



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

April 30, 2012

10 CFR 50.4
10 CFR 50.36a(a)(2)

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

Watts Bar Nuclear Plant, Unit 1
Facility Operating License No. NPF-90
NRC Docket No. 50-390

Subject: **2011 Annual Radioactive Effluent Release Report**

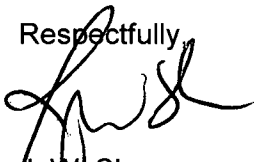
Provided in Enclosure 1 is the Watts Bar Nuclear Plant (WBN) 2011 Annual Radioactive Effluent Release Report (ARERR). This report includes a summary of the required effluent release data and fulfills the requirements of Technical Specification 5.9.3 for the January 1, 2011, through December 31, 2011 period for WBN. Sections 2 through 6 of Enclosure 1, titled "Supplemental Information," are provided in accordance with Regulatory Guide 1.21, Revision 1, Appendix B, Section A.

Attachment 1 to Enclosure 1 documents deviations which have occurred from Offsite Dose Calculation Manual (ODCM) requirements. Attachment 2 to Enclosure 1 provides information on radiation monitors inoperable for greater than 30 days. Attachment 3 to Enclosure 1 is Revision 23 of the ODCM, in effect as of February 12, 2010 and provided in accordance with Technical Specification 5.7.2.3.

Enclosure 2 addresses requirements of the Process Control Program (PCP) which are reported in conjunction with the ARERR in accordance with Section 2.4.D.2 of the PCP.

There are no regulatory commitments in this letter. Please direct any questions concerning this matter to Kara M. Stacy, Program Manager at (423) 751-3489.

Respectfully,



J. W. Shea
Manager, Corporate Nuclear Licensing

cc: See Page 2

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IE48
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Enclosures:

1. 2011 Annual Radioactive Effluent Release Report
2. Process Control Program Reporting Requirements

cc: (Enclosures):

NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Watts Bar Nuclear Plant, Unit 1
NRC Senior Resident Inspector - Watts Bar Nuclear Plant, Unit 2

Enclosure 1

Watts Bar Nuclear Plant

2011 Annual Radioactive Effluent Release Report

2011
WATTS BAR NUCLEAR PLANT
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1. Regulatory Limits

A. Gaseous Effluents

1. 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:
 - a. 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.
 - b. Iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days:
 - Less than or equal to 1500 mrem/year to any organ.
2. Air dose due to noble gases released in gaseous effluents to areas at and beyond the unrestricted area boundary shall be limited to the following:
 - a. 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.
 - b. 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.
3. Dose to a member of the public from iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than eight days in gaseous effluents released to areas at and beyond the unrestricted area boundary shall be limited to the following:
 - a. Less than or equal to 7.5 mrem to any organ during any calendar quarter.
 - b. Less than or equal to 15 mrem to any organ during any calendar year.

B. Liquid Effluents

1. The concentration of radioactivity released in liquid effluents to unrestricted areas shall be limited to 10 times the concentrations specified in Title 10 of the Code of Federal Regulations, 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 2.0 E-04 $\mu\text{Ci/ml}$ total activity.
2. The dose or dose commitment to a member of the public from radioactivity in liquid effluents released to unrestricted areas shall be limited to:
 - a. Less than or equal to 1.5 mrem to the total body and less than or equal to 5 mrem to any organ during any calendar quarter.
 - b. Less than or equal to 3 mrem to the total body and less than or equal to 10 mrem to any organ during any calendar year.

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2. Effluent Concentration Limits

A. Liquids

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.

B. Gaseous

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 1.A.1 of this report.

3. 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, "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.

4. Measurements and Approximations of Total Radioactivity

Radioactivity measurements performed in support of the WBN ODCM meet the Lower Limit of Detection requirements given in ODCM Tables 2.2-1 and 2.2-2.

A. Liquid Effluents

Batch (Radwaste and Condensate Demineralizer tanks)

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 concentration is used to determine the curies of tritium released from Condensate Demineralizer Tank.

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

During periods of no significant identified primary to secondary leakage, the volume released from the TBSS and SGB is obtained. The TBSS tritium concentration is determined via weekly grab samples. The feedwater tritium concentration is used to determine the curies of tritium released from SGB. The GWS is sampled monthly and analyzed for gross gamma and tritium on a monthly basis and for Sr-89 and Sr-90 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.

Monitoring Wells

WBN started conducting an investigation of tritium releases to the groundwater in 2003 due to identification of tritium in three of the four newly installed on-site monitoring wells associated with the December 2002 Department of Energy tritium production program site preparation activity. This study involved pressure testing of the radwaste discharge line, evaporation calculations of the Spent Fuel Pool (SFP) and Refueling Water Storage Tank (RWST), installation and sampling of groundwater wells, inspection of drain lines, boroscopic investigation of the SFP, and Fuel Transfer Canal leak collection system channels and drains.

In addition to the six (6) Radiological Environmental Monitoring Program (REMP) on-site groundwater monitoring wells, WBN also has 19 non-REMP monitoring wells to support monitoring the onsite groundwater plume for the presence or increase of radioactivity. WBN contracted with ARCADIS in 2004 to perform an investigation of the impact tritium had on groundwater and to perform a site characterization, area of impact, preliminary human health and ecological risk screening and to prepare an updated site conceptual model. Although this update was previously identified for completion in 2011, it is now anticipated that the evaluations will be completed in 2012.

The on-site monitoring wells are sampled semi-annually for gamma and tritium. These wells continue to exhibit a downward trend. The tritium concentrations obtained in 2011 from these monitoring wells are listed below. The well K sample was also analyzed for Sr-89, Sr-90, Fe-55, and Ni-63, with no detectable results.

Well ID	05/04/2011 Activity pCi/L	11/09/2011 Activity pCi/L
B	dry	1976
C	<280	343
F	1900	1358
H	1770	1026
I	<280	<280
J	<280	959
K	9885	13363
L	7587	3305
R	2,388	2208

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Doses from I-131 Water Ingestion Pathway

The radiological environmental monitoring program (REMP) specified in Table 3.12-1 from NUREG 1301, "Offsite Dose 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 calculated. The results reported confirm that the drinking water pathway dose from I-131 was only a small fraction of the 1 mrem limit and that the performance of the I-131 specific analysis is not required for WBN REMP drinking water samples.

Quarter	1	2	3	4	Totals
I-131 Ci	2.76E-6	0.00E+00	0.00E+00	0.00E+00	2.76E-06
Child/Thyroid (mrem)	1.40E-06	0.00E+00	0.00E+00	0.00E+00	1.40E-06
Population/Thyroid (mrem)	9.2E-06	0.00E+00	0.00E+00	0.00E+00	9.2E-06

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B. 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 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 exhaust due to purging of containment is determined by using the purge monitor response in combination with containment air samples obtained prior to 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 dose equivalent I-131 (DEI) concentration in the primary coolant or if the noble gas activity monitor shows that the containment activity has increased more than a factor of three.

The quantity of noble gases released through the Shield Building exhaust due to the batch release of waste gas decay tanks is determined by sampling each tank prior to release. The total activity released is determined from the total pressure change recorded for the tank 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 exhaust and auxiliary building exhausts and from the Condenser Vacuum Exhaust 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, when a primary to secondary leak exists, particulate and charcoal samples are taken from the Shield Building Exhausts, Auxiliary Building Exhaust, and Condenser Vacuum Exhaust once per 24 hours for 7 days following startup, shutdown, or a rated thermal power change exceeding 15 percent within one hour if DEI 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 that 10.6 curies of Carbon-14 is generated annually at WBN. 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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5. Batch Releases

	Value		Units
	1st Half	2nd Half	
A. Liquid (Radwaste only)			
1. Number of releases	59	63	Each
2. Total time period of releases	7,007	8,011	Minutes
3. Maximum time period of release	236	195	Minutes
4. Average time period of releases	119	127	Minutes
5. Minimum time period for release	60	72	Minutes
6. Average dilution stream flow during release periods	32,103	32,103	CFS
B. Gaseous (Batches only - containment purges, and waste gas decay tanks)			
1. Number of releases	33	9	Each
2. Total time period of releases	4,731	30,823	Minutes
3. Maximum time period for release	849	7,803	Minutes
4. Average time period for releases	143	3,425	Minutes
5. Minimum time period for release	31	4	Minutes

6. Abnormal Releases

	Value		Units
	1st Half	2nd Half	
A. Liquid			
Number of Releases	0	0	Ci
Total Activity Released	0.00E+00	0.00E+00	
B. Gaseous			
Number of Releases	0	1	Ci
Total Activity Released	0.00E+00	2.20E-03*	

*PORV's Release

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ABNORMAL RELEASES

Release Type: Gaseous (Steam)

Release Point: Unit 1 PORV's

Date(s) of Release: 10/08/2011 0804 through 10/16/2011 0412

This evaluation is for the release to the environment that occurred from the Unit 1 PORV's following a reactor trip on October 08, 2011 to support #11 bearing maintenance. Following the reactor trip, the Steam Generator PORVs were open for periods of time during the following 8 days. The following is data used to determine the curies and dose impacts as a result 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.
- During Cycle 11, there have been no gamma emitting radionuclides identified in any Secondary Coolant samples.
- The feedwater tritium results obtained on 10/03/2011 indicated a tritium concentration of $4.08\text{E-}06$ $\mu\text{Ci/ml}$. This tritium concentration is assumed to have been the initial concentration in all four steam generators with no additional tritium introduced into the generators during the release period. All of the tritium initially present in the generators was released through the PORVs during the event.

The volume of each steam generator was taken from Chemistry Manual Chapter 5.01. The listed normal water level value of 4750 ft^3 was used as a conservative value. This calculation 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:

$$4750\text{ ft}^3/\text{generator} * 2.832\text{E}+04\text{ ml/ft}^3 * 4\text{ generators} = 5.38\text{E}+08\text{ ml}$$

$$4.08\text{E-}06\text{ }\mu\text{Ci/ml} * 5.380\text{E}+08\text{ ml} = 2.20\text{E}+03\text{ }\mu\text{Ci of H-3 or }2.20\text{E-}03\text{ Ci of H-3}$$

The activity of $2.20\text{E-}03$ curies was added to the 4th Quarter Table 4-A, "Curies Released in Gaseous Ground Level Releases," and the 4th Quarter doses in Table 6-B, "Doses from Airborne Effluents."

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TABLE 1-A
Liquid Effluents - Summation of All Releases
During the period
Starting: 1-Jan-2011 Ending: 30-Jun-2011

Type Of Effluent	Units	Quarter 1	Quarter 2	Est. Tot Error %
A. Fission & Activation Products				
1. Total Release (Not Including Tritium, Gases, Alpha)	Ci	1.32E-02	2.38E-01	25%
2. Average Diluted Concentration During Period	μCi/ml	9.03E-08	4.36E-08	
3. Percent Of Applicable Limit	%	*	*	
B. Tritium				
1. Total Release	Ci	4.04E+02	1.40E+02	18%
2. Average Diluted Concentration During Period	μCi/ml	2.76E-03	2.56E-05	
3. Percent Of Applicable Limit	%	*	*	
C. Dissolved And Entrained Gases				
1. Total Release	Ci	1.50E-02	1.45E-04	39%
2. Average Diluted Concentration During Period	μCi/ml	1.03E-07	2.65E-11	
3. Percent Of Applicable Limit	%	5.13E-02	1.33E-05	
D. Gross Alpha Radioactivity				
1. Total Release	Curies	0.000E+00**	0.000E+00	N/A**
E. Total Waste Volume Released (Pre-Dilution)				
	Liters	1.52E+08	1.87E+08	2%
F. Volume Of Dilution Water Used				
	Liters	5.48E+08	5.46E+09	12%
G. Radwaste Volume Released				
	Liters	1.16E+06	1.62E+06	12%

Zeroes in this table indicate that no radioactivity was present at detectable levels.

