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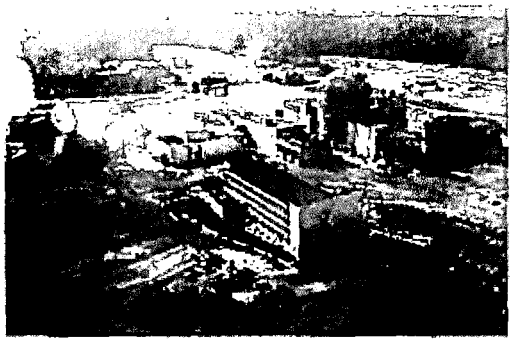

River Bend Station (RBS)

Radiological Effluent EAL Threshold Values

EP-CALC-RBS-1801
Revision 0

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Table of Contents

1. PURPOSE

The River Bend Station (RBS) Emergency Action Level (EAL) Technical Bases Manual contains background information, event declaration thresholds, bases and references for the EAL and Fission Product Barrier (FPB) values used to implement the Nuclear Energy Institute (NEI) 99-01 Revision 6 EAL guidance. This calculation document provides additional technical detail specific to the derivation of the gaseous and liquid radiological effluent EAL values developed in accordance with the guidance in NEI 99-01 Revision 6.

Documentation of the assumptions, calculations and results are provided for the RBS Ax1 series EAL effluent monitor values associated the NEI 99-01 Revision 6 EALs listed below.

- NEI EAL AU1.1 (gaseous and liquid)
- NEI EAL AA1.1 (gaseous and liquid)
- NEI EAL AS1.1 (gaseous)
- NEI EAL AG1.1 (gaseous)

2. DEVELOPMENT METHODOLOGY AND BASES

2.1. Threshold Limits

2.1.1. AU1.1 Liquid Threshold Limits

Guidance Criteria

The AU1 Initiating Condition (IC) addresses a release of gaseous or liquid radioactivity greater than 2 times the Offsite Dose Calculation Manual (ODCM) limits for 60 minutes or longer.

RBS Bases

ODCM Section 7.2.1 states that the limits for the concentration of radioactive liquid effluents released from the site to unrestricted areas are as follows:

- Ten (10) times the concentrations specified in 10 CFR Part 20, Appendix B, Table 2, Column 2 for radionuclides other than dissolved or entrained noble gases.
- 2.0E-04 µCi/ml total activity for dissolved or entrained noble gases.

The site specific AU1.1 liquid effluent EAL threshold value will equate to 2 times the alarm setpoint.

2.1.2. AU1.1 Gaseous Threshold Limits

Guidance Criteria

The AU1 IC addresses a release of gaseous or liquid radioactivity greater than 2 times the ODCM limits for 60 minutes or longer.

RBS Bases

ODCM Section 8.3.1.1 states that the limits for the radioactive gaseous effluents released from the site at or beyond the site boundary are as follows:

- Less than or equal to 500 mrem/yr to the total body (Noble Gases)
- Less than or equal to 3000 mrem/yr to the skin (Noble Gases)
- Less than or equal to 1500 mrem/yr to any organ (I-131, I-133, tritium and radioactive materials in particulate form with half-lives > 8 days)

  ODCM gaseous setpoint calculations are based on the noble gas limits. Organ dose includes inhalation, ingestion and deposition pathways and are applied in unrestricted area site boundary gaseous effluent dose calculations used in the Annual Radioactive Effluent Release Report. Ingestion pathway bases are not compatible or directly comparable with short term event considerations and are not a significant contribution to the total dose (total body or skin dose limits from noble gas are the major exposure pathway). Thus, the organ dose limit is not applicable for EAL threshold determination.

The site specific AU1.1 gaseous effluent EAL threshold values will equate to 2 times the ODCM limit for the lesser of the total body or skin exposure pathways.

2.1.3. AA1.1 Liquid Threshold Limits

Guidance Criteria

The AA1 IC addresses a release of radioactivity resulting in offsite dose greater than 10 mrem TEDE or 50 mrem thyroid CDE.

This is based on values at 1% of the EPA Protective Action Guides (PAGs).

Per NEI 99-01, the effluent monitor readings should correspond to the above dose limits at the "site-specific dose receptor point" (consistent with the calculation methodology employed) for one hour of exposure.

RBS Bases

The liquid effluent limits are based on the water concentration values given in 10 CFR 20 Appendix B Table 2 Column 2 (see Section 2.1.1 above). The 10 CFR 20 values are equivalent to the radionuclide concentrations which, if ingested continuously over the course of a year, would produce a total effective dose equivalent of 0.05 rem (50 mrem). The EPA PAGs are based on a TEDE dose from immersion, inhalation and deposition. The 10 CFR 20 limits and the EPA limits do not represent the same type of exposure and thus cannot be compared on a one to one basis.

Thus, the site specific EALs will not contain an AA1.1 liquid effluent monitor threshold value that equates to 1% of the EPA PAG. However, EALs AA1.3 (liquid effluent sample analysis) and AA1.4 (field survey results) will remain applicable for liquid effluent releases that exceed their respective thresholds.

2.1.4. AA1.1 Gaseous Threshold Limits

Guidance Criteria

The AA1 IC addresses a release of radioactivity resulting in offsite dose greater than 10 mrem TEDE or 50 mrem thyroid CDE.

Per NEI 99-01, the effluent monitor readings are based on values at 1% of the EPA PAGs at the "site-specific dose receptor point" (consistent with the calculation methodology employed) for one hour of exposure.

RBS Bases

The gaseous effluent limits for AA1.1 are based on values that equate to an offsite dose greater than 10 mrem TEDE or 50 mrem CDE thyroid, which are 1% of the EPA PAGs.

2.1.5. AS1.1 Gaseous Threshold Limits

Guidance Criteria

The AS1 IC addresses a release of radioactivity resulting in offsite dose greater than 100 mrem TEDE or 500 mrem thyroid CDE.

This is based on values at 10% of the EPA PAGs at the "site-specific dose receptor point" (consistent with the calculation methodology employed) for one hour of exposure.

RBS Bases

The gaseous effluent limits for AS1.1 are based on values that equate to an offsite dose greater than 100 mrem TEDE or 500 mrem CDE thyroid, which are 10% of the EPA PAGs.

2.1.6. AG1.1 Gaseous Threshold Limits

Guidance Criteria

The AG1 IC addresses a release of radioactivity resulting in offsite dose greater than 1,000 mrem TEDE or 5,000 mrem thyroid CDE.

This is based on values at 100% of the EPA PAGs at the "site-specific dose receptor point" (consistent with the calculation methodology employed) for one hour of exposure.

RBS Bases

The gaseous effluent limits for AG1.1 are based on values that equate to an offsite dose greater than 1,000 mrem TEDE or 5,000 mrem CDE thyroid, which are 100% of the EPA PAGs.

2.2. Effluent Release Points

Note – All effluent release points assume a background reading of zero to conservatively account for all modes of operation applicable to the EALs.

2.2.1. Liquid Release Points

Guidance Criteria

Per NEI 99-01, the AU1 IC addresses normally occurring continuous radioactivity releases from monitored gaseous or liquid effluent pathways (NEI AU1 EAL #1) and planned batch releases from non-continuous release pathways (NEI AU1 EAL #2).

Per NEI 99-01, the AA1 IC includes events or conditions involving a monitored or un-monitored gaseous or liquid radiological release.

Classification based on effluent monitor readings assumes a release path to the environment. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.

The "site-specific monitor list and threshold values" should be determined with consideration of the appropriate installed gaseous and liquid effluent monitors.

RBS Bases

ODCM Figure 4 illustrates two monitors in liquid discharge pathways at RBS.

- RMS-RE107 – Liquid Monitor
- RMS-RE108 – Cooling Tower Blowdown

Per ODCM Section 7.2.2.1, principal sources of liquid radwaste are from floor drains, phase separators/backwash tank subsystem, recovery sample tanks, and reactor water cleanup from batch releases monitored by RE107. Cooling Tower Blowdown is used for batch discharge dilution flow and is not itself a normal source of radioactive liquid discharge. Thus, RE108 is not included in the ODCM setpoint calculations.

2.2.2. Gaseous Release Points

Guidance Criteria

Per NEI 99-01, the AU1 IC addresses normally occurring continuous radioactivity releases from monitored gaseous or liquid effluent pathways (NEI AU1 EAL #1) and planned batch releases from non-continuous release pathways (NEI AU1 EAL #2).

Per NEI 99-01, the AA1 IC includes events or conditions involving a monitored or un-monitored gaseous or liquid radiological release.

Per NEI 99-01, the AS1 and AG1 ICs includes events or conditions involving a monitored and un-monitored of gaseous radiological release.

Classification based on effluent monitor readings assumes a release path to the environment. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.

The "site-specific monitor list and threshold values" should include the effluent monitors described in emergency plan and emergency dose assessment procedures.

RBS Bases

ODCM Section 8.1 lists three monitors in the gaseous radioactivity discharge pathways at RBS.

- Main Plant Exhaust Vent – WRGM RMS-RE125 / Particulate and Gas Monitor RMS-RE126
- Fuel Building Exhaust Vent – WRGM RMS-RE5A / Particulate and Gas Monitor RMS-RE5B
- Radwaste Building Exhaust Vent – WRGM RMS-RE6A / Particulate and Gas Monitor RMS-RE6B

2.3. Source Term

2.3.1. AU1.1 Gaseous Source Term

Guidance Criteria

NEI 99-01 does not provide specific guidance for AU1 gaseous source term assumptions.

