

Enclosure 1

Watts Bar Nuclear Plant

Annual Radioactive Effluent Release Report

1999
WATTS BAR NUCLEAR PLANT
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

SUPPLEMENTAL INFORMATION

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 $2.0 \text{ E-}04 \text{ } \mu\text{Ci/ml}$ 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 $2.0E-04$ $\mu\text{Ci/ml}$ 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's 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 Offsite Dose Calculation Manual (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 activity concentrations are determined on each Radwaste batch tank prior to release. The total activity of a released batch is determined by summing each nuclide's concentration and multiplying by the total volume discharged. Composite samples are maintained and analyzed monthly for tritium and gross alpha, and quarterly for Iron-55, Strontium-89, and Strontium-90. During periods of no significant identified primary to secondary leakage, the volume from each Condensate Demineralizer tank release is obtained and the feedwater tritium concentration is used to determine the curies of tritium released.

Continuous Releases (Turbine Building Sump and Steam Generator Blowdown)

During periods of no significant identified primary to secondary leakage, the volume released from the TBS and SGB is obtained and the feedwater tritium concentration is used to determine the curies of tritium released.

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B. 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

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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 only required if dose equivalent I-131 concentration in the primary coolant or the noble gas activity monitor shows that the containment activity has increased more than a factor of 3).

The quantity of noble gases released through the shield building exhaust due to purging of containment is determined by sampling prior to the beginning of the purge, and periodically during the purge. The total activity released is determined from the total flow recorded for each sample period. 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 only required if dose equivalent I-131 concentration in the primary coolant or the noble gas activity monitor shows that the containment activity has increased more than a factor of 3).

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.

C. Iodines and Particulates in Gaseous Releases

Iodine and particulate activity is continuously sampled. Charcoal and particulate samples are taken from the shield and auxiliary building exhausts and analyzed at least weekly to determine the total activity released from the plant based on the total vent flows recorded for the sampling period. Also, particulate and charcoal samples are taken from the auxiliary and shield building exhausts once per 24 hours for 7 days following startup, shutdown, or a rated thermal power change exceeding 15 percent within one hour (if dose equivalent I-131 concentration in the primary coolant or the noble gas activity monitor shows that the containment activity has increased more than a factor of 3).

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5. Batch Releases

	Value		Units
	1st Half	2nd Half	
A. Liquid (Radwaste only)			
1. Number of releases	123	30	Each
2. Total time period of releases	17559	4151	Minutes
3. Maximum time period of release	273	195	Minutes
4. Average time period of releases	143	138	Minutes
5. Minimum time period for release	1	2	Minutes
6. Average dilution stream flow during release periods	19360	21630	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	67458	42657	Minutes
3. Maximum time period for release	28127	39000	Minutes
4. Average time period for releases	2044	4740	Minutes
5. Minimum time period for release	1	61	Minutes

6. Abnormal Releases

	Value		Units
	1st Half	2nd Half	
A. Liquid			
Number of Releases	none	none	
Total Activity Released	N/A	N/A	Ci
B. Gaseous			
Number of Releases	3*	none	
Total Activity Released	5.423E-03	N/A	Ci

*These releases were as follows:

- Release through the Power Operated Relief Valves (PORVs) following shutdown.
- Release through the Shield Building Vent during maintenance activities being performed on a WGDT relief valve.
- Release from the Shield Building from an ABGTS run when all releases should have been suspended since the isokinetic sampler had been declared inoperable.

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TABLE 1-A
 Liquid Effluents - Summation of All Releases
 Unit: 1
 Starting : 1-Jan-1999 Ending : 30-Jun-1999

Type Of Effluent	Units	Quarter 1	Quarter 2	Est. Tot Error %
A. Fission & Activation Products				
1. Total Release (Not Including Tritium, Gases, Alpha)	Ci	1.467E-02	2.121E-02	25%
2. Average Diluted Concentration During Period	μCi/ml	2.751E-09	1.902E-08	
3. Percent Of Applicable Limit	%	*	*	
B. Tritium				
1. Total Release	Ci	3.099E+02	3.309E+01	18%
2. Average Diluted Concentration During Period	μCi/ml	5.811E-05	2.968E-05	
3. Percent Of Applicable Limit	%	*	*	
C. Dissolved And Entrained Gases				
1. Total Release	Ci	7.436E-03	6.485E-05	39%
2. Average Diluted Concentration During Period	μCi/ml	1.394E-09	5.816E-11	
3. Percent Of Applicable Limit	%	6.97E-04	2.91E-04	
D. Gross Alpha Radioactivity				
1. Total Release	Curies	0.000E+00**	0.000E+00	N/A***
E. Waste Volume Released (Pre-Dilution)				
	Liters	4.057E+07	3.616E+07	2%
F. Volume Of Dilution Water Used				
	Liters	5.292E+09	1.079E+09	12%

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

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

*** 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
Unit: 1
Starting : 1-Jul-1999 Ending : 31-Dec-1999

Type Of Effluent	Units	Quarter 3	Quarter 4	Est. Tot Error %
A. Fission & Activation Products				
1. Total Release (Not Including Tritium, Gases, Alpha)	Ci	1.899E-02	3.322E-03	25%
2. Average Diluted Concentration During Period	μCi/ml	1.284E-08	8.441E-11	
3. Percent Of Applicable Limit	%	*	*	
B. Tritium				
1. Total Release	Ci	9.364E+00	1.601E+01	18%
2. Average Diluted Concentration During Period	μCi/ml	6.331E-06	4.096E-06	
3. Percent Of Applicable Limit	%	*	*	
C. Dissolved And Entrained Gases				
1. Total Release	Ci	4.870E-05	00E+00	39%
2. Average Diluted Concentration During Period	μCi/ml	3.293E-11	00E+00	
3. Percent Of Applicable Limit	%	1.647E-05	00E+00	
D. Gross Alpha Radioactivity				
1. Total Release	Ci	0.000E+00**	0.000E+00	N/A***
E. Waste Volume Released (Pre-Dilution)				
	Liters	8.253E+07	7.558E+07	2%
F. Volume Of Dilution Water Used				
	Liters	1.396E+09	3.859E+09	12%

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

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

*** 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
 Liquid Effluents
 Unit: 1

Starting : 1-Jan-1999 Ending : 30-Jun-1999

Nuclide	Unit	Continuous Mode		Batch Mode	
		Quarter 1	Quarter 2	Quarter 1	Quarter 2
H-3	Ci	2.92E-02	1.38E-01	3.10E+02	3.30E+01
Fission & Activation Products					
Ba-139	Ci	0.00E+00*	0.00E+00	8.92E-06	0.00E+00
Co-57	Ci	0.00E+00*	0.00E+00	2.43E-05	1.30E-05
Co-58	Ci	0.00E+00	0.00E+00	2.19E-03	7.58E-03
Co-60	Ci	0.00E+00	0.00E+00	2.17E-03	6.81E-04
Cr-51	Ci	0.00E+00	0.00E+00	7.84E-04	6.56E-04
Cs-134	Ci	0.00E+00	0.00E+00	1.55E-05	5.96E-05
Cs-137	Ci	0.00E+00	0.00E+00	3.88E-05	8.17E-05
F-18	Ci	0.00E+00	0.00E+00	2.53E-04	1.02E-03
Fe-55	Ci	0.00E+00	0.00E+00	6.18E-03	7.60E-03
Fe-59	Ci	0.00E+00	0.00E+00	3.97E-04	1.92E-04
I-131	Ci	0.00E+00	0.00E+00	1.67E-04	0.00E+00
I-133	Ci	0.00E+00	0.00E+00	4.58E-06	0.00E+00
I-135	Ci	0.00E+00	0.00E+00	2.62E-05	0.00E+00
In-113m	Ci	0.00E+00	0.00E+00	8.09E-05	6.50E-06
Mn-54	Ci	0.00E+00	0.00E+00	2.04E-04	2.09E-04
Mo-99	Ci	0.00E+00	0.00E+00	1.90E-05	0.00E+00
Nb-95	Ci	0.00E+00	0.00E+00	1.22E-06	3.81E-05
Sb-124	Ci	0.00E+00	0.00E+00	4.30E-05	4.17E-04
Sb-125	Ci	0.00E+00	0.00E+00	1.84E-03	2.59E-03
Se-75	Ci	0.00E+00	0.00E+00	6.51E-06	0.00E+00
Sn-113	Ci	0.00E+00	0.00E+00	8.09E-05	6.50E-06
Sn-117	Ci	0.00E+00	0.00E+00	1.37E-05	0.00E+00
Tc-99m	Ci	0.00E+00	0.00E+00	1.90E-05	0.00E+00
Zn-65	Ci	0.00E+00	0.00E+00	1.13E-04	0.00E+00
Zr-95	Ci	0.00E+00	0.00E+00	3.52E-06	0.00E+00
Totals	Ci	0.00E+00	0.00E+00	1.47E-02	2.12E-02
Dissolved And Entrained Gases					
Ar-41	Ci	0.00E+00	0.00E+00	0.00E+00	2.70E-06
Kr-85	Ci	0.00E+00	0.00E+00	3.58E-04	0.00E+00
Xe-131m	Ci	0.00E+00	0.00E+00	9.21E-05	0.00E+00
Xe-133	Ci	0.00E+00	0.00E+00	6.78E-03	5.01E-05
Xe-135	Ci	0.00E+00	0.00E+00	2.07E-04	0.00E+00
Xe-135m	Ci	0.00E+00	0.00E+00	0.00E+00	1.20E-05
Totals	Ci	0.00E+00	0.00E+00	7.44E-03	6.48E-05