* Applicable limits are expressed in terms of dose. See Table 7A of this report.

** N/A - Errors in measurements are not reported for these values since none were identified during the reporting period.

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TABLE 1-B

Liquid Effluents - Summation of All Releases
During the period
Starting: 1-Jul-2011 Ending: 31-Dec-2011

Type Of Effluent	Units	Quarter 3	Quarter 4	Est. Tot Error %
A. Fission & Activation Products				
1. Total Release (Not Including Tritium, Gases, Alpha)	Ci	8.24E-03	8.04E-03	25%
2. Average Diluted Concentration During Period	µCi/ml	4.34E-10	8.66E-10	
3. Percent Of Applicable Limit	%	*	*	
B. Tritium				
1. Total Release	Ci	3.94E+01	2.40E+02	18%
2. Average Diluted Concentration During Period	µCi/ml	2.07E-06	2.59E-05	
3. Percent Of Applicable Limit	%	*	*	
C. Dissolved And Entrained Gases				
1. Total Release	Ci	1.36E-04	3.40E-04	39%
2. Average Diluted Concentration During Period	µCi/ml	7.16E-12	3.66E-11	
3. Percent Of Applicable Limit	%	3.58E-06	1.83E-05	
D. Gross Alpha Radioactivity				
1. Total Release	Ci	0.00E+00**	0.00E+00	N/A**
E. Total Waste Volume Released (Pre-Dilution)				
	Liters	2.88E+08	2.70E+08	2%
F. Volume Of Dilution Water Used				
	Liters	1.90E+10	9.28E+09	12%
G. Radwaste Volume Released				
	Liters	1.32E+06	1.44E+06	12%

Zeroes in this table indicate that no radioactivity was present at detectable levels.

* Applicable limits are expressed in terms of dose. See Table 7A of this report.

** N/A - Errors in measurements are not reported for these values since none were identified during the reporting period.

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TABLE 2-A

Curies Released in Liquid Effluents
During the period
Starting: 1-Jan-2011 Ending: 31-Mar-2011

	CONTINUOUS	BATCH	TOTAL
H-3	8.97E-02	4.03E+02	4.04E+02
FISSION & ACTIVATION PRODUCTS			
CO-57	0.00E+00	2.61E-06	2.61E-06
CO-58	0.00E+00	1.03E-02	1.03E-02
CO-60	0.00E+00	9.01E-04	9.01E-04
FE-55	0.00E+00	1.07E-03	1.07E-03
MN-54	0.00E+00	1.63E-04	1.63E-04
CS-137	0.00E+00	1.37E-05	1.37E-05
SB-125	0.00E+00	3.78E-04	3.78E-04
I-131	0.00E+00	2.76E-06	2.76E-06
CR-51	0.00E+00	2.94E-04	2.94E-04
NB-95	0.00E+00	3.23E-05	3.23E-05
TOTALS	0.00E+00	1.32E-02	1.32E-02
DISSOLVED AND ENTRAINED GASES			
XE-133	0.00E+00	1.49E-02	1.49E-02
XE-133M	0.00E+00	2.13E-04	2.13E-04
XE-135	0.00E+00	3.27E-04	3.27E-04
TOTALS	0.00E+00	1.50E-02	1.50E-02

* Zeroes in this table indicate that no radioactivity was present at detectable levels.

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TABLE 2-B

Curies Released in Liquid Effluents
During the period
Starting: 1-Apr-2011 Ending: 30-Jun-2011

	CONTINUOUS	BATCH	TOTAL
H-3	1.27E-01	1.40E+02	1.40E+02
FISSION & ACTIVATION PRODUCTS			
CO-57	0.00E+00	5.50E-04	5.50E-04
CO-58	0.00E+00	2.28E-01	2.28E-01
CO-60	0.00E+00	4.03E-03	4.03E-03
FE-55	0.00E+00	1.72E-03	1.72E-03
MN-54	0.00E+00	6.95E-05	6.95E-05
FE-59	0.00E+00	5.46E-05	5.46E-05
SB-124	0.00E+00	5.13E-04	5.13E-04
SB-125	0.00E+00	9.65E-04	9.65E-04
CR-51	0.00E+00	1.61E-03	1.61E-03
NB-95	0.00E+00	1.44E-05	1.44E-05
ZN-65	0.00E+00	3.36E-04	3.36E-04
MO-99	0.00E+00	7.93E-06	7.93E-06
TC-99	0.00E+00	7.93E-06	7.93E-06
TOTALS	0.00E+00	2.38E-01	2.38E-01
DISSOLVED AND ENTRAINED GASES			
XE-133	0.00E+00	1.16E-04	1.16E-04
XE-135	0.00E+00	2.88E-05	2.88E-05
KR-85	0.00E+00	2.88E-05	2.88E-05
TOTALS	0.00E+00	1.45E-04	1.45E-04

*Zeroes in this table indicate that no radioactivity was present at detectable levels.

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TABLE 2-C

Curies Released in Liquid Effluents
During the period
Starting: 1-Jul-2011 Ending: 30-Sep-2011

	CONTINUOUS	BATCH	TOTAL
H-3	2.52E-01	3.91E+01	3.94E+01
FISSION & ACTIVATION PRODUCTS			
AG-110M	0.00E+00	8.25E-06	8.25E-06
CO-57	0.00E+00	2.00E-06	2.00E-06
CO-58	0.00E+00	1.36E-03	1.36E-03
CO-60	0.00E+00	2.19E-04	2.19E-04
CR-51	0.00E+00	4.42E-05	4.42E-05
CS-137	0.00E+00	1.18E-05	1.18E-05
FE-55	0.00E+00	2.17E-03	2.17E-03
MN-54	0.00E+00	1.63E-05	1.63E-05
SB-124	0.00E+00	2.07E-05	2.07E-05
SB-125	0.00E+00	2.27E-04	2.27E-04
SR-89	0.00E+00	4.17E-05	4.17E-05
TOTALS	0.00E+00	8.24E-03	8.24E-03
DISSOLVED AND ENTRAINED GASES			
XE-133	0.00E+00	1.36E-04	1.36E-04
XE-135	0.00E+00	5.40E-07	5.40E-07
TOTALS	0.00E+00	1.36E-04	1.36E-04

*Zeroes in this table indicate that no radioactivity was present at detectable levels.

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TABLE 2-D

Curies Released in Liquid Effluents
During the period
Starting: 1-Oct-2011 Ending: 31-Dec-2011

	CONTINUOUS	BATCH	TOTAL
H-3	2.47E-01	2.40E+02	2.40E+02
FISSION & ACTIVATION PRODUCTS			
CO-57	0.00E+00	4.63E-06	4.63E-06
CO-58	0.00E+00	8.27E-04	8.27E-04
CO-60	0.00E+00	2.09E-04	2.09E-04
FE-55	0.00E+00	6.89E-03	6.89E-03
MN-54	0.00E+00	1.32E-05	1.32E-05
MO-99	0.00E+00	3.74E-07	3.74E-07
NB-95	0.00E+00	1.29E-06	1.29E-06
SB-125	0.00E+00	3.99E-05	3.99E-05
TC-99M	0.00E+00	3.74E-07	3.74E-07
SR-89	0.00E+00	5.84E-05	5.84E-05
TOTALS	0.00E+00	8.04E-03	8.04E-03
DISSOLVED AND ENTRAINED GASES			
XE-133	0.00E+00	3.40E-04	3.40E-04

* Zeroes in this table indicate that no radioactivity was present at detectable levels.

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TABLE 3-A

Gaseous Effluents - Summation of All Releases
During the period
Starting: 1-Jan-2011 Ending: 30-Jun-2011

Type Of Effluent	Units	Quarter 1	Quarter 2	Est. Tot Error %
A. Fission & Activation Products				
1. Total Release	Ci	8.62E-01	2.96E-01	22
2. Average Release Rate For Period	μCi/sec	1.50E-02	2.70E-02	
3. Percent Of Applicable Limit	%	*	*	
B. Radioiodines				
1. Total Iodine-131	Ci	1.68E-05	4.53E-05	N/A**
2. Average Release Rate For Period	μCi/sec	1.02E-06	5.10E-06	
3. Percent Of Applicable Limit	%	*	*	
C. Particulates				
1. Particulates (Half-Lives>8 Days)	Ci	0.000E+00	1.19E-03	15
2. Average Release Rate For Period	μCi/sec	0.000E+00	1.09E-04	
			0.000E+00	
3. Percent Of Applicable Limit	%	*	*	
4. Gross Alpha Radioactivity	Ci	0.000E+00	0.000E+00	N/A**
D. Tritium				
1. Total Release	Ci	4.70E+00	1.04E+01	11
2. Average Release Rate For Period	μCi/sec	2.84E-01	1.30E+00	
3. Percent Of Applicable Limit	%	*	*	
E. Carbon-14				
1. Total Release	Ci	2.63E+00	1.10E+00	N/A
2. Average Release Rate For Period	μCi/sec	9.14E-03	2.00E-02	
3. Percent Of Applicable Limit	%	*	*	

Zeroes in this table indicate that no radioactivity was present at detectable levels.

* Applicable limits are expressed in terms of dose. See Table 6A of this report.

** N/A - Errors in measurements are not reported for these values since none were identified during the reporting period.

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TABLE 3-B

Gaseous Effluents - Summation of All Releases
During the period
Starting: 1-Jul-2011 Ending: 31-Dec-2011

Type Of Effluent	Units	Quarter 3	Quarter 4	Est. Tot Error %
A. Fission & Activation Products				
1. Total Release	Ci	2.13E+00	2.29E+00	22
2. Average Release Rate For Period	μCi/sec	2.68E-01	2.88E-01	
3. Percent Of Applicable Limit	%	*	*	
B. Radioiodines				
1. Total Iodine-131	Ci	0.000E+00	0.000E+00	N/A
2. Average Release Rate For Period	μCi/sec	0.000E+00	0.000E+00	
3. Percent Of Applicable Limit	%	*	*	
C. Particulates				
1. Particulates (Half-Lives>8 Days)	Ci	0.000E+00	0.000E+00	15
2. Average Release Rate For Period	μCi/sec	0.000E+00	0.000E+00	
3. Percent Of Applicable Limit	%	*	*	
4. Gross Alpha Radioactivity	Ci	0.000E+00	0.000E+00	**N/A
D. Tritium				
1. Total Release	Ci	1.96E+01	3.23E+01	11
2. Average Release Rate For Period	μCi/sec	2.46E+00	4.07E+00	
3. Percent Of Applicable Limit	%	*	*	
E. Carbon-14				
1. Total Release	Ci	2.75E+00	2.52E+00	N/A
2. Average Release Rate For Period	μCi/sec	6.93E-02	2.50E-01	
3. Percent Of Applicable Limit	%	*	*	

Zeroes in this table indicate that no radioactivity was present at detectable levels.

