135	Ci	0.00E+00	5.45E-07	5.80E-06	5.10E-05	5.75E-05
Xe-138	Ci	0.00E+00	0.00E+00	1.44E-06	0.00E+00	1.44E-06
Total	Ci	3.49E-05	6.30E-05	5.05E-04	9.70E-04	1.57E-03
4. Gross Alpha Radioactivity						
Total For Period	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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Table 2-C Liquid Effluents – Unit 1 Continuous Mode

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
1. Fission and Activation Products						
Total For Period	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2. Tritium						
H-3	Ci	6.67E-01	1.11E+00	1.28E+00	3.69E+01	4.00E+01
3. Dissolved and Entrained Gases						
Total For Period	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4. Gross Alpha Radioactivity						
Total For Period	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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Table 2-D Liquid Effluents – Unit 2 Batch Mode

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
1. Fission and Activation Products						
Na-24	Ci	0.00E+00	0.00E+00	0.00E+00	2.63E-06	2.63E-06
Cr-51	Ci	0.00E+00	0.00E+00	0.00E+00	2.70E-03	2.70E-03
Mn-54	Ci	0.00E+00	0.00E+00	0.00E+00	6.35E-04	6.35E-04
Mn-56	Ci	0.00E+00	0.00E+00	0.00E+00	1.44E-06	1.44E-06
Co-58	Ci	0.00E+00	0.00E+00	0.00E+00	2.28E-02	2.28E-02
Fe-59	Ci	0.00E+00	0.00E+00	0.00E+00	3.11E-05	3.11E-05
Co-60	Ci	0.00E+00	0.00E+00	0.00E+00	3.73E-03	3.73E-03
Ni-63	Ci	0.00E+00	0.00E+00	0.00E+00	1.72E-03	1.72E-03
Zn-65	Ci	0.00E+00	0.00E+00	0.00E+00	3.72E-06	3.72E-06
Zr-95	Ci	0.00E+00	0.00E+00	0.00E+00	4.41E-04	4.41E-04
Nb-95	Ci	0.00E+00	0.00E+00	0.00E+00	6.49E-04	6.49E-04
Zr-97	Ci	0.00E+00	0.00E+00	0.00E+00	1.75E-06	1.75E-06
Nb-97	Ci	0.00E+00	0.00E+00	0.00E+00	1.10E-06	1.10E-06
Mo-99	Ci	0.00E+00	0.00E+00	0.00E+00	8.71E-07	8.71E-07
Ag-110m	Ci	0.00E+00	0.00E+00	0.00E+00	2.92E-05	2.92E-05
Sn-117m	Ci	0.00E+00	0.00E+00	0.00E+00	5.31E-07	5.31E-07
Sb-124	Ci	0.00E+00	0.00E+00	0.00E+00	8.80E-05	8.80E-05
Sb-125	Ci	0.00E+00	0.00E+00	0.00E+00	1.31E-03	1.31E-03
I-135	Ci	0.00E+00	0.00E+00	0.00E+00	5.07E-06	5.07E-06
Total For Period	Ci	0.00E+00	0.00E+00	0.00E+00	3.24E-02	3.42E-02
2. Tritium						
H-3	Ci	1.26E+02	3.41E+02	6.25E+02	7.17E+02	1.81E+03
3. Dissolved and Entrained Gases						
Ar-41	Ci	0.00E+00	0.00E+00	0.00E+00	2.79E-06	2.79E-06
Kr-85m	Ci	0.00E+00	0.00E+00	5.45E-07	0.00E+00	5.45E-07
Xe-131m	Ci	1.75E-05	0.00E+00	2.17E-05	0.00E+00	3.92E-05
Xe-133m	Ci	0.00E+00	0.00E+00	0.00E+00	1.83E-05	1.83E-05
Xe-133	Ci	1.73E-05	6.25E-05	4.75E-04	8.85E-04	1.44E-03
Xe-135m	Ci	0.00E+00	0.00E+00	0.00E+00	1.07E-05	1.07E-05
Xe-135	Ci	0.00E+00	5.45E-07	5.80E-06	5.10E-05	5.75E-05
Xe-138	Ci	0.00E+00	0.00E+00	1.44E-06	0.00E+00	1.44E-06
Total For Period	Ci	3.49E-05	6.30E-05	5.05E-04	9.70E-04	1.57E-03
4. Gross Alpha Radioactivity						
Total For Period	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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Table 2-D Liquid Effluents – Unit 2 Continuous Mode

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
1. Fission and Activation Products						
Total For Period	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2. Tritium						
H-3	Ci	1.88E-01	3.12E-01	3.61E-01	1.04E+01	1.13E+01
3. Dissolved and Entrained Gases						
Total For Period	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4. Gross Alpha Radioactivity						
Total For Period	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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V. Solid Waste Storage and Shipment

A. Types of Solid Waste – Summary

Type of Waste	Unit	12 Month Period	Est. (Ci) Error %
Spent resins, filters, sludges, evaporator bottoms, etc.	m ³	12.99E+00	N/A
	Ci	1.56E+02	+/- 25%
Dry Active Waste, Compressible Waste Contaminated Equipment, etc.	m ³	6.65E+02	N/A
	Ci	1.45E+00	+/- 25%
Irradiated Components, Control Rods, etc.	m ³	0.00	N/A
	Ci	0.00	N/A

B. Destination by Carrier

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
1	Motor Freight	Waste Control Specialist - Andrews, TX
3	Motor Freight	Energy Solutions, Clive Utah
3	Motor Freight	Energy Solutions, Memphis TN
2	Motor Freight	Energy Solutions, Oak Ridge TN
9	Motor Freight	TOXCO - Oak Ridge, TN

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C. Major Nuclides by Waste Class and Stream

(Cutoff = 1.0%)

Spent resins, filters, sludges, evaporator
bottoms, etc. (nuclides determined by
measurement

<u>Nuclide</u>	<u>Percent</u>	<u>Ci</u>
Be-7	1.14%	2.75E+00
Mn-54	8.71%	1.71E+01
Fe-55	22.01%	4.31E+01
Co-58	27.18%	5.33E+00
Co-60	23.10%	4.53E+01
Ni-63	13.44%	2.63E+01
Zn-65	1.70%	3.33E+00

Dry Active Waste, Compressible Waste
Contaminated Equipment, etc. (nuclides
determined by estimate)

<u>Nuclide</u>	<u>Percent</u>	<u>Ci</u>
H-3	47.03%	7.24E-01
Mn-54	2.81%	3.36E-02
Fe-55	7.62%	1.17E-01
Co-58	4.26%	6.56E-02
Co-60	19.30%	2.97E-01
Ni-63	3.59%	5.52E-02
Zr-95	3.49%	5.37E-02
Nb-95	7.30%	8.71E-03
Sb-125	2.73%	4.21E-02
Cs-137	1.44%	2.22E-02

Irradiated Components

None N/A N/A

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D. Irradiated Fuel Shipments

None

E. Solidification of Waste

Was solidification performed? No

If yes, solidification media: N/A

VI. Radiological Impact to Man

A. Introduction

Potential doses to maximum individuals and the population around WBN are calculated for each quarter as required in Section 5.2 of the ODCM. Measured plant releases for the reporting period are used to estimate these doses. Dispersion of radioactive effluents in the environment is estimated using meteorological data and river flow data. In this report, the doses resulting from releases are described and compared to limits established for WBN.

B. Dose Limits

The ODCM specifies limits for the release of radioactive effluents, as well as limits for doses to the general public, from the release of radioactive effluents. These limits are set well below the Technical Specification limits which govern the concentrations of radioactivity and doses permissible in unrestricted areas. This ensures that radioactive effluent releases are as low as reasonably achievable.

C. Dose Calculations

Estimated doses to the public are determined using computer models (the Gaseous Effluent Licensing Code, GELC, and the Quarterly Water Dose Assessment Code, QWATA). These models are based on guidance provided by the NRC (in Regulatory Guides 1.109, 1.111 and 1.113) for determining the potential dose to individuals and populations living in the vicinity of the plant. The area around the plant is analyzed to determine the pathways through which the public may receive a dose. The doses calculated are a representation of the dose to a "maximum exposed individual." Some of the factors used in these calculations (such as ingestion rates) are maximum values. Many of these factors are obtained from NUREG/CR-1004. The values chosen will tend to overestimate the dose to this "maximum" person. The expected dose to actual individuals is lower. The calculated doses are presented in Tables 3 and 4.

D. Doses from Airborne Effluents

For airborne effluents, the public can be exposed to radiation from several sources: direct radiation from the radioactivity in the air, direct radiation from radioactivity deposited on the ground, inhalation of airborne radioactivity, ingestion of vegetation which contains radioactivity deposited from the atmosphere, and ingestion of milk and beef which contains radioactivity deposited from the atmosphere onto vegetation and subsequently eaten by milk and beef animals.

Airborne Discharge Points

All releases from WBN are considered ground-level releases. The ground-level Joint Frequency Distribution (JFD) is derived from wind speeds and directions measured 10 meters above ground and from the vertical temperature difference between 10 and 46 meters, as presented for each quarter in Section VIII.

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Meteorological Data

Meteorological variables at WBN are measured continuously. Measurements collected include wind speed, wind direction, and temperature at heights of 10, 46, and 91 meters above the ground. Quarterly JFDs are calculated for each release point using the appropriate levels of meteorological data. A JFD provides the percentage of the time in a quarter that the wind is blowing out of a particular upwind compass sector in a particular range of wind speeds for a given stability class A through G. The wind speeds are divided into nine wind speed ranges. Calms are distributed by direction in proportion to the distribution of non-calm wind directions less than 0.7 m/s (1.5 mph). Stability classes are determined from the vertical temperature difference between two measurement levels.