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

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TABLE 2-B
 Liquid Effluents
 Unit: 1
 Starting : 1-Jul-1999 Ending : 31-Dec-1999

Nuclide	Unit	Continuous Mode		Batch Mode	
		Quarter 3	Quarter 4	Quarter 3	Quarter 4
H-3	Ci	1.27E+00	6.97E-01	8.09E+00	1.19E+01
Fission & Activation Products					
Co-57	Ci	0.00E+00*	0.00E+00	2.19E-05	1.14E-05
Co-58	Ci	0.00E+00	0.00E+00	5.57E-03	1.05E-03
Co-60	Ci	0.00E+00	0.00E+00	9.27E-04	2.34E-04
Cr-51	Ci	0.00E+00	0.00E+00	7.07E-05	0.00E+00
F-18	Ci	0.00E+00	0.00E+00	3.66E-04	0.00E+00
Fe-55	Ci	0.00E+00	0.00E+00	1.07E-02	1.09E-03
Fe-59	Ci	0.00E+00	0.00E+00	2.62E-04	0.00E+00
In-113m	Ci	0.00E+00	0.00E+00	4.32E-06	0.00E+00
Mn-54	Ci	0.00E+00	0.00E+00	1.47E-04	1.58E-05
Mo-99	Ci	0.00E+00	0.00E+00	2.15E-06	0.00E+00
Nb-95	Ci	0.00E+00	0.00E+00	1.11E-04	2.38E-05
Sb-124	Ci	0.00E+00	0.00E+00	1.70E-05	0.00E+00
Sb-125	Ci	0.00E+00	0.00E+00	7.53E-04	4.30E-04
Sn-113	Ci	0.00E+00	0.00E+00	4.32E-06	0.00E+00
Tc-99m	Ci	0.00E+00	0.00E+00	2.15E-06	0.00E+00
Zr-95	Ci	0.00E+00	0.00E+00	6.22E-05	1.40E-05
Totals	Ci	0.00E+00	0.00E+00	1.90E-02	2.86E-03
Dissolved And Entrained Gases					
Xe-133	Ci	0.00E+00	0.00E+00	4.87E-05	0.00E+00
Totals	Ci	0.00E+00	0.00E+00	4.87E-05	0.00E+00

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TABLE 3-A
 Gaseous Effluents - Summation of All Releases
 Unit: 1
 Starting : 1-Jan-1999 Ending : 30-Jun-1999

Type Of Effluent	Units	Quarter 1	Quarter 2	Est. Tot Error %
A. Fission & Activation Products				
1. Total Release	Ci	8.328E+00	2.318E+00	22
2. Average Release Rate For Period	μCi/sec	1.071E+00	2.948E-01	
3. Percent Of Applicable Limit	%	*	*	
B. Radioiodines				
1. Total Iodine-131	Ci	4.566E-06	0.000E+00	N/A***
2. Average Release Rate For Period	μCi/sec	5.872E-07	0.000E+00	
3. Percent Of Applicable Limit	%	*	*	
C. Particulates				
1. Particulates (Half-Lives>8 Days)	Ci	4.947E-05	3.205E-08	N/A
2. Average Release Rate For Period	μCi/sec	6.361E-06	4.076E-09	
3. Percent Of Applicable Limit	%	*	*	
4. Gross Alpha Radioactivity	Ci	0.000E+00	0.000E+00	
D. Tritium				
1. Total Release	Ci	1.792E+00	1.303E+00	11
2. Average Release Rate For Period	μCi/sec	2.305E-01	1.658E-01	
3. Percent Of Applicable Limit	%	*	*	

- * Applicable limits are expressed in terms of dose. See Table 6A of this report.
- ** Zeroes in this table indicate that no radioactivity was present at detectable levels.
- *** 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
Unit: 1
Starting : 1-Jul-1999 Ending : 31-Dec-1999

Type Of Effluent	Units	Quarter 3	Quarter 4	Est. Tot Error %
A. Fission & Activation Products				
1. Total Release	Ci	1.542E+00	5.057E-01	22
2. Average Release Rate For Period	μCi/sec	1.940E-01	6.363E-02	
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	***N/A
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	
D. Tritium				
1. Total Release	Ci	2.921E+00	2.561E+00	11
2. Average Release Rate For Period	μCi/sec	3.675E-01	3.221E-01	
3. Percent Of Applicable Limit	%	*	*	

- * Applicable limits are expressed in terms of dose. See Table 6-B of this report.
- ** Zeroes in this table indicate that no radioactivity was present at detectable levels.
- *** 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
 Gaseous Effluents-Ground Level Releases
 Unit: 1
 Starting : 1-Jan-1999 Ending : 30-Jun-1999

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		Quarter 1	Quarter 2	Quarter 1	Quarter 2
Fission Gases					
Xe-131m	Ci	0.00E+00*	0.00E+00	1.66E-04	0.00E+00
Kr-85m	Ci	0.00E+00	0.00E+00	2.97E-02	0.00E+00
Xe-133m	Ci	0.00E+00	0.00E+00	2.13E-01	0.00E+00
Xe-135	Ci	0.00E+00	0.00E+00	5.35E-01	0.00E+00
Ar-41	Ci	0.00E+00	0.00E+00	2.04E+00	0.00E+00
Xe-133	Ci	6.40E-03	2.26E+00	5.19E+00	3.71E-03
Kr-85	Ci	0.00E+00	0.00E+00	1.17E-01	5.19E-02
Total	Ci	6.40E-03	2.26E+00	8.12E+00	5.56E-02
Iodines					
I-131	Ci	4.46E-06	0.00E+00	0.00E+00	0.00E+00
Total	Ci	4.46E-06	0.00E+00	0.00E+00	0.00E+00
Particulates					
Br-82	Ci	2.96E-06	0.00E+00	0.00E+00	0.00E+00
Cr-51	Ci	1.39E-05	0.00E+00	0.00E+00	0.00E+00
Co-58	Ci	3.55E-05	3.21E-08	0.00E+00	0.00E+00
Total	Ci	5.24E-05	3.21E-08	0.00E+00	0.00E+00
H-3	Ci	1.24E+00	1.26E+00	5.51E-01	3.95E-02

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TABLE 4-B
 Gaseous Effluents-Ground Level Releases
 Unit: 1
 Starting : 1-Jul-1999 Ending : 31-Dec-1999

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		Quarter 3	Quarter 4	Quarter 3	Quarter 4
Fission Gases					
Kr-85m	Ci	0.00E+00*	8.65E-10	0.00E+00	0.00E+00
Xe-131m	Ci	5.87E-10	4.91E-09	0.00E+00	0.00E+00
Xe-133m	Ci	2.29E-10	8.07E-09	0.00E+00	0.00E+00
Xe-135	Ci	0.00E+00	4.49E-08	1.97E-02	2.00E-03
Kr-85	Ci	2.22E-08	1.42E-06	1.45E-02	6.70E-03
Xe-133	Ci	3.42E-08	4.80E-07	5.66E-01	1.10E-01
Ar-41	Ci	0.00E+00	1.08E-09	9.42E-01	3.87E-01
Total	Ci	5.72E-08	1.96E-06	1.54E+00	5.06E-01
Iodines					
	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Particulates					
	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	Ci	2.03E+00	2.25E+00	8.88E-01	3.14E-01

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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. Tot. Error %</u>
a. Spent resins, filter sludges, evaporator bottoms, etc.	m ³	11.7	N/A
	Ci	9.78	N/A
b. Dry Active Waste, Compressible Waste Contaminated Equipment, etc.	m ³	3.9	N/A
	Ci	0.0986	N/A
c. Irradiated Components, Control Rods, etc.	m ³	None	N/A
	Ci	None	N/A

2. Estimate of Major Nuclide Composition (by type of waste)

	Percent	Ci
a. Spent resins, filter sludges, evaporator bottoms, etc. (nuclides determined by measurement)		
H-3	1.13	0.11
C-14	5.52	0.54
Mn-54	4.75	0.46
Fe-55	39.77	3.89
Co-58	15.87	1.55
Co-60	10.32	1.01
Ni-63	16.31	1.60
Cs-134	1.57	0.15
Cs-137	4.51	0.44
b. Dry active waste, compressible waste, contaminated equipment, etc. (nuclides determined by estimate)		
Mn-54	2.15	0.01
Fe-55	29.48	0.73
Co-60	5.36	0.03
Ni-63	1.22	0.007
Cr-51	13.63	0.08
Fe-59	2.65	0.02
Co-58	37.18	0.22
Zr-95	2.07	0.01
Nb-95	3.72	0.02
Cs-137	0.90	0.005
c. Irradiated Components	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>
2	Motor Freight	Barnwell, SC
4*	Motor Freight	Oak Ridge, TN

* Two shipments made to GTS Duratek in 1998. Disposal volume and activity reported for waste processed and buried in 1999.