* Applicable limits are expressed in terms of dose. See Table 6A of this report.

** N/A - Errors in measurements are not reported for these values since none were identified during the reporting period.

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TABLE 4-A

Curies released in Gaseous Ground Level Releases
During the period
Starting: 1-Jan-2011 Ending: 31-Mar-2011

	CONTINUOUS	BATCH	TOTAL
FISSION GASES			
AR-41	0.00E+00	1.63E-01	1.63E-01
XE-131M	0.00E+00	6.13E-01	6.13E-01
XE-133	0.00E+00	8.26E-02	8.26E-02
XE-135	0.00E+00	2.93E-03	2.93E-03
TOTALS	0.00E+00	8.62E-01	8.62E-01
IODINES			
I-131	1.48E-05	0.00E+00	1.48E-05
I-133	2.02E-06	0.00E+00	2.02E-06
TOTALS	1.68E-05	0.00E+00	1.68E-05
PARTICULATES	0.00E+00	0.00E+00	0.00E+00
H-3	4.70E+00	0.00E+00	4.70E+00
C-14 (Total)	2.63E+00	0.00E+00	2.63E+00
C-14 (CO2 Form)	5.251E-01	0.00E+00	5.25E-01

* Zeroes in this table indicate that no radioactivity was present at detectable levels.

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TABLE 4-B

Curies released in Gaseous Ground Level Releases
During the period
Starting: 1-Apr-2011 Ending: 30-Jun-2011

	CONTINUOUS	BATCH	TOTAL
FISSION GASES			
AR-41	0.00E+00	1.66E-01	1.66E-01
KR-85	0.00E+00	4.59E-07	4.59E-07
XE-131M	0.00E+00	4.80E-04	4.80E-04
XE-133	0.00E+00	1.25E-01	1.25E-01
XE-133M	0.00E+00	4.88E-05	4.88E-05
XE-135	0.00E+00	4.43E-03	4.43E-03
TOTALS	0.00E+00	8.62E-01	2.96E-01
IODINES			
I-131	3.90E-05	0.00E+00	3.90E-05
I-133	6.26E-06	0.00E+00	6.26E-06
TOTALS	1.68E-05	0.00E+00	4.53E-05
PARTICULATES			
CO-58	1.18E-03	0.00E+00	1.18E-03
CO-60	1.16E-05	0.00E+00	1.16E-05
MN-54	3.39E-06	0.00E+00	3.39E-06
TOTALS	1.68E-05	0.00E+00	1.19E-03
H-3	1.04E+01	0.00E+00	1.04E+01
C-14 (Total)	1.10E+00	0.00E+00	1.10E+00
C-14 (CO2 Form)	2.19E-01	0.00E+00	2.19E-01

* Zeroes in this table indicate that no radioactivity was present at detectable levels.

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TABLE 4-C

Curies released in Gaseous Ground Level Releases
During the period
Starting: 1-Jul-2011 Ending: 30-Sep-2011

	CONTINUOUS	BATCH	TOTALS
FISSION GASES			
KR-85	0.00E+00	2.30E-07	2.30E-07
XE-133	0.00E+00	2.26E-01	2.26E-01
AR-41	0.00E+00	1.91E+00	1.91E+00
TOTALS	0.00E+00	2.13E+00	2.13E+00
IODINES	0.00E+00	0.00E+00	0.00E+00
PARTICULATES			
BR-82	5.08E-07	0.00E+00	5.08E-07
 H-3	 1.96E+01	 0.00E+00	 1.96E+01
C-14 (Total)	2.75E+00	0.00E+00	2.75E+00
C-14 (CO2 Form)	5.51E-01	0.00E+00	5.51E-01

* Zeroes in this table indicate that no radioactivity was present at detectable levels.

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TABLE 4-D

Curies released in Gaseous Ground Level Releases
During the period
Starting: 1-Oct-2011 Ending: 31-Dec-2011

	CONTINUOUS	BATCH	TOTALS
FISSION GASES			
KR-85	0.00E+00	4.59E-07	4.59E-07
XE-135	0.00E+00	2.02E-02	2.02E-02
XE-133	0.00E+00	3.43E-01	3.43E-01
AR-41	0.00E+00	1.93E+00	1.93E+00
TOTALS	0.00E+00	2.29E+00	2.29E+00
IODINES	0.00E+00	0.00E+00	0.00E+00
PARTICULATES	0.00E+00	0.00E+00	0.00E+00
H-3	3.23E+01	0.00E+00	3.23E+01
C-14 (Total)	2.52E+00	0.00E+00	2.52E+00
C-14 (CO2 Form)	5.03E-01	0.00E+00	5.03E-01

* Zeroes in this table indicate that no radioactivity was present at detectable levels.

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TABLE 5-A
SOLID WASTE (RADIOACTIVE SHIPMENTS)

A. Solid Waste Shipped Offsite for Burial or Disposal (not Irradiated Fuel)

1. <u>Type of Waste</u>	<u>Unit</u>	<u>12 Month Period</u>	<u>Est. (Ci) Error %</u>
a. Spent resins, filters, sludges, evaporator bottoms, etc.	m ³ Ci	11.7 23.8	N/A +/-25%
b. Dry Active Waste, Compressible Waste Contaminated Equipment, etc.	m ³ Ci	84.11 0.171	N/A +/-25%
c. Irradiated Components, Control Rods, etc.	m ³ Ci	27.9 20.1	N/A N/A

2. Estimate of Major Nuclide Composition (by type of waste)
(Percent Cutoff = 1.0 percent)

	<u>Percent</u>	<u>Ci</u>
a. Spent resins, filter sludges, evaporator bottoms, etc. (nuclides determined by measurement)		
H-3	5.69	1.35E+00
Cr-51	1.47	3.50E-01
Mn-54	1.76	4.19E-01
Fe-55	13.09	3.11E+00
Co-58	22.96	5.46E+00
Co-60	11.03	2.62E+00
Ni-63	35.61	8.47E+00
Sb-125	5.13	1.22E+00
Cs-137	1.92	4.57E-01

b. Dry active waste, compressible waste, contaminated equipment, etc. (nuclides determined by estimate)

	<u>Percent</u>	<u>Ci</u>
Mn-54	2.75	4.69E-03
Fe-55	5.38	9.18E-02
Co-58	6.19	1.06E-02
Co-60	27.03	4.61E-01
Ni-63	6.78	1.16E-02
Sb-125	1.34	2.29E-03

c. Irradiated Components	None	N/A	N/A
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TABLE 5-B
SOLID WASTE (RADIOACTIVE SHIPMENTS)

3. Solid Waste Disposition

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
20	Hittman Transport	Energy Solutions Facility - Clive, UT

4. Irradiated Fuel Shipments (Disposition)

<u>Number of Shipments</u>	<u>Type</u>	<u>Quantity</u>	<u>Mode of Transportation</u>	<u>Destination</u>
None		N/A	N/A	N/A

5. Solidification of Waste

Was solidification performed? No

If yes, solidification media: N/A

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Radiological Impact

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 riverflow data measured during the period. In this report, the doses resulting from releases are described and compared to limits established for WBN.

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.

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 6A, 6B, 7A, and 7B.

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 on pages E1-32 through E1-59.

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Radiological Impact

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, only those pathways that exist for each receptor are considered in the sum. 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. It is assumed that the dose to an individual organ is equal to the total body dose.

Doses from airborne effluents are presented in Tables 6A and 6B.

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).

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Radiological Impact

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 7A and 7B, along with the average river flows past the plant site for the periods.

Population Doses

Population doses for highest exposed organ due to airborne effluents are calculated for an estimated 1,066,600 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.

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 are presented in Tables 6A, 6B, 7A and 7B.

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Radiological Impact

Direct Radiation

External gamma radiation levels were measured by Landauer InLight environmental dosimeters deployed around WBN as part of the offsite Environmental Radiological Monitoring Program. The quarterly gamma radiation levels determined from these dosimeters during this reporting period averaged 18.0 mR/quarter at onsite (at or near the site boundary) stations and 16.50 mR/quarter at offsite stations or 1.50 mR/quarter higher onsite than at offsite stations. This difference is consistent with levels measured for preoperation 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.

Dose To A Member Of The Public Inside The Unrestricted Area 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 quarterly dosimeter measurements indicated that the highest annual dosimeter reading outside Radiological Control Areas was 85 mrem. Using this value, subtracting an annual background value of approximately 72.0 mrem/year (see previous section), 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 2.96 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.

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 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 8.

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TABLE 6-A
Doses from Airborne Effluents

First Quarter

Individual Doses

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
External				
Gamma Air	4.01E-04 mrad	5 mrad	< 1%	E/1280 meters
Beta Air	3.68E-04 mrad	10 mrad	< 1%	ENE/1370 meters
Submersion				
Total Body	1.95E-04 mrem	N/A	N/A	SE/1372 meters
Skin	3.41E-04 mrem	N/A	N/A	SE/1372 meters
Organ Doses¹				
(Max) Child/Bone	5.05E-01 mrem	7.5 mrem	6.73%	SE/1372 meters
Child/Thyroid	1.05E-01 mrem	7.5 mrem	1.4%	SE/1372 meters
Child/Total Body	1.05E-01 mrem	7.5 mrem	1.4%	SE/1372 meters

Population Doses

Total Body Dose 1.49E-01 man-rem
Maximum Organ Dose (organ) 6.93E-01 man-rem (bone)

Second Quarter

Individual Doses

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
External				
Gamma Air	6.59E-04 mrad	5 mrad	< 1%	E/1280 meters
Beta Air	2.99E-04 mrad	10 mrad	< 1%	E/1280 meters
Submersion				
Total Body	6.39E-04 mrem	N/A	N/A	SE/1372 meters
Skin	8.66E-04 mrem	N/A	N/A	SE/1372 meters
Organ Doses¹				
(Max) Child/Bone	4.11E-01 mrem	7.5 mrem	5.48%	SE/1372 meters
Child/Thyroid	1.00E-01 mrem	7.5 mrem	1.33%	SE/1372 meters
Child/Total Body	1.00E-01 mrem	7.5 mrem	1.33%	SE/1372 meters

Population Doses

Total Body Dose 1.19E-01 man-rem
Maximum Organ Dose (organ) 4.35E-01 man-rem (bone)

Population doses can be compared to the natural background dose for the entire 50-mile population of about 150,000 man-rem/year (based on 140 mrem/yr for natural background).