External Exposure Dose

Dose estimates for maximum external air dose (gamma-air and beta-air doses) are made for points at and beyond the unrestricted area boundary as described in the WBN ODCM. The highest of these doses is then selected.

Submersion Dose

External doses to the skin and total body, due to submersion in a cloud of noble gases, are estimated for the nearest residence in each sector. The residence with the highest dose is then selected from all sectors.

Organ Dose

Doses to organs due to releases of airborne effluents are estimated for the inhalation, ground contamination, and ingestion pathways. The ingestion pathway is further divided into three possible contributing pathways: ingestion of cow milk, ingestion of beef, and ingestion of vegetables. Doses from applicable pathways are calculated for each real receptor location identified in the most recent land use survey. To determine the maximum organ dose, the doses from the pathways are summed for each receptor. For the ingestion dose, however, only those pathways that exist for each receptor are considered in the sum, i.e., milk ingestion doses are included only for locations where milk is consumed without commercial preparation and vegetable ingestion is included only for those locations where a garden is identified. Since specific data on beef animals were not available, the location of the highest beef dose for all receptors within an age group will be considered the beef dose for each receptor within that age group. For ground contamination, the dose added to the organ dose being calculated is the total body dose calculated for that location, i.e., it is assumed that the dose to an individual organ is equal to the total body dose.

Doses from airborne effluents from Unit 1 are presented in Tables 3-A through 3-D. Doses from airborne effluents from Unit 2 are presented in Tables 3-E through 3-H.

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E. Doses from Liquid Effluents

For liquid effluents, the public can be exposed to radiation from three sources: the ingestion of water from the Tennessee River, the ingestion of fish caught in the Tennessee River, and direct exposure from radioactive material deposited on the river shoreline sediment (recreation).

The concentrations of radioactivity in the Tennessee River are estimated by a computer model which uses measured hydraulic data downstream of WBN. Parameters used to determine the doses are based on guidance given by the NRC (in Regulatory Guide 1.109) for maximum ingestion rates, exposure times, etc. Wherever possible, parameters used in the dose calculation are site specific use factors determined by TVA. The models that are used to estimate doses, as well as the parameters input to the models, are described in detail in the WBN ODCM.

Liquid Release Points and River Data

Radioactivity concentrations in the Tennessee River are calculated assuming that releases in liquid effluents are continuous. All routine liquid releases from WBN, located at Tennessee River Mile 528.5, are made through diffusers which extend into the Tennessee River. It is assumed that releases to the river through these diffusers will initially be entrained in one-tenth of the water which flows past the plant. The QWATA code makes the assumption that this mixing condition holds true until the water is completely mixed at Tennessee River Mile 510.0.

Doses are calculated for locations within a 50-mile radius downstream of the plant site. The maximum potential recreation dose is calculated for a location immediately downstream from the plant outfall. The maximum individual dose from ingestion of fish is assumed to be that calculated for the consumption of fish caught anywhere between the plant and the first downstream dam (Chickamauga Dam). The maximum individual dose from drinking water is assumed to be that calculated at the nearest downstream public water supply (Dayton, TN). This could be interpreted as indicating that the maximum individual, as assumed for liquid releases from WBN, is an individual who obtains all of his drinking water at Dayton, TN, consumes fish caught from the Tennessee River between WBN and Chickamauga Dam, and spends 500 hours per year on the shoreline just below the outfall from WBN. Dose estimates for the maximum individual due to liquid effluents for each quarter in the period are presented in Tables 4-A through 4-H, along with the average river flows past the plant site for the periods.

F. Population Doses

Population doses for highest exposed organ due to airborne effluents are calculated for a projected 2040 population distribution of 1,523,385 persons living within a 50-mile radius of the plant site. Doses from external pathways and inhalation are based on the 50-mile human population distribution. Ingestion population doses are calculated assuming that each individual consumes milk, vegetables, and meat produced within the sector annulus in which he resides. Doses from external pathways and inhalation are based on the 50-mile human population distribution.

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Population doses for total body and the maximum exposed organ due to liquid effluents are calculated for the entire downstream Tennessee River Population. Water ingestion population doses are calculated using actual population figures for downstream public water supplies. Fish ingestion population doses are calculated assuming that all sport fish caught in the Tennessee River are consumed by the Tennessee River population. Recreation population doses are calculated using actual recreational data on the number of shoreline visits at downstream locations.

Population dose estimates for airborne and liquid effluents from Unit 1 are presented in Tables 3-A through 3-D and 4-A through 4-D. Population dose estimates for airborne and liquid effluents from Unit 2 are presented in Tables 3-E through 3-H and 4-E through 4-H.

G. Offsite Direct Radiation Dose

External gamma radiation levels were measured by Landauer InLight (optically stimulated luminescence dosimeters (OSLDs) deployed around WBN as part of the offsite Radiological Environmental Monitoring Program. The quarterly gamma radiation levels determined from these dosimeters during this reporting period averaged 15.4 mR/quarter at onsite (at or near the site boundary) stations and 14.5 mR/quarter at offsite stations or 0.9 mR/quarter higher onsite than at offsite stations. This difference is consistent with levels measured for preoperational and construction phases of the WBN plant site where the average radiation levels onsite were generally 2-8 mR/quarter higher than the levels offsite. This may be attributable to natural variations in environmental radiation levels, earth moving activities onsite, the mass of concrete employed in the construction of the plants, or other undetermined influences. Fluctuations in natural background dose rates and in dosimeters readings tend to mask any small increments which may be due to plant operations. Thus, there was no identifiable increase in dose rate levels attributable to direct radiation from plant equipment and/or gaseous effluents.

H. Dose to a Member of the Public Inside the Site Boundary

As stated in the WBN ODCM, an evaluation of the dose to a member of the public inside the unrestricted area boundary is performed for a hypothetical TVA employee who works just outside the restricted area boundary for an entire work year (2000 hours). Results from onsite dosimeter measurements indicated that the highest annual dosimeter reading outside Radiological Control Area was 70 mrem. Using this value, subtracting an annual background value of approximately 50 mrem/year, and multiplying by the ratio of the occupancy times (2000/8760), the highest external dose to a member of the public inside the unrestricted area boundary would be 4.6 mrem. The doses due to radioactive effluents released to the atmosphere calculated in this report would not add a significant amount to this measured dose. This dose is below the 10 CFR 20 annual limit of 100 mrem.

I. Total Dose

To determine compliance with 40 CFR 190, annual total dose contributions to the maximum individual from WBN radioactive effluents and all other nearby uranium fuel cycle sources are considered.

The annual dose to any organ other than thyroid for the maximum individual is conservatively estimated by summing the following doses: the total body air submersion

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dose for each quarter, the critical organ dose (for any organ other than the thyroid) from airborne effluents for each quarter from ground contamination, inhalation and ingestion, the total body dose from liquid effluents for each quarter, the maximum organ dose (for any organ other than the thyroid) from liquid effluents for each quarter, and any identifiable increase in direct radiation dose levels as measured by the environmental monitoring program. This dose is compared to the 40 CFR 190 limit for total body or any organ dose (other than thyroid) to determine compliance.

The annual thyroid dose to the maximum individual is conservatively estimated by summing the following doses: the total body air submersion dose for each quarter, the thyroid dose from airborne effluents for each quarter, the total body dose from liquid effluents for each quarter, the thyroid dose from liquid effluents for each quarter, and any identifiable increase in direct radiation dose levels as measured by the environmental monitoring program. This dose is compared to the 40 CFR 190 limit for thyroid dose to determine compliance. Cumulative annual total doses are presented in Table 5.

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J. Tables

Table 3-A Doses from Unit 1 Airborne Effluents – 1st Quarter

Individual Doses

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
Beta Air	1.98E-02 mrad	1.00E+01 mrad	1.98E-01	ENE 1370 meters
Gamma Air	5.35E-02 mrad	5.00E+00 mrad	1.07E+00	ENE 1370 meters
NG Skin	2.08E-02 mrad	N/A	N/A	SE 1409 meters
NG Total Body	1.41E-02 mrad	N/A	N/A	SE 1409 meters
Organ Doses (Iodine, Tritium, Particulates with >8-Day half-life)				
(Max) Child / Bone	4.95E-01 mrem	7.5 mrem	6.54E+00	NE 3661 meters
Child / Thyroid	1.20E-01 mrem	7.5 mrem	1.54E+00	SE 1409 meters
Child / Total Body	1.20E-01 mrem	7.5 mrem	1.54E+00	SE 1409 meters

Population Doses

Total Body Dose	3.57E-01 man-rem
Maximum Organ Dose (Organ)	1.44E+00 man-rem (Bone)

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Table 3-B Doses from Unit 1 Airborne Effluents – 2nd Quarter

Individual Doses

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
Beta Air	4.28E-02 mrad	1.00E+01 mrad	4.82E-01	ENE 1370 meters
Gamma Air	1.57E-02 mrad	5.00E+00 mrad	3.14E-01	ENE 1370 meters
NG Skin	1.59E-02 mrad	N/A	N/A	ENE 3072 meters
NG Total Body	1.07E-02 mrad	N/A	N/A	ENE 3072 meters

Organ Doses

(Iodine, Tritium, Particulates with >8-Day half-life)

(Max) Child / Bone	9.07E-01 mrem	7.5 mrem	12.1E+00	NE 3661 meters
Child / Thyroid	2.10E-01 mrem	7.5 mrem	2.80E+00	NE 3661 meters
Child / Total Body	2.10E-01 mrem	7.5 mrem	2.80E+00	NE 3661 meters