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 Watts Bar are calculated for each quarter as required in Section 5.2 of the Offsite Dose Calculation Manual (ODCM). Measured plant releases for the reporting period are used to estimate these doses. Dispersion of radioactive effluents in the environment is estimated using meteorological data and river flow data measured during the period. In this report, the doses resulting from releases are described and compared to limits established for Watts Bar.

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 Watts Bar 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, and are presented for each quarter in Tables 9A through 12G.

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Radiological Impact

Meteorological Data

Meteorological variables at Watts Bar are measured continuously. Measurements collected include wind speed, wind direction, and temperature at heights of 10, 46, and 91 meters above the ground. Quarterly joint frequency distributions (JFDs) are calculated for each release point using the appropriate levels of meteorological data. A joint frequency distribution gives 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 Watts Bar 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 four possible contributing pathways: ingestion of cow/goat milk, ingestion of beef, and ingestion of vegetables. Doses from applicable pathways are calculated for each real receptor location identified in the most recent land use survey. To determine the maximum organ dose, the doses from the pathways are summed for each receptor. For the ingestion dose, however, only those pathways that exist for each receptor are considered in the sum, i.e., milk ingestion doses are included only for locations where milk is consumed without commercial preparation and vegetable ingestion is included only for those locations where a garden is identified. To conservatively account for beef ingestion, a beef ingestion dose equal to that for the highest unrestricted area boundary location is added to each identified receptor. For ground contamination, the dose added to the organ dose being calculated is the total body dose calculated for that location, i.e., it is assumed that the dose to an individual organ is equal to the total body dose.

Doses from airborne effluents 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 Watts Bar. 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 Watts Bar 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 Watts Bar, 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 Watts Bar, is an individual who obtains all of his drinking water at Dayton, TN, consumes fish caught from the Tennessee River between Watts Bar and Chickamauga Dam, and spends 500 hours per year on the shoreline just below the outfall from Watts Bar. 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.

Radiological Impact

Direct Radiation

External gamma radiation levels were measured by thermoluminescent dosimeters (TLDs) deployed around WBN as part of the offsite Environmental Radiological Monitoring Program. The quarterly gamma radiation levels determined from these TLDs during this reporting period averaged approximately 16.2 mR/quarter at onsite (at or near the site boundary) stations and approximately 14.8 mR/quarter at offsite stations or approximately 1.4 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 2-6 mR/quarter higher than

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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 TLD 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 Watts Bar Offsite Dose Calculation Manual, 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 TLD measurements for 1999 indicate that the highest onsite TLD reading outside the Radiological Control Area was 314 mrem. Using this value, subtracting an annual background value of approximately 65 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 57 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 well 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 Watts Bar 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-B
 Doses from Airborne Effluents**

Third Quarter

Individual Doses

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
External				
Gamma Air	5.10E-03 mrad	5 mrad	< 1%	ESE/1250 meters
Beta Air	2.28E-03 mrad	10 mrad	< 1%	ESE/1250 meters
Submersion				
Total Body	2.25E-03 mrem	N/A	N/A	SE/1372 meters
Skin	3.40E-03 mrem	N/A	N/A	SE/1372 meters
Organ Doses				
Child/Thyroid	2.90E-03 mrem	7.5 mrem	< 1%	SSE/1676 meters
Child/Total Body	2.90E-03 mrem	7.5 mrem	< 1%	SSE/1676 meters

Population Doses

Total Body Dose 1.49E-02 man-rem
 Maximum Organ Dose (organ) 1.49E-02 man-rem (thyroid)

Fourth Quarter

Individual Doses

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
External				
Gamma Air	2.19E-03 mrad	5 mrad	< 1%	ESE/1250 meters
Beta Air	8.78E-04 mrad	10 mrad	< 1%	ESE/1250 meters
Submersion				
Total Body	8.57E-04 mrem	N/A	N/A	SE/1372 meters
Skin	1.28E-03 mrem	N/A	N/A	SE/1372 meters
Organ Doses				
Child/Thyroid	3.12E-03 mrem	7.5 mrem	< 1%	SSE/1676 meters
Child/Total Body	3.12E-03 mrem	7.5 mrem	< 1%	SSE/1676 meters

Population Doses

Total Body Dose 1.35E-02 man-rem
 Maximum Organ Dose (organ) 1.35E-02 man-rem (thyroid)

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-A
Doses from Liquid Effluents

First Quarter

Individual Doses (mrem)

Age Group	Organ	Dose	Quarterly Limit	Percent of Limit
Child	Total Body	1.7E-03	1.5 mrem	< 1 %
Child	Liver	1.8E-03	5 mrem	< 1 %
Child	Thyroid	1.7E-03	5 mrem	< 1 %

Average river flow past WBN (cubic feet per second): 28,605

Population Doses

Total Body Dose 8.3E-02 man-rem
Maximum Organ Dose (organ) 8.3E-02 man-rem (Liver)

Second Quarter

Individual Doses (mrem)

Age Group	Organ	Dose	Quarterly Limit	Percent of Limit
Adult	Total Body	1.4E-03	1.5 mrem	< 1 %
Adult	GIT	1.6E-03	5 mrem	< 1 %
Child	Thyroid	8.6E-04	5 mrem	< 1 %

Average river flow past WBN (cubic feet per second): 10,107

Population Doses

Total Body Dose 2.9E-02 man-rem
Maximum Organ Dose (organ) 3.0E-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	2.1E-04	1.5 mrem	< 1 %
Adult	GIT	9.1E-04	5 mrem	< 1 %
Child	Thyroid	2.0E-04	5 mrem	< 1 %

Average river flow past WBN (cubic feet per second): 25,440

Population Doses

Total Body Dose 4.8E-03 man-rem
Maximum Organ Dose (organ) 5.4E-03 man-rem (GIT)

Fourth Quarter

Individual Doses (mrem)

Age Group	Organ	Dose	Quarterly Limit	Percent of Limit
Child	Total Body	1.6E-04	1.5 mrem	< 1 %
Adult	GIT	3.5E-04	5 mrem	< 1 %
Child	Thyroid	1.5E-04	5 mrem	< 1 %

Average river flow past WBN (cubic feet per second): 17,816

Population Doses

Total Body Dose 6.3E-03 man-rem
Maximum Organ Dose (organ) 6.5E-03 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 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	1.60E-03	1.16E-04	2.25E-03	8.57E-04	
Critical organ dose (air)	2.28E-03	6.19E-04	2.90E-03	3.12E-03	
Total body dose (liquid)	1.7E-03	1.4E-03	2.1E-04	1.6E-04	
Maximum organ dose (liquid)	1.8E-03	1.6E-03	9.1E-04	3.5E-04	
Direct Radiation Dose	0.0E+00	0.0E+00	0.0E+00	0.0E+00	
Total	7.38E-03	3.74E-03	6.27E-03	4.49E-03	
Cumulative Total Dose (mrem)					2.19E-02
Annual Dose Limit (mrem)					25
Percent of Limit					< 1 %
Thyroid					
Total body air submersion	1.60E-03	1.16E-04	2.25E-03	8.57E-04	
Thyroid dose (airborne)	2.28E-03	6.19E-04	2.90E-03	3.12E-03	
Total body dose (liquid)	1.7E-03	1.4E-03	2.1E-04	1.6E-04	
Thyroid dose (liquid)	1.7E-03	8.6E-04	2.0E-04	1.5E-04	
Direct Radiation Dose	0.0E+00	0.0E+00	0.0E+00	0.0E+00	
Total	7.28E-03	3.00E-03	5.56E-03	4.29E-03	
Cumulative Total Dose (mrem)					2.01E-02
Annual Dose Limit (mrem)					75
Percent of Limit					< 1 %

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TABLE 9-A
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS A (DELTA T<=-1.9 C/100 M)
 JAN 1, 1999 - MAR 31, 1999

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	0	0	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0	0	0	0
NE	0	0	0	0	0	0.145	0	0	0	0.145
ENE	0	0	0	0	0.048	0	0	0	0	0.048
E	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0	0	0	0
S	0	0	0	0.097	0	0	0	0	0	0.097
SSW	0	0	0	0.194	0.678	0.484	0	0	0	1.356
SW	0	0	0	0.048	0.242	0.097	0	0	0	0.387
WSW	0	0	0	0	0.048	0.048	0	0	0	0.097
W	0	0	0	0	0	0.048	0	0	0	0.048
WNW	0	0	0	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	0	0	0	0.339	1.017	0.823	0	0	0	2.179