¹Organ Doses include contributions from Carbon-14 as carbon dioxide

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TABLE 6-B
Doses from Airborne Effluents

Third Quarter

Individual Doses

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
External				
Gamma Air	7.97E-03 mrad	5 mrad	< 1%	ESE/1250 meters
Beta Air	2.93E-03 mrad	10 mrad	< 1%	ESE/1250 meters
Submersion				
Total Body	4.68E-03 mrem	N/A	N/A	SE/1372 meters
Skin	6.91E-03 mrem	N/A	N/A	SE/1372 meters
Organ Doses¹				
(Max) Child/Bone	1.18E+00 mrem	7.5 mrem	15.73%	SE/1372 meters
Child/Thyroid	2.77E-01 mrem	7.5 mrem	3.96%	SE/1372 meters
Child/Total Body	2.77E-01 mrem	7.5 mrem	3.96%	SE/1372 meters

Population Doses

Total Body Dose 2.36E-01 man-rem
Maximum Organ Dose (organ) 9.21E-01 man-rem (bone)

Fourth Quarter

Individual Doses

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
External				
Gamma Air	1.13E-02 mrad	5 mrad	< 1%	ESE/1250 meters
Beta Air	4.28E-03 mrad	10 mrad	< 1%	ESE/1250 meters
Submersion				
Total Body	4.90E-03 mrem	N/A	N/A	SE/1372 meters
Skin	7.26E-03 mrem	N/A	N/A	SE/1372 meters
Organ Doses¹				
Child/Bone	1.24E+00 mrem	7.5 mrem	16.5%	SE/1372 meters
Child/Thyroid	3.18E-01 mrem	7.5 mrem	4.24%	SE/1372 meters
Child/Total Body	3.18E-01 mrem	7.5 mrem	4.24%	SE/1372 meters

Population Doses

Total Body Dose 2.82E-01 man-rem
Maximum Organ Dose (organ) 9.51E-01 man-rem (bone)

Population doses can be compared to the natural background dose for the entire 50-mile population of about 150,000 man-rem/year (based on 140 mrem/yr for natural background).

¹Organ Doses include contributions from Carbon-14 as carbon dioxide

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TABLE 7-A
Doses from Liquid Effluents

First Quarter

Individual Doses (mrem)

Age Group	Organ	Dose	Quarterly Limit	Percent of Limit
Child	Total Body	1.50E-03	1.5 mrem	< 1 %
Child	Bone	1.50E-03	5 mrem	< 1 %
Child	Thyroid	1.50E-03	5 mrem	< 1 %

Average Riverflow past WBN (cubic feet per second): 37,740

Population Doses

Total Body Dose 9.02E-02 man-rem
Maximum Organ Dose (organ) 9.02E-02 man-rem (bone)

Second Quarter

Individual Doses (mrem)

Age Group	Organ	Dose	Quarterly Limit	Percent of Limit
Child	Total Body	1.90E-03	1.5 mrem	< 1 %
Adult	GIT	3.30E-3	5 mrem	< 1 %
Child	Thyroid	1.10E-03	5 mrem	< 1 %

Average Riverflow past WBN (cubic feet per second): 26,465

Population Doses

Total Body Dose 5.2E-02 man-rem
Maximum Organ Dose (organ) 5.9E-02 man-rem (GIT)

Population doses can be compared to the natural background dose for the entire 50-mile population of about 150,000 man-rem/year (based on 140 mrem/yr for natural background).

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TABLE 7-B
Doses from Liquid Effluents

Third Quarter

Individual Doses (mrem)

Age Group	Organ	Dose	Quarterly Limit	Percent of Limit
Child	Total Body	3.04E-04	1.5 mrem	< 1 %
Child	Bone	3.04E-04	5 mrem	< 1 %
Child	Thyroid	2.90E-04	5 mrem	< 1 %

Average Riverflow past WBN (cubic feet per second): 20,479

Population Doses

Total Body Dose 1.7E-02 man-rem
Maximum Organ Dose (organ) 1.7E-02 man-rem (bone)

Fourth Quarter

Individual Doses (mrem)

Age Group	Organ	Dose	Quarterly Limit	Percent of Limit
Child	Total Body	7.80E-04	1.5 mrem	< 1 %
Child	Bone	8.10E-04	5 mrem	< 1 %
Child	Thyroid	7.80E-04	5 mrem	< 1 %

Average Riverflow past WBN (cubic feet per second): 39,777

Population Doses

Total Body Dose 5.1E-02 man-rem
Maximum Organ Dose (organ) 5.1E-02 man-rem (bone)

Population doses can be compared to the natural background dose for the entire 50-mile population of about 150,000 man-rem/year (based on 140 mrem/yr for natural background).

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TABLE 8
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)	1.95E-04	6.39E-04	4.68E-03	4.90E-03	
Critical organ dose (airborne)	5.05E-01	4.11E-01	1.18E+00	1.24E+00	
Total body dose (liquid)	1.50E-03	1.90E-03	3.04E-04	7.80E-04	
Maximum organ dose (liquid)	1.50E-03	3.30E-03	3.04E-04	8.10E-04	
Direct Radiation Dose	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Total	5.08E-01	4.17E-01	1.19E+00	1.25E+00	
Cumulative Total Dose (mrem)					3.36E+00
Annual Dose Limit (mrem)					25
Percent of Limit					13.43%
Thyroid					
Total body air (submersion)	1.95E-04	6.39E-04	4.68E-03	4.90E-03	
Thyroid dose (airborne)	1.05E-01	1.00E-01	2.77E-01	3.18E-01	
Total body dose (liquid)	1.50E-03	1.90E-03	3.04E-04	7.80E-04	
Thyroid dose (liquid)	1.50E-03	1.10E-03	2.90E-04	7.80E-04	
Total	1.08E-01	1.04E-01	2.82E-01	3.24E-01	
Cumulative Total Dose (mrem)					8.19E-01
Annual Dose Limit (mrem)					75
Percent of Limit					1.09%

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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

JAN 1, 2011 - MAR 31, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.000	0.000	0.093	0.326	0.186	0.000	0.000	0.000	0.605
NNE	0.000	0.000	0.000	0.000	0.047	0.093	0.000	0.000	0.000	0.140
NE	0.000	0.000	0.000	0.000	0.000	0.047	0.000	0.000	0.000	0.047
ENE	0.000	0.000	0.000	0.000	0.047	0.000	0.000	0.000	0.000	0.047
E	0.000	0.047	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.047
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	0.419	0.000	0.000	0.000	0.419
SSW	0.000	0.000	0.000	0.000	0.698	0.838	0.000	0.000	0.000	1.536
SW	0.000	0.000	0.000	0.093	0.372	0.186	0.000	0.000	0.000	0.651
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	0.233	0.047	0.000	0.000	0.000	0.279
WNW	0.000	0.000	0.000	0.093	0.186	0.419	0.000	0.000	0.000	0.698
NW	0.000	0.000	0.000	0.000	0.047	0.186	0.000	0.000	0.000	0.233
NNW	0.000	0.000	0.000	0.000	0.186	0.279	0.000	0.000	0.000	0.465
SUBTOTAL	0.000	0.047	0.000	0.279	2.141	2.699	0.000	0.000	0.000	5.165

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2149
TOTAL HOURS OF STABILITY CLASS A	111
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS A	111
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2149
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

MEAN WIND SPEED = 7.62

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - MAR 31, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.000	0.047	0.186	0.000	0.140	0.000	0.000	0.000	0.372
NNE	0.000	0.000	0.000	0.047	0.186	0.279	0.000	0.000	0.000	0.512
NE	0.000	0.000	0.047	0.047	0.047	0.000	0.000	0.000	0.000	0.140
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	0.140	0.047	0.000	0.000	0.000	0.186
SSW	0.000	0.000	0.000	0.140	0.233	0.233	0.000	0.000	0.000	0.605
SW	0.000	0.000	0.000	0.233	0.186	0.093	0.000	0.000	0.000	0.512
WSW	0.000	0.000	0.000	0.047	0.000	0.000	0.047	0.000	0.000	0.093
W	0.000	0.000	0.000	0.047	0.047	0.000	0.000	0.000	0.000	0.093
WNN	0.000	0.000	0.047	0.000	0.140	0.140	0.000	0.000	0.000	0.326
NW	0.000	0.000	0.000	0.000	0.047	0.233	0.000	0.000	0.000	0.279
NNW	0.000	0.000	0.047	0.047	0.047	0.047	0.000	0.000	0.000	0.186
SUBTOTAL	0.000	0.000	0.186	0.791	1.070	1.210	0.047	0.000	0.000	3.304

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2149
TOTAL HOURS OF STABILITY CLASS B	71
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS B	71
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2149
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

MEAN WIND SPEED = 6.76

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - MAR 31, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.000	0.047	0.186	0.140	0.047	0.000	0.000	0.000	0.419
NNE	0.000	0.000	0.093	0.140	0.140	0.186	0.000	0.000	0.000	0.558
NE	0.000	0.000	0.047	0.047	0.047	0.093	0.000	0.000	0.000	0.233
ENE	0.000	0.000	0.047	0.093	0.047	0.000	0.000	0.000	0.000	0.186
E	0.000	0.000	0.000	0.047	0.000	0.000	0.000	0.000	0.000	0.047
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	0.093	0.000	0.000	0.000	0.000	0.000	0.093
S	0.000	0.000	0.000	0.186	0.186	0.047	0.000	0.000	0.000	0.419
SSW	0.000	0.000	0.047	0.326	0.465	0.093	0.093	0.000	0.000	1.024
SW	0.000	0.000	0.000	0.465	0.000	0.047	0.000	0.000	0.000	0.512
WSW	0.000	0.000	0.000	0.093	0.047	0.093	0.000	0.000	0.000	0.233
W	0.000	0.000	0.000	0.000	0.186	0.000	0.000	0.000	0.000	0.186
WNW	0.000	0.000	0.000	0.000	0.047	0.186	0.000	0.000	0.000	0.233
NW	0.000	0.000	0.000	0.000	0.186	0.186	0.000	0.000	0.000	0.372
NNW	0.000	0.000	0.000	0.047	0.047	0.047	0.000	0.000	0.000	0.140
SUBTOTAL	0.000	0.000	0.279	1.722	1.536	1.024	0.093	0.000	0.000	4.653

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2149
TOTAL HOURS OF STABILITY CLASS C	100
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS C	100
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2149
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

MEAN WIND SPEED = 6.13

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - MAR 31, 2011

WIND DIRECTION	WIND SPEED (MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.000	1.117	1.489	1.536	1.536	0.000	0.000	0.000	5.677
NNE	0.000	0.000	0.791	2.280	1.210	1.024	0.000	0.000	0.000	5.305
NE	0.000	0.047	0.698	1.070	0.419	0.093	0.000	0.000	0.000	2.327
ENE	0.000	0.047	0.745	0.651	0.326	0.093	0.000	0.000	0.000	1.861
E	0.000	0.000	0.326	0.140	0.000	0.000	0.000	0.000	0.000	0.465
ESE	0.000	0.000	0.326	0.093	0.000	0.000	0.000	0.000	0.000	0.419
SE	0.000	0.047	0.326	0.140	0.000	0.000	0.000	0.000	0.000	0.512
SSE	0.000	0.047	0.558	0.233	0.000	0.000	0.000	0.000	0.000	0.838
S	0.000	0.000	0.791	0.558	0.512	0.186	0.047	0.000	0.000	2.094
SSW	0.000	0.047	1.117	1.536	1.163	1.489	0.000	0.000	0.000	5.351
SW	0.000	0.140	1.117	0.605	0.279	0.186	0.000	0.000	0.000	2.327
WSW	0.000	0.233	0.605	0.326	0.140	0.186	0.000	0.000	0.000	1.489
W	0.000	0.047	0.512	0.512	0.512	0.605	0.000	0.000	0.000	2.187
WNW	0.000	0.047	0.512	0.977	1.163	0.605	0.047	0.000	0.000	3.350
NW	0.000	0.047	0.558	0.512	1.210	1.256	0.047	0.000	0.000	3.630
NNW	0.000	0.000	0.838	0.698	1.582	1.443	0.000	0.000	0.000	4.560
SUBTOTAL	0.000	0.745	10.935	11.819	10.051	8.702	0.140	0.000	0.000	42.392

