

Bellefonte Nuclear Plant, Units 3 & 4
COL Application
Part 2, FSAR

CHAPTER 15
ACCIDENT ANALYSES

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CHAPTER 15

ACCIDENT ANALYSES

15.0 ACCIDENT ANALYSES

This **section** of the referenced DCD is incorporated by reference with the following departures and/or supplements.

15.0.3.2 Initial Conditions

BLN DEP 2.3-1 Replace the third paragraph of DCD Subsection 15.0.3.2 with the following:

Core Power	± 2 percent allowance for calorimetric error. The main feed water flow measurement supports a 1-percent power uncertainty; use of a 2-percent power uncertainty is conservative. Accidents use 2% core power uncertainty unless identified in Table 15.0-2 .
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BLN DEP 2.3-1

TABLE 15.0-201
 BLN SUMMARY OF INITIAL CONDITIONS AND COMPUTER CODES USED

Section	Faults	Computer Codes Used	Reactivity Coefficients Assumed			Initial Thermal Power Output Assumed (MWt)
			Moderator Density ($\Delta k/\text{gm}/\text{cm}^3$)	Moderator Temperature (pcm/°F)	Doppler	
	LOCAs resulting from the spectrum of postulated piping breaks within the reactor coolant pressure boundary	NOTRUMP WCOBRA/ TRAC HOTSPOT	See subsection 15.6.5 references	-	See subsection 15.6.5 references	3468.0 (SBLOCA) 3434.0 (LBLOCA) 3434.0 (BLN Dose)

Note: This table supplements **DCD Table 15.0-2**.

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15.1 INCREASE IN HEAT REMOVAL FROM THE PRIMARY SYSTEM

This **section** of the referenced DCD is incorporated by reference with no departures or supplements.

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15.2 DECREASE IN HEAT REMOVAL BY THE SECONDARY SYSTEM

This **section** of the referenced DCD is incorporated by reference with no departures or supplements.

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15.3 DECREASE IN REACTOR COOLANT SYSTEM FLOW RATE

This **section** of the referenced DCD is incorporated by reference with no departures or supplements.

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15.4 REACTIVITY AND POWER DISTRIBUTION ANOMALIES

This **section** of the referenced DCD is incorporated by reference with no departures or supplements.

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15.5 INCREASE IN REACTOR COOLANT INVENTORY

This **section** of the referenced DCD is incorporated by reference with no departures or supplements.

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15.6 DECREASE IN REACTOR COOLANT INVENTORY

This **section** of the referenced DCD is incorporated by reference with the following departures and/or supplements.

15.6.5.3.1.2 Core Release

BLN DEP 2.3-1 Replace the first two sentences of the second paragraph of DCD Subsection 15.6.5.3.1.2 with the following sentence:

The core fission product inventory at the time of the most accidents is based on operation near the end of a fuel cycle is provided in **Table 15A-3 of DCD** Appendix 15A and in **Table 15A-201 of FSAR Appendix 15A**.

15.6.5.3.7.3 Atmospheric Dispersion Factors

Add the following paragraph at the end of DCD Subsection 15.6.5.3.7.3.

BLN COL 2.3-4 Site-specific χ/Q values provided in **Subsection 2.3.4** are not bounded by the values given in **DCD Tables 15A-5 and 15A-6**. Therefore, a site-specific dose consequence analysis was performed as discussed in Subsection 15.6.5.

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BLN DEP 2.3-1

TABLE 15.6-201
BLN ASSUMPTIONS AND PARAMETERS USED IN
CALCULATING RADIOLOGICAL CONSEQUENCES OF A LOSS-
OF-COOLANT ACCIDENT

BLN Containment leakage release data	
Containment leak rate, 0-24 hr (% per day)	0.09 (for EAB) 0.10 (for LPZ and Control Room)

Note: This table supplements **DCD Table 15.6.5-2**.

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BLN DEP 2.3-1

TABLE 15.6-202
BLN RADIOLOGICAL CONSEQUENCES OF A LOSS-OF-
COOLANT ACCIDENT WITH CORE MELT

	TEDE Dose (rem)
BLN Exclusion zone boundary dose (1.4 - 3.4 hr) ⁽¹⁾	23.8

Notes:

1. This table supplements **DCD Table 15.6.5-3**.

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15.7 RADIOACTIVE RELEASE FROM A SUBSYSTEM OR COMPONENT

This **section** of the referenced DCD is incorporated by reference with the following departures and/or supplements.

15.7.6 COMBINED LICENSE INFORMATION

BLN COL 15.7-1 This COL item is addressed in **Subsection 2.4.13**.

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15.8 ANTICIPATED TRANSIENTS WITHOUT SCRAM

This **section** of the referenced DCD is incorporated by reference with no departures or supplements.