RBS Bases

The AU1.1 gaseous effluent EAL threshold is based on the 2010-2014 Annual Radioactive Effluent Release Reports.

For purposes of the EAL thresholds historical annual release report activity is used as a representative basis. Future annual release report results need not require a recalculation of EAL thresholds.

Annual Report Gaseous Effluent Mixed Mode Releases

	2010 (Ci/y)	2011 (Ci/y)	2012 (Ci/y)	2013 (Ci/y)	2014 (Ci/y)	5 yr Total (Ci/y)	Gas Fraction
Ar-41	0.00E+00	0.00E+00	0.00E+00	1.01E+00	0.00E+00	1.01E+00	4.33E-03
Kr-85m	2.44E+00	2.73E+00	4.64E-01	4.42E-01	0.00E+00	6.08E+00	2.61E-02
Kr-87	9.31E-01	5.77E-01	0.00E+00	1.29E-01	0.00E+00	1.64E+00	7.02E-03
Kr-88	2.23E-01	2.09E+00	0.00E+00	1.36E-01	0.00E+00	2.45E+00	1.05E-02
Xe-133	5.02E+00	2.51E+00	2.70E+00	1.23E-01	1.16E+00	1.15E+01	4.94E-02
Xe-135	5.28E+01	3.07E+01	1.27E+01	1.80E+00	3.16E+00	1.01E+02	4.34E-01
Xe-135m	3.58E+01	3.60E+01	1.15E+01	7.35E-01	1.26E+00	8.53E+01	3.66E-01
Xe-137	3.37E+00	3.82E-01	0.00E+00	0.00E+00	0.00E+00	3.75E+00	1.61E-02
Xe-138	7.71E+00	9.15E-01	0.00E+00	1.17E+01	0.00E+00	2.03E+01	8.72E-02
Totals	1.08E+02	7.59E+01	2.74E+01	1.61E+01	5.58E+00	2.33E+02	1.00E+00

Annual Report Gaseous Effluent Ground Releases

	2010 (Ci/y)	2011 (Ci/y)	2012 (Ci/y)	2013 (Ci/y)	2014 (Ci/y)	5 yr Total (Ci/y)	Gas Fraction
Xe-133	1.60E-01	5.97E-01	0.00E+00	0.00E+00	0.00E+00	7.57E-01	2.31E-02
Xe-135	7.50E+00	4.75E+00	3.11E+00	6.53E-01	1.53E+00	1.75E+01	5.36E-01
Xe-135m	4.47E+00	2.19E+00	3.92E+00	1.14E+00	2.68E+00	1.44E+01	4.40E-01
Totals	1.21E+01	7.54E+00	7.03E+00	1.79E+00	4.21E+00	3.27E+01	1.00E+00

2.3.2. AA1.1, AS1.1 and AG1.1 Gaseous Source Terms

Guidance Criteria

NEI 99-01 specifies that the calculation of monitor readings will require use of an assumed release isotopic mix; the selected mix should be the same for ICs AA1, AS1 and AG1.

RBS Bases

The AA1.1, AS1.1 and AG1.1 gaseous EAL thresholds are based on RBS URI dose model results using input assumptions applicable to the event, pathway and particular monitor.

The source term used in the URI dose model is taken from NUREG-1940 Table 1.1 (URI Requirements Specification Appendix A Section A.2).

The process reductions used in the URI dose model are taken from NUREG-1228 and NUREG-1465 (URI Requirements Specification Appendix A Sections A.4 and A.5).

Note – HUT is hold-up time.

Other than the fuel handling accident scenario, the release paths selected were chosen to represent a LOCA type event with fuel clad damage and process reductions for applicable suppression pool and bypass release pathways.

URI input assumptions for the gaseous release points are as follows:

RCS	Pool Subcooled	Rx Bldg HUT <2 hrs	Filter Working	MPE Stack	Env

Release path 'P' selected to model a LOCA type event with fuel clad damage and suppression pool reduction through the Main Plant Exhaust Vent.

RCS	Pool Subcooled	Rx Bldg HUT <2 hrs	Fuel Bldg HUT <2 hrs	Filter Working	FB Stack	Env

Release path 'T' selected to model a LOCA type event with fuel clad damage and suppression pool reduction through the Fuel Building Exhaust Vent.

RCS	Pool Subcooled	Rx Bldg HUT <2 hrs	RW Bldg HUT <2 hrs	Filter Working	RW Stack	Env

Release path 'V' selected to model a LOCA type event with fuel clad damage and suppression pool reduction through the Radwaste Building Exhaust Vent.

A 1 hour time after shutdown (TAS) is used for the source decay period as it is long enough for plant conditions to deteriorate for core damage to occur and a significant release to start.

2.4. Effluent Flow

2.4.1. Effluent Gaseous Vent Flow

Guidance Criteria

NEI 99-01 does not provide specific guidance for effluent gaseous vent flow assumptions.

RBS Bases

Vent flow values are taken from:

- Main Plant Exhaust – URI default flow
- Fuel Building Vent – URI default flow
- Radwaste Building Vent – PID-22-05A and USAR Figure 9.4-3a (based on the sum of HVW-FLT1A/B provided by either HVW-FN4A or HVW-FN4B at 4,000 cfm, and 2 of the 3 HVW-FN1A, B or C flowpaths at 38,200 cfm each)

Refer to Section 3.2.2 for the input values related to the effluent flow parameter.

2.5. Release Duration

Guidance Criteria

Per NEI 99-01, the effluent monitor readings for AS1.1 and AG1.1 gaseous EAL threshold values should correspond to a dose at the "site-specific dose receptor point" (consistent with the calculation methodology employed) for one hour of exposure.

RBS Bases

The effluent monitor readings for AA1.1, AS1.1 and AG1.1 gaseous EAL threshold values are calculated for a release duration of one hour.

2.6. Meteorology

Guidance Criteria

The effluent monitor readings should correspond to the applicable dose limit at the "site-specific dose receptor point." The "site-specific dose receptor point" is the distance(s) and/or locations used by the licensee to distinguish between on-site and offsite doses. The selected distance(s) and/or locations should reflect the content of the emergency plan, and the procedural methodology used to determine offsite doses and protective action recommendations. This is typically the boundary of the Owner Controlled Area.

Monitor readings will be calculated using a set of assumed meteorological data or atmospheric dispersion factors; the data or factors selected for use should be the same for ICs AA1, AS1 and AG1.

RBS Bases

The site-specific meteorology used for the EAL calculation inputs are based upon the USAR and ODCM as documented below.

2.6.1. ODCM Gaseous Dispersion Factor (ODCM Table E-1)

The highest annual average dispersion factor for the restricted area boundary for all Sectors.

- Ground Level = 6.54E-5 sec/m^3 to the West Sector (Radwaste and Fuel Buildings)
- Mixed Mode = 3.31E-6 sec/m3 to the WNW Sector (Main Plant Exhaust)

For purposes of the EAL thresholds the current ODCM dispersion factor is used as a representative basis. Any future changes in ODCM dispersion factor results need not require a recalculation of EAL thresholds.

2.6.2. Stability Class

USAR Tables 2.3-36 to 42 (30' tower) and Tables 2.3-76 to 82 (150' tower) document the predominant stability class as 'E'. Additionally, the cumulative hours from the 2011-2014 Annual Radioactive Effluent Release Reports indicate stability class 'E' as the predominant stability for the 30' and 150' towers. Thus, stability class "E" is used as the URI input for purposes of the EAL calculations.

For purposes of the EAL thresholds the USAR historical stability class is used as a representative basis. Any future changes in USAR stability results need not require a recalculation of EAL thresholds.

2.6.3. Wind Speed

USAR Table 2.3-31 documents the annual average wind speed of 3.7 mph. Thus, a wind speed of 3.7 mph is used as the URI input for purposes of the EAL calculations.

For purposes of the EAL thresholds the USAR historical wind speed is used as a representative basis. Any future changes in USAR wind speed results need not require a recalculation of EAL thresholds.

2.6.4. Wind Direction

USAR Table 2.3-32 documents the predominant wind direction to the East sector. Thus, a wind direction input of 270° (winds from) is used as the URI input for purposes of the EAL calculations.

For purposes of the EAL thresholds the USAR historical wind direction is used as a representative basis. Any future changes in USAR wind direction results need not require a recalculation of EAL thresholds.

2.6.5. Other Parameters

No precipitation is assumed to occur for the duration of the release and plume transport across the Emergency Planning Zone.

3. DESIGN INPUTS

3.1. General Constants and Conversion Factors

3.1.1. 472 cc/sec per cfm

3.2. Gaseous Effluent

3.2.1. Gaseous Effluent Monitor Ranges (G13.18.9.4-065)

Note – Main Plant Exhaust Vent, Fuel Building Exhaust Vent and Radwaste Building Exhaust Vent Particulate and Gas monitors have identical ranges.

1) Particulate and Gas Monitor ..... 1E-7 to 1E-2 µCi/cc

Note – Main Plant Exhaust Vent, Fuel Building Exhaust Vent and Radwaste Building Exhaust Vent WRGMs have identical ranges.