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2149
TOTAL HOURS OF STABILITY CLASS D	911
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS D	911
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2149
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

MEAN WIND SPEED = 5.29

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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WATTS BAR NUCLEAR PLANT
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - MAR 31, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.047	1.070	0.419	0.093	0.279	0.000	0.000	0.000	1.908
NNE	0.000	0.047	0.698	0.372	0.279	0.047	0.000	0.000	0.000	1.443
NE	0.000	0.000	0.558	0.465	0.000	0.000	0.000	0.000	0.000	1.024
ENE	0.000	0.093	0.465	0.047	0.047	0.000	0.000	0.000	0.000	0.651
E	0.000	0.093	0.372	0.047	0.047	0.000	0.000	0.000	0.000	0.558
ESE	0.000	0.047	0.186	0.093	0.000	0.000	0.000	0.000	0.000	0.326
SE	0.000	0.047	0.093	0.140	0.047	0.000	0.000	0.000	0.000	0.326
SSE	0.000	0.093	0.465	0.233	0.140	0.047	0.000	0.000	0.000	0.977
S	0.000	0.186	0.605	0.372	0.279	0.140	0.093	0.000	0.000	1.675
SSW	0.000	0.279	1.024	1.024	0.698	0.326	0.000	0.000	0.000	3.350
SW	0.000	0.558	1.070	0.372	0.279	0.047	0.000	0.000	0.000	2.327
WSW	0.000	0.233	1.024	0.326	0.047	0.047	0.000	0.000	0.000	1.675
W	0.000	0.233	1.303	0.279	0.140	0.093	0.000	0.000	0.000	2.047
WNW	0.000	0.233	0.884	0.465	0.093	0.000	0.000	0.000	0.000	1.675
NW	0.000	0.233	0.372	0.233	0.140	0.047	0.047	0.000	0.000	1.070
NNW	0.000	0.000	0.465	0.419	0.233	0.140	0.000	0.000	0.000	1.256
SUBTOTAL	0.000	2.420	10.656	5.305	2.559	1.210	0.140	0.000	0.000	22.289

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2149
TOTAL HOURS OF STABILITY CLASS E	479
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS E	479
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2149
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

MEAN WIND SPEED = 3.55

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - MAR 31, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.047	0.047	0.047	0.000	0.000	0.000	0.000	0.000	0.140
NNE	0.000	0.093	0.047	0.000	0.000	0.000	0.000	0.000	0.000	0.140
NE	0.000	0.047	0.233	0.000	0.000	0.000	0.000	0.000	0.000	0.279
ENE	0.000	0.233	0.884	0.000	0.000	0.000	0.000	0.000	0.000	1.117
E	0.000	0.186	0.279	0.000	0.000	0.000	0.000	0.000	0.000	0.465
ESE	0.000	0.140	0.047	0.000	0.000	0.000	0.000	0.000	0.000	0.186
SE	0.000	0.186	0.047	0.000	0.000	0.000	0.000	0.000	0.000	0.233
SSE	0.000	0.093	0.093	0.000	0.000	0.000	0.000	0.000	0.000	0.186
S	0.000	0.093	0.140	0.047	0.000	0.000	0.000	0.000	0.000	0.279
SSW	0.000	0.140	1.117	0.465	0.000	0.000	0.000	0.000	0.000	1.722
SW	0.000	0.186	0.651	0.000	0.000	0.000	0.000	0.000	0.000	0.838
WSW	0.000	1.117	0.372	0.000	0.000	0.000	0.000	0.000	0.000	1.489
W	0.000	0.838	0.605	0.000	0.000	0.000	0.000	0.000	0.000	1.443
WNN	0.000	0.838	0.326	0.000	0.000	0.000	0.000	0.000	0.000	1.163
NW	0.000	0.512	0.465	0.000	0.000	0.000	0.000	0.000	0.000	0.977
NNW	0.000	0.419	0.233	0.047	0.000	0.000	0.000	0.000	0.000	0.698
SUBTOTAL	0.000	5.165	5.584	0.605	0.000	0.000	0.000	0.000	0.000	11.354

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2149
TOTAL HOURS OF STABILITY CLASS F	244
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS F	244
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2149
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

MEAN WIND SPEED = 1.76

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - MAR 31, 2011

WIND DIRECTION	WIND SPEED (MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.003	0.186	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.189
NNE	0.007	0.233	0.186	0.000	0.000	0.000	0.000	0.000	0.000	0.426
NE	0.005	0.140	0.140	0.000	0.000	0.000	0.000	0.000	0.000	0.284
ENE	0.011	0.233	0.419	0.000	0.000	0.000	0.000	0.000	0.000	0.663
E	0.007	0.279	0.140	0.000	0.000	0.000	0.000	0.000	0.000	0.426
ESE	0.005	0.233	0.047	0.000	0.000	0.000	0.000	0.000	0.000	0.284
SE	0.005	0.233	0.047	0.000	0.000	0.000	0.000	0.000	0.000	0.284
SSE	0.004	0.233	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.237
S	0.003	0.140	0.047	0.000	0.000	0.000	0.000	0.000	0.000	0.189
SSW	0.008	0.279	0.186	0.000	0.000	0.000	0.000	0.000	0.000	0.473
SW	0.023	0.977	0.326	0.000	0.000	0.000	0.000	0.000	0.000	1.326
WSW	0.033	1.163	0.698	0.000	0.000	0.000	0.000	0.000	0.000	1.894
W	0.030	1.117	0.605	0.000	0.000	0.000	0.000	0.000	0.000	1.752
WNW	0.020	0.838	0.326	0.000	0.000	0.000	0.000	0.000	0.000	1.184
NW	0.017	0.512	0.465	0.000	0.000	0.000	0.000	0.000	0.000	0.994
NNW	0.004	0.233	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.237
SUBTOTAL	0.186	7.027	3.630	0.000	0.000	0.000	0.000	0.000	0.000	10.842

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2149
TOTAL HOURS OF STABILITY CLASS G	233
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS G	233
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2149
TOTAL HOURS CALM	4

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

MEAN WIND SPEED = 1.32

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - JUN 30, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.000	0.000	0.154	0.256	0.000	0.000	0.000	0.000	0.410
NNE	0.000	0.000	0.051	0.102	0.154	0.000	0.000	0.000	0.000	0.307
NE	0.000	0.000	0.051	0.102	0.000	0.000	0.000	0.000	0.000	0.154
ENE	0.000	0.000	0.000	0.000	0.051	0.000	0.000	0.000	0.000	0.051
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	0.102	0.154	0.102	0.359	0.000	0.000	0.000	0.717
SSW	0.000	0.000	0.000	0.205	0.461	0.615	0.000	0.000	0.000	1.281
SW	0.000	0.000	0.000	0.000	0.154	0.051	0.000	0.000	0.000	0.205
WSW	0.000	0.000	0.102	0.000	0.000	0.000	0.000	0.000	0.000	0.102
W	0.000	0.000	0.000	0.000	0.051	0.000	0.000	0.000	0.000	0.051
WNW	0.000	0.000	0.000	0.000	0.051	0.256	0.000	0.000	0.000	0.307
NW	0.000	0.000	0.000	0.000	0.051	0.102	0.000	0.000	0.000	0.154
NNW	0.000	0.000	0.000	0.051	0.000	0.359	0.000	0.000	0.000	0.410
SUBTOTAL	0.000	0.000	0.307	0.768	1.332	1.742	0.000	0.000	0.000	4.150

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	1967
TOTAL HOURS OF STABILITY CLASS A	81
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS A	81
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	1952
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

MEAN WIND SPEED = 6.95

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011
WATTS BAR NUCLEAR PLANT
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - JUN 30, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.000	0.051	0.051	0.205	0.102	0.000	0.000	0.000	0.410
NNE	0.000	0.000	0.102	0.154	0.102	0.102	0.000	0.000	0.000	0.461
NE	0.000	0.000	0.000	0.051	0.000	0.051	0.000	0.000	0.000	0.102
ENE	0.000	0.000	0.000	0.000	0.205	0.000	0.000	0.000	0.000	0.205
E	0.000	0.000	0.000	0.000	0.102	0.000	0.000	0.000	0.000	0.102
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	0.051	0.000	0.307	0.410	0.000	0.000	0.000	0.768
SSW	0.000	0.000	0.051	0.102	0.461	0.512	0.000	0.000	0.000	1.127
SW	0.000	0.000	0.000	0.102	0.000	0.000	0.000	0.000	0.000	0.102
WSW	0.000	0.000	0.000	0.000	0.102	0.000	0.000	0.000	0.000	0.102
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	0.102	0.205	0.102	0.000	0.000	0.410
NW	0.000	0.000	0.000	0.051	0.102	0.102	0.000	0.000	0.000	0.256
NNW	0.000	0.000	0.000	0.051	0.000	0.000	0.000	0.000	0.000	0.051
SUBTOTAL	0.000	0.000	0.256	0.564	1.691	1.486	0.102	0.000	0.000	4.098

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	1967
TOTAL HOURS OF STABILITY CLASS B	81
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS B	80
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	1952
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

MEAN WIND SPEED = 7.09

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - JUN 30, 2011

WIND DIRECTION	WIND SPEED (MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.000	0.051	0.051	0.154	0.051	0.000	0.000	0.000	0.307
NNE	0.000	0.000	0.102	0.154	0.000	0.154	0.000	0.000	0.000	0.410
NE	0.000	0.000	0.205	0.102	0.000	0.000	0.000	0.000	0.000	0.307
ENE	0.000	0.000	0.051	0.154	0.051	0.000	0.000	0.000	0.000	0.256
E	0.000	0.000	0.000	0.051	0.000	0.000	0.000	0.000	0.000	0.051
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	0.154	0.102	0.000	0.000	0.000	0.000	0.256
S	0.000	0.000	0.051	0.410	0.410	0.205	0.051	0.000	0.000	1.127
SSW	0.000	0.000	0.102	0.768	0.564	0.154	0.000	0.000	0.000	1.588
SW	0.000	0.000	0.051	0.205	0.051	0.000	0.000	0.000	0.000	0.307
WSW	0.000	0.000	0.102	0.102	0.000	0.000	0.000	0.000	0.000	0.205
W	0.000	0.000	0.051	0.051	0.102	0.000	0.000	0.000	0.000	0.205
WNW	0.000	0.000	0.000	0.000	0.205	0.102	0.000	0.000	0.000	0.307
NW	0.000	0.000	0.051	0.000	0.051	0.256	0.000	0.000	0.000	0.359
NNW	0.000	0.000	0.000	0.000	0.051	0.051	0.000	0.000	0.000	0.102
SUBTOTAL	0.000	0.000	0.820	2.203	1.742	0.973	0.051	0.000	0.000	5.789