Population Doses

Total Body Dose	5.55E-01 man-rem
Maximum Organ Dose (Organ)	2.20E+00 man-rem (Bone)

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Table 3-C Doses from Unit 1 Airborne Effluents – 3rd Quarter

Individual Doses

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
Beta Air	1.57E-01 mrad	1.00E+01 mrad	1.57E+00	ENE 1370 meters
Gamma Air	4.42E-01 mrad	5.00E+00 mrad	8.84E+00	ENE 1370 meters
NG Skin	1.59E-01 mrad	N/A	N/A	ENE 3072 meters
NG Total Body	1.08E-01 mrad	N/A	N/A	ENE 3072 meters

Organ Doses

(Iodine, Tritium, Particulates with >8-Day half-life)

(Max) Child / Bone	7.68E-01 mrem	7.5 mrem	1.02E+01	NE 3661 meters
Child / Thyroid	2.62E-01 mrem	7.5 mrem	3.49E+00	SE 1409 meters
Child / Total Body	2.62E-01 mrem	7.5 mrem	3.49E+00	SE 1409 meters

Population Doses

Total Body Dose	7.36E-01 man-rem
Maximum Organ Dose (Organ)	2.16E+00 man-rem (Bone)

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Table 3-D Doses from Unit 1 Airborne Effluents – 4th Quarter

Individual Doses

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
Beta Air	1.37E-02 mrad	1.00E+01 mrad	1.37E-01	ESE 1250 meters
Gamma Air	3.82E-02 mrad	5.00E+00 mrad	7.64E-01	ESE 1250 meters
NG Skin	1.71E-02 mrad	N/A	N/A	SE 1409 meters
NG Total Body	1.60E-02 mrad	N/A	N/A	SE 1409 meters
Organ Doses (Iodine, Tritium, Particulates with >8-Day half-life)				
(Max) Child / Bone	3.12E-01 mrem	7.5 mrem	4.16E+00	SE 1409 meters
Child / Thyroid	1.24E-01 mrem	7.5 mrem	1.65E+00	SE 1409 meters
Child / Total Body	1.24E-01 mrem	7.5 mrem	1.65E+00	SE 1409 meters

Population Doses

Total Body Dose	4.25E-01 man-rem
Maximum Organ Dose (Organ)	8.64E-01 man-rem (Bone)

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Table 3-E Doses from Unit 2 Airborne Effluents – 1st Quarter

Individual Doses

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
Beta Air	4.20E-03 mrad	1.00E+01 mrad	4.2E-02	ENE 1370 meters
Gamma Air	1.19E-02 mrad	5.00E+00 mrad	2.38E-01	ENE 1370 meters
NG Skin	4.65E-03 mrad	N/A	N/A	SE 1409 meters
NG Total Body	3.16E-03 mrad	N/A	N/A	SE 1409 meters
Organ Doses (Iodine, Tritium, Particulates with >8-Day half-life)				
(Max) Child / Bone	4.16E-01 mrem	7.5 mrem	5.55E+00	NE 3661 meters
Child / Thyroid	8.79E-02 mrem	7.5 mrem	1.17E+00	SE 1409 meters
Child / Total Body	8.79E-02 mrem	7.5 mrem	1.17E+00	SE 1409 meters

Population Doses

Total Body Dose	2.59E-01 man-rem
Maximum Organ Dose (Organ)	1.20E+00 man-rem (Bone)

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Table 3-F Doses from Unit 2 Airborne Effluents – 2nd Quarter

Individual Doses

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
Beta Air	3.96E-03 mrad	1.00E+01 mrad	3.96E-02	ENE 1370 meters
Gamma Air	1.12E-02 mrad	5.00E+00 mrad	2.24E-01	ENE 1370 meters
NG Skin	4.19E-03 mrad	N/A	N/A	ENE 3072 meters
NG Total Body	2.86E-03 mrad	N/A	N/A	ENE 3072 meters
Organ Doses (Iodine, Tritium, Particulates with >8-Day half-life)				
(Max) Child / Bone	7.75E-01 mrem	7.5 mrem	10.3E+00	NE 3661 meters
Child / Thyroid	1.63E-01 mrem	7.5 mrem	2.17E+00	NE 3661 meters
Child / Total Body	1.63E-01 mrem	7.5 mrem	2.17E+00	NE 3661 meters

Population Doses

Total Body Dose	4.02E-01 man-rem
Maximum Organ Dose (Organ)	1.85E+00 man-rem (Bone)

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Table 3-G Doses from Unit 2 Airborne Effluents – 3rd Quarter

Individual Doses

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
Beta Air	2.14E-02 mrad	1.00E+01 mrad	2.14E-01	ENE 1370 meters
Gamma Air	6.07E-02 mrad	5.00E+00 mrad	1.21E+00	ENE 1370 meters
NG Skin	2.17E-02 mrad	N/A	N/A	ENE 3072 meters
NG Total Body	1.48E-02 mrad	N/A	N/A	ENE 3072 meters
Organ Doses (Iodine, Tritium, Particulates with >8-Day half-life)				
(Max) Child / Bone	4.71E-01 mrem	7.5 mrem	6.28E+00	NE 3661 meters
Child / Thyroid	1.13E-01 mrem	7.5 mrem	1.51E+00	NE 3661 meters
Child / Total Body	1.13E-01 mrem	7.5 mrem	1.51E+00	NE 3661 meters

Population Doses

Total Body Dose	3.45E-01 man-rem
Maximum Organ Dose (Organ)	1.32E+00 man-rem (Bone)

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Table 3-H Doses from Unit 2 Airborne Effluents – 4th Quarter

Individual Doses

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
Beta Air	3.68E-02 mrad	1.00E+01 mrad	3.68E-01	ESE 1250 meters
Gamma Air	1.04E-01 mrad	5.00E+00 mrad	2.08E+00	ESE 1250 meters
NG Skin	4.62E-02 mrad	N/A	N/A	SE 1409 meters
NG Total Body	3.14E-02 mrad	N/A	N/A	SE 1409 meters
Organ Doses (Iodine, Tritium, Particulates with >8-Day half-life)				
(Max) Child / Bone	8.10E-01 mrem	7.5 mrem	10.8E+00	SE 1409 meters
Child / Thyroid	2.02E-01 mrem	7.5 mrem	2.69E+00	SE 1409 meters
Child / Total Body	2.02E-01 mrem	7.5 mrem	2.69E+00	SE 1409 meters

Population Doses

Total Body Dose	4.53E-01 man-rem
Maximum Organ Dose (Organ)	1.87E+00 man-rem (Bone)

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Table 4-A Doses from Unit 1 Liquid Effluents – 1st Quarter

Individual Doses

Age Group	Organ	Dose	Quarterly Limit	Percent of Limit
Child	Bone	1.30E-03 mrem	5.00E+00	2.60E-02
Child	GI-LLI	1.30E-03 mrem	5.00E+00	2.60E-02
Child	Kidney	1.30E-03 mrem	5.00E+00	2.60E-02
Child	Liver	1.30E-03 mrem	5.00E+00	2.60E-02
Child	Lung	1.30E-03 mrem	5.00E+00	2.60E-02
Child	Thyroid	1.30E-03 mrem	5.00E+00	2.60E-02
Child	Total Body	1.30E-03 mrem	1.50E+00	8.67E-02

Average river flow past WBN (cubic feet per second): 44,582 cfs

Population Doses

Total Body Dose 1.10E-01 man-rem
Maximum Organ Dose (Organ) 1.10E-01 man-rem (Bone, GI-LLI, Kidney, Liver, Lung, Thyroid)

Table 4-B Doses from Unit 1 Liquid Effluents – 2nd Quarter

Individual Doses

Age Group	Organ	Dose	Quarterly Limit	Percent of Limit
Child	Bone	6.50E-03 mrem	5.00E+00	1.30E-01
Child	GI-LLI	6.50E-03 mrem	5.00E+00	1.30E-01
Child	Kidney	6.50E-03 mrem	5.00E+00	1.30E-01
Child	Liver	6.50E-03 mrem	5.00E+00	1.30E-01
Child	Lung	6.50E-03 mrem	5.00E+00	1.30E-01
Child	Thyroid	6.50E-03 mrem	5.00E+00	1.30E-01
Child	Total Body	6.50E-03 mrem	1.50E+00	4.33E-01

Average river flow past WBN (cubic feet per second): 23,902 cfs

Population Doses

Total Body Dose 5.50E-01 man-rem
Maximum Organ Dose (Organ) 5.50E-01 man-rem (Bone, GI-LLI, Kidney, Liver, Lung, Thyroid)

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Table 4-C Doses from Unit 1 Liquid Effluents – 3rd Quarter

Individual Doses

Age Group	Organ	Dose	Quarterly Limit	Percent of Limit
Child	Bone	1.20E-02 mrem	5.00E+00	2.40E-01
Child	GI-LLI	1.20E-02 mrem	5.00E+00	2.40E-01
Child	Kidney	1.20E-02 mrem	5.00E+00	2.40E-01
Child	Liver	1.20E-02 mrem	5.00E+00	2.40E-01
Child	Lung	1.20E-02 mrem	5.00E+00	2.40E-01
Child	Thyroid	1.20E-02 mrem	5.00E+00	2.40E-01
Child	Total Body	1.20E-02 mrem	1.50E+00	8.00E-01

Average river flow past WBN (cubic feet per second): 23,826 cfs

Population Doses

Total Body Dose 9.70E-01 man-rem
Maximum Organ Dose (Organ) 9.70E-01 man-rem (Bone, GI-LLI, Kidney, Liver, Lung, Thyroid)