2) WRGM Low Range ..... 1E-7 to 1E-1 µCi/cc
3) WRGM Medium Range ..... 1E-4 to 1E+2 µCi/cc
4) WRGM High Range ..... 1E-1 to 1E+5 µCi/cc

3.2.2. Gaseous Effluent Source Flow – *f*

1) Main Plant Exhaust Vent (URI Default) ..... 123,000 cfm
2) Fuel Building Exhaust Vent (URI Default) ..... 10,000 cfm
3) Radwaste Building Exhaust Vent (PID-22-05A) ..... 80,400 cfm

3.2.3. AU1.1 X/Q Dispersion Factor (ODCM Table E-1)

1) Ground Level Release Points (Radwaste and Fuel Buildings) ..... 6.54E-5 sec/m^3
2) Mixed Mode Release Points (Main Plant) ..... 3.31E-6 sec/m^3

3.2.4. ODCM Dose Factors (ODCM Table C-1)

	γ – Body Kl (mrem/yr per µCi/m^3)	β – Skin Ll (mrem/yr per µCi/m^3)	γ – Air Ml (mrad/yr per µCi/m^3)
Ar-41	8.84E+03	2.69E+03	9.30E+03
Kr-83m	7.56E-02	0.00E+00	1.93E+01
Kr-85m	1.17E+03	1.46E+03	1.23E+03
Kr-85	1.61E+01	1.34E+03	1.72E+01
Kr-87	5.92E+03	9.73E+03	6.17E+03
Kr-88	1.47E+04	2.37E+03	1.52E+04
Kr-89	1.66E+04	1.01E+04	1.73E+04
Kr-90	1.56E+04	7.29E+03	1.63E+04
Xe-131m	9.15E+01	4.76E+02	1.56E+02
Xe-133m	2.51E+02	9.94E+02	3.27E+02
Xe-133	2.94E+02	3.06E+02	3.53E+02
Xe-135m	3.12E+03	7.11E+02	3.36E+03
Xe-135	1.81E+03	1.86E+03	1.92E+03
Xe-137	1.42E+03	1.22E+04	1.51E+03
Xe-138	8.83E+03	4.13E+03	9.21E+03

4. CALCULATIONS

4.1. AU1.1 Gaseous Release

4.1.1. Gaseous Release at the ODCM Limit

$$SP_{whole\ body} = \frac{500}{472 \times f \times {}^{X}/_{Q_{RP}} \times \sum(Q_i \times K_i)}$$

$$SP_{skin} = \frac{3000}{472 \times f \times {}^{X}/_{Q_{RP}} \times \sum(Q_i \times (L_i + 1.1M_i))}$$

Where:	
SP	radiation monitor setpoint equivalent to the ODCM limit (µCi/cc)
500/3000	Dose Limit – 500 whole body or 3000 skin (mrem/yr)
472	conversion factor (cc/ft^3 per sec/min)
f	vent flow (cfm)
X/Q_{RP}	highest land annual average dispersion factor for the release point (sec/m^3)
Q_I	activity released (fraction – unit less)
K_I	whole body dose correction factor (mrem/yr per µCi/m^3)
$L_I + 1.1M_I$	skin dose factor (mrem/yr per µCi/m^3)

4.1.2. AU1.1 Gaseous Release EAL Threshold

AU1.1 gaseous is two times (2x) the lesser of the calculated whole body or skin ODCM limit setpoint.

Refer to Attachment 1 for the spreadsheet calculations that develop the AU1.1 gaseous effluent EAL threshold values for each applicable monitor.

4.1.3. Gas & Particulate Monitors and WRGMs

The AA1.1, AS1.1 and AG1.1 gaseous release EAL thresholds for the gas & particulate monitors and WRGMs are developed using the RBS URI dose assessment model with the inputs described in Section 2 above.

Refer to Attachment 2 for the results of the URI gaseous effluent EAL threshold calculations.

5. CONCLUSIONS

5.1. Effluent Monitor Reading Results

	Release Point	Monitor	GE	SAE	Alert	UE
Gaseous	Main Plant Exhaust Vent	RMS-RE126 (µCi/ml)	N/A	N/A	1.66E-1	1.74E-3
		RMS-RE125 (µCi/sec)	9.56E+8	9.56E+7	9.63E+6	1.01E+5
	Fuel Building Exhaust Vent	RMS-RE5B (µCi/ml)	N/A	N/A	1.72E-1	1.38E-3
		RMS-RE5A (µCi/sec)	7.75E+8	7.75E+7	7.75E+6	6.50E+3
	Radwaste Building Exhaust Vent	RMS-RE6B (µCi/ml)	N/A	N/A	2.12E-1	1.71E-4
		RMS-RE6A (µCi/sec)	8.03E+8	8.03E+7	8.03E+6	6.96E+4
Liquid	Radwaste Liquid Effluent Monitor	RMS-RE107 (µCi/ml)	N/A	N/A	N/A	2x Alarm Setpoint

6. REFERENCES

6.1. NEI 99-01 Revision 6, Methodology for Development of Emergency Action Levels, November 2012

6.2. 10 CFR 20 Appendix B Table 2 Column 2

6.3. EPA-400-R-92-001, Manual of Protective Actions for Nuclear Incidents, May 1992

6.4. NUREG-1228, Source Term Estimation During Incident Response to Severe Nuclear Power Plant Accidents, October 1988

6.5. NUREG-1465, Accident Source Terms for Light-Water Nuclear Power Plants, February 1995

6.6. NUREG-1940, RASCAL 4: Description of Models and Methods, December 2012

6.7. River Bend Station Offsite Dose Calculation Manual (ODCM), Revision 15

6.8. Unified RASCAL Interface Requirement Specification, Draft 051611

6.9. Unified RASCAL Interface Requirement Specification River Bend Site Annex, Version 2, Draft 12/07/14

6.10. River Bend Station USAR

- Table 2.3-31
- Table 2.3-32
- Tables 2.3-36 to 42
- Tables 2.3-76 to 82
- Figure 9.4-3a

6.11. PID-22-05A, Engineering P & I Diagram System 407 HVAC – Radwaste Building, Revision 13

6.12. Radioactive Effluent Release Reports

- 2010 – G9.5, G9.25.1.5, 04/28/11
- 2011 – RBG-47237 / RBF1-12-0060, 04/30/12
- 2012 – RBG-47359 / RBF1-13-0060, 05/01/13
- 2013 – RBG-47467 / RBF1-14-0068, 05/01/14
- 2014 – RBG-47562 / RBF1-15-0066, 05/01/15

	Total Body Dose Factor - Ki (mrem/yr per µCi/m3)	Skin Beta Dose Factor - Li (mrem/yr per µCi/m3)	Gamma Air Dose Factor - Mi (mrad/yr per µCi/m3)	2010 Source Term - (Ci/yr)	2011 Source Term - (Ci/yr)	2012 Source Term - (Ci/yr)	2013 Source Term - (Ci/yr)	2014 Source Term - (Ci/yr)	5 Year Source Term - (Ci/yr)	Source Term Fraction - Qi	Qi x Ki (mrem/yr per µCi/m3)	Qi x (Li + 1.1Mi) (mrem/yr per µCi/m3)
Ar-41	8.8E+03	2.7E+03	9.3E+03	0.00E+00	0.00E+00	0.00E+00	1.01E+00	0.00E+00	1.01E+00	4.33E-03	3.83E+01	1.16E+01
Kr-85m	1.2E+03	1.5E+03	1.2E+03	2.44E+00	2.73E+00	4.64E-01	4.42E-01	0.00E+00	6.08E+00	2.61E-02	3.05E+01	3.80E+01
Kr-87	5.9E+03	9.7E+03	6.2E+03	9.31E-01	5.77E-01	0.00E+00	1.29E-01	0.00E+00	1.64E+00	7.02E-03	4.16E+01	6.83E+01
Kr-88	1.5E+04	2.4E+03	1.5E+04	2.23E-01	2.09E+00	0.00E+00	1.36E-01	0.00E+00	2.45E+00	1.05E-02	1.54E+02	2.49E+01
Xe-133	2.9E+02	3.1E+02	3.5E+02	5.02E+00	2.51E+00	2.70E+00	1.23E-01	1.16E+00	1.15E+01	4.94E-02	1.45E+01	1.51E+01
Xe-135	1.8E+03	1.9E+03	1.9E+03	5.28E+01	3.07E+01	1.27E+01	1.80E+00	3.16E+00	1.01E+02	4.34E-01	7.85E+02	8.07E+02
Xe-135m	3.1E+03	7.1E+02	3.4E+03	3.58E+01	3.60E+01	1.15E+01	7.35E-01	1.26E+00	8.53E+01	3.66E-01	1.14E+03	2.60E+02
Xe-137	1.4E+03	1.2E+04	1.5E+03	3.37E+00	3.82E-01	0.00E+00	0.00E+00	0.00E+00	3.75E+00	1.61E-02	2.28E+01	1.96E+02
Xe-138	8.8E+03	4.1E+03	9.2E+03	7.71E+00	9.15E-01	0.00E+00	1.17E+01	0.00E+00	2.03E+01	8.72E-02	7.70E+02	3.60E+02
				1.08E+02	7.59E+01	2.74E+01	1.61E+01	5.58E+00	2.33E+02	**1.00E+00**	**3.00E+03**	**1.78E+03**

Calculation Constants

Total Body Limit (mrem/yr):	500
Skin Dose Limit (mrem/yr):	3000
UCF (cc/sec per cfm):	472
DCF (mrad to mrem):	1.1

	Plant Vent
Dispersion - X/Q (sec/m3):	3.31E-06
Effluent Flow - f (cfm):	1.23E+05

Calculated Setpoint Results	Plant Vent
SP-TB (µCi/sec):	5.04E+04
SP-Skin (µCi/sec):	5.09E+05
SP-TB (µCi/cc):	8.68E-04
SP-Skin (µCi/cc):	8.77E-03