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	1967
TOTAL HOURS OF STABILITY CLASS C	114
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS C	113
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	1952
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

MEAN WIND SPEED = 5.70

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - JUN 30, 2011

WIND DIRECTION	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	TOTAL
N	0.000	0.000	0.205	0.512	0.615	0.410	0.000	0.000	0.000	1.742
NNE	0.000	0.000	0.307	0.461	0.256	0.102	0.000	0.000	0.000	1.127
NE	0.000	0.000	0.359	0.102	0.051	0.051	0.000	0.000	0.000	0.564
ENE	0.000	0.051	0.256	0.154	0.051	0.000	0.000	0.000	0.000	0.512
E	0.000	0.051	0.205	0.154	0.000	0.000	0.000	0.000	0.000	0.410
ESE	0.000	0.102	0.256	0.102	0.000	0.000	0.000	0.000	0.000	0.461
SE	0.000	0.051	0.359	0.102	0.051	0.000	0.000	0.000	0.000	0.564
SSE	0.000	0.102	0.820	0.461	0.154	0.000	0.000	0.000	0.000	1.537
S	0.000	0.051	1.127	1.947	1.281	1.537	0.102	0.000	0.000	6.045
SSW	0.000	0.000	1.998	2.357	1.639	1.178	0.051	0.000	0.000	7.223
SW	0.000	0.051	0.973	0.922	0.051	0.205	0.000	0.000	0.000	2.203
WSW	0.000	0.205	0.666	0.154	0.154	0.256	0.000	0.000	0.000	1.434
W	0.000	0.102	0.512	0.410	0.307	0.256	0.000	0.000	0.000	1.588
WNW	0.000	0.000	0.256	0.461	0.359	0.307	0.000	0.000	0.000	1.383
NW	0.000	0.051	0.154	0.205	0.461	0.461	0.000	0.000	0.000	1.332
NNW	0.000	0.000	0.256	0.205	0.512	0.205	0.000	0.000	0.000	1.178
SUBTOTAL	0.000	0.820	8.709	8.709	5.943	4.969	0.154	0.000	0.000	29.303

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	1967
TOTAL HOURS OF STABILITY CLASS D	581
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS D	572
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	1952
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

MEAN WIND SPEED = 5.00

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - JUN 30, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.000	0.205	0.205	0.102	0.000	0.000	0.000	0.000	0.512
NNE	0.000	0.102	0.256	0.102	0.051	0.000	0.000	0.000	0.000	0.512
NE	0.000	0.051	0.307	0.000	0.000	0.000	0.000	0.000	0.000	0.359
ENE	0.000	0.000	0.359	0.051	0.000	0.000	0.000	0.000	0.000	0.410
E	0.000	0.051	0.102	0.102	0.000	0.000	0.000	0.000	0.000	0.256
ESE	0.000	0.205	0.205	0.000	0.000	0.000	0.000	0.000	0.000	0.410
SE	0.000	0.307	0.307	0.000	0.051	0.000	0.000	0.000	0.000	0.666
SSE	0.000	0.000	0.461	0.256	0.102	0.102	0.000	0.000	0.000	0.922
S	0.000	0.205	1.332	1.230	0.871	0.615	0.000	0.000	0.000	4.252
SSW	0.000	0.307	2.100	2.613	1.281	0.820	0.000	0.000	0.000	7.121
SW	0.000	0.256	1.588	0.256	0.205	0.051	0.000	0.000	0.000	2.357
WSW	0.000	0.717	1.178	0.205	0.000	0.205	0.000	0.000	0.000	2.305
W	0.000	0.820	0.973	0.102	0.154	0.051	0.000	0.000	0.000	2.100
WNW	0.000	0.205	0.512	0.307	0.000	0.051	0.000	0.000	0.000	1.076
NW	0.000	0.410	0.564	0.102	0.000	0.154	0.000	0.000	0.000	1.230
NNW	0.000	0.102	0.102	0.307	0.000	0.000	0.000	0.000	0.000	0.512
SUBTOTAL	0.000	3.740	10.553	5.840	2.818	2.049	0.000	0.000	0.000	25.000

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	1967
TOTAL HOURS OF STABILITY CLASS E	492
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS E	488
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	1952
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

MEAN WIND SPEED = 3.64

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - JUN 30, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.102	0.256	0.000	0.000	0.000	0.000	0.000	0.000	0.359
NNE	0.000	0.154	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.205
NE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ENE	0.000	0.205	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.205
E	0.000	0.359	0.205	0.000	0.000	0.000	0.000	0.000	0.000	0.564
ESE	0.000	0.000	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.051
SE	0.000	0.102	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.154
SSE	0.000	0.051	0.205	0.000	0.000	0.000	0.000	0.000	0.000	0.256
S	0.000	0.512	0.410	0.000	0.000	0.000	0.000	0.000	0.000	0.922
SSW	0.000	0.256	1.742	0.154	0.000	0.000	0.000	0.000	0.000	2.152
SW	0.000	1.332	0.615	0.102	0.051	0.000	0.000	0.000	0.000	2.100
WSW	0.000	1.230	0.512	0.000	0.000	0.000	0.000	0.000	0.000	1.742
W	0.000	1.537	0.615	0.000	0.000	0.000	0.000	0.000	0.000	2.152
WNW	0.000	1.178	0.717	0.000	0.051	0.000	0.000	0.000	0.000	1.947
NW	0.000	1.230	0.512	0.000	0.051	0.000	0.000	0.000	0.000	1.793
NNW	0.000	0.461	0.154	0.000	0.000	0.000	0.000	0.000	0.000	0.615
SUBTOTAL	0.000	8.709	6.096	0.256	0.154	0.000	0.000	0.000	0.000	15.215

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	1967
TOTAL HOURS OF STABILITY CLASS F	297
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS F	297
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	1952
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

MEAN WIND SPEED = 1.55

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - JUN 30, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.004	0.154	0.102	0.000	0.000	0.000	0.000	0.000	0.000	0.260
NNE	0.003	0.102	0.102	0.000	0.000	0.000	0.000	0.000	0.000	0.208
NE	0.002	0.102	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.156
ENE	0.003	0.154	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.208
E	0.004	0.256	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.260
ESE	0.002	0.102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.104
SE	0.004	0.256	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.260
SSE	0.006	0.359	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.364
S	0.007	0.461	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.468
SSW	0.021	1.076	0.256	0.000	0.000	0.000	0.000	0.000	0.000	1.353
SW	0.024	1.230	0.256	0.000	0.000	0.000	0.000	0.000	0.000	1.509
WSW	0.045	2.254	0.615	0.000	0.000	0.000	0.000	0.000	0.000	2.914
W	0.049	2.715	0.359	0.000	0.000	0.000	0.000	0.000	0.000	3.122
WNW	0.036	1.895	0.359	0.000	0.000	0.000	0.000	0.000	0.000	2.290
NW	0.036	1.486	0.768	0.000	0.000	0.000	0.000	0.000	0.000	2.290
NNW	0.011	0.512	0.154	0.000	0.000	0.000	0.000	0.000	0.000	0.677
SUBTOTAL	0.256	13.115	3.074	0.000	0.000	0.000	0.000	0.000	0.000	16.445

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	1967
TOTAL HOURS OF STABILITY CLASS G	321
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS G	321
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	1952
TOTAL HOURS CALM	5

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

MEAN WIND SPEED = 1.17

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011
WATTS BAR NUCLEAR PLANT
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

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

WATTS BAR NUCLEAR PLANT

JUL 1, 2011 - SEP 30, 2011

WIND DIRECTION	WIND SPEED (MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.000	0.000	0.499	0.408	0.408	0.000	0.000	0.000	1.316
NNE	0.000	0.000	0.091	0.590	0.227	0.817	0.000	0.000	0.000	1.724
NE	0.000	0.000	0.091	0.590	0.091	0.181	0.000	0.000	0.000	0.953
ENE	0.000	0.000	0.000	0.454	0.045	0.045	0.000	0.000	0.000	0.544
E	0.000	0.000	0.000	0.136	0.000	0.000	0.000	0.000	0.000	0.136
ESE	0.000	0.000	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.045
SE	0.000	0.000	0.045	0.045	0.000	0.000	0.000	0.000	0.000	0.091
SSE	0.000	0.000	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.045
S	0.000	0.000	0.000	0.227	0.045	0.000	0.000	0.000	0.000	0.272
SSW	0.000	0.000	0.181	0.499	0.272	0.000	0.000	0.000	0.000	0.953
SW	0.000	0.000	0.136	0.499	0.045	0.000	0.000	0.000	0.000	0.681
WSW	0.000	0.000	0.000	0.091	0.045	0.000	0.000	0.000	0.000	0.136
W	0.000	0.000	0.045	0.000	0.045	0.000	0.000	0.000	0.000	0.091
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	0.136	0.000	0.091	0.000	0.000	0.000	0.227
NNW	0.000	0.000	0.091	0.318	0.363	0.045	0.000	0.000	0.000	0.817
SUBTOTAL	0.000	0.000	0.771	4.083	1.588	1.588	0.000	0.000	0.000	8.031

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2204
TOTAL HOURS OF STABILITY CLASS A	177
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS A	177
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2204
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

MEAN WIND SPEED = 5.61

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011
WATTS BAR NUCLEAR PLANT
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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

JUL 1, 2011 - SEP 30, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.000	0.045	0.181	0.318	0.045	0.000	0.000	0.000	0.590
NNE	0.000	0.000	0.227	0.272	0.136	0.181	0.000	0.000	0.000	0.817
NE	0.000	0.000	0.045	0.363	0.000	0.045	0.000	0.000	0.000	0.454
ENE	0.000	0.000	0.181	0.272	0.045	0.000	0.000	0.000	0.000	0.499
E	0.000	0.000	0.045	0.045	0.000	0.000	0.000	0.000	0.000	0.091
ESE	0.000	0.000	0.000	0.091	0.000	0.000	0.000	0.000	0.000	0.091
SE	0.000	0.000	0.000	0.045	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	0.045	0.136	0.091	0.000	0.000	0.000	0.000	0.272
SSW	0.000	0.000	0.272	0.499	0.045	0.000	0.000	0.000	0.000	0.817
SW	0.000	0.000	0.181	0.227	0.000	0.000	0.000	0.000	0.000	0.408
WSW	0.000	0.000	0.045	0.091	0.000	0.000	0.000	0.000	0.000	0.136
W	0.000	0.000	0.000	0.181	0.000	0.000	0.000	0.000	0.000	0.181
WNW	0.000	0.000	0.091	0.136	0.091	0.000	0.000	0.000	0.000	0.318
NW	0.000	0.000	0.045	0.136	0.091	0.272	0.000	0.000	0.000	0.544
NNW	0.000	0.000	0.181	0.181	0.091	0.227	0.000	0.000	0.000	0.681
SUBTOTAL	0.000	0.000	1.407	2.858	0.907	0.771	0.000	0.000	0.000	5.944