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2102
TOTAL HOURS OF STABILITY CLASS A	46
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS A	45
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2065
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

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TABLE 9-B
JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
STABILITY CLASS B (-1.9 < DELTA T <= -1.7 C/100 M)
JAN 1, 1999 - MAR 31, 1999

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	0	0	0.048	0.048	0.097	0	0	0	0.194
NNE	0	0	0	0	0.097	0.097	0	0	0	0.194
NE	0	0	0.048	0.097	0.048	0.242	0	0	0	0.436
ENE	0	0	0.048	0.048	0.097	0.048	0	0	0	0.242
E	0	0	0	0.048	0.048	0	0	0	0	0.097
ESE	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0.097	0	0	0	0	0	0.097
SSE	0	0	0.145	0.048	0	0	0	0	0	0.194
S	0	0	0.097	0.048	0	0	0.048	0	0	0.194
SSW	0	0	0	0.291	0.387	0.145	0	0	0	0.823
SW	0	0	0.048	0.194	0.097	0.048	0	0	0	0.387
WSW	0	0	0	0.048	0	0.097	0	0	0	0.145
W	0	0	0	0	0	0.048	0	0	0	0.048
WNW	0	0	0	0	0.048	0.145	0	0	0	0.194
NW	0	0	0	0	0	0.048	0	0	0	0.048
NNW	0	0	0	0	0	0.145	0	0	0	0.145
SUBTOTAL	0	0	0.387	0.969	0.872	1.162	0.048	0	0	3.438

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2102
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	2065
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 = 6.51

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 9-C
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS C (-1.7 < DELTA T <= -1.5 C/100 M)
 JAN 1, 1999 - MAR 31, 1999

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	0	0	0	0.048	0.145	0	0	0	0.194
NNE	0	0	0.097	0.194	0.145	0.242	0	0	0	0.678
NE	0	0	0.097	0.097	0.145	0.097	0	0	0	0.436
ENE	0	0	0.145	0.097	0	0.048	0.048	0	0	0.339
E	0	0.048	0.145	0.097	0	0	0	0	0	0.291
ESE	0	0.048	0.097	0.048	0	0	0	0	0	0.194
SE	0	0	0	0	0	0	0	0	0	0
SSE	0	0	0.048	0	0	0	0	0	0	0.048
S	0	0	0.048	0	0	0.048	0	0	0	0.097
SSW	0	0	0.145	0.291	0.145	0	0.048	0	0	0.63
SW	0	0	0.097	0.242	0.145	0	0	0	0	0.484
WSW	0	0	0	0.048	0.048	0.097	0	0	0	0.194
W	0	0	0	0.097	0.145	0	0	0	0	0.242
WNW	0	0	0	0.048	0.048	0.291	0	0	0	0.387
NW	0	0	0	0	0	0.097	0	0	0	0.097
NNW	0	0	0	0.048	0	0.145	0	0	0	0.194
SUBTOTAL	0	0.097	0.92	1.308	0.872	1.211	0.097	0	0	4.504

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2102
TOTAL HOURS OF STABILITY CLASS C	95
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS C	93
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2065
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 = 6.03

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 9-D
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS D (-1.5 < DELTA T <= -0.5 C/100 M)
 JAN 1, 1999 - MAR 31, 1999

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	0	1.114	1.114	1.695	2.034	0	0	0	5.956
NNE	0	0.097	1.114	1.84	1.404	1.55	0.145	0	0	6.15
NE	0	0.048	0.969	2.082	1.114	0.339	0	0	0	4.552
ENE	0	0.097	0.242	0.436	0.194	0.048	0	0	0	1.017
E	0	0.145	0.242	0.194	0	0	0	0	0	0.581
ESE	0	0.097	0.097	0.048	0	0	0	0	0	0.242
SE	0	0.048	0.097	0.048	0	0	0	0	0	0.194
SSE	0	0.048	0.291	0.048	0	0.048	0.048	0	0	0.484
S	0	0	0.63	0.436	0.194	0.436	0.291	0	0	1.985
SSW	0	0.145	1.211	1.937	1.55	0.387	0	0	0	5.23
SW	0	0	1.404	0.969	0.242	0	0	0	0	2.615
WSW	0	0.145	0.726	0.242	0	0.097	0	0	0	1.211
W	0	0.048	0.581	0.242	0.194	0.436	0	0	0	1.501
WNW	0	0.145	0.145	0.63	0.823	0.775	0	0	0	2.518
NW	0	0	0.436	0.291	0.678	1.017	0.097	0	0	2.518
NNW	0	0.048	0.581	0.775	0.823	1.259	0	0	0	3.487
SUBTOTAL	0	1.114	9.879	11.332	8.91	8.426	0.581	0	0	40.242

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2102
TOTAL HOURS OF STABILITY CLASS D	854
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS D	831
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2065
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 = 5.42

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 9-E
JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
STABILITY CLASS E (-0.5 < DELTA T <= 1.5 C/100 M)
JAN 1, 1999 - MAR 31, 1999

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	0.145	0.581	0.726	0.145	0	0	0	0	1.598
NNE	0	0.145	0.533	0.242	0.145	0	0	0	0	1.065
NE	0	0.291	0.823	0.387	0.048	0.048	0	0	0	1.598
ENE	0	0.194	0.678	0.387	0.048	0	0	0	0	1.308
E	0	0.194	0.484	0.048	0	0	0	0	0	0.726
ESE	0	0.242	0.097	0.048	0	0	0	0	0	0.387
SE	0	0.339	0.194	0.097	0.048	0.048	0	0	0	0.726
SSE	0	0.339	0.387	0.194	0.048	0.145	0.097	0	0	1.211
S	0	0.242	0.872	0.63	0.194	0.436	0	0	0	2.373
SSW	0	0.63	1.598	1.889	0.775	0.484	0	0	0	5.375
SW	0	0.387	1.356	0.581	0.145	0.048	0	0	0	2.518
WSW	0	0.194	0.775	0.291	0.145	0	0	0	0	1.404
W	0	0.775	0.775	0.387	0.097	0.048	0	0	0	2.082
WNW	0	0.581	0.678	0.291	0	0.194	0	0	0	1.743
NW	0	0.242	0.436	0.242	0.387	0.242	0	0	0	1.55
NNW	0	0.242	0.339	0.291	0.339	0.048	0	0	0	1.259
SUBTOTAL	0	5.182	10.605	6.731	2.567	1.743	0.097	0	0	26.925

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2102
TOTAL HOURS OF STABILITY CLASS E	564
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS E	556
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2065
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 = 3.50

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 9-F
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS F (1.5 < DELTA T <= 4.0 C/100 M)
 JAN 1, 1999 - MAR 31, 1999

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	0.017	0.339	0.194	0.048	0	0	0	0	0	0.598
NNE	0.012	0.291	0.097	0	0.048	0	0	0	0	0.448
NE	0.017	0.145	0.387	0.048	0	0	0	0	0	0.598
ENE	0.023	0.194	0.533	0	0	0	0	0	0	0.749
E	0.017	0.339	0.194	0	0	0	0	0	0	0.549
ESE	0.003	0.097	0	0	0	0	0	0	0	0.1
SE	0.006	0.194	0	0	0	0	0	0	0	0.2
SSE	0.002	0	0.048	0	0	0	0	0	0	0.05
S	0.012	0.048	0.339	0.048	0	0	0	0	0	0.448
SSW	0.026	0.145	0.678	0.339	0	0	0	0	0	1.188
SW	0.03	0.533	0.436	0.048	0	0	0	0	0	1.047
WSW	0.035	0.63	0.484	0	0	0	0	0	0	1.149
W	0.046	1.017	0.436	0	0	0	0	0	0	1.498
WNW	0.046	1.308	0.145	0.097	0	0	0	0	0	1.595
NW	0.03	0.533	0.436	0	0	0	0	0	0	0.999
NNW	0.018	0.436	0.145	0	0	0	0	0	0	0.599
SUBTOTAL	0.339	6.247	4.552	0.63	0.048	0	0	0	0	11.816

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2102
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	2065
TOTAL HOURS CALM	7

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 = 1.66

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 9-G
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS G (DELTA T > 4.0 C/100 M)
 JAN 1, 1999 - MAR 31, 1999