Calculated UE Threshold Results	Plant Vent
AU1.1 (µCi/sec):	1.01E+05
AU1.1 (µCi/cc):	1.74E-03

	Total Body Dose Factor - Ki (mrem/yr per µCi/m3)	Skin Beta Dose Factor - Li (mrem/yr per µCi/m3)	Gamma Air Dose Factor - Mi (mrad/yr per µCi/m3)	2010 Source Term - (Ci/yr)	2011 Source Term - (Ci/yr)	2012 Source Term - (Ci/yr)	2013 Source Term - (Ci/yr)	2014 Source Term - (Ci/yr)	5 Year Source Term - (Ci/yr)	Source Term Fraction - Qi	Qi x Ki (mrem/yr per µCi/m3)	Qi x (Li + 1.1Mi) (mrem/yr per µCi/m3)
Xe-133	2.9E+02	3.1E+02	3.5E+02	1.60E-01	5.97E-01	0.00E+00	0.00E+00	0.00E+00	7.57E-01	2.31E-02	6.81E+00	7.08E+00
Xe-135	1.8E+03	1.9E+03	1.9E+03	7.50E+00	4.75E+00	3.11E+00	6.53E-01	1.53E+00	1.75E+01	5.36E-01	9.71E+02	9.98E+02
Xe-135m	3.1E+03	7.1E+02	3.4E+03	4.47E+00	2.19E+00	3.92E+00	1.14E+00	2.68E+00	1.44E+01	4.40E-01	1.37E+03	3.13E+02
				1.21E+01	7.54E+00	7.03E+00	1.79E+00	4.21E+00	3.27E+01	**1.00E+00**	**2.35E+03**	**1.32E+03**

Calculation Constants

Total Body Limit (mrem/yr):	500
Skin Dose Limit (mrem/yr):	3000
UCF (cc/sec per cfm):	472
DCF (mrad to mrem):	1.1

	Fuel Bldg	RW Bldg
Dispersion - X/Q (sec/m3):	6.54E-05	6.54E-05
Effluent Flow - f (cfm):	1.00E+04	8.04E+04

Calculated Setpoint Results

	Fuel Bldg	RW Bldg
SP-TB (µCi/sec):	3.25E+03	3.25E+03
SP-Skin (µCi/sec):	3.48E+04	3.48E+04
SP-TB (µCi/cc):	6.89E-04	8.57E-05
SP-Skin (µCi/cc):	7.37E-03	9.17E-04

Calculated UE Threshold Results

	Fuel Bldg	RW Bldg
AU1.1 (µCi/sec):	**6.50E+03**	**6.96E+04**
AU1.1 (µCi/cc):	**1.38E-03**	**1.71E-04**

Main Plant Exhaust Vent RMS-RE125 – General Emergency

Dose Assessment

River Bend — Thursday, March 8, 2018 21:30

Method: Detailed Assessment - Monitored Release

Release Pathway: <RCS> <Supp Pool> <Rx Bldg> <Filter> <Main Plant Exh> <Env> — PRF: 4.00E-05

Rx Bldg HUT: = < 2 Hours | Supp Pool Status: = Subcooled | Aux RW Turb FB HUT: = N/A | FB/RW Filter: = N/A

SBGT Filter: = Working

Source Term: Reactor Core Accident - Clad — Pri Lower

Time After S/D (hh:mm): 1:00 — Wind: From 270° @ 3.7 mph

Release Duration (hh:mm): 1:00 ETE (hh:mm): [N/A] — Stability Class: E

Precipitation: None

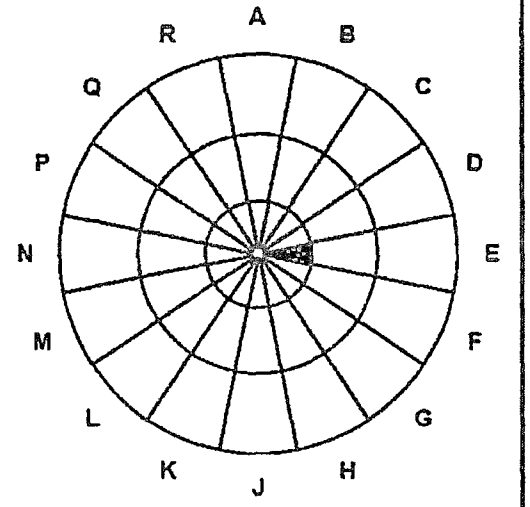
Monitor: MPE WRGM Rate Readings: 9.56E+08 uCi/sec

Distance (Miles)	Exposure Rate (mR/hr)	External Plume DDE (Rem)	Inhalation CEDE (Rem)	Deposition Ground DDE (Rem)	TEDE (Rem)	CDE Thyroid (Rem)
S.B	1.41E+03	9.83E-01	1.16E-02	6.18E-03	1.00E+00	1.54E-01
0.7	1.20E+03	8.32E-01	2.12E-02	1.40E-02	8.67E-01	1.23E-01
1.0	9.20E+02	6.32E-01	2.42E-02	1.66E-02	6.73E-01	8.80E-02
1.5	6.76E+02	4.60E-01	2.65E-02	1.80E-02	5.04E-01	6.32E-02
2.0	5.28E+02	3.56E-01	2.64E-02	1.73E-02	4.00E-01	5.00E-02
3.0	4.36E+02	2.81E-01	1.64E-02	1.05E-02	3.08E-01	3.58E-02
4.0	3.73E+02	2.36E-01	1.54E-02	9.42E-03	2.60E-01	2.98E-02
5.0	3.14E+02	2.12E-01	1.47E-02	8.67E-03	2.36E-01	2.69E-02
7.0	2.52E+02	1.63E-01	1.18E-02	6.47E-03	1.81E-01	2.09E-02
10.0	1.69E+02	1.07E-01	7.63E-03	3.74E-03	1.18E-01	1.40E-02

Assessment Data Results Saved to File:
River Bend 10Miles Monitored Release 03082018 213011.URI7

Evacuation Areas From 0 to 10 Miles

Circle distances are 2, 5 and 10 miles.



PAGs Exceeded in Designated Areas

Release Rates (Ci / sec)	
Particulate	3.69E-03 (0.0%)
Iodine	7.11E-02 (0.0%)
Noble Gas	9.56E+02 (100.0%)

*** Classification: General Emergency ***

Reviewed By: _____

Page 1 of 3 — River Bend / 2.0.1.0

Main Plant Exhaust Vent RMS-RE125 – Site Area Emergency

Dose Assessment

River Bend — Thursday, March 8, 2018 21:33

Method: Detailed Assessment - Monitored Release

Release Pathway: <RCS> <Supp Pool> <Rx Bldg> <Filter> <Main Plant Exh> <Env> — PRF: 4.00E-05

Rx Bldg HUT: = < 2 Hours | Supp Pool Status: = Subcooled | Aux RW Turb FB HUT: = N/A | FB/RW Filter: = N/A

SBGT Filter: = Working

Source Term: Reactor Core Accident - Clad — Pn Lower

Time After S/D (hh:mm): 1:00 — Wind: From 270° @ 3.7 mph

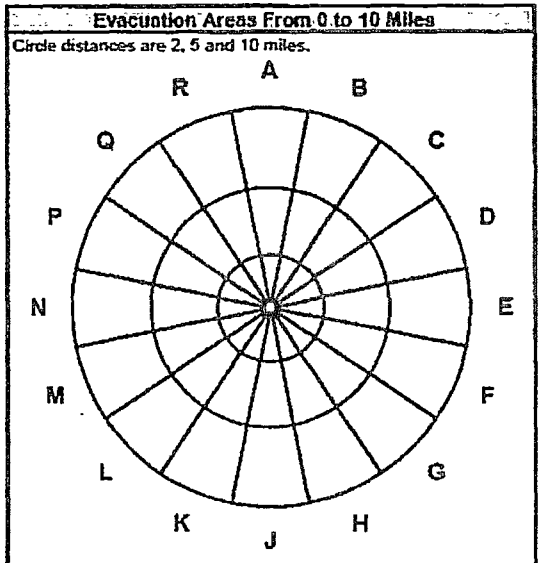
Release Duration (hh:mm): 1:00 ETE (hh:mm): [N/A] — Stability Class: E

Precipitation: None

Monitor: MPE WRGM Rate Readings: 9.56E+07 uCi/sec

Distance (Miles)	Exposure Rate (mR/hr)	External Plume DDE (Rem)	Inhalation CEDE (Rem)	Deposition Ground DDE (Rem)	TEDE (Rem)	CDE Thyroid (Rem)
S B	1.41E+02	9.83E-02	1.16E-03	6.18E-04	1.00E-01	1.54E-02
0.7	1.20E+02	8.32E-02	2.12E-03	1.40E-03	8.67E-02	1.23E-02
1.0	9.20E+01	6.32E-02	2.42E-03	1.66E-03	6.73E-02	8.80E-03
1.5	6.76E+01	4.60E-02	2.65E-03	1.80E-03	5.04E-02	6.32E-03
2.0	5.28E+01	3.56E-02	2.64E-03	1.73E-03	4.00E-02	5.00E-03
3.0	4.36E+01	2.81E-02	1.64E-03	1.05E-03	3.08E-02	3.58E-03
4.0	3.73E+01	2.36E-02	1.54E-03	9.42E-04	2.60E-02	2.98E-03
5.0	3.14E+01	2.12E-02	1.47E-03	8.67E-04	2.36E-02	2.69E-03
7.0	2.52E+01	1.63E-02	1.18E-03	6.47E-04	1.81E-02	2.09E-03
10.0	1.69E+01	1.07E-02	7.63E-04	3.74E-04	1.18E-02	1.40E-03