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2204
TOTAL HOURS OF STABILITY CLASS B	131
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS B	131
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2204
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

MEAN WIND SPEED = 4.86

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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

JUL 1, 2011 - SEP 30, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.000	0.136	0.227	0.181	0.045	0.000	0.000	0.000	0.590
NNE	0.000	0.000	0.227	0.272	0.272	0.091	0.000	0.000	0.000	0.862
NE	0.000	0.000	0.318	0.318	0.091	0.000	0.000	0.000	0.000	0.726
ENE	0.000	0.000	0.045	0.136	0.045	0.000	0.000	0.000	0.000	0.227
E	0.000	0.000	0.091	0.136	0.000	0.000	0.000	0.000	0.000	0.227
ESE	0.000	0.000	0.045	0.091	0.000	0.000	0.000	0.000	0.000	0.136
SE	0.000	0.000	0.091	0.045	0.000	0.000	0.000	0.000	0.000	0.136
SSE	0.000	0.000	0.091	0.045	0.000	0.000	0.000	0.000	0.000	0.136
S	0.000	0.000	0.045	0.136	0.045	0.000	0.000	0.000	0.000	0.227
SSW	0.000	0.000	0.272	0.771	0.181	0.000	0.000	0.000	0.000	1.225
SW	0.000	0.000	0.318	0.544	0.000	0.000	0.000	0.000	0.000	0.862
WSW	0.000	0.000	0.181	0.136	0.000	0.000	0.000	0.000	0.000	0.318
W	0.000	0.000	0.091	0.045	0.000	0.000	0.000	0.000	0.000	0.136
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	0.136	0.091	0.136	0.000	0.000	0.000	0.363
NNW	0.000	0.000	0.091	0.136	0.091	0.045	0.000	0.000	0.000	0.363
SUBTOTAL	0.000	0.000	2.042	3.176	0.998	0.318	0.000	0.000	0.000	6.534

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2204
TOTAL HOURS OF STABILITY CLASS C	144
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS C	144
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2204
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

MEAN WIND SPEED = 4.35

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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

JUL 1, 2011 - SEP 30, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.091	0.635	0.363	0.681	0.408	0.000	0.000	0.000	2.178
NNE	0.000	0.000	0.272	0.635	0.408	0.953	0.000	0.000	0.000	2.269
NE	0.000	0.045	0.363	0.363	0.091	0.000	0.000	0.000	0.000	0.862
ENE	0.000	0.000	0.953	0.363	0.045	0.045	0.000	0.000	0.000	1.407
E	0.000	0.000	0.454	0.227	0.000	0.091	0.000	0.000	0.000	0.771
ESE	0.000	0.045	0.454	0.045	0.000	0.000	0.000	0.000	0.000	0.544
SE	0.000	0.181	0.318	0.272	0.091	0.000	0.000	0.000	0.000	0.862
SSE	0.000	0.136	0.726	0.091	0.000	0.000	0.000	0.000	0.000	0.953
S	0.000	0.136	1.815	0.318	0.000	0.091	0.000	0.000	0.000	2.359
SSW	0.000	0.045	1.543	1.044	0.136	0.045	0.000	0.000	0.000	2.813
SW	0.000	0.136	1.270	0.499	0.000	0.000	0.000	0.000	0.000	1.906
WSW	0.000	0.136	1.089	0.227	0.000	0.000	0.000	0.000	0.000	1.452
W	0.000	0.227	0.408	0.363	0.091	0.000	0.000	0.000	0.000	1.089
WNW	0.000	0.136	0.408	0.499	0.227	0.000	0.000	0.000	0.000	1.270
NW	0.000	0.000	0.408	0.363	0.363	0.227	0.000	0.000	0.000	1.361
NNW	0.000	0.000	0.227	0.227	0.363	0.091	0.000	0.000	0.000	0.907
SUBTOTAL	0.000	1.316	11.343	5.898	2.495	1.951	0.000	0.000	0.000	23.004

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2204
TOTAL HOURS OF STABILITY CLASS D	507
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS D	507
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2204
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

MEAN WIND SPEED = 3.85

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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

JUL 1, 2011 - SEP 30, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.002	0.181	0.681	1.134	0.045	0.590	0.000	0.000	0.000	2.634
NNE	0.001	0.000	0.318	0.227	0.227	0.363	0.045	0.000	0.000	1.180
NE	0.002	0.045	0.771	0.363	0.000	0.000	0.000	0.000	0.000	1.182
ENE	0.002	0.091	0.953	0.181	0.000	0.045	0.000	0.000	0.000	1.273
E	0.002	0.227	0.635	0.045	0.000	0.000	0.000	0.000	0.000	0.909
ESE	0.001	0.227	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.273
SE	0.001	0.091	0.227	0.045	0.000	0.000	0.000	0.000	0.000	0.364
SSE	0.001	0.181	0.318	0.045	0.000	0.000	0.000	0.000	0.000	0.546
S	0.004	0.454	1.134	0.227	0.045	0.045	0.000	0.000	0.000	1.909
SSW	0.005	0.408	1.906	0.363	0.181	0.000	0.000	0.000	0.000	2.864
SW	0.005	0.817	1.361	0.181	0.000	0.000	0.000	0.000	0.000	2.364
WSW	0.004	0.817	0.862	0.000	0.000	0.000	0.000	0.000	0.000	1.683
W	0.004	0.907	0.817	0.136	0.000	0.000	0.000	0.000	0.000	1.864
WNW	0.004	0.998	0.862	0.544	0.000	0.000	0.000	0.000	0.000	2.409
NW	0.005	0.635	1.316	0.272	0.091	0.045	0.000	0.000	0.000	2.364
NNW	0.002	0.227	0.817	0.635	0.227	0.045	0.000	0.000	0.000	1.953
SUBTOTAL	0.045	6.307	13.022	4.401	0.817	1.134	0.045	0.000	0.000	25.771

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2204
TOTAL HOURS OF STABILITY CLASS E	568
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS E	568
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2204
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

MEAN WIND SPEED = 2.74

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011
WATTS BAR NUCLEAR PLANT
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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

JUL 1, 2011 - SEP 30, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.408	0.091	0.045	0.000	0.000	0.000	0.000	0.000	0.544
NNE	0.000	0.136	0.136	0.000	0.000	0.000	0.000	0.000	0.000	0.272
NE	0.000	0.272	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.363
ENE	0.000	0.227	0.227	0.000	0.000	0.000	0.000	0.000	0.000	0.454
E	0.000	0.136	0.136	0.000	0.000	0.000	0.000	0.000	0.000	0.272
ESE	0.000	0.181	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.227
SE	0.000	0.181	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.272
SSE	0.000	0.136	0.091	0.045	0.000	0.000	0.000	0.000	0.000	0.272
S	0.000	0.408	0.227	0.045	0.000	0.000	0.000	0.000	0.000	0.681
SSW	0.000	0.363	0.681	0.000	0.000	0.000	0.000	0.000	0.000	1.044
SW	0.000	0.953	0.499	0.045	0.000	0.000	0.000	0.000	0.000	1.497
WSW	0.000	1.543	0.907	0.045	0.000	0.000	0.000	0.000	0.000	2.495
W	0.000	2.904	0.862	0.000	0.000	0.000	0.000	0.000	0.000	3.766
WNW	0.000	2.359	1.134	0.000	0.045	0.000	0.000	0.000	0.000	3.539
NW	0.000	1.996	1.134	0.000	0.000	0.000	0.000	0.000	0.000	3.131
NNW	0.000	0.590	0.363	0.045	0.000	0.000	0.000	0.000	0.000	0.998
SUBTOTAL	0.000	12.795	6.715	0.272	0.045	0.000	0.000	0.000	0.000	19.828

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2204
TOTAL HOURS OF STABILITY CLASS F	437
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS F	437
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2204
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

MEAN WIND SPEED = 1.45

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR

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

WATTS BAR NUCLEAR PLANT

JUL 1, 2011 - SEP 30, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.001	0.181	0.136	0.000	0.000	0.000	0.000	0.000	0.000	0.319
NNE	0.000	0.000	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.091
NE	0.000	0.045	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.091
ENE	0.001	0.091	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.182
E	0.000	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.091
ESE	0.001	0.181	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.182
SE	0.001	0.136	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.182
SSE	0.000	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.091
S	0.001	0.181	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.228
SSW	0.002	0.272	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.365
SW	0.004	0.363	0.499	0.000	0.000	0.000	0.000	0.000	0.000	0.866
WSW	0.005	0.862	0.408	0.000	0.000	0.000	0.000	0.000	0.000	1.276
W	0.009	1.543	0.590	0.000	0.000	0.000	0.000	0.000	0.000	2.141
WNW	0.008	1.497	0.363	0.045	0.000	0.000	0.000	0.000	0.000	1.913
NW	0.008	1.089	0.771	0.000	0.000	0.000	0.000	0.000	0.000	1.868
NNW	0.004	0.590	0.408	0.000	0.000	0.000	0.000	0.000	0.000	1.002
SUBTOTAL	0.045	7.214	3.584	0.045	0.000	0.000	0.000	0.000	0.000	10.889

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2204
TOTAL HOURS OF STABILITY CLASS G	240
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS G	240
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2204
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

MEAN WIND SPEED = 1.31

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011
WATTS BAR NUCLEAR PLANT
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - DEC 31, 2011

WIND DIRECTION	CALM	0.6-1.4	1.5-3.4	WIND SPEED(MPH)					12.5-18.4	18.5-24.4	>=24.5	TOTAL
				3.5-5.4	5.5-7.4	7.5-12.4						
N	0.000	0.000	0.045	0.136	0.181	0.181	0.000	0.000	0.000	0.000	0.000	0.544
NNE	0.000	0.000	0.045	0.136	0.181	0.181	0.000	0.000	0.000	0.000	0.000	0.544
NE	0.000	0.000	0.136	0.000	0.136	0.000	0.000	0.000	0.000	0.000	0.000	0.272
ENE	0.000	0.000	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045
E	0.000	0.000	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045
ESE	0.000	0.000	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045
SE	0.000	0.000	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	0.000	0.000
S	0.000	0.000	0.000	0.000	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.091
SSW	0.000	0.000	0.000	0.000	0.181	0.045	0.000	0.000	0.000	0.000	0.000	0.227
SW	0.000	0.000	0.000	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045
WSW	0.000	0.000	0.000	0.000	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.045
W	0.000	0.000	0.000	0.000	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.045
WNW	0.000	0.000	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	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.136
NNW	0.000	0.000	0.000	0.091	0.091	0.136	0.000	0.000	0.000	0.000	0.000	0.317
SUBTOTAL	0.000	0.000	0.363	0.454	1.043	0.544	0.000	0.000	0.000	0.000	0.000	2.404

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2205
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	2205
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