Table 4-D Doses from Unit 1 Liquid Effluents – 4th Quarter

Individual Doses

Age Group	Organ	Dose	Quarterly Limit	Percent of Limit
Child	Bone	1.30E-02 mrem	5.00E+00	2.60E-01
Adult	GI-LLI	1.40E-02 mrem	5.00E+00	2.80E-01
Child	Kidney	1.20E-02 mrem	5.00E+00	2.40E-01
Child	Liver	1.20E-02 mrem	5.00E+00	2.40E-01
Child	Lung	1.20E-02 mrem	5.00E+00	2.40E-01
Child	Thyroid	1.20E-02 mrem	5.00E+00	2.40E-01
Child	Total Body	1.20E-02 mrem	1.50E+00	8.00E-01

Average river flow past WBN (cubic feet per second): 27,974 cfs

Population Doses

Total Body Dose 1.10E+00 man-rem
Maximum Organ Dose (Organ) 1.10E+00 man-rem (Bone, GI-LLI, Kidney, Liver, Lung, Thyroid)

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Radiological Impact

Table 4-E Doses from Unit 2 Liquid Effluents – 1st Quarter

Individual Doses

Age Group	Organ	Dose	Quarterly Limit	Percent of Limit
Child	Bone	3.60E-04 mrem	5.00E+00	7.20E-03
Child	GI-LLI	3.60E-04 mrem	5.00E+00	7.20E-03
Child	Kidney	3.60E-04 mrem	5.00E+00	7.20E-03
Child	Liver	3.60E-04 mrem	5.00E+00	7.20E-03
Child	Lung	3.60E-04 mrem	5.00E+00	7.20E-03
Child	Thyroid	3.60E-04 mrem	5.00E+00	7.20E-03
Child	Total Body	3.60E-04 mrem	1.50E+00	2.40E-02

Average river flow past WBN (cubic feet per second): 44,582 cfs

Population Doses

Total Body Dose 3.20E-02 man-rem
Maximum Organ Dose (Organ) 3.20E-02 man-rem (Bone, GI-LLI, Kidney, Liver, Lung, Thyroid)

Table 4-F Doses from Unit 2 Liquid Effluents – 2nd Quarter

Individual Doses

Age Group	Organ	Dose	Quarterly Limit	Percent of Limit
Child	Bone	1.80E-03 mrem	5.00E+00	3.60E-02
Child	GI-LLI	1.80E-03 mrem	5.00E+00	3.60E-02
Child	Kidney	1.80E-03 mrem	5.00E+00	3.60E-02
Child	Liver	1.80E-03 mrem	5.00E+00	3.60E-02
Child	Lung	1.80E-03 mrem	5.00E+00	3.60E-02
Child	Thyroid	1.80E-03 mrem	5.00E+00	3.60E-02
Child	Total Body	1.80E-03 mrem	1.50E+00	1.20E-01

Average river flow past WBN (cubic feet per second): 23,902 cfs

Population Doses

Total Body Dose 1.50E-01 man-rem
Maximum Organ Dose (Organ) 1.50E-01 man-rem (Bone, GI-LLI, Kidney, Liver, Lung, Thyroid)

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Radiological Impact

Table 4-G Doses from Unit 2 Liquid Effluents – 3rd Quarter

Individual Doses

Age Group	Organ	Dose	Quarterly Limit	Percent of Limit
Child	Bone	3.40E-03 mrem	5.00E+00	6.80E-02
Child	GI-LLI	3.40E-03 mrem	5.00E+00	6.80E-02
Child	Kidney	3.40E-03 mrem	5.00E+00	6.80E-02
Child	Liver	3.40E-03 mrem	5.00E+00	6.80E-02
Child	Lung	3.40E-03 mrem	5.00E+00	6.80E-02
Child	Thyroid	3.40E-03 mrem	5.00E+00	6.80E-02
Child	Total Body	3.40E-03 mrem	1.50E+00	2.27E-01

Average river flow past WBN (cubic feet per second): 23,826 cfs

Population Doses

Total Body Dose 2.70E-01 man-rem
Maximum Organ Dose (Organ) 2.70E-01 man-rem (Bone, GI-LLI, Kidney, Liver, Lung, Thyroid)

Table 4-H Doses from Unit 2 Liquid Effluents – 4th Quarter

Individual Doses

Age Group	Organ	Dose	Quarterly Limit	Percent of Limit
Child	Bone	4.10E-03 mrem	5.00E+00	8.20E-02
Adult	GI-LLI	6.90E-03 mrem	5.00E+00	1.38E-01
Child	Kidney	3.93E-03 mrem	5.00E+00	7.86E-02
Child	Liver	3.90E-03 mrem	5.00E+00	7.80E-02
Child	Lung	3.90E-03 mrem	5.00E+00	7.80E-02
Child	Thyroid	3.90E-03 mrem	5.00E+00	7.80E-02
Child	Total Body	3.90E-03 mrem	1.50E+00	2.60E-02

Average river flow past WBN (cubic feet per second): 27,974 cfs

Population Doses

Total Body Dose 3.1E-01 man-rem
Maximum Organ Dose (Organ) 3.2E-01 man-rem (Bone, GI-LLI)

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Table 5 Total Dose from Fuel Cycle

Dose	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	
Total Body or any Organ (except thyroid)					
Total body air (submersion)	1.73E-02	1.36E-02	2.56E-01	4.74E-02	
Critical organ dose (airborne)	9.11E-01	1.68E+00	1.24E+00	1.12E+00	
Total body dose (liquid)	2.60E-02	1.30E-02	2.40E-02	3.90E-03	
Maximum organ dose (liquid)	2.60E-02	1.30E-02	2.40E-02	6.90E-03	
Direct Radiation Dose	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Total	9.80E-01	1.72E+00	1.54E+00	1.18E+00	
Cumulative Total Dose (mrem)					5.42E+00
Annual Dose Limit (mrem)					2.50E+01
Percent of Limit					2.17E+01
Thyroid					
Total body air (submersion)	1.73E-02	1.36E-02	2.56E-01	4.74E-02	
Thyroid dose (airborne)	2.08E-01	3.73E-01	3.75E-01	3.26E-01	
Total body dose (liquid)	2.60E-02	1.30E-02	2.40E-02	3.90E-03	
Thyroid dose (liquid)	2.60E-02	1.30E-02	2.40E-02	2.40E-02	
Total	2.77E-01	4.13E-01	6.79E-01	4.01E-01	
Cumulative Total Dose (mrem)					1.77E+00
Annual Dose Limit (mrem)					7.50E+01
Percent of Limit					2.36E+00

VII. Independent Spent Fuel Storage Installation

The Tennessee Valley Authority (TVA) selected the Holtec International Storage Module (HI-STORM) Flood/Wind (FW) Multi-Purpose Canister (MPC) Storage System for storage of spent fuel at the Watts Bar Nuclear (WBN) Plant Independent Spent Fuel Storage Installation (ISFSI). The HI-STORM FW MPC Storage System has been reviewed and approved by the Nuclear Regulatory Commission (NRC) and Certificate of Compliance (CoC) number 1032 Title 10 CFR 72.104, Criteria for radioactive materials in effluents and direct radiation from an ISFSI or Monitored Retrievable Storage Installation (MSRI), requires that the annual dose equivalent to any real individual, located beyond the controlled area, must not exceed 25 millirem (mrem) to the whole body, 75 mrem to the thyroid, and 25 mrem to any other critical organ, as a result of exposure to direct radiation from ISFSI operations.

WBN successfully placed its first loaded HI-STORM FW on the ISFSI pad on October 5, 2016. The TVA ISFSI storage pad is located within the plant's protected area. The storage pad is designed to adequately support both static and dynamic loads of 80 loaded Holtec HI-STORM FW MPC Storage Systems. Currently, the storage pad contains twenty canisters.

The off-site dose for normal operating conditions to a real individual beyond the controlled area boundary is limited by 10 CFR 72.104(a) to a maximum of 25 mrem/year whole body, 75 mrem/year thyroid, and 25 mrem/year for other critical organs, including contributions from all nuclear fuel cycle operations. For this report, total site releases include the WBN ISFSI as part of plant operations. By its design, there were no liquid or gaseous effluents from the operation of the ISFSI during 2021.

Radiological Environmental Monitoring Program assessment of direct radiation exposure by dosimeters at or near the site boundary is 3.5 mrem/yr for onsite locations. As stated in the WBN ODCM and per this report, the dose to a member of the public inside the unrestricted boundary is then performed. Results from onsite dosimeter measurement and subtracting background indicated that the highest dosimeter reading at the boundary of the protected area was 3 mrem for the Warehouse B O/S wall of RMA Cage location AR002.

Based on the above measurements performed during this reporting period, it can be concluded that the radiation exposure due to the ISFSI, combined with all other fuel cycle operations, will not exceed the regulatory requirements of 25 mrem/year in 10 CFR 72.104(a) and 40 CFR Part 190.