Assessment Data Results Saved to File:
River Bend 10Miles Monitored Release 03082018 213325.URI7



No PAGs Exceeded

*** Classification: Site Area Emergency ***

Release Rates (Ci / sec)	
Particulate	3.69E-04 (0.0%)
Iodine	7.11E-03 (0.0%)
Noble Gas	9.56E+01 (100.0%)

Reviewed By: _____

Page 1 of 3 — River Bend / 2.0 1.0

Main Plant Exhaust Vent RMS-RE125 – Alert

Dose Assessment

River Bend — Thursday, March 8, 2018 21:36

Method: Detailed Assessment - Monitored Release

Release Pathway: <RCS> <Supp Pool> <Rx Bldg> <Filter> <Main Plant Exh> <Env> — PRF: 4.00E-05

Rx Bldg HUT: = < 2 Hours — Supp Pool Status: = Subcooled — Aux RW Turb FB HUT: = N/A — FB/RW Filter: = N/A

SBGT Filter: = Working

Source Term: Reactor Core Accident - Clad — Pri Lower

Time After S/D (hh:mm): 1:00 — Wind: From 270° @ 3.7 mph

Release Duration (hh:mm): 1:00 — ETE (hh:mm): [N/A] — Stability Class: E

Precipitation: None

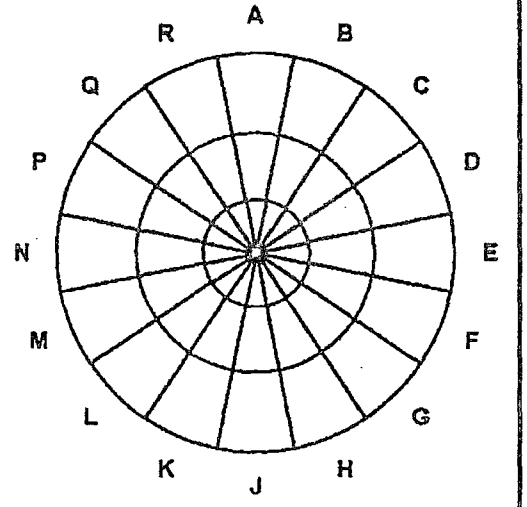
Monitor: MPE WRGM Rate — Readings: 9.63E+06 uCi/sec

Distance (Miles)	Exposure Rate (mR/hr)	External Plume DDE (Rem)	Inhalation CEDE (Rem)	Deposition Ground DDE (Rem)	TEDE (Rem)	CDE Thyroid (Rem)
S B	1.42E+01	9.89E-03	1.17E-04	0.00E+00	1.00E-02	1.55E-03
0.7	1.21E+01	8.36E-03	2.13E-04	1.41E-04	8.71E-03	1.24E-03
1.0	9.28E+00	6.36E-03	2.44E-04	1.67E-04	6.77E-03	8.88E-04
1.5	6.80E+00	4.64E-03	2.67E-04	1.81E-04	5.09E-03	6.40E-04
2.0	5.32E+00	3.59E-03	2.66E-04	1.74E-04	4.03E-03	5.04E-04
3.0	4.36E+00	2.83E-03	1.65E-04	1.05E-04	3.10E-03	3.62E-04
4.0	3.76E+00	2.37E-03	1.55E-04	0.00E+00	2.53E-03	3.01E-04
5.0	3.16E+00	2.14E-03	1.49E-04	0.00E+00	2.29E-03	2.71E-04
7.0	2.54E+00	1.64E-03	1.19E-04	0.00E+00	1.76E-03	2.11E-04
10.0	1.70E+00	1.07E-03	0.00E+00	0.00E+00	1.07E-03	1.42E-04

Assessment Data Results Saved to File:
River Bend 10Miles Monitored Release 03082018 213835.URI7

Evacuation Areas From 0 to 10 Miles

Circle distances are 2, 5 and 10 miles.



No PAGs Exceeded

Release Rates (Ci / sec)	
Particulate	3.72E-05 (0.0%)
Iodine	7.16E-04 (0.0%)
Noble Gas	9.63E+00 (100.0%)

*** Classification: Validate against Emergency Action Levels ***

Reviewed By: _____

Page 1 of 3 — River Bend / 2.0.1.0

Main Plant Exhaust Vent RMS-RE126 – Alert

Dose Assessment

River Bend — Thursday, March 8, 2018 21:49

Method: Detailed Assessment - Monitored Release

Release Pathway: <RCS> <Supp Pool> <Rx Bldg> <Filter> <Main Plant Exh> <Env> — PRF: 4.00E-05

Rx Bldg HUT: = < 2 Hours | Supp Pool Status: = Subcooled | Aux RW Turb FB HUT: = N/A | FB/RW Filter: = N/A

SBGT Filter: = Working

Source Term: Reactor Core Accident - Clad — Pri Lower

Time After S/D (hh:mm): 1:00 — Wind: From 270° @ 3.7 mph

Release Duration (hh:mm): 1:00 — ETE (hh:mm): [N/A] — Stability Class: E

Precipitation: None

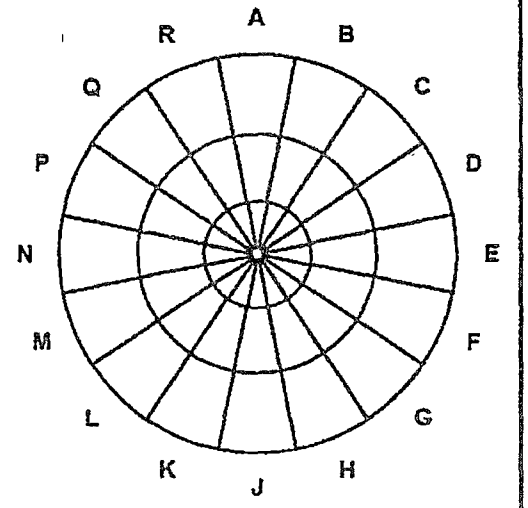
Monitor: MPE Gas — Readings: 1.66E-01 uCi/cc — Flowrate: 123000 CFM

Distance (Miles)	Exposure Rate (mR/hr)	External Plume DDE (Rem)	Inhalation CEDE (Rem)	Deposition Ground DDE (Rem)	TEDE (Rem)	CDE Thyroid (Rem)
S B.	1.42E+01	9.89E-03	1.17E-04	0.00E+00	1.00E-02	1.55E-03
0.7	1.21E+01	8.36E-03	2.13E-04	1.41E-04	8.71E-03	1.24E-03
1.0	9.28E+00	6.36E-03	2.44E-04	1.67E-04	6.77E-03	8.88E-04
1.5	6.84E+00	4.64E-03	2.67E-04	1.81E-04	5.09E-03	6.40E-04
2.0	5.32E+00	3.59E-03	2.66E-04	1.74E-04	4.03E-03	5.04E-04
3.0	4.36E+00	2.83E-03	1.65E-04	1.06E-04	3.10E-03	3.62E-04
4.0	3.76E+00	2.37E-03	1.55E-04	0.00E+00	2.53E-03	3.01E-04
5.0	3.16E+00	2.14E-03	1.49E-04	0.00E+00	2.29E-03	2.71E-04
7.0	2.54E+00	1.64E-03	1.19E-04	0.00E+00	1.76E-03	2.11E-04
10.0	1.70E+00	1.07E-03	0.00E+00	0.00E+00	1.07E-03	1.42E-04

Assessment Data Results Saved to File:
River Bend 10Miles Monitored Release 03082018 214911.URI7

Evacuation Areas From 0 to 10 Miles

Circle distances are 2, 5 and 10 miles.



No PAGs Exceeded

*** Classification: Validate against Emergency Action Levels ***

Release Rates (Ci / sec)	
Particulate	3.72E-05 (0.0%)
Iodine	7.16E-04 (0.0%)
Noble Gas	9.64E+00 (100.0%)

Reviewed By: _____

Page 1 of 3 — River Bend / 2.0.1.0

Fuel Building Exhaust Vent RMS-RE5A – General Emergency

Dose Assessment

River Bend — Thursday, March 8, 2018 21:56

Method: Detailed Assessment - Monitored Release

Release Pathway: <RCS> <Supp Pool> <Rx Bldg> <Fuel Bldg> <Filter> <FB Exh> <Env> — PRF: 1.60E-05

Rx Bldg HUT: = < 2 Hours | Supp Pool Status: = Subcooled | Aux RW Turb FB HUT: = < 2 Hours | FB/RW Filter: = Working | SBGT Filter: = N/A

Source Term: Reactor Core Accident - Clad — Pri Lower

Time After S/D (hh:mm): 1:00 — Wind: From 270° @ 3.7 mph

Release Duration (hh:mm): 1:00 — ETE (hh:mm): [N/A] — Stability Class: E

Precipitation: None

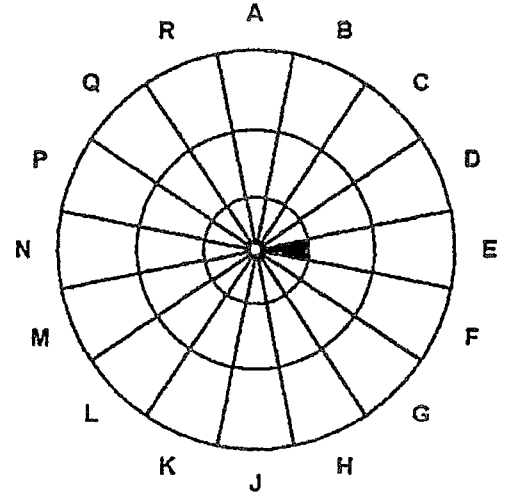
Monitor: FB WRGM Rate — Readings: 7.75E+08 uCi/sec