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	0.044	0.436	0.097	0	0	0	0	0	0	0.576
NNE	0.059	0.63	0.097	0	0	0	0	0	0	0.786
NE	0.075	0.63	0.291	0	0	0	0	0	0	0.995
ENE	0.079	0.581	0.387	0	0	0	0	0	0	1.048
E	0.036	0.291	0.145	0	0	0	0	0	0	0.471
ESE	0.012	0.145	0	0	0	0	0	0	0	0.157
SE	0.016	0.097	0.097	0	0	0	0	0	0	0.21
SSE	0.02	0.242	0	0	0	0	0	0	0	0.262
S	0.032	0.242	0.145	0	0	0	0	0	0	0.419
SSW	0.044	0.436	0.097	0	0	0	0	0	0	0.576
SW	0.075	0.726	0.194	0	0	0	0	0	0	0.995
WSW	0.107	1.017	0.291	0	0	0	0	0	0	1.414
W	0.087	0.823	0.242	0	0	0	0	0	0	1.152
WNW	0.059	0.533	0.194	0	0	0	0	0	0	0.786
NW	0.044	0.484	0.048	0	0	0	0	0	0	0.576
NNW	0.036	0.387	0.048	0	0	0	0	0	0	0.471
SUBTOTAL	0.823	7.7	2.373	0	0	0	0	0	0	10.896

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2102
TOTAL HOURS OF STABILITY CLASS G	228
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS G	225
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2065
TOTAL HOURS CALM	17

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 = 1.11

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 10-A
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS A (DELTA T<=-1.9 C/100 M)
 APR 1, 1999 - JUN 30, 1999

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	0	0	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0.049	0	0	0	0	0	0.049
SSE	0	0	0	0	0	0	0	0	0	0
S	0	0	0	0.343	0.343	0.147	0	0	0	0.833
SSW	0	0	0	0.686	1.126	0.539	0.049	0	0	2.4
SW	0	0	0.049	0.294	0.196	0.147	0	0	0	0.686
WSW	0	0	0.049	0	0.049	0.245	0.098	0	0	0.441
W	0	0	0	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0	0	0	0
NNW	0	0	0	0	0.049	0	0	0	0	0.049
SUBTOTAL	0	0	0.098	1.371	1.763	1.077	0.147	0	0	4.456

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2045
TOTAL HOURS OF STABILITY CLASS A	92
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS A	91
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2042
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 = 6.65

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 10-B
JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
STABILITY CLASS B (-1.9 < DELTA T <= -1.7 C/100 M)
APR 1, 1999 - JUN 30, 1999

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	0	0	0.098	0.098	0.294	0	0	0	0.49
NNE	0	0	0	0	0.049	0.196	0	0	0	0.245
NE	0	0	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0.049	0	0	0	0.049
E	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0.049	0	0	0	0	0	0.049
SSE	0	0	0.049	0.049	0.098	0	0	0	0	0.196
S	0	0	0.098	0.147	0.147	0.098	0	0	0	0.49
SSW	0	0	0.049	0.784	0.245	0.343	0.049	0	0	1.469
SW	0	0	0	0.392	0.049	0.049	0	0	0	0.49
WSW	0	0	0	0.049	0	0.196	0	0	0	0.245
W	0	0	0	0	0.196	0.049	0	0	0	0.245
WNW	0	0	0	0	0	0.049	0	0	0	0.049
NW	0	0	0	0.049	0	0	0	0	0	0.049
NNW	0	0	0	0	0.049	0.049	0	0	0	0.098
SUBTOTAL	0	0	0.196	1.616	0.93	1.371	0.049	0	0	4.163

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2045
TOTAL HOURS OF STABILITY CLASS B	85
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS B	85
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2042
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 = 6.52

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 10-C
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS C (-1.7 < DELTA T <= -1.5 C/100 M)
 APR 1, 1999 - JUN 30, 1999

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	0	0	0.098	0.147	0.196	0	0	0	0.441
NNE	0	0	0	0	0.098	0.147	0	0	0	0.245
NE	0	0	0	0.098	0.049	0.098	0.049	0	0	0.294
ENE	0	0	0	0.049	0	0	0	0	0	0.049
E	0	0	0	0.098	0	0.049	0	0	0	0.147
ESE	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0.049	0.049	0	0	0	0	0.098
SSE	0	0	0.147	0.049	0	0	0	0	0	0.196
S	0	0	0.098	0.245	0	0.147	0	0	0	0.49
SSW	0	0	0.147	0.784	0.147	0.147	0.049	0	0	1.273
SW	0	0	0.196	0.392	0.147	0	0	0	0	0.735
WSW	0	0	0.049	0	0	0.049	0	0	0	0.098
W	0	0	0	0	0.049	0.049	0	0	0	0.098
WNW	0	0	0	0	0	0.196	0	0	0	0.196
NW	0	0	0	0.049	0	0	0	0	0	0.049
NNW	0	0	0	0	0.049	0	0	0	0	0.049
SUBTOTAL	0	0	0.637	1.91	0.735	1.077	0.098	0	0	4.456

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2045
TOTAL HOURS OF STABILITY CLASS C	91
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS C	91
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2042
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 = 5.76

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 10-D
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS D (-1.5< DELTA T<=-0.5 C/100 M)
 APR 1, 1999 - JUN 30, 1999

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	0.049	0.343	0.881	0.392	0.441	0	0	0	2.106
NNE	0	0	0.686	1.028	0.588	1.616	0.098	0	0	4.016
NE	0	0.049	0.93	0.881	0.441	0.392	0.098	0	0	2.791
ENE	0	0.147	0.833	0.833	0.147	0.049	0.049	0	0	2.057
E	0	0	0.735	0.49	0	0	0	0	0	1.224
ESE	0	0.049	0.735	0.049	0	0.049	0	0	0	0.881
SE	0	0.098	0.49	0.049	0	0	0	0	0	0.637
SSE	0	0.147	0.833	0.049	0	0	0	0	0	1.028
S	0	0.049	0.93	0.686	0.441	0.392	0	0	0	2.498
SSW	0	0.049	1.175	1.077	0.343	0.539	0	0	0	3.183
SW	0	0.098	0.881	0.979	0.098	0.049	0	0	0	2.106
WSW	0	0	0.343	0.196	0.049	0.147	0	0	0	0.735
W	0	0	0.343	0.343	0.196	0.441	0	0	0	1.322
WNW	0	0.196	0.147	0.196	0.294	0.441	0	0	0	1.273
NW	0	0	0.294	0.098	0.392	0.049	0	0	0	0.833
NNW	0	0	0.245	0.245	0.245	0.196	0	0	0	0.93
SUBTOTAL	0	0.93	9.941	8.08	3.624	4.799	0.245	0	0	27.62

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2045
TOTAL HOURS OF STABILITY CLASS D	564
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS D	564
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2042
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 = 4.81

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 10-E
JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
STABILITY CLASS E (-0.5 < DELTA T <= 1.5 C/100 M)
APR 1, 1999 - JUN 30, 1999

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	0.007	0.049	0.539	1.028	0.343	0.098	0	0	0	2.064
NNE	0.005	0.049	0.392	0.833	0.343	0.49	0	0	0	2.111
NE	0.008	0.098	0.588	0.686	0.098	0	0	0	0	1.477
ENE	0.011	0.147	0.833	0.245	0.098	0	0	0	0	1.333
E	0.007	0.588	0.049	0	0.049	0	0	0	0	0.693
ESE	0.005	0.098	0.343	0	0.049	0.049	0	0	0	0.544
SE	0.006	0.392	0.098	0.098	0.049	0	0	0	0	0.642
SSE	0.007	0.196	0.392	0.343	0	0	0	0	0	0.937
S	0.028	0.881	1.567	1.567	0.539	0.343	0	0	0	4.925
SSW	0.046	0.588	3.428	1.224	0.881	0.588	0	0	0	6.755
SW	0.025	0.881	1.273	0.49	0	0.098	0	0	0	2.767
WSW	0.012	0.49	0.539	0.098	0.343	0.245	0	0	0	1.726
W	0.009	0.392	0.441	0.147	0.098	0.147	0	0	0	1.234
WNW	0.009	0.343	0.49	0.49	0.147	0.049	0	0	0	1.528
NW	0.006	0.147	0.392	0.343	0	0	0	0	0	0.888
NNW	0.006	0.147	0.343	0.392	0.245	0.049	0	0	0	1.181
SUBTOTAL	0.196	5.485	11.704	7.982	3.281	2.155	0	0	0	30.803

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2045
TOTAL HOURS OF STABILITY CLASS E	630
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS E	629
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2042
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 = 3.49

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 10-F
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS F (1.5 < DELTA T <= 4.0 C/100 M)
 APR 1, 1999 - JUN 30, 1999