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Meteorological Data

VIII. Meteorological Data

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Meteorological Data

JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

STABILITY CLASS A (DELTA T<=-1.9 C/100 M)

WATTS BAR NUCLEAR PLANT

JAN 1, 2021 - MAR 31, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.000	0.000	0.000	0.000	0.046	0.000	0.000	0.000	0.000	0.046
NNE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NE	0.000	0.000	0.000	0.000	0.046	0.000	0.000	0.000	0.000	0.046
ENE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
E	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ESE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SSE	0.000	0.000	0.000	0.046	0.000	0.000	0.000	0.000	0.000	0.046
S	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SSW	0.000	0.000	0.046	0.000	0.000	0.278	0.000	0.000	0.000	0.325
SW	0.000	0.000	0.000	0.000	0.000	0.046	0.000	0.000	0.000	0.046
WSW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
W	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WNW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NNW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUBTOTAL	0.000	0.000	0.046	0.046	0.093	0.325	0.000	0.000	0.000	0.510

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2157
TOTAL HOURS OF STABILITY CLASS A	11
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS A	11
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2157
TOTAL HOURS CALM	0

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2021/04/26

MEAN WIND SPEED = 8.20

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

Watts Bar Nuclear Power Plant
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JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

STABILITY CLASS B (-1.9< DELTA T<=-1.7 C/100 M)

WATTS BAR NUCLEAR PLANT

JAN 1, 2021 - MAR 31, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.000	0.000	0.000	0.046	0.000	0.139	0.000	0.000	0.000	0.185
NNE	0.000	0.000	0.000	0.000	0.185	0.278	0.000	0.000	0.000	0.464
NE	0.000	0.000	0.000	0.000	0.000	0.046	0.000	0.000	0.000	0.046
ENE	0.000	0.000	0.000	0.000	0.046	0.000	0.000	0.000	0.000	0.046
E	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ESE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SSE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
S	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SSW	0.000	0.000	0.000	0.000	0.046	0.185	0.000	0.000	0.000	0.232
SW	0.000	0.000	0.000	0.000	0.046	0.093	0.000	0.000	0.000	0.139
WSW	0.000	0.000	0.000	0.000	0.000	0.046	0.000	0.000	0.000	0.046
W	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WNW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NNW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUBTOTAL	0.000	0.000	0.000	0.046	0.325	0.788	0.000	0.000	0.000	1.159

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2157
TOTAL HOURS OF STABILITY CLASS B	25
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS B	25
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2157
TOTAL HOURS CALM	0

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2021/04/26

MEAN WIND SPEED = 8.34

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

Watts Bar Nuclear Power Plant
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JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

STABILITY CLASS C (-1.7< DELTA T<=-1.5 C/100 M)

WATTS BAR NUCLEAR PLANT

JAN 1, 2021 - MAR 31, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.000	0.000	0.000	0.278	0.093	0.046	0.000	0.000	0.000	0.417
NNE	0.000	0.000	0.000	0.185	0.417	0.232	0.000	0.000	0.000	0.834
NE	0.000	0.000	0.000	0.046	0.000	0.093	0.000	0.000	0.000	0.139
ENE	0.000	0.000	0.000	0.093	0.093	0.000	0.000	0.000	0.000	0.185
E	0.000	0.000	0.000	0.093	0.093	0.046	0.000	0.000	0.000	0.232
ESE	0.000	0.000	0.000	0.046	0.000	0.000	0.000	0.000	0.000	0.046
SE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SSE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
S	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SSW	0.000	0.000	0.000	0.046	0.232	0.371	0.000	0.000	0.000	0.649
SW	0.000	0.000	0.000	0.000	0.093	0.278	0.000	0.000	0.000	0.371
WSW	0.000	0.000	0.000	0.000	0.046	0.093	0.000	0.000	0.000	0.139
W	0.000	0.000	0.000	0.000	0.046	0.000	0.000	0.000	0.000	0.046
WNW	0.000	0.000	0.000	0.046	0.000	0.185	0.000	0.000	0.000	0.232
NW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NNW	0.000	0.000	0.000	0.000	0.000	0.093	0.000	0.000	0.000	0.093
SUBTOTAL	0.000	0.000	0.000	0.834	1.113	1.437	0.000	0.000	0.000	3.384

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2157
TOTAL HOURS OF STABILITY CLASS C	73
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS C	73
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2157
TOTAL HOURS CALM	0

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2021/04/26

MEAN WIND SPEED = 7.06

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

STABILITY CLASS D (-1.5< DELTA T<=-0.5 C/100 M)

WATTS BAR NUCLEAR PLANT

JAN 1, 2021 - MAR 31, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.000	0.000	1.020	2.364	2.503	2.457	0.000	0.000	0.000	8.345
NNE	0.000	0.000	1.808	2.735	1.391	0.603	0.000	0.000	0.000	6.537
NE	0.000	0.000	2.133	3.338	1.113	0.046	0.000	0.000	0.000	6.630
ENE	0.000	0.046	1.484	1.159	0.278	0.185	0.000	0.000	0.000	3.153
E	0.000	0.000	0.742	0.278	0.000	0.046	0.000	0.000	0.000	1.066
ESE	0.000	0.046	0.371	0.232	0.000	0.000	0.000	0.000	0.000	0.649
SE	0.000	0.093	0.325	0.139	0.000	0.000	0.000	0.000	0.000	0.556
SSE	0.000	0.046	0.139	0.139	0.000	0.000	0.000	0.000	0.000	0.325
S	0.000	0.046	0.788	0.417	0.093	0.185	0.000	0.000	0.000	1.530
SSW	0.000	0.046	1.252	1.113	0.881	1.113	0.000	0.000	0.000	4.404
SW	0.000	0.093	1.530	1.762	0.510	0.417	0.000	0.000	0.000	4.312
WSW	0.000	0.000	0.742	0.974	0.510	0.185	0.000	0.000	0.000	2.411
W	0.000	0.046	0.417	0.371	0.974	0.371	0.000	0.000	0.000	2.179
WNW	0.000	0.093	0.464	0.371	0.742	0.603	0.000	0.000	0.000	2.272
NW	0.000	0.046	0.417	0.278	0.464	0.649	0.000	0.000	0.000	1.854
NNW	0.000	0.093	0.649	0.417	1.252	2.643	0.000	0.000	0.000	5.053
SUBTOTAL	0.000	0.695	14.279	16.087	10.709	9.504	0.000	0.000	0.000	51.275

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2157
TOTAL HOURS OF STABILITY CLASS D	1106
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS D	1106
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2157
TOTAL HOURS CALM	0

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2021/04/26

MEAN WIND SPEED = 5.12

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

STABILITY CLASS E (-0.5< DELTA T<= 1.5 C/100 M)

WATTS BAR NUCLEAR PLANT

JAN 1, 2021 - MAR 31, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.000	0.000	0.649	0.603	0.742	0.093	0.000	0.000	0.000	2.086
NNE	0.000	0.000	0.649	0.417	0.185	0.000	0.000	0.000	0.000	1.252
NE	0.000	0.093	0.556	0.139	0.000	0.000	0.000	0.000	0.000	0.788
ENE	0.000	0.046	0.417	0.556	0.046	0.000	0.000	0.000	0.000	1.066
E	0.000	0.093	0.510	0.046	0.000	0.000	0.000	0.000	0.000	0.649
ESE	0.000	0.185	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.232
SE	0.000	0.232	0.232	0.046	0.000	0.000	0.000	0.000	0.000	0.510
SSE	0.000	0.278	0.232	0.232	0.093	0.000	0.000	0.000	0.000	0.834
S	0.000	0.325	0.649	0.093	0.046	0.000	0.000	0.000	0.000	1.113
SSW	0.000	0.139	1.391	1.066	0.464	0.371	0.000	0.000	0.000	3.431
SW	0.000	0.371	1.715	1.205	0.139	0.185	0.000	0.000	0.000	3.616
WSW	0.000	0.603	1.020	0.510	0.093	0.000	0.000	0.000	0.000	2.225
W	0.000	0.232	0.649	0.371	0.000	0.000	0.000	0.000	0.000	1.252
WNW	0.000	0.325	0.649	0.510	0.093	0.046	0.000	0.000	0.000	1.623
NW	0.000	0.371	0.742	0.139	0.000	0.000	0.000	0.000	0.000	1.252
NNW	0.000	0.000	0.185	0.278	0.417	0.232	0.000	0.000	0.000	1.113
SUBTOTAL	0.000	3.292	10.292	6.212	2.318	0.927	0.000	0.000	0.000	23.041

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2157
TOTAL HOURS OF STABILITY CLASS E	497
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS E	497
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2157
TOTAL HOURS CALM	0

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2021/04/26

MEAN WIND SPEED = 3.38

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

Watts Bar Nuclear Power Plant
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JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

STABILITY CLASS F (1.5< DELTA T<= 4.0 C/100 M)

WATTS BAR NUCLEAR PLANT

JAN 1, 2021 - MAR 31, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.000	0.046	0.093	0.000	0.000	0.000	0.000	0.000	0.000	0.139
NNE	0.000	0.046	0.185	0.000	0.000	0.000	0.000	0.000	0.000	0.232
NE	0.000	0.046	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.093
ENE	0.000	0.000	0.139	0.000	0.000	0.000	0.000	0.000	0.000	0.139
E	0.000	0.000	0.093	0.000	0.000	0.000	0.000	0.000	0.000	0.093
ESE	0.000	0.093	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.139
SE	0.000	0.046	0.093	0.000	0.000	0.000	0.000	0.000	0.000	0.139
SSE	0.000	0.093	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.139
S	0.000	0.046	0.325	0.000	0.000	0.000	0.000	0.000	0.000	0.371
SSW	0.000	0.185	0.649	0.139	0.000	0.000	0.000	0.000	0.000	0.974
SW	0.000	0.556	0.649	0.046	0.000	0.000	0.000	0.000	0.000	1.252
WSW	0.000	0.742	0.927	0.046	0.000	0.000	0.000	0.000	0.000	1.715
W	0.000	1.437	0.510	0.000	0.000	0.000	0.000	0.000	0.000	1.947
WNW	0.000	0.695	0.185	0.000	0.000	0.000	0.000	0.000	0.000	0.881
NW	0.000	0.417	0.185	0.000	0.000	0.000	0.000	0.000	0.000	0.603
NNW	0.000	0.046	0.185	0.046	0.000	0.000	0.000	0.000	0.000	0.278
SUBTOTAL	0.000	4.497	4.358	0.278	0.000	0.000	0.000	0.000	0.000	9.133