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APPENDIX 15A
EVALUATION MODELS AND PARAMETERS FOR ANALYSIS OF
RADIOLOGICAL CONSEQUENCES OF ACCIDENTS

This **section** of the referenced DCD is incorporated by reference with the following departures and/or supplements.

15A.3.1.3 Core Source Team

BLN DEP 2.3-1 Replace the first sentence of DCD Subsection 15A.3.1.3 with the following sentence:

Table 15A-3 and FSAR **Table 15A-201** list the core source terms at shutdown.

15A.3.3 Atmospheric Dispersion Factors

Replace the third paragraph in DCD Subsection 15A.3.3 with the following:

BLN COL 2.3-4 [Site-specific χ/Q values provided in **Subsection 2.3.4** are bounded by the values given in **DCD Tables 15A-5** and **15A-6**. (This text to be revised in a future amendment.)]

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BLN DEP 2.3-1

TABLE 15A-201 (Sheet 1 of 2)
BLN REACTOR CORE SOURCE TERM⁽¹⁾

	Nuclide	Inventory (Ci)
Iodines	I-130	1.84E+06
	I-131	9.29E+07
	I-132	1.36E+08
	I-133	1.92E+08
	I-134	2.15E+08
	I-135	1.82E+08
Cs Group	Cs-134	1.62E+07
	Cs-136	3.79E+06
	Cs-137	1.07E+07
	Cs-138	1.78E+08
	Rb-86	1.77E+05
Te Group	Te-127m	1.35E+06
	Te-127	8.28E+06
	Te-129m	4.65E+06
	Te-129	2.45E+07
	Te-131m	1.85E+07
	Te-132	1.33E+08
	Sb-127	8.54E+06
	Sb-129	2.62E+07
Ru Group	Ru-103	1.41E+08
	Ru-105	9.73E+07
	Ru-106	4.45E+07
	Rh-105	9.03E+07
	Mo-99	1.74E+08
	Tc-99m	1.53E+08
Noble Gases	Kr-85m	2.47E+07
	Kr-85	1.05E+06
	Kr-87	4.86E+07
	Kr-88	6.53E+07
	Xe-131m	1.01E+06
	Xe-133m	5.95E+06
	Xe-133	1.88E+08
	Xe-135m	4.00E+07
	Xe-135	3.80E+07
	Xe-138	1.63E+08
Sr & Ba	Sr-89	9.30E+07
	Sr-90	8.18E+06

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BLN DEP 2.3-1

TABLE 15A-201 (Sheet 2 of 2)
BLN REACTOR CORE SOURCE TERM⁽¹⁾

	Nuclide	Inventory (Ci)
Ce Group	Sr-91	1.14E+08
	Sr-92	1.22E+08
	Ba-139	1.70E+08
	Ba-140	1.64E+08
	Ce-141	1.56E+08
	Ce-143	1.45E+08
	Ce-144	1.20E+08
	Pu-238	2.18E+05
	Pu-239	2.48E+04
	Pu-240	3.88E+04
La Group	Pu-241	9.90E+06
	Np-239	1.95E+09
	Y-90	8.55E+06
	Y-91	1.21E+08
	Y-92	1.24E+08
	Y-93	1.40E+08
	Nb-95	1.62E+08
	Zr-95	1.60E+08
	Zr-97	1.59E+08
	La-140	1.74E+08
	La-141	1.54E+08
	La-142	1.49E+08
	Pr-143	1.41E+08
	Nd-147	6.00E+07
	Am-241	1.02E+04
	Cm-242	2.76E+06
	Cm-244	2.38E+05

Notes:

1. The following assumptions apply:
 - Core thermal power of 3434 MWt (1 percent above the design core power of 3400 MWt).
 - Three-region equilibrium cycle core at end of life.
 - These source terms applied only for the EAB doses.

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BLN DEP 2.3-1

TABLE 15A-202
BLN OFFSITE ATMOSPHERIC DISPERSION FACTORS (χ/Q)
FOR ACCIDENT DOSE ANALYSIS⁽¹⁾

BLN Site Boundary χ/Q (s/m ³) 0 - 2 hours ⁽²⁾	5.85 x 10 ⁻⁴
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Notes:

1. The LOCA dose analysis models the bounding atmospheric dispersion factors listed above. Other analyses model more conservative values.
2. Nominally defined as the 0- to 2-hour interval but is applied to the 2-hour interval having the highest activity releases in order to address 10 CFR Part 50.34 requirements.
3. This table supplements **DCD Table 15A-5**.

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APPENDIX 15B
REMOVAL OF AIRBORNE ACTIVITY FROM THE CONTAINMENT
ATMOSPHERE FOLLOWING A LOCA

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