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	0.007	0.098	0.098	0	0	0	0	0	0	0.203
NNE	0	0	0	0.049	0	0	0	0	0	0.049
NE	0.015	0.196	0.196	0.049	0	0	0	0	0	0.455
ENE	0.022	0.294	0.294	0.049	0	0	0	0	0	0.658
E	0.016	0.294	0.147	0	0	0	0	0	0	0.457
ESE	0.011	0.147	0.147	0	0	0	0	0	0	0.305
SE	0.011	0.245	0.049	0	0	0	0	0	0	0.305
SSE	0.02	0.49	0.049	0	0	0	0	0	0	0.559
S	0.055	0.93	0.539	0.098	0.049	0	0	0	0	1.671
SSW	0.046	0.343	0.881	0.196	0	0	0	0	0	1.466
SW	0.053	0.833	0.588	0.049	0	0	0	0	0	1.522
WSW	0.055	0.881	0.588	0	0	0	0	0	0	1.524
W	0.062	1.371	0.294	0	0	0	0	0	0	1.727
WNW	0.042	0.881	0.245	0	0	0	0	0	0	1.168
NW	0.049	1.028	0.294	0	0	0	0	0	0	1.371
NNW	0.027	0.392	0.343	0.049	0	0	0	0	0	0.811
SUBTOTAL	0.49	8.423	4.75	0.539	0.049	0	0	0	0	14.251

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2045
TOTAL HOURS OF STABILITY CLASS F	291
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS F	291
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2042
TOTAL HOURS CALM	10

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 = 1.47

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 10-G
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS G (DELTA T > 4.0 C/100 M)
 APR 1, 1999 - JUN 30, 1999

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	0.027	0.343	0.147	0	0	0	0	0	0	0.516
NNE	0.013	0.245	0	0	0	0	0	0	0	0.258
NE	0.021	0.294	0.098	0	0	0	0	0	0	0.413
ENE	0.043	0.686	0.098	0	0	0	0	0	0	0.826
E	0.019	0.294	0.049	0	0	0	0	0	0	0.361
ESE	0.029	0.539	0	0	0	0	0	0	0	0.568
SE	0.019	0.343	0	0	0	0	0	0	0	0.361
SSE	0.029	0.539	0	0	0	0	0	0	0	0.568
S	0.029	0.392	0.147	0	0	0	0	0	0	0.568
SSW	0.048	0.833	0.049	0	0	0	0	0	0	0.929
SW	0.067	1.028	0.196	0	0	0	0	0	0	1.291
WSW	0.085	1.175	0.392	0	0	0	0	0	0	1.652
W	0.106	1.518	0.441	0	0	0	0	0	0	2.065
WNW	0.085	1.469	0.098	0	0	0	0	0	0	1.652
NW	0.088	1.273	0.343	0	0	0	0	0	0	1.704
NNW	0.027	0.294	0.196	0	0	0	0	0	0	0.516
SUBTOTAL	0.735	11.263	2.253	0	0	0	0	0	0	14.251

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2045
TOTAL HOURS OF STABILITY CLASS G	292
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS G	291
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2042
TOTAL HOURS CALM	15

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 = 1.05

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 11-A
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS A (DELTA T<=-1.9 C/100 M)
 JUL 1, 1999 - SEP 30, 1999

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	0	0	0.119	0.417	0.954	0	0	0	1.49
NNE	0	0	0	0.179	0.358	1.132	0.179	0	0	1.847
NE	0	0	0.06	0.06	0.179	0.477	0	0	0	0.775
ENE	0	0	0	0.06	0.06	0.06	0	0	0	0.179
E	0	0	0	0.119	0.119	0	0	0	0	0.238
ESE	0	0	0	0.06	0	0	0	0	0	0.06
SE	0	0	0	0.06	0	0	0	0	0	0.06
SSE	0	0	0	0.119	0	0	0	0	0	0.119
S	0	0	0	0.238	0.119	0	0	0	0	0.358
SSW	0	0	0	0.596	0.238	0	0	0	0	0.834
SW	0	0	0.06	0.894	0.06	0	0	0	0	1.013
WSW	0	0	0.06	0.179	0	0	0	0	0	0.238
W	0	0	0	0	0	0	0	0	0	0
WNW	0	0	0	0.06	0	0	0	0	0	0.06
NW	0	0	0	0.06	0.06	0	0	0	0	0.119

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2055
TOTAL HOURS OF STABILITY CLASS A	143
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS A	138
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	1678
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 = 6.93

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 11-B
JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
STABILITY CLASS B (-1.9 < DELTA T <= -1.7 C/100 M)
JUL 1, 1999 - SEP 30, 1999

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	0	0.06	0.298	0.119	0.358	0	0	0	0.834
NNE	0	0	0.06	0.179	0.358	0.536	0	0	0	1.132
NE	0	0	0	0.358	0.179	0	0	0	0	0.536
ENE	0	0	0.06	0.298	0.06	0	0	0	0	0.417
E	0	0	0	0.119	0	0	0	0	0	0.119
ESE	0	0	0.06	0	0	0	0	0	0	0.06
SE	0	0	0.06	0.417	0	0	0	0	0	0.477
SSE	0	0	0.119	0.358	0	0	0	0	0	0.477
S	0	0	0.06	0.238	0	0.06	0	0	0	0.358
SSW	0	0	0.238	0.238	0.119	0	0	0	0	0.596
SW	0	0	0.06	0.596	0	0	0	0	0	0.656
WSW	0	0	0	0.179	0	0	0	0	0	0.179
W	0	0	0	0	0	0	0	0	0	0
WNW	0	0	0	0.06	0	0	0	0	0	0.06
NW	0	0	0	0.119	0	0	0	0	0	0.119
NNW	0	0	0	0.06	0	0.119	0	0	0	0.179
SUBTOTAL	0	0	0.775	3.516	0.834	1.073	0	0	0	6.198

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2055
TOTAL HOURS OF STABILITY CLASS B	120
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS B	104
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	1678
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 = 5.06

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 11-C
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS C (-1.7 < DELTA T <= -1.5 C/100 M)
 JUL 1, 1999 - SEP 30, 1999

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	0	0.119	0.119	0.179	0.358	0	0	0	0.775
NNE	0	0	0.119	0.298	0.358	0.238	0	0	0	1.013
NE	0	0	0.238	0.656	0.179	0.06	0	0	0	1.132
ENE	0	0	0.06	0.298	0	0	0	0	0	0.358
E	0	0	0.417	0.179	0	0	0	0	0	0.596
ESE	0	0	0.298	0.238	0	0	0	0	0	0.536
SE	0	0	0.417	0.06	0	0	0	0	0	0.477
SSE	0	0	0.179	0.119	0	0	0	0	0	0.298
S	0	0	0.477	0.238	0	0	0	0	0	0.715
SSW	0	0	0.656	0.596	0	0	0	0	0	1.251
SW	0	0	0.358	0	0	0	0	0	0	0.358
WSW	0	0	0.119	0	0	0	0	0	0	0.119
W	0	0	0.06	0	0	0	0	0	0	0.06
WNW	0	0	0.06	0.06	0	0	0	0	0	0.119
NW	0	0	0	0	0.06	0	0	0	0	0.06
NNW	0	0	0	0.06	0	0	0	0	0	0.06
SUBTOTAL	0	0	3.576	2.92	0.775	0.656	0	0	0	7.926

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2055
TOTAL HOURS OF STABILITY CLASS C	152
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS C	133
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	1678
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 = 4.14

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 11-D
JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
STABILITY CLASS D (-1.5 < DELTA T <= -0.5 C/100 M)
JUL 1, 1999 - SEP 30, 1999

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	0	0.238	0.596	1.013	1.251	0	0	0	3.099
NNE	0	0	0.238	0.477	1.311	0.715	0	0	0	2.741
NE	0	0	0.536	0.656	0.358	0	0	0	0	1.549
ENE	0	0	0.775	0.894	0.06	0.06	0	0	0	1.788
E	0	0.06	0.656	0.119	0.06	0	0	0	0	0.894
ESE	0	0.119	0.358	0	0	0	0	0	0	0.477
SE	0	0.119	0.358	0	0	0	0	0	0	0.477
SSE	0	0	0.536	0.119	0	0	0	0	0	0.656
S	0	0.179	0.596	0.119	0.179	0	0	0	0	1.073
SSW	0	0.06	1.073	1.073	0.298	0	0	0	0	2.503
SW	0	0.06	0.834	0.298	0	0	0	0	0	1.192
WSW	0	0	0.238	0	0	0	0	0	0	0.238
W	0	0.06	0.298	0	0.06	0	0	0	0	0.417
WNW	0	0	0.298	0.179	0	0	0	0	0	0.477
NW	0	0	0.298	0.119	0.179	0.06	0	0	0	0.656
NNW	0	0	0.06	0.06	0.298	0.238	0	0	0	0.656
SUBTOTAL	0	0.656	7.39	4.708	3.814	2.324	0	0	0	18.892

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2055
TOTAL HOURS OF STABILITY CLASS D	422
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS D	317
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	1678
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 = 4.03

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 11-E
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS E (-0.5 < DELTA T <= 1.5 C/100 M)
 JUL 1, 1999 - SEP 30, 1999

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	0.025	0.119	0.596	1.967	0.477	0.06	0	0	0	3.243
NNE	0.017	0.119	0.358	0.596	0.298	0.06	0	0	0	1.447
NE	0.017	0.06	0.417	0.536	0.179	0.06	0	0	0	1.268
ENE	0.023	0	0.656	0.596	0.06	0	0	0	0	1.334
E	0.027	0.238	0.536	0.119	0.06	0	0	0	0	0.98
ESE	0.006	0.06	0.119	0	0	0	0	0	0	0.185
SE	0.006	0.119	0.06	0.06	0	0	0	0	0	0.245
SSE	0.023	0.358	0.298	0.119	0	0	0	0	0	0.797
S	0.056	0.715	0.894	0.298	0.119	0	0	0	0	2.082
SSW	0.097	0.656	2.145	0.238	0	0	0	0	0	3.136
SW	0.066	0.775	1.132	0.06	0	0	0	0	0	2.033
WSW	0.041	1.013	0.179	0	0	0	0	0	0	1.233
W	0.029	0.477	0.358	0	0	0	0	0	0	0.863
WNW	0.029	0.715	0.119	0	0	0	0	0	0	0.863
NW	0.006	0.119	0.06	0.238	0	0	0	0	0	0.423
NNW	0.01	0.06	0.238	0.536	0.179	0	0	0	0	1.023
SUBTOTAL	0.477	5.602	8.164	5.364	1.371	0.179	0	0	0	21.156

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2055
TOTAL HOURS OF STABILITY CLASS E	453
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS E	355
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	1678
TOTAL HOURS CALM	8

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 = 2.53

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 11-F
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS F (1.5 < DELTA T <= 4.0 C/100 M)
 JUL 1, 1999 - SEP 30, 1999

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	0.032	0.119	0.298	0.179	0	0	0	0	0	0.628
NNE	0.032	0.119	0.298	0	0	0	0	0	0	0.449
NE	0.041	0.238	0.298	0	0	0	0	0	0	0.577
ENE	0.091	0.596	0.596	0.06	0	0	0	0	0	1.343
E	0.032	0.179	0.238	0	0	0	0	0	0	0.449
ESE	0.014	0.179	0	0	0	0	0	0	0	0.192
SE	0.023	0.179	0.119	0	0	0	0	0	0	0.321
SSE	0.023	0.179	0.119	0	0	0	0	0	0	0.321
S	0.041	0.358	0.179	0.06	0	0	0	0	0	0.637
SSW	0.105	0.775	0.596	0	0	0	0	0	0	1.475
SW	0.114	0.954	0.536	0	0	0	0	0	0	1.604
WSW	0.15	1.311	0.656	0	0	0	0	0	0	2.117
W	0.187	2.324	0.119	0	0	0	0	0	0	2.63
WNW	0.269	3.159	0.358	0	0	0	0	0	0	3.785
NW	0.228	2.503	0.477	0	0	0	0	0	0	3.207
NNW	0.05	0.536	0.119	0.06	0	0	0	0	0	0.765
SUBTOTAL	1.43	13.707	5.006	0.358	0	0	0	0	0	20.501

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2055
TOTAL HOURS OF STABILITY CLASS F	450
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS F	344
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	1678
TOTAL HOURS CALM	24

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 = 1.24

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 11-G
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS G (DELTA T > 4.0 C/100 M)
 JUL 1, 1999 - SEP 30, 1999

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	0.024	0.179	0.119	0	0	0	0	0	0	0.322
NNE	0.038	0.358	0.119	0	0	0	0	0	0	0.515
NE	0.019	0.238	0	0	0	0	0	0	0	0.257
ENE	0.024	0.238	0.06	0.06	0	0	0	0	0	0.381
E	0.038	0.417	0.06	0	0	0	0	0	0	0.515
ESE	0.005	0.06	0	0	0	0	0	0	0	0.064
SE	0.014	0.179	0	0	0	0	0	0	0	0.193
SSE	0.019	0.179	0.06	0	0	0	0	0	0	0.257
S	0.024	0.298	0	0	0	0	0	0	0	0.322
SSW	0.028	0.358	0	0	0	0	0	0	0	0.386
SW	0.076	0.596	0.358	0	0	0	0	0	0	1.029
WSW	0.146	1.609	0.238	0	0	0	0	0	0	1.994
W	0.208	2.324	0.298	0	0	0	0	0	0	2.83
WNW	0.213	2.324	0.358	0	0	0	0	0	0	2.894
NW	0.283	2.861	0.715	0	0	0	0	0	0	3.859
NNW	0.094	1.013	0.179	0	0	0	0	0	0	1.286
SUBTOTAL	1.251	13.23	2.563	0.06	0	0	0	0	0	17.104

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2055
TOTAL HOURS OF STABILITY CLASS G	315
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS G	287
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	1678
TOTAL HOURS CALM	21

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 = 1.06

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 12-A
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS A (DELTA T<=-1.9 C/100 M)
 OCT 1, 1999 - DEC 31, 1999

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	0	0.046	0	0	0.091	0	0	0	0.137
NNE	0	0	0	0	0.137	0.137	0	0	0	0.273
NE	0	0	0	0.046	0.046	0	0	0	0	0.091
ENE	0	0	0	0.091	0	0	0	0	0	0.091
E	0	0	0.046	0	0	0	0	0	0	0.046
ESE	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	0	0	0
SSE	0	0	0	0.046	0	0.046	0	0	0	0.091
S	0	0	0.091	0.046	0.182	0.137	0	0	0	0.456
SSW	0	0	0	0.228	0.82	0.319	0	0	0	1.367
SW	0	0	0.046	0.046	0.319	0.091	0	0	0	0.501
WSW	0	0	0	0.046	0.091	0	0	0	0	0.137
W	0	0	0	0	0.046	0	0	0	0	0.046
WNW	0	0	0	0	0	0.091	0	0	0	0.091
NW	0	0	0	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0.046	0	0	0	0.046
SUBTOTAL	0	0	0.228	0.547	1.641	0.957	0	0	0	3.373

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2195
TOTAL HOURS OF STABILITY CLASS A	74
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS A	74
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2194
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 = 6.56

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 12-B
JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
STABILITY CLASS B (-1.9 < DELTA T <= -1.7 C/100 M)
OCT 1, 1999 - DEC 31, 1999

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	0	0.046	0	0.091	0.137	0	0	0	0.273
NNE	0	0	0	0.228	0.456	0.547	0	0	0	1.231
NE	0	0	0.182	0.091	0.091	0.046	0	0	0	0.41
ENE	0	0	0.046	0.137	0	0	0	0	0	0.182
E	0	0	0.046	0.046	0	0	0	0	0	0.091
ESE	0	0	0.046	0.046	0	0	0	0	0	0.091
SE	0	0	0.091	0	0	0	0	0	0	0.091
SSE	0	0	0.046	0	0	0.046	0	0	0	0.091
S	0	0	0.046	0.137	0.046	0	0	0	0	0.228
SSW	0	0	0	0.41	0.137	0.091	0	0	0	0.638
SW	0	0	0	0.319	0.137	0	0	0	0	0.456
WSW	0	0	0	0.046	0	0	0	0	0	0.046
W	0	0	0	0	0.091	0.091	0	0	0	0.182
WNW	0	0	0	0	0	0.091	0	0	0	0.091
NW	0	0	0	0	0	0	0	0	0	0
NNW	0	0	0	0	0.046	0.046	0	0	0	0.091
SUBTOTAL	0	0	0.547	1.459	1.094	1.094	0	0	0	4.193

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2195
TOTAL HOURS OF STABILITY CLASS B	92
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS B	92
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2194
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 = 6.04

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 12-C
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS C (-1.7 < DELTA T <= -1.5 C/100 M)
 OCT 1, 1999 - DEC 31, 1999

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	0	0.137	0.228	0.228	0.273	0	0	0	0.866
NNE	0	0	0.228	0.273	0.137	0.41	0.046	0	0	1.094
NE	0	0	0.046	0.319	0.137	0	0	0	0	0.501
ENE	0	0	0.091	0	0	0	0	0	0	0.091
E	0	0	0.228	0.046	0	0	0	0	0	0.273
ESE	0	0	0.137	0	0	0	0	0	0	0.137
SE	0	0	0.046	0	0	0	0	0	0	0.046
SSE	0	0	0.091	0	0.046	0	0	0	0	0.137
S	0	0	0.137	0.182	0.046	0.046	0	0	0	0.41
SSW	0	0	0.046	0.775	0.091	0.046	0	0	0	0.957
SW	0	0	0.091	0.456	0.046	0	0	0	0	0.593
WSW	0	0	0.046	0.091	0	0	0	0	0	0.137
W	0	0	0.046	0.046	0.046	0.046	0	0	0	0.182
WNW	0	0	0.046	0	0.046	0.182	0	0	0	0.273
NW	0	0	0.046	0	0	0.137	0	0	0	0.182
NNW	0	0	0.091	0.046	0.046	0.046	0	0	0	0.228
SUBTOTAL	0	0	1.55	2.461	0.866	1.185	0.046	0	0	6.108