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2157
TOTAL HOURS OF STABILITY CLASS F	197
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS F	197
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2157
TOTAL HOURS CALM	0

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2021/04/26

MEAN WIND SPEED = 1.67

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

STABILITY CLASS G (DELTA T > 4.0 C/100 M)

WATTS BAR NUCLEAR PLANT

JAN 1, 2021 - MAR 31, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.001	0.046	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.094
NNE	0.002	0.185	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.188
NE	0.002	0.093	0.093	0.000	0.000	0.000	0.000	0.000	0.000	0.188
ENE	0.003	0.046	0.232	0.000	0.000	0.000	0.000	0.000	0.000	0.282
E	0.001	0.046	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.094
ESE	0.001	0.093	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.094
SE	0.001	0.046	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.094
SSE	0.003	0.232	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.235
S	0.004	0.232	0.093	0.000	0.000	0.000	0.000	0.000	0.000	0.328
SSW	0.007	0.464	0.139	0.000	0.000	0.000	0.000	0.000	0.000	0.610
SW	0.022	1.576	0.185	0.000	0.000	0.000	0.000	0.000	0.000	1.783
WSW	0.036	2.179	0.742	0.000	0.000	0.000	0.000	0.000	0.000	2.956
W	0.031	1.994	0.556	0.000	0.000	0.000	0.000	0.000	0.000	2.581
WNW	0.014	0.927	0.232	0.000	0.000	0.000	0.000	0.000	0.000	1.173
NW	0.007	0.325	0.278	0.000	0.000	0.000	0.000	0.000	0.000	0.610
NNW	0.002	0.139	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.188
SUBTOTAL	0.139	8.623	2.735	0.000	0.000	0.000	0.000	0.000	0.000	11.497

TOTAL HOURS OF VALID STABILITY OBSERVATIONS

2157

TOTAL HOURS OF STABILITY CLASS G

248

TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS G

248

TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS

2157

TOTAL HOURS CALM

3

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT

STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS

WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2021/04/26

MEAN WIND SPEED = 1.22

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

STABILITY CLASS A (DELTA T<=-1.9 C/100 M)

WATTS BAR NUCLEAR PLANT

APR 1, 2021 - JUN 30, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.000	0.000	0.000	0.092	0.184	0.230	0.000	0.000	0.000	0.506
NNE	0.000	0.000	0.000	0.138	0.138	0.276	0.000	0.000	0.000	0.551
NE	0.000	0.000	0.046	0.046	0.046	0.000	0.000	0.000	0.000	0.138
ENE	0.000	0.000	0.000	0.092	0.000	0.092	0.000	0.000	0.000	0.184
E	0.000	0.000	0.000	0.000	0.000	0.046	0.000	0.000	0.000	0.046
ESE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SE	0.000	0.000	0.000	0.000	0.092	0.000	0.000	0.000	0.000	0.092
SSE	0.000	0.000	0.000	0.000	0.092	0.000	0.000	0.000	0.000	0.092
S	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SSW	0.000	0.000	0.000	0.000	0.138	0.276	0.000	0.000	0.000	0.414
SW	0.000	0.000	0.000	0.000	0.000	0.092	0.000	0.000	0.000	0.092
WSW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
W	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WNW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NW	0.000	0.000	0.000	0.000	0.000	0.046	0.000	0.000	0.000	0.046
NNW	0.000	0.000	0.000	0.092	0.046	0.138	0.000	0.000	0.000	0.276
SUBTOTAL	0.000	0.000	0.046	0.460	0.735	1.195	0.000	0.000	0.000	2.436

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2176
TOTAL HOURS OF STABILITY CLASS A	53
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS A	53
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2176
TOTAL HOURS CALM	0

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2021/07/23

MEAN WIND SPEED = 7.70

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

Watts Bar Nuclear Power Plant
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JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

STABILITY CLASS B (-1.9< DELTA T<=-1.7 C/100 M)

WATTS BAR NUCLEAR PLANT

APR 1, 2021 - JUN 30, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.000	0.000	0.046	0.230	0.414	0.230	0.000	0.000	0.000	0.919
NNE	0.000	0.000	0.092	0.322	0.230	0.092	0.000	0.000	0.000	0.735
NE	0.000	0.000	0.000	0.138	0.000	0.092	0.000	0.000	0.000	0.230
ENE	0.000	0.000	0.138	0.046	0.000	0.000	0.000	0.000	0.000	0.184
E	0.000	0.000	0.000	0.046	0.000	0.000	0.000	0.000	0.000	0.046
ESE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SSE	0.000	0.000	0.000	0.046	0.092	0.000	0.000	0.000	0.000	0.138
S	0.000	0.000	0.000	0.138	0.000	0.000	0.000	0.000	0.000	0.138
SSW	0.000	0.000	0.000	0.414	0.368	0.414	0.000	0.000	0.000	1.195
SW	0.000	0.000	0.000	0.322	0.184	0.184	0.000	0.000	0.000	0.689
WSW	0.000	0.000	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.046
W	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WNW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NW	0.000	0.000	0.046	0.046	0.000	0.000	0.000	0.000	0.000	0.092
NNW	0.000	0.000	0.092	0.092	0.046	0.184	0.000	0.000	0.000	0.414
SUBTOTAL	0.000	0.000	0.460	1.838	1.333	1.195	0.000	0.000	0.000	4.825

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2176
TOTAL HOURS OF STABILITY CLASS B	105
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS B	105
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2176
TOTAL HOURS CALM	0

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2021/07/23

MEAN WIND SPEED = 6.07

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

Watts Bar Nuclear Power Plant
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JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
STABILITY CLASS C (-1.7< DELTA T<=-1.5 C/100 M)

WATTS BAR NUCLEAR PLANT

APR 1, 2021 - JUN 30, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.000	0.000	0.092	0.368	0.184	0.368	0.000	0.000	0.000	1.011
NNE	0.000	0.000	0.046	0.230	0.046	0.138	0.000	0.000	0.000	0.460
NE	0.000	0.000	0.000	0.184	0.000	0.000	0.000	0.000	0.000	0.184
ENE	0.000	0.000	0.046	0.092	0.000	0.000	0.000	0.000	0.000	0.138
E	0.000	0.000	0.000	0.138	0.000	0.000	0.000	0.000	0.000	0.138
ESE	0.000	0.000	0.138	0.046	0.000	0.000	0.000	0.000	0.000	0.184
SE	0.000	0.000	0.046	0.046	0.046	0.000	0.000	0.000	0.000	0.138
SSE	0.000	0.000	0.000	0.046	0.000	0.000	0.000	0.000	0.000	0.046
S	0.000	0.000	0.046	0.368	0.230	0.000	0.000	0.000	0.000	0.643
SSW	0.000	0.000	0.046	0.506	0.322	0.230	0.000	0.000	0.000	1.103
SW	0.000	0.000	0.000	0.506	0.276	0.138	0.000	0.000	0.000	0.919
WSW	0.000	0.000	0.000	0.138	0.000	0.000	0.000	0.000	0.000	0.138
W	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WNW	0.000	0.000	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.046
NW	0.000	0.000	0.092	0.000	0.000	0.184	0.000	0.000	0.000	0.276
NNW	0.000	0.000	0.000	0.046	0.092	0.092	0.046	0.000	0.000	0.276
SUBTOTAL	0.000	0.000	0.597	2.711	1.195	1.149	0.046	0.000	0.000	5.699

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2176
TOTAL HOURS OF STABILITY CLASS C	124
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS C	124
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2176
TOTAL HOURS CALM	0

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2021/07/23

MEAN WIND SPEED = 5.74

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

STABILITY CLASS D (-1.5< DELTA T<=-0.5 C/100 M)

WATTS BAR NUCLEAR PLANT

APR 1, 2021 - JUN 30, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.000	0.000	0.460	1.425	1.379	1.149	0.000	0.000	0.000	4.412
NNE	0.000	0.000	1.011	0.873	0.322	0.138	0.000	0.000	0.000	2.344
NE	0.000	0.000	0.230	0.460	0.138	0.000	0.000	0.000	0.000	0.827
ENE	0.000	0.000	0.597	0.322	0.184	0.046	0.000	0.000	0.000	1.149
E	0.000	0.092	0.460	0.276	0.046	0.000	0.000	0.000	0.000	0.873
ESE	0.000	0.092	0.184	0.276	0.092	0.000	0.000	0.000	0.000	0.643
SE	0.000	0.230	0.322	0.368	0.000	0.000	0.000	0.000	0.000	0.919
SSE	0.000	0.322	0.460	0.551	0.092	0.046	0.000	0.000	0.000	1.471
S	0.000	0.276	1.241	1.241	0.368	0.138	0.000	0.000	0.000	3.263
SSW	0.000	0.046	2.206	3.263	1.792	0.873	0.046	0.000	0.000	8.226
SW	0.000	0.092	1.471	1.884	0.460	0.276	0.000	0.000	0.000	4.182
WSW	0.000	0.092	0.414	0.184	0.138	0.092	0.000	0.000	0.000	0.919
W	0.000	0.000	0.184	0.138	0.046	0.000	0.000	0.000	0.000	0.368
WNW	0.000	0.092	0.230	0.276	0.322	0.184	0.000	0.000	0.000	1.103
NW	0.000	0.092	0.138	0.184	0.506	0.689	0.000	0.000	0.000	1.608
NNW	0.000	0.046	0.322	0.689	0.368	1.195	0.000	0.000	0.000	2.619
SUBTOTAL	0.000	1.471	9.926	12.408	6.250	4.825	0.046	0.000	0.000	34.926