Distance (Miles)	Exposure Rate (mR/hr)	External Plume DDE (Rem)	Inhalation CEDE (Rem)	Deposition Ground DDE (Rem)	TEDE (Rem)	CDE Thyroid (Rem)
S.B.	1.38E+03	9.54E-01	2.72E-02	1.95E-02	1.00E+00	6.24E-02
0.7	1.15E+03	7.88E-01	3.10E-02	2.22E-02	8.41E-01	5.00E-02
1.0	8.64E+02	5.88E-01	3.45E-02	2.42E-02	6.47E-01	3.63E-02
1.5	6.12E+02	4.12E-01	3.21E-02	2.14E-02	4.66E-01	2.65E-02
2.0	4.76E+02	3.18E-01	2.71E-02	1.71E-02	3.62E-01	2.07E-02
3.0	3.93E+02	2.65E-01	1.76E-02	1.08E-02	2.94E-01	1.51E-02
4.0	3.38E+02	2.21E-01	1.56E-02	9.02E-03	2.46E-01	1.24E-02
5.0	2.85E+02	1.81E-01	1.29E-02	7.09E-03	2.01E-01	1.00E-02
7.0	1.83E+02	1.20E-01	8.32E-03	4.17E-03	1.32E-01	6.61E-03
10.0	1.13E+02	7.43E-02	4.73E-03	2.10E-03	8.11E-02	4.16E-03

Assessment Data Results Saved to File:
River Bend 10Miles Monitored Release 03082018 215844.URI7

Evacuation Areas From 0 to 10 Miles

Circle distances are 2, 5 and 10 miles.



PAGs Exceeded in Designated Areas

Classification: General Emergency

Release Rates (Ci / sec)	
Particulate	1.20E-03 (0.0%)
Iodine	2.30E-02 (0.0%)
Noble Gas	7.75E+02 (100.0%)

Reviewed By: _____

Page 1 of 3 — River Bend / 2.0.1.0

Fuel Building Exhaust Vent RMS-RE5A – Site Area Emergency

Dose Assessment

River Bend — Thursday, March 8, 2018 21:59

Method: Detailed Assessment - Monitored Release

Release Pathway: <RCS> <Supp Pool> <Rx Bldg> <Fuel Bldg> <Filter> <FB Exh> <Env> — PRF: 1.00E-05

Rx Bldg HUT: = < 2 Hours | Supp Pool Status: = Subcooled | Aux RW Turb FB HUT: = < 2 Hours | FB/RW Filter: = Working

SBGT Filter: = N/A

Source Term: Reactor Core Accident - Clad — Pri Lower

Time After S/D (hh:mm): 1:00 — Wind: From 270° @ 3.7 mph

Release Duration (hh:mm): 1:00 ETE (hh:mm): [N/A] — Stability Class: E

Precipitation: None

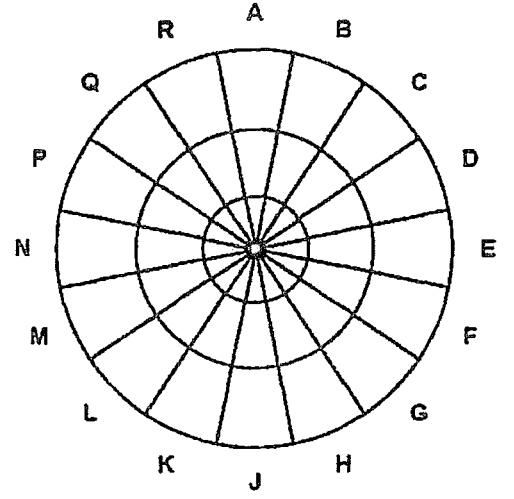
Monitor: FB WRGM Rate Readings: 7.75E+07 uCi/sec

Distance (Miles)	Exposure Rate (mR/hr)	External Plume DDE (Rem)	Inhalation CEDE (Rem)	Deposition Ground DDE (Rem)	TEDE (Rem)	CDE Thyroid (Rem)
S.B.	1.38E+02	9.54E-02	2.72E-03	1.95E-03	1.00E-01	6.24E-03
0.7	1.15E+02	7.88E-02	3.10E-03	2.22E-03	8.41E-02	5.00E-03
1.0	8.64E+01	5.88E-02	3.45E-03	2.42E-03	6.47E-02	3.63E-03
1.5	6.12E+01	4.12E-02	3.21E-03	2.14E-03	4.66E-02	2.65E-03
2.0	4.76E+01	3.18E-02	2.71E-03	1.71E-03	3.62E-02	2.07E-03
3.0	3.93E+01	2.65E-02	1.76E-03	1.08E-03	2.94E-02	1.51E-03
4.0	3.38E+01	2.21E-02	1.56E-03	9.02E-04	2.46E-02	1.24E-03
5.0	2.85E+01	1.81E-02	1.29E-03	7.09E-04	2.01E-02	1.00E-03
7.0	1.83E+01	1.20E-02	8.32E-04	4.17E-04	1.32E-02	6.61E-04
10.0	1.13E+01	7.43E-03	4.73E-04	2.10E-04	8.11E-03	4.16E-04

Assessment Data Results Saved to File:
River Bend 10Miles Monitored Release 03082018 215910.URI7

Evacuation Areas From 0 to 10 Miles

Circle distances are 2, 5 and 10 miles.



No PAGs Exceeded

Classification: Site Area Emergency

Release Rates (Ci / sec)	
Particulate	1.20E-04 (0.0%)
Iodine	2.30E-03 (0.0%)
Noble Gas	7.75E+01 (100.0%)

Reviewed By: _____

Page 1 of 3 — River Bend / 2.0.1.0

Fuel Building Exhaust Vent RMS-RE5A – Alert

Dose Assessment

River Bend — Thursday, March 8, 2018 22:01

Method: Detailed Assessment - Monitored Release

Release Pathway: <RCS> <Supp Pool> <Rx Bldg> <Fuel Bldg> <Filter> <FB Exh> <Env> — PRF: 1.60E-05

Rx Bldg HUT: = < 2 Hours | Supp Pool Status: = Subcooled | Aux RW Turb FB HUT: = < 2 Hours | FB/RW Filter = Working

SBGT Filter: = N/A

Source Term: Reactor Core Accident - Clad — Pri Lower

Time After S/D (hh:mm): 1:00 — Wind: From 270° @ 3.7 mph

Release Duration (hh:mm): 1:00 — ETE (hh:mm): [N/A] — Stability Class: E

Precipitation: None

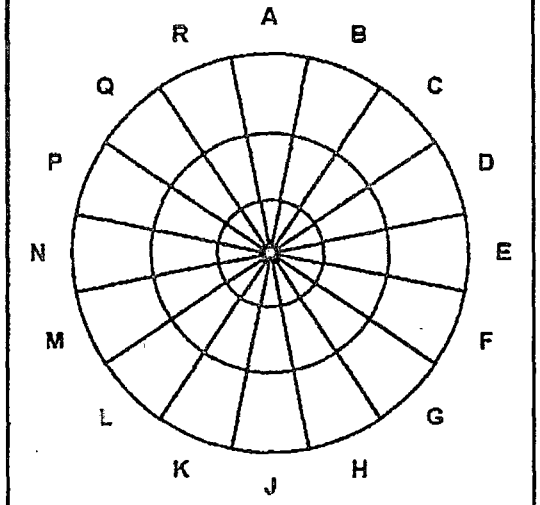
Monitor: FB WRGM Rate — Readings: 7.75E+06 uCi/sec

Distance (Miles)	Exposure Rate (mR/hr)	External Plume DDE (Rem)	Inhalation CEDE (Rem)	Deposition Ground DDE (Rem)	TEDE (Rem)	CDE Thyroid (Rem)
S.B.	1.38E+01	9.54E-03	2.72E-04	1.95E-04	1.00E-02	6.24E-04
0.7	1.15E+01	7.88E-03	3.10E-04	2.22E-04	8.41E-03	5.00E-04
1.0	8.64E+00	5.88E-03	3.45E-04	2.42E-04	6.47E-03	3.63E-04
1.5	6.12E+00	4.12E-03	3.21E-04	2.14E-04	4.66E-03	2.65E-04
2.0	4.76E+00	3.18E-03	2.71E-04	1.71E-04	3.62E-03	2.07E-04
3.0	3.93E+00	2.65E-03	1.76E-04	1.08E-04	2.94E-03	1.51E-04
4.0	3.38E+00	2.21E-03	1.56E-04	0.00E+00	2.37E-03	1.24E-04
5.0	2.85E+00	1.81E-03	1.29E-04	0.00E+00	1.94E-03	1.00E-04
7.0	1.83E+00	1.20E-03	0.00E+00	0.00E+00	1.20E-03	0.00E+00
10.0	1.13E+00	7.43E-04	0.00E+00	0.00E+00	7.43E-04	0.00E+00

Assessment Data Results Saved to File:
River Bend 10Miles Monitored Release 03082018 220109.URI7

Evacuation Areas From 0 to 10 Miles

Circle distances are 2, 5 and 10 miles.