MEAN WIND SPEED = 5.92

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - DEC 31, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.000	0.136	0.181	0.136	0.091	0.000	0.000	0.000	0.544
NNE	0.000	0.000	0.000	0.272	0.091	0.000	0.000	0.000	0.000	0.363
NE	0.000	0.000	0.045	0.045	0.045	0.045	0.000	0.000	0.000	0.181
ENE	0.000	0.000	0.045	0.136	0.045	0.000	0.000	0.000	0.000	0.227
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	0.136	0.000	0.000	0.000	0.000	0.136
SSW	0.000	0.000	0.000	0.181	0.454	0.000	0.000	0.000	0.000	0.635
SW	0.000	0.000	0.000	0.045	0.045	0.000	0.000	0.000	0.000	0.091
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	0.045	0.045	0.000	0.000	0.000	0.091
WNW	0.000	0.000	0.000	0.045	0.000	0.045	0.000	0.000	0.000	0.091
NW	0.000	0.000	0.000	0.000	0.091	0.045	0.000	0.000	0.000	0.136
NNW	0.000	0.000	0.045	0.181	0.045	0.091	0.000	0.000	0.000	0.363
SUBTOTAL	0.000	0.000	0.272	1.088	1.134	0.363	0.000	0.000	0.000	2.857

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2205
TOTAL HOURS OF STABILITY CLASS B	63
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS B	63
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2205
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

MEAN WIND SPEED = 5.58

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - DEC 31, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.000	0.136	0.091	0.091	0.181	0.000	0.000	0.000	0.499
NNE	0.000	0.000	0.227	0.091	0.136	0.045	0.000	0.000	0.000	0.499
NE	0.000	0.000	0.181	0.363	0.000	0.000	0.000	0.000	0.000	0.544
ENE	0.000	0.045	0.045	0.136	0.000	0.000	0.000	0.000	0.000	0.227
E	0.000	0.000	0.045	0.045	0.000	0.000	0.000	0.000	0.000	0.091
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	0.045	0.000	0.000	0.000	0.000	0.000	0.091
SSE	0.000	0.000	0.000	0.000	0.045	0.000	0.000	0.000	0.000	0.045
S	0.000	0.000	0.000	0.136	0.045	0.136	0.000	0.000	0.000	0.317
SSW	0.000	0.000	0.091	0.091	0.091	0.091	0.000	0.000	0.000	0.363
SW	0.000	0.000	0.045	0.091	0.000	0.000	0.000	0.000	0.000	0.136
WSW	0.000	0.000	0.000	0.136	0.045	0.000	0.000	0.000	0.000	0.181
W	0.000	0.000	0.000	0.091	0.000	0.045	0.000	0.000	0.000	0.136
WNW	0.000	0.000	0.000	0.045	0.045	0.091	0.000	0.000	0.000	0.181
NW	0.000	0.000	0.045	0.091	0.000	0.000	0.000	0.000	0.000	0.136
NNW	0.000	0.000	0.091	0.091	0.000	0.227	0.000	0.000	0.000	0.408
SUBTOTAL	0.000	0.045	0.952	1.542	0.499	0.816	0.000	0.000	0.000	3.855

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2205
TOTAL HOURS OF STABILITY CLASS C	85
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS C	85
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2205
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

MEAN WIND SPEED = 5.14

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - DEC 31, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.045	0.408	0.726	1.270	0.816	0.000	0.000	0.000	3.265
NNE	0.000	0.091	0.680	0.998	0.862	0.272	0.000	0.000	0.000	2.902
NE	0.000	0.136	0.499	0.771	0.181	0.000	0.000	0.000	0.000	1.587
ENE	0.000	0.045	0.680	0.181	0.000	0.000	0.000	0.000	0.000	0.907
E	0.000	0.045	0.680	0.317	0.000	0.000	0.000	0.000	0.000	1.043
ESE	0.000	0.045	0.181	0.045	0.000	0.000	0.000	0.000	0.000	0.272
SE	0.000	0.000	0.454	0.181	0.000	0.000	0.000	0.000	0.000	0.635
SSE	0.000	0.091	0.726	0.454	0.000	0.000	0.000	0.000	0.000	1.270
S	0.000	0.000	0.998	1.134	0.952	0.635	0.000	0.000	0.000	3.719
SSW	0.000	0.091	1.134	1.950	1.043	0.590	0.000	0.000	0.000	4.807
SW	0.000	0.091	0.862	1.179	0.499	0.136	0.000	0.000	0.000	2.766
WSW	0.000	0.045	0.635	0.635	0.544	0.091	0.000	0.000	0.000	1.950
W	0.000	0.045	0.590	0.454	0.408	0.136	0.000	0.000	0.000	1.633
WNW	0.000	0.000	0.408	0.499	0.181	0.091	0.000	0.000	0.000	1.179
NW	0.000	0.045	0.408	0.272	0.363	0.317	0.000	0.000	0.000	1.406
NNW	0.000	0.000	0.363	1.043	1.587	0.635	0.000	0.000	0.000	3.628
SUBTOTAL	0.000	0.816	9.705	10.839	7.891	3.719	0.000	0.000	0.000	32.971

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2205
TOTAL HOURS OF STABILITY CLASS D	727
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS D	727
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2205
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

MEAN WIND SPEED = 4.70

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - DEC 31, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.000	0.045	0.272	0.272	0.272	0.091	0.000	0.000	0.000	0.952
NNE	0.000	0.136	0.499	0.272	0.045	0.045	0.000	0.000	0.000	0.998
NE	0.000	0.000	0.454	0.091	0.000	0.000	0.000	0.000	0.000	0.544
ENE	0.000	0.227	0.499	0.091	0.000	0.000	0.000	0.000	0.000	0.816
E	0.000	0.317	0.544	0.000	0.000	0.000	0.000	0.000	0.000	0.862
ESE	0.000	0.272	0.272	0.136	0.000	0.000	0.000	0.000	0.000	0.680
SE	0.000	0.045	0.272	0.000	0.000	0.000	0.000	0.000	0.000	0.317
SSE	0.000	0.181	0.454	0.000	0.000	0.000	0.000	0.000	0.000	0.635
S	0.000	0.363	0.862	0.544	0.272	0.317	0.000	0.000	0.000	2.358
SSW	0.000	0.363	1.451	1.950	0.680	0.136	0.000	0.000	0.000	4.580
SW	0.000	0.544	0.952	0.499	0.091	0.000	0.000	0.000	0.000	2.086
WSW	0.000	0.680	0.998	0.227	0.091	0.000	0.000	0.000	0.000	1.995
W	0.000	0.590	0.998	0.408	0.091	0.000	0.000	0.000	0.000	2.086
WNW	0.000	0.363	0.862	0.363	0.136	0.000	0.000	0.000	0.000	1.723
NW	0.000	0.227	0.680	0.317	0.317	0.045	0.000	0.000	0.000	1.587
NNW	0.000	0.227	0.363	1.043	0.454	0.136	0.000	0.000	0.000	2.222
SUBTOTAL	0.000	4.580	10.431	6.213	2.449	0.771	0.000	0.000	0.000	24.444

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2205
TOTAL HOURS OF STABILITY CLASS E	539
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS E	539
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2205
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

MEAN WIND SPEED = 3.19

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - DEC 31, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.001	0.181	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.273
NNE	0.001	0.091	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.182
NE	0.000	0.045	0.045	0.000	0.045	0.000	0.000	0.000	0.000	0.136
ENE	0.002	0.272	0.227	0.000	0.000	0.000	0.000	0.000	0.000	0.501
E	0.000	0.091	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.137
ESE	0.000	0.136	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137
SE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SSE	0.000	0.045	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.091
S	0.001	0.136	0.136	0.045	0.000	0.000	0.000	0.000	0.000	0.318
SSW	0.003	0.181	0.590	0.091	0.000	0.000	0.000	0.000	0.000	0.864
SW	0.004	0.363	0.771	0.045	0.000	0.000	0.000	0.000	0.000	1.183
WSW	0.004	0.590	0.544	0.000	0.000	0.000	0.000	0.000	0.000	1.138
W	0.008	1.179	1.134	0.045	0.000	0.000	0.000	0.000	0.000	2.366
WNW	0.013	2.222	1.497	0.227	0.000	0.000	0.000	0.000	0.000	3.958
NW	0.007	1.043	0.907	0.091	0.045	0.000	0.000	0.000	0.000	2.093
NNW	0.002	0.317	0.317	0.045	0.000	0.000	0.000	0.000	0.000	0.682
SUBTOTAL	0.045	6.893	6.440	0.590	0.091	0.000	0.000	0.000	0.000	14.059

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2205
TOTAL HOURS OF STABILITY CLASS F	310
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS F	310
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2205
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

MEAN WIND SPEED = 1.73

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

2011 WATTS BAR NUCLEAR PLANT EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

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, 2011 - DEC 31, 2011

WIND DIRECTION	WIND SPEED(MPH)									TOTAL
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.003	0.227	0.136	0.000	0.000	0.000	0.000	0.000	0.000	0.366
NNE	0.001	0.000	0.136	0.000	0.000	0.000	0.000	0.000	0.000	0.137
NE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ENE	0.001	0.091	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.137
E	0.002	0.181	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.183
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	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.137
SSE	0.002	0.091	0.136	0.000	0.000	0.000	0.000	0.000	0.000	0.229
S	0.000	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.046
SSW	0.004	0.272	0.181	0.000	0.000	0.000	0.000	0.000	0.000	0.458
SW	0.012	0.998	0.317	0.000	0.000	0.000	0.000	0.000	0.000	1.328
WSW	0.022	1.633	0.680	0.000	0.000	0.000	0.000	0.000	0.000	2.335
W	0.043	2.993	1.587	0.045	0.000	0.000	0.000	0.000	0.000	4.669
WNW	0.047	2.902	2.086	0.000	0.000	0.000	0.000	0.000	0.000	5.036
NW	0.030	2.313	0.816	0.000	0.000	0.000	0.000	0.000	0.000	3.159
NNW	0.010	0.862	0.227	0.000	0.000	0.000	0.000	0.000	0.000	1.099
SUBTOTAL	0.181	12.789	6.395	0.045	0.000	0.000	0.000	0.000	0.000	19.410

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2205
TOTAL HOURS OF STABILITY CLASS G	428
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS G	428
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2205
TOTAL HOURS CALM	4

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

MEAN WIND SPEED = 1.31

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

**2011
WATTS BAR NUCLEAR PLANT
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT**

ATTACHMENT 1

Deviations from ODCM Controls/Surveillance Requirements

None

**2011
WATTS BAR NUCLEAR PLANT
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT**

ATTACHMENT 2

Radioactive Effluent Monitoring Instrumentation Inoperable for Greater than 30 days

01/31/2011	1/2.1.2 Control 1.1.2 Action B Table 1.1-2 Item 4. c	Auxiliary Building Flowrate Measuring Device 0-LPF-90-300 was inoperable for more than 30 days. Flowrate device 0-LPF-90-300 became inoperable on 11/11/2010 at 0610 and returned to operable status on 02/15/2011 at 0917. The Auxiliary Building ventilation was shutdown to support testing of the Unit 2 blast doors. During this time, the stack flow indication erroneously remained above 100,000 scfm even though auxiliary building ventilation was shutdown (PER 282385 and WO 111637182). During the inoperable period, compensatory requirements specified in the ODCM were met for the inoperable flowrate device.
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