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2176
TOTAL HOURS OF STABILITY CLASS D	760
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS D	760
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2176
TOTAL HOURS CALM	0

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2021/07/23

MEAN WIND SPEED = 4.72

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

Watts Bar Nuclear Power Plant
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JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

STABILITY CLASS E (-0.5< DELTA T<= 1.5 C/100 M)

WATTS BAR NUCLEAR PLANT

APR 1, 2021 - JUN 30, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.000	0.046	0.551	0.322	0.368	0.230	0.000	0.000	0.000	1.517
NNE	0.000	0.046	0.322	0.092	0.000	0.000	0.000	0.000	0.000	0.460
NE	0.000	0.046	0.368	0.046	0.000	0.000	0.000	0.000	0.000	0.460
ENE	0.000	0.092	0.506	0.092	0.046	0.046	0.000	0.000	0.000	0.781
E	0.000	0.092	0.230	0.184	0.000	0.000	0.000	0.000	0.000	0.506
ESE	0.000	0.092	0.092	0.000	0.000	0.000	0.000	0.000	0.000	0.184
SE	0.000	0.046	0.092	0.000	0.000	0.000	0.000	0.000	0.000	0.138
SSE	0.000	0.322	0.230	0.138	0.046	0.000	0.000	0.000	0.000	0.735
S	0.000	0.689	1.057	0.276	0.046	0.000	0.000	0.000	0.000	2.068
SSW	0.000	0.689	2.160	0.873	0.368	0.184	0.000	0.000	0.000	4.274
SW	0.000	0.506	2.022	0.460	0.000	0.000	0.000	0.000	0.000	2.987
WSW	0.000	0.322	1.149	0.046	0.046	0.000	0.000	0.000	0.000	1.563
W	0.000	0.460	0.597	0.230	0.092	0.000	0.000	0.000	0.000	1.379
WNW	0.000	0.230	0.230	0.276	0.000	0.000	0.000	0.000	0.000	0.735
NW	0.000	0.138	0.551	0.322	0.046	0.046	0.000	0.000	0.000	1.103
NNW	0.000	0.046	0.506	0.460	0.322	0.138	0.000	0.000	0.000	1.471
SUBTOTAL	0.000	3.860	10.662	3.814	1.379	0.643	0.000	0.000	0.000	20.358

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2176
TOTAL HOURS OF STABILITY CLASS E	443
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS E	443
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2176
TOTAL HOURS CALM	0

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2021/07/23

MEAN WIND SPEED = 2.93

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

Watts Bar Nuclear Power Plant
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JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

STABILITY CLASS F (1.5< DELTA T<= 4.0 C/100 M)

WATTS BAR NUCLEAR PLANT

APR 1, 2021 - JUN 30, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.001	0.000	0.230	0.000	0.000	0.000	0.000	0.000	0.000	0.231
NNE	0.000	0.000	0.000	0.046	0.000	0.000	0.000	0.000	0.000	0.046
NE	0.000	0.000	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.046
ENE	0.001	0.092	0.092	0.000	0.000	0.000	0.000	0.000	0.000	0.184
E	0.001	0.138	0.276	0.046	0.000	0.000	0.000	0.000	0.000	0.461
ESE	0.001	0.184	0.092	0.000	0.000	0.000	0.000	0.000	0.000	0.277
SE	0.001	0.138	0.046	0.046	0.000	0.000	0.000	0.000	0.000	0.230
SSE	0.001	0.138	0.138	0.000	0.000	0.000	0.000	0.000	0.000	0.277
S	0.002	0.322	0.276	0.000	0.000	0.000	0.000	0.000	0.000	0.599
SSW	0.004	0.551	0.735	0.046	0.000	0.046	0.000	0.000	0.000	1.383
SW	0.010	1.517	1.471	0.000	0.000	0.000	0.000	0.000	0.000	2.997
WSW	0.009	1.746	0.873	0.046	0.000	0.000	0.000	0.000	0.000	2.674
W	0.009	1.884	1.011	0.000	0.000	0.000	0.000	0.000	0.000	2.905
WNW	0.004	0.597	0.643	0.046	0.000	0.000	0.000	0.000	0.000	1.291
NW	0.002	0.414	0.230	0.000	0.000	0.000	0.000	0.000	0.000	0.645
NNW	0.001	0.138	0.138	0.138	0.000	0.000	0.000	0.000	0.000	0.414
SUBTOTAL	0.046	7.858	6.296	0.414	0.000	0.046	0.000	0.000	0.000	14.660

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2176
TOTAL HOURS OF STABILITY CLASS F	319
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS F	319
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2176
TOTAL HOURS CALM	1

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2021/07/23

MEAN WIND SPEED = 1.58

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

STABILITY CLASS G (DELTA T > 4.0 C/100 M)

WATTS BAR NUCLEAR PLANT

APR 1, 2021 - JUN 30, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NNE	0.000	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.046
NE	0.000	0.092	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.092
ENE	0.000	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.046
E	0.000	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.046
ESE	0.000	0.000	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.046
SE	0.000	0.046	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.092
SSE	0.000	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.046
S	0.001	0.230	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.230
SSW	0.002	0.781	0.092	0.000	0.000	0.000	0.000	0.000	0.000	0.876
SW	0.010	3.355	0.414	0.000	0.000	0.000	0.000	0.000	0.000	3.779
WSW	0.016	5.101	0.827	0.000	0.000	0.000	0.000	0.000	0.000	5.944
W	0.009	3.079	0.414	0.000	0.000	0.000	0.000	0.000	0.000	3.502
WNW	0.004	1.057	0.460	0.000	0.000	0.000	0.000	0.000	0.000	1.521
NW	0.002	0.276	0.414	0.000	0.000	0.000	0.000	0.000	0.000	0.691
NNW	0.000	0.138	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.138
SUBTOTAL	0.046	14.338	2.711	0.000	0.000	0.000	0.000	0.000	0.000	17.096

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2176
TOTAL HOURS OF STABILITY CLASS G	372
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS G	372
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2176
TOTAL HOURS CALM	1

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2021/07/23

MEAN WIND SPEED = 1.20

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

STABILITY CLASS A (DELTA T<=-1.9 C/100 M)

WATTS BAR NUCLEAR PLANT

OCT 1, 2021 - DEC 31, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.000	0.000	0.000	0.000	0.000	0.045	0.000	0.000	0.000	0.045
NNE	0.000	0.000	0.045	0.045	0.182	0.000	0.000	0.000	0.000	0.272
NE	0.000	0.000	0.000	0.000	0.045	0.000	0.000	0.000	0.000	0.045
ENE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
E	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ESE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SSE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
S	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SSW	0.000	0.000	0.045	0.000	0.182	0.227	0.000	0.000	0.000	0.454
SW	0.000	0.000	0.000	0.000	0.000	0.136	0.000	0.000	0.000	0.136
WSW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
W	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WNW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NNW	0.000	0.000	0.000	0.000	0.000	0.091	0.000	0.000	0.000	0.091
SUBTOTAL	0.000	0.000	0.091	0.045	0.409	0.500	0.000	0.000	0.000	1.045

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2202
TOTAL HOURS OF STABILITY CLASS A	23
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS A	23
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2202
TOTAL HOURS CALM	0

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2022/01/14

MEAN WIND SPEED = 7.28

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

Watts Bar Nuclear Power Plant
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JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

STABILITY CLASS B (-1.9< DELTA T<=-1.7 C/100 M)

WATTS BAR NUCLEAR PLANT

OCT 1, 2021 - DEC 31, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.000	0.000	0.000	0.091	0.182	0.000	0.000	0.000	0.000	0.272
NNE	0.000	0.000	0.000	0.182	0.091	0.091	0.000	0.000	0.000	0.363
NE	0.000	0.000	0.000	0.000	0.091	0.000	0.000	0.000	0.000	0.091
ENE	0.000	0.000	0.045	0.045	0.091	0.000	0.000	0.000	0.000	0.182
E	0.000	0.000	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.045
ESE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SSE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
S	0.000	0.000	0.000	0.045	0.045	0.045	0.000	0.000	0.000	0.136
SSW	0.000	0.000	0.000	0.182	0.545	0.227	0.000	0.000	0.000	0.954
SW	0.000	0.000	0.000	0.000	0.136	0.045	0.000	0.000	0.000	0.182
WSW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
W	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WNW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NNW	0.000	0.000	0.045	0.000	0.045	0.091	0.000	0.000	0.000	0.182
SUBTOTAL	0.000	0.000	0.136	0.545	1.226	0.500	0.000	0.000	0.000	2.407

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2202
TOTAL HOURS OF STABILITY CLASS B	53
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS B	53
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2202
TOTAL HOURS CALM	0

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2022/01/14

MEAN WIND SPEED = 6.38

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

Watts Bar Nuclear Power Plant
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Meteorological Data

JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

STABILITY CLASS C (-1.7< DELTA T<=-1.5 C/100 M)