No PAGs Exceeded

Classification: Validate against Emergency Action Levels

Release Rates (Ci / sec)	
Particulate	1.20E-05 (0.0%)
Iodine	2.30E-04 (0.0%)
Noble Gas	7.75E+00 (100.0%)

Reviewed By: _____

Page 1 of 3 — River Bend / 2.0 1.0

Fuel Building Exhaust Vent RMS-RE5B – Alert

Dose Assessment

River Bend — Thursday, March 8, 2018 22:04

Method: Detailed Assessment - Monitored Release

Release Pathway: <RCS> <Supp Pool> <Rx Bldg> <Fuel Bldg> <Filter> <FB Exh> <Env> — PRF: 1.60E-05

Rx Bldg HUT: = < 2 Hours | Supp Pool Status: = Subcooled | Aux RW Turb FB HUT: = < 2 Hours | FB/RW Filter = Working

SBGT Filter: = N/A

Source Term: Reactor Core Accident - Clad — Pri Lower

Time After S/D (hh:mm): 1:00 — Wind: From 270° @ 3.7 mph

Release Duration (hh:mm): 1:00 ETE (hh:mm): [N/A] — Stability Class: E

Precipitation: None

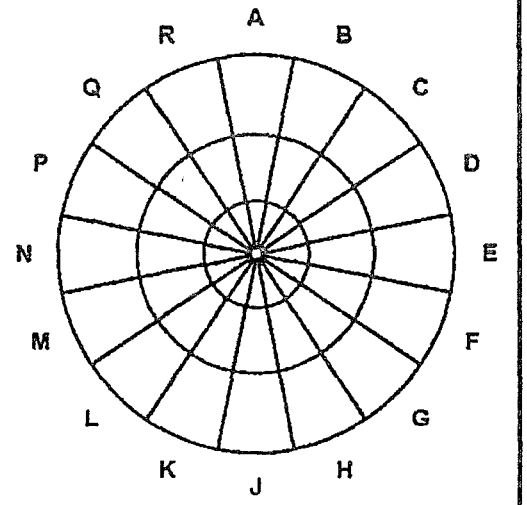
Monitor: FB Gas Readings: 1.72E-01 uCi/cc Flowrate: 10000 CFM

Distance (Miles)	Exposure Rate (mR/hr)	External Plume DDE (Rem)	Inhalation CEDE (Rem)	Deposition Ground DDE (Rem)	TEDE (Rem)	CDE Thyroid (Rem)
S B	1.45E+00	1.00E-03	0.00E+00	0.00E+00	1.00E-03	0.00E+00
0.7	1.21E+00	8.28E-04	0.00E+00	0.00E+00	8.28E-04	0.00E+00
1.0	9.08E-01	6.12E-04	0.00E+00	0.00E+00	6.12E-04	0.00E+00
1.5	6.40E-01	4.28E-04	0.00E+00	0.00E+00	4.28E-04	0.00E+00
2.0	4.96E-01	3.33E-04	0.00E+00	0.00E+00	3.33E-04	0.00E+00
3.0	4.12E-01	2.78E-04	0.00E+00	0.00E+00	2.78E-04	0.00E+00
4.0	3.54E-01	2.32E-04	0.00E+00	0.00E+00	2.32E-04	0.00E+00
5.0	2.98E-01	1.89E-04	0.00E+00	0.00E+00	1.89E-04	0.00E+00
7.0	1.91E-01	1.26E-04	0.00E+00	0.00E+00	1.26E-04	0.00E+00
10.0	1.18E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Assessment Data Results Saved to File:
River Bend 10Miles Monitored Release 03082018 220435.URI7

Evacuation Areas From 0 to 10 Miles

Circle distances are 2, 5 and 10 miles.



No PAGs Exceeded

Classification: Validate against Emergency Action Levels

Release Rates (Ci / sec)	
Particulate	1.25E-06 (0.0%)
Iodine	2.41E-05 (0.0%)
Noble Gas	6.12E-01 (100.0%)

Reviewed By: _____

Page 1 of 3 — River Bend 12.0.1.0

Radwaste Building Exhaust Vent RMS-RE6A – General Emergency

Dose Assessment

River Bend — Thursday, March 8, 2018 22:10

Method: Detailed Assessment - Monitored Release

Release Pathway: <RCS> <Supp Pool> <Rx Bldg> <RW Bldg> < Filter> <RW Exh> <Env> — PRF: 1.60E-05

Rx Bldg HUT: = < 2 Hours | Supp Pool Status: = Subcooled | Aux RW Turb FB HUT: = < 2 Hours | FB/RW Filter: = Working

SBGT Filter: = N/A

Source Term: Reactor Core Accident - Clad — Pri Lower

Time After S/D (hh:mm): 1:00 — Wind: From 270° @ 3.7 mph

Release Duration (hh:mm): 1:00 ETE (hh:mm): [N/A] — Stability Class: E

Precipitation: None

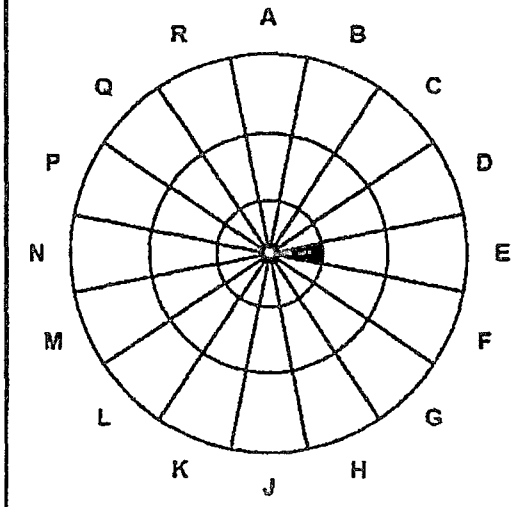
Monitor: RW WRGM Rate Readings: 8.03E+08 uCi/sec

Distance (Miles)	Exposure Rate (mR/hr)	External Plume DDE (Rem)	Inhalation CEDE (Rem)	Deposition Ground DDE (Rem)	TEDE (Rem)	CDE Thyroid (Rem)
S.B.	1.38E+03	9.53E-01	2.74E-02	1.96E-02	1.00E+00	6.27E-02
0.7	1.16E+03	7.92E-01	3.10E-02	2.22E-02	8.45E-01	5.00E-02
1.0	8.68E+02	5.88E-01	3.44E-02	2.41E-02	6.47E-01	3.61E-02
1.5	6.16E+02	4.12E-01	3.19E-02	2.13E-02	4.65E-01	2.63E-02
2.0	4.72E+02	3.18E-01	2.70E-02	1.70E-02	3.62E-01	2.06E-02
3.0	3.92E+02	2.66E-01	1.69E-02	1.07E-02	2.93E-01	1.50E-02
4.0	3.30E+02	2.21E-01	1.53E-02	9.08E-03	2.45E-01	1.23E-02
5.0	2.79E+02	1.87E-01	1.33E-02	7.53E-03	2.08E-01	1.03E-02
7.0	1.92E+02	1.25E-01	8.84E-03	4.59E-03	1.38E-01	6.88E-03
10.0	1.27E+02	8.31E-02	5.50E-03	2.55E-03	9.12E-02	4.65E-03

Assessment Data Results Saved to File:
River Bend 10Miles Monitored Release 03082018 221014.URI7

Evacuation Areas From 0 to 10 Miles

Circle distances are 2, 5 and 10 miles.



PAGs Exceeded in Designated Areas

Classification: General Emergency

Release Rates (Ci / sec)	
Particulate	1.24E-03 (0.0%)
Iodine	2.39E-02 (0.0%)
Noble Gas	8.03E+02 (100.0%)

Reviewed By: _____

Page 1 of 3 — River Bend / 2.0.1.0

Radwaste Building Exhaust Vent RMS-RE6A – Site Area Emergency

Dose Assessment

River Bend — Thursday, March 8, 2018 22:14

Method: Detailed Assessment - Monitored Release

Release Pathway: <RCS> <Supp Pool> <Rx Bldg> <RW Bldg> < Filter> <RW Exh> <Env> — PRF: 1.60E-05

Rx Bldg HUT: = < 2 Hours — Supp Pool Status: = Subcooled — Aux RW Turb FB HUT: = < 2 Hours — FB/RW Filter: = Working

SBGT Filter: = N/A

Source Term: Reactor Core Accident - Clad — Pn Lower

Time After S/D (hh:mm): 1:00 — Wind: From 270° @ 3.7 mph

Release Duration (hh:mm): 1:00 — ETE (hh:mm): [N/A] — Stability Class: E

Precipitation: None

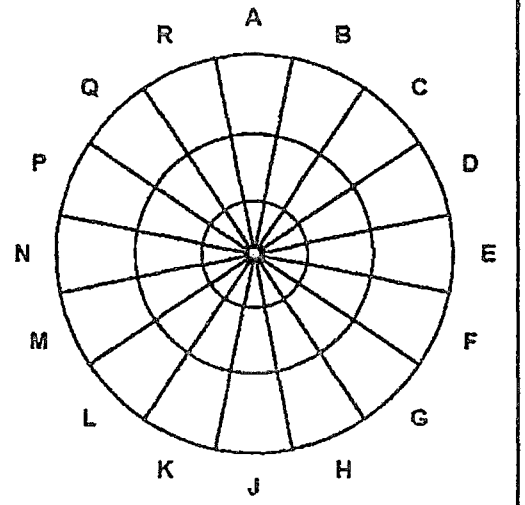
Monitor: RW WRGM Rate — Readings: 8.03E+07 uCi/sec

Distance (Miles)	Exposure Rate (mR/hr)	External Plume DDE (Rem)	Inhalation CEDE (Rem)	Deposition Ground DDE (Rem)	TEDE (Rem)	CDE Thyroid (Rem)
S.B.	1.38E+02	9.53E-02	2.74E-03	1.96E-03	1.00E-01	6.27E-03
0.7	1.16E+02	7.92E-02	3.10E-03	2.22E-03	8.45E-02	5.00E-03
1.0	8.68E+01	5.88E-02	3.44E-03	2.41E-03	6.47E-02	3.61E-03
1.5	6.16E+01	4.12E-02	3.19E-03	2.13E-03	4.65E-02	2.63E-03
2.0	4.72E+01	3.18E-02	2.70E-03	1.70E-03	3.62E-02	2.06E-03
3.0	3.92E+01	2.66E-02	1.69E-03	1.07E-03	2.93E-02	1.50E-03
4.0	3.30E+01	2.21E-02	1.53E-03	9.08E-04	2.45E-02	1.23E-03
5.0	2.79E+01	1.87E-02	1.33E-03	7.53E-04	2.08E-02	1.03E-03
7.0	1.92E+01	1.25E-02	8.84E-04	4.59E-04	1.38E-02	6.88E-04
10.0	1.27E+01	8.31E-03	5.50E-04	2.55E-04	9.12E-03	4.65E-04

Assessment Data Results Saved to File:
River Bend 10Miles Monitored Release 03082018 221434.URI7

Evacuation Areas From 0 to 10 Miles

Circle distances are 2, 5 and 10 miles.



No PAGs Exceeded

*** Classification: Site Area Emergency ***

Release Rates (Ci / sec)	
Particulate	1.24E-04 (0.0%)
Iodine	2.39E-03 (0.0%)
Noble Gas	8.03E+01 (100.0%)

Reviewed By: _____

Page 1 of 3 — River Bend / 2.0.1.0

Radwaste Building Exhaust Vent RMS-RE6A – Alert

Dose Assessment

River Bend — Thursday, March 8, 2018 22:16

Method: Detailed Assessment - Monitored Release

Release Pathway: <RCS> <Supp Pool> <Rx Bldg> <RW Bldg> < Filter> <RW Exh> <Env> — PRF: 1.60E-05

Rx Bldg HUT: = < 2 Hours — Supp Pool Status: = Subcooled — Aux RW Turb FB HUT: = < 2 Hours — FB/RW Filter: = Working

SBGT Filter: = N/A

Source Term: Reactor Core Accident - Clad — Pri Lower

Time After S/D (hh:mm): 1:00 — Wind: From 270° @ 3.7 mph

Release Duration (hh:mm): 1:00 — ETE (hh:mm): [N/A] — Stability Class: E

Precipitation: None

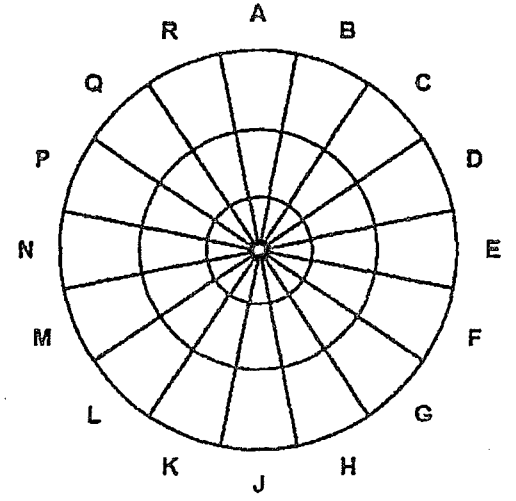
Monitor: RW WRGM Rate — Readings: 8.03E+06 uCi/sec

Distance (Miles)	Exposure Rate (mR/hr)	External Plume DDE (Rem)	Inhalation CEDE (Rem)	Deposition Ground DDE (Rem)	TEDE (Rem)	CDE Thyroid (Rem)
S.B.	1.38E+01	9.53E-03	2.74E-04	1.96E-04	1.00E-02	6.27E-04
0.7	1.16E+01	7.92E-03	3.10E-04	2.22E-04	8.45E-03	5.00E-04
1.0	8.68E+00	5.88E-03	3.44E-04	2.41E-04	6.47E-03	3.61E-04
1.5	6.16E+00	4.12E-03	3.19E-04	2.13E-04	4.65E-03	2.63E-04
2.0	4.72E+00	3.18E-03	2.70E-04	1.70E-04	3.62E-03	2.06E-04
3.0	3.92E+00	2.66E-03	1.69E-04	1.07E-04	2.93E-03	1.50E-04
4.0	3.30E+00	2.21E-03	1.53E-04	0.00E+00	2.36E-03	1.23E-04
5.0	2.79E+00	1.87E-03	1.33E-04	0.00E+00	2.00E-03	1.03E-04
7.0	1.92E+00	1.25E-03	0.00E+00	0.00E+00	1.25E-03	0.00E+00
10.0	1.27E+00	8.31E-04	0.00E+00	0.00E+00	8.31E-04	0.00E+00

Assessment Data Results Saved to File:
River Bend 10Miles Monitored Release 03082018 221613.URI7

Evacuation Areas From 0 to 10 Miles

Circle distances are 2, 5 and 10 miles.



No PAGs Exceeded

Classification: Validate against Emergency Action Levels

Release Rates (Ci / sec)	
Particulate	1.24E-05 (0.0%)
Iodine	2.39E-04 (0.0%)
Noble Gas	8.03E+00 (100.0%)

Reviewed By: _____

Page 1 of 3 — River Bend / 2.0 1.0

Radwaste Building Exhaust Vent RMS-RE6B – Alert

Dose Assessment

River Bend **Monday, March 12, 2018 13:25**

Method: Detailed Assessment - Monitored Release

Release Pathway: <RCS> <Supp Pool> <Rx Bldg> <RW Bldg> < Filter> <RW Exh> <Env> PRF: 1.60E-05

Rx Bldg HUT = < 2 Hours Supp Pool Status: = Subcooled Aux RW Turb FB HUT: = < 2 Hours FB/RW Filter: = Working

SBGT Filter = N/A

Source Term: Reactor Core Accident - Clad Pri Lower

Time After S/D (hh:mm): 1:00 Wind: From 270° @ 3.7 mph

Release Duration (hh:mm): 1:00 ETE (hh:mm): [N/A] Stability Class: E

Precipitation: None

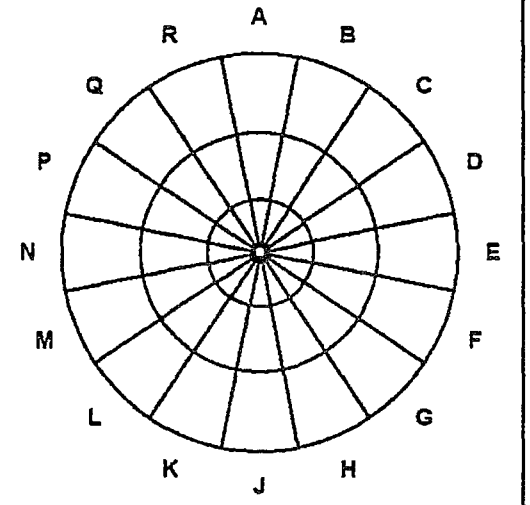
Monitor: RW Gas Readings: 2.12E-01 uCi/cc Flowrate: 80400 CFM

Distance (Miles)	Exposure Rate (mR/hr)	External Plume DDE (Rem)	Inhalation CEDE (Rem)	Deposition Ground DDE (Rem)	TEDE (Rem)	CDE Thyroid (Rem)
S.B.	1.39E+01	9.53E-03	2.74E-04	1.96E-04	1.00E-02	6.29E-04
0.7	1.16E+01	7.92E-03	3.10E-04	2.22E-04	8.45E-03	5.00E-04
1.0	8.68E+00	5.88E-03	3.44E-04	2.41E-04	6.47E-03	3.62E-04
1.5	6.16E+00	4.12E-03	3.19E-04	2.13E-04	4.65E-03	2.64E-04
2.0	4.72E+00	3.18E-03	2.70E-04	1.70E-04	3.62E-03	2.06E-04
3.0	3.92E+00	2.66E-03	1.69E-04	1.07E-04	2.93E-03	1.51E-04
4.0	3.30E+00	2.21E-03	1.53E-04	0.00E+00	2.36E-03	1.23E-04
5.0	2.79E+00	1.87E-03	1.33E-04	0.00E+00	2.00E-03	1.04E-04
7.0	1.92E+00	1.25E-03	0.00E+00	0.00E+00	1.25E-03	0.00E+00
10.0	1.27E+00	8.31E-04	0.00E+00	0.00E+00	8.31E-04	0.00E+00

Assessment Data Results Saved to File:
River Bend 10Miles Monitored Release 03122018 132552.URI7

Evacuation Areas From 0 to 10 Miles

Circle distances are 2, 5 and 10 miles.



No PAGs Exceeded

Classification: Validate against Emergency Action Levels

Release Rates (Ci / sec)	
Particulate	1.24E-05 (0.0%)
Iodine	2.39E-04 (0.0%)
Noble Gas	8.04E+00 (100.0%)

Reviewed By: _____

Page 1 of 3 River Bend / 2.0.1.0