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2195
TOTAL HOURS OF STABILITY CLASS C	135
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS C	134
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2194
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

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TABLE 12-D
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS D (-1.5 < DELTA T <= -0.5 C/100 M)
 OCT 1, 1999 - DEC 31, 1999

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	0.137	0.638	1.094	1.276	1.641	0	0	0	4.789
NNE	0.004	0.091	0.866	1.231	1.003	0.547	0	0	0	3.741
NE	0.002	0.046	0.547	0.729	0.365	0.137	0	0	0	1.826
ENE	0.004	0.046	0.866	0.228	0	0.046	0	0	0	1.189
E	0.002	0.046	0.41	0.046	0	0	0	0	0	0.503
ESE	0.002	0.137	0.228	0	0	0	0	0	0	0.366
SE	0.002	0.137	0.319	0.091	0	0	0	0	0	0.549
SSE	0.001	0.046	0.228	0	0.046	0.091	0	0	0	0.411
S	0.002	0.137	0.456	0.273	0	0	0	0	0	0.868
SSW	0.005	0	1.276	1.003	0.137	0.41	0	0	0	2.831
SW	0.005	0.046	1.185	0.82	0.273	0.137	0	0	0	2.466
WSW	0.003	0	0.684	0.182	0	0	0	0	0	0.869
W	0.003	0.046	0.729	0.456	0.182	0.182	0	0	0	1.599
WNW	0.002	0.091	0.273	0.046	0.228	0.137	0	0	0	0.776
NW	0.002	0.182	0.319	0.182	0.319	0.684	0.046	0	0	1.734
NNW	0.003	0.046	0.638	0.866	0.684	1.003	0	0	0	3.239
SUBTOTAL	0.046	1.231	9.663	7.247	4.512	5.014	0.046	0	0	27.758

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2195
TOTAL HOURS OF STABILITY CLASS D	609
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS D	609
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2194
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 = 4.70

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 12-E
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS E (-0.5 < DELTA T <= 1.5 C/100 M)
 OCT 1, 1999 - DEC 31, 1999

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	0.013	0.273	0.593	1.413	0.456	0.046	0	0	0	2.793
NNE	0.005	0.046	0.319	0.365	0.182	0	0	0	0	0.917
NE	0.014	0.319	0.638	0.456	0.046	0	0	0	0	1.473
ENE	0.019	0.41	0.866	0.41	0	0	0	0	0	1.706
E	0.006	0.228	0.182	0.046	0	0	0	0	0	0.462
ESE	0.003	0.137	0.046	0.046	0	0	0	0	0	0.231
SE	0.008	0.137	0.365	0.137	0	0	0	0	0	0.646
SSE	0.005	0.091	0.228	0.228	0.273	0	0	0	0	0.825
S	0.012	0.228	0.547	0.228	0	0	0	0	0	1.014
SSW	0.019	0.319	0.957	0.82	0.091	0.046	0	0	0	2.253
SW	0.019	0.273	1.003	0.137	0.182	0.091	0	0	0	1.706
WSW	0.012	0.41	0.365	0.137	0.228	0	0	0	0	1.151
W	0.012	0.319	0.501	0.228	0.046	0	0	0	0	1.106
WNW	0.018	0.547	0.638	0.137	0.182	0	0	0	0	1.522
NW	0.01	0.319	0.365	0.319	0.456	0.228	0	0	0	1.697
NNW	0.007	0.046	0.41	0.638	0.273	0.182	0	0	0	1.557
SUBTOTAL	0.182	4.102	8.022	5.743	2.416	0.593	0	0	0	21.057

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2195
TOTAL HOURS OF STABILITY CLASS E	462
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS E	462
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2194
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 = 3.24

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 12-F
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS F (1.5 < DELTA T <= 4.0 C/100 M)
 OCT 1, 1999 - DEC 31, 1999

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	0.031	0.365	0.137	0	0	0	0	0	0	0.532
NNE	0.02	0.182	0.137	0	0	0	0	0	0	0.339
NE	0.017	0.046	0.228	0	0	0	0	0	0	0.29
ENE	0.017	0.228	0.046	0	0	0	0	0	0	0.29
E	0.006	0.091	0	0	0	0	0	0	0	0.097
ESE	0.011	0.182	0	0	0	0	0	0	0	0.194
SE	0.011	0.137	0.046	0	0	0	0	0	0	0.194
SSE	0.006	0.091	0	0	0	0	0	0	0	0.097
S	0.028	0.273	0.182	0	0	0	0	0	0	0.484
SSW	0.023	0.091	0.273	0	0	0	0	0	0	0.387
SW	0.076	0.547	0.684	0	0	0	0	0	0	1.307
WSW	0.102	1.139	0.501	0	0	0	0	0	0	1.743
W	0.203	2.644	0.638	0.046	0	0	0	0	0	3.531
WNW	0.217	2.552	0.957	0.046	0	0	0	0	0	3.773
NW	0.164	2.142	0.501	0.046	0	0	0	0	0	2.853
NNW	0.071	0.775	0.365	0.137	0	0	0	0	0	1.347
SUBTOTAL	1.003	11.486	4.695	0.273	0	0	0	0	0	17.457

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2195
TOTAL HOURS OF STABILITY CLASS F	383
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS F	383
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2194
TOTAL HOURS CALM	22

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 = 1.25

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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TABLE 12-G
 JOINT PERCENTAGE FREQUENCIES OF WIND SPEED BY WIND DIRECTION FOR
 STABILITY CLASS G (DELTA T > 4.0 C/100 M)
 OCT 1, 1999 - DEC 31, 1999

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	0.061	0.547	0.046	0	0	0	0	0	0	0.653
NNE	0.033	0.273	0.046	0	0	0	0	0	0	0.352
NE	0.042	0.41	0	0	0	0	0	0	0	0.452
ENE	0.042	0.41	0	0	0	0	0	0	0	0.452
E	0.009	0.091	0	0	0	0	0	0	0	0.101
ESE	0.005	0.046	0	0	0	0	0	0	0	0.05
SE	0.019	0.182	0	0	0	0	0	0	0	0.201
SSE	0.028	0.228	0.046	0	0	0	0	0	0	0.302
S	0.019	0.182	0	0	0	0	0	0	0	0.201
SSW	0.037	0.319	0.046	0	0	0	0	0	0	0.402
SW	0.108	0.912	0.137	0	0	0	0	0	0	1.156
WSW	0.248	1.914	0.501	0	0	0	0	0	0	2.664
W	0.422	3.145	0.957	0	0	0	0	0	0	4.524
WNW	0.323	2.689	0.456	0	0	0	0	0	0	3.468
NW	0.318	2.37	0.729	0	0	0	0	0	0	3.418
NNW	0.155	1.048	0.456	0	0	0	0	0	0	1.659
SUBTOTAL	1.869	14.768	3.418	0	0	0	0	0	0	20.055

TOTAL HOURS OF VALID STABILITY OBSERVATIONS	2195
TOTAL HOURS OF STABILITY CLASS G	440
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY CLASS G	440
TOTAL HOURS OF VALID WIND DIRECTION-WIND SPEED-STABILITY OBSERVATIONS	2194
TOTAL HOURS CALM	41

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 = 1.03

NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUMBERS

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ATTACHMENT 1.0
Deviations from ODCM Controls/Surveillance Requirements

Event Date(s)	ODCM Surveillance Missed	Description of Event/Resolution
03/13/1999	1/2.1.2 Table 1.1-2 item 3.d	<p>Chemistry was notified at 1005 on 3/13/99 that ABGTS Train A had been started and run for approximately 50 minutes (from 0917 until 0958). This was in violation of ODCM requirements that all releases be suspended from the Unit 1 Shield Building Exhaust (SBE) while the Unit 1 SBE isokinetic sampler is inoperable. The sampler was inoperable at the time of this release. Since the Auxiliary Building Exhaust Radiation Monitor (0-RE-90-101) was also inoperable at that time, Chemistry was obtaining 12-hour compensatory grab samples of noble gas and a continuous iodine and particulate compensatory sample from the ABE monitor. Gas samples obtained at 0115 and 1415 on 3/13/99 indicated that there was no gaseous radioactivity in the ABE. However, continuously collected iodine and particulate compensatory samples obtained from the ABE during this time did indicate that iodine and particulate activity was present in the ABE effluent stream. A release permit was generated to account for the potential activity released through the ABGTS-A run. The ABE iodine and particulate activities were reduced by a factor of 99% to account for the HEPA and charcoal filters in the ABGTS train. The design flow rate of 9000 cfm was used for the entire release period to quantify the release. The permit supports the conclusion that no ODCM release limits were exceeded.</p>

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ATTACHMENT 2.0
Radiation Monitors Inoperable for Greater than 30 days

NONE