WATTS BAR NUCLEAR PLANT

OCT 1, 2021 - DEC 31, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.000	0.000	0.091	0.136	0.182	0.091	0.000	0.000	0.000	0.500
NNE	0.000	0.000	0.000	0.136	0.182	0.136	0.000	0.000	0.000	0.454
NE	0.000	0.000	0.045	0.091	0.045	0.000	0.000	0.000	0.000	0.182
ENE	0.000	0.000	0.000	0.136	0.000	0.000	0.000	0.000	0.000	0.136
E	0.000	0.000	0.091	0.091	0.000	0.000	0.000	0.000	0.000	0.182
ESE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SE	0.000	0.000	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.045
SSE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
S	0.000	0.000	0.000	0.091	0.045	0.000	0.000	0.000	0.000	0.136
SSW	0.000	0.000	0.136	0.636	0.091	0.182	0.000	0.000	0.000	1.045
SW	0.000	0.000	0.045	0.363	0.045	0.045	0.000	0.000	0.000	0.500
WSW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
W	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WNW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NW	0.000	0.000	0.000	0.045	0.000	0.000	0.000	0.000	0.000	0.045
NNW	0.000	0.000	0.000	0.000	0.182	0.136	0.000	0.000	0.000	0.318
SUBTOTAL	0.000	0.000	0.454	1.726	0.772	0.590	0.000	0.000	0.000	3.542

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2202
TOTAL HOURS OF STABILITY CLASS C	78
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS C	78
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2202
TOTAL HOURS CALM	0

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2022/01/14

MEAN WIND SPEED = 5.36

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

Watts Bar Nuclear Power Plant
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JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

STABILITY CLASS D (-1.5< DELTA T<=-0.5 C/100 M)

WATTS BAR NUCLEAR PLANT

OCT 1, 2021 - DEC 31, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.000	0.000	0.636	0.545	1.272	1.453	0.000	0.000	0.000	3.906
NNE	0.000	0.000	0.863	0.817	0.363	0.091	0.000	0.000	0.000	2.134
NE	0.000	0.091	0.454	0.999	0.363	0.000	0.000	0.000	0.000	1.907
ENE	0.000	0.091	0.863	0.999	0.182	0.000	0.000	0.000	0.000	2.134
E	0.000	0.045	0.727	0.136	0.000	0.000	0.000	0.000	0.000	0.908
ESE	0.000	0.000	0.545	0.091	0.000	0.000	0.000	0.000	0.000	0.636
SE	0.000	0.045	0.409	0.045	0.045	0.000	0.000	0.000	0.000	0.545
SSE	0.000	0.091	0.590	0.136	0.000	0.000	0.000	0.000	0.000	0.817
S	0.000	0.091	0.772	0.772	0.318	0.182	0.000	0.000	0.000	2.134
SSW	0.000	0.091	1.953	3.224	1.544	1.045	0.000	0.000	0.000	7.856
SW	0.000	0.182	1.045	1.544	0.136	0.045	0.000	0.000	0.000	2.952
WSW	0.000	0.227	1.090	0.227	0.000	0.000	0.000	0.000	0.000	1.544
W	0.000	0.000	0.272	0.045	0.045	0.000	0.000	0.000	0.000	0.363
WNW	0.000	0.091	0.590	0.182	0.182	0.000	0.000	0.000	0.000	1.045
NW	0.000	0.000	0.454	0.363	0.454	0.272	0.045	0.000	0.000	1.589
NNW	0.000	0.000	0.454	0.182	0.636	1.090	0.000	0.000	0.000	2.361
SUBTOTAL	0.000	1.045	11.717	10.309	5.540	4.178	0.045	0.000	0.000	32.834

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2202
TOTAL HOURS OF STABILITY CLASS D	723
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS D	723
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2202
TOTAL HOURS CALM	0

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2022/01/14

MEAN WIND SPEED = 4.52

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

STABILITY CLASS E (-0.5< DELTA T<= 1.5 C/100 M)

WATTS BAR NUCLEAR PLANT

OCT 1, 2021 - DEC 31, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.000	0.045	0.500	0.363	0.227	0.136	0.000	0.000	0.000	1.272
NNE	0.000	0.045	0.500	0.272	0.000	0.000	0.000	0.000	0.000	0.817
NE	0.000	0.136	0.817	0.272	0.000	0.000	0.000	0.000	0.000	1.226
ENE	0.000	0.136	0.500	0.409	0.000	0.000	0.000	0.000	0.000	1.045
E	0.000	0.045	0.363	0.045	0.000	0.000	0.000	0.000	0.000	0.454
ESE	0.000	0.091	0.091	0.045	0.000	0.000	0.000	0.000	0.000	0.227
SE	0.000	0.136	0.091	0.045	0.000	0.000	0.000	0.000	0.000	0.272
SSE	0.000	0.409	0.590	0.000	0.000	0.000	0.000	0.000	0.000	0.999
S	0.000	0.363	1.090	0.272	0.045	0.000	0.000	0.000	0.000	1.771
SSW	0.000	0.500	2.271	1.726	1.272	0.727	0.000	0.000	0.000	6.494
SW	0.000	0.863	1.817	0.409	0.182	0.000	0.000	0.000	0.000	3.270
WSW	0.000	1.090	1.408	0.136	0.045	0.000	0.000	0.000	0.000	2.679
W	0.000	0.817	1.045	0.227	0.000	0.000	0.000	0.000	0.000	2.089
WNW	0.000	0.817	0.681	0.318	0.045	0.045	0.000	0.000	0.000	1.907
NW	0.000	0.636	0.363	0.363	0.091	0.045	0.000	0.000	0.000	1.499
NNW	0.000	0.227	0.545	0.363	0.681	0.136	0.000	0.000	0.000	1.953
SUBTOTAL	0.000	6.358	12.670	5.268	2.589	1.090	0.000	0.000	0.000	27.975

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2202
TOTAL HOURS OF STABILITY CLASS E	616
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS E	616
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2202
TOTAL HOURS CALM	0

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2022/01/14

MEAN WIND SPEED = 3.00

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
STABILITY CLASS F (1.5< DELTA T<= 4.0 C/100 M)

WATTS BAR NUCLEAR PLANT

OCT 1, 2021 - DEC 31, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.002	0.136	0.136	0.000	0.000	0.000	0.000	0.000	0.000	0.274
NNE	0.001	0.045	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.137
NE	0.001	0.091	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.183
ENE	0.002	0.045	0.363	0.045	0.000	0.000	0.000	0.000	0.000	0.457
E	0.001	0.000	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.091
ESE	0.001	0.091	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.137
SE	0.001	0.000	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.091
SSE	0.001	0.045	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.137
S	0.003	0.227	0.272	0.000	0.000	0.000	0.000	0.000	0.000	0.502
SSW	0.010	0.500	1.181	0.091	0.000	0.000	0.000	0.000	0.000	1.781
SW	0.009	0.863	0.636	0.045	0.000	0.000	0.000	0.000	0.000	1.553
WSW	0.014	1.680	0.636	0.000	0.000	0.000	0.000	0.000	0.000	2.330
W	0.017	2.225	0.590	0.000	0.000	0.000	0.000	0.000	0.000	2.832
WNW	0.018	2.634	0.500	0.000	0.000	0.000	0.000	0.000	0.000	3.152
NW	0.008	0.954	0.409	0.000	0.000	0.000	0.000	0.000	0.000	1.370
NNW	0.004	0.272	0.363	0.000	0.000	0.000	0.000	0.000	0.000	0.640
SUBTOTAL	0.091	9.809	5.586	0.182	0.000	0.000	0.000	0.000	0.000	15.668

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2202
TOTAL HOURS OF STABILITY CLASS F	345
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS F	345
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2202
TOTAL HOURS CALM	2

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2022/01/14

MEAN WIND SPEED = 1.44

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

STABILITY CLASS G (DELTA T > 4.0 C/100 M)

WATTS BAR NUCLEAR PLANT

OCT 1, 2021 - DEC 31, 2021

WIND DIRECTION	CALM	0.60-1.40	1.41-3.40	WIND SPEED (MPH)		7.41-12.40	12.41-18.40	18.41-24.40	>=24.41	TOTAL
				3.41-5.40	5.41-7.40					
N	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NNE	0.000	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.046
NE	0.002	0.136	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.183
ENE	0.002	0.045	0.136	0.000	0.000	0.000	0.000	0.000	0.000	0.183
E	0.001	0.045	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.137
ESE	0.001	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.092
SE	0.001	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.092
SSE	0.002	0.227	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.229
S	0.002	0.182	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.229
SSW	0.006	0.545	0.182	0.000	0.000	0.000	0.000	0.000	0.000	0.733
SW	0.020	1.953	0.454	0.000	0.000	0.000	0.000	0.000	0.000	2.427
WSW	0.032	3.043	0.817	0.000	0.000	0.000	0.000	0.000	0.000	3.892
W	0.031	3.179	0.545	0.000	0.000	0.000	0.000	0.000	0.000	3.755
WNW	0.023	2.316	0.454	0.000	0.000	0.000	0.000	0.000	0.000	2.793
NW	0.010	0.863	0.363	0.000	0.000	0.000	0.000	0.000	0.000	1.236
NNW	0.004	0.409	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.504
SUBTOTAL	0.136	13.170	3.224	0.000	0.000	0.000	0.000	0.000	0.000	16.530

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2202
TOTAL HOURS OF STABILITY CLASS G	364
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS G	364
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2202
TOTAL HOURS CALM	3

METEOROLOGICAL FACILITY: WATTS BAR NUCLEAR PLANT
STABILITY BASED ON DELTA-T BETWEEN 9.51 AND 45.63 METERS
WIND SPEED AND DIRECTION MEASURED AT 9.72 METER LEVEL

DATE PRINTED: 2022/01/14

MEAN WIND SPEED = 1.19

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS