Table D-31. (continued).

Scenario Release Designator	Short Description	Downwind TEDE[a] Estimates for 95% Worst-Case Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF[a] Boundary (2,865 m)	Site Boundary (10,855 m)			
ATRPDS-6	Interfacing system LOCA due to failure of valve or piping in an interfacing system connected to PCS and failure of low-pressure injection system	1.66E+3 (4 hr) 4.98E+3 (12 hr)	1.66E+2 (4 hr) 4.98E+2 (12 hr)	1.66E+2 (4 hr) 4.98E+2 (12 hr)	2.73E+0 (4 hr) 8.19E+0 (12 hr)	2.74E−1 (4 hr) 8.22E−1 (12 hr)	5,300 (4 hr) 9,800 (12 hr)	200 (4 hr) 575 (12 hr)	SAE
ATRPDS-7	Canal drain, loss of coolant water due to breach of canal wall or floor from dropping shield cask, falling overhead crane, or seismic event	7.09E+6 (2.5 hr)	7.09E+5 (2.5 hr)	6.97E+5 (2.5 hr)	2.85E+3 (92.5 hr)	2.86E+2 (2.5 hr)	105,000 (2.5 hr)	19,400 (2.5 hr)	GE (potential for ingestion advisories)

Table D-31. (continued).

Scenario Release Designator	Short Description	Downwind TEDE[a] Estimates for 95% Worst-Case Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF[a] Boundary (2,865 m)	Site Boundary (10,855 m)			
ATREXPLR-1	Loss of experiment loop coolant due to break in PCS piping, causing fission product release from a 1-MW experiment	1.78E+3 (4 hr)	1.78E+2 (4 hr)	1.75E+2 (4 hr)	7.10E−1 (4 hr)	7.25E−2 (4 hr)	2,630 (4 hr)	200 (4 hr)	SAE (based on thyroid CDE release less than or equal to 4 hours; potential for ingestion advisories)
		1.94E+4 (48 hr)	1.94E+3 (48 hr)	1.91E+3 (48 hr)	7.63E+0 (48 hr)	7.75E−1 (48 hr)	10,000 (48 hr)	1,090 (48 hr)	GE (release greater than 4 hours; potential for ingestion advisories)
ATREXPLR-2	Loss of experiment loop coolant due to break in PCS piping, causing fission product release from a 200-kW experiment	3.56E+2 (4 hr) 4.27E+3 (48 hr)	3.56E+1 (4 hr) 4.27E+2 (48 hr)	3.50E+1 (4 hr) 4.20E+2 (48 hr)	1.423E−1 (4 hr) 1.70E+0 (48 hr)	1.45E−2 (4 hr) 1.74E−1 (48 hr)	1,575[d] (4 hr) 3,700 (48 hr)	30 (4 hr) 350 (48 hr)	SAE

Table D-31. (continued).

Scenario Release Designator	Short Description	Downwind TEDE[a] Estimates for 95% Worst-Case Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF[a] Boundary (2,865 m)	Site Boundary (10,855 m)			
ATRFCB-1	Fuel element damage or fuel channel blockage due to failure of large structural elements in ATR vessel, above or in the core, with possible damage to PCS	5.92E+2 (4 hr)	5.92E+1 (4 hr)	5.82E+1 (4 hr)	2.43E−1 (4 hr)	2.43E−2 (4 hr)	1,900 (4 hr)	75 (4 hr)	SAE
		3.55E+3 (24 hr)	3.55E+2 (24 hr)	3.49E+2 (24 hr)	1.46E+0 (24 hr)	1.46E−1 (24 hr)	3,500 (24 hr)	330 (24 hr)	SAE
ATRCaskDp-1	Cask drop from above lift limits onto open ATR vessel may damage EFIS, causing experimental fuel to melt	7.45E+1 (4 hr)	7.45E+0 (4 hr)	7.33E+0 (4 hr)	3.05E−2 (4 hr)	3.06E−3 (4 hr)	570 (4 hr)	Not exceeded	SAE (4 hr)
		4.47E+2 (24 hr)	4.47E+1 (24 hr)	4.39E+1 (24 hr)	1.83E−1 (24 hr)	1.84E−2 (24 hr)	1,710 (24 hr)	Less than 100	SAE (24 hr)
TRA670RR-1 (ATR ground-level release)	Fuel cladding imperfections cause PCS concentrations greater than 20 μCi/mL	1.58E−1 (4 hr)	1.58E−2 (4 hr)	1.56E−2 (4 hr)	6.34E−5 (4 hr)	6.41E−6 (4 hr)	N/A	Not exceeded	Not an emergency
		1.90E+0 (48 hr)	1.90E−1 (48 hr)	1.87E−1 (48 hr)	7.61E−4 (48 hr)	2.24E−5 (48 hr)	100 (default distance)	Not exceeded	Alert

Table D-31. (continued).

Scenario Release Designator	Short Description	Downwind TEDE[a] Estimates for 95% Worst-Case Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF[a] Boundary (2,865 m)	Site Boundary (10,855 m)			
ATRDLEXP-1	Dropped loop experiment due to uncoupling of irradiated experiment from transfer shield assembly, resulting in gamma radiation exposure	516 R/hr	46.5 R/hr	30.2 R/hr	5.66E−2 R/hr	N/A	815	68	SAE
ATRCIC-1	Dropped core internal changeout component or equipment due to uncoupling of irradiated core internal component or equipment from transfer shield assembly, resulting in gamma radiation exposure	516 R/hr	46.5 R/hr	30.2 R/hr	5.66E−2 R/hr	N/A	815	68	SAE

Table D-31. (continued).

Scenario Release Designator	Short Description	Downwind TEDE[a] Estimates for 95% Worst-Case Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF[a] Boundary (2,865 m)	Site Boundary (10,855 m)			
ATRCCD-1	Fuel handling accident, control bridge drops onto ATRC Facility reactor core, damaging fuel cladding	3.54E+0	3.54E−1	3.48E−1	1.42E−3	1.42E−4	100	Not exceeded	Alert
ATRCFM-1	Severe accident, multiple system failures at maximum operating power cause fuel to melt	4.62E+2	4.62E+1	4.54E+1	1.83E−1	1.89E−3	1,710	60	SAE
ATRCCRIT (prompt neutron)	Criticality in ATRC Facility canal	5.80E+1[e]	5.10E+0[c]	5.00E+0[c]	Not calculated	Not calculated	N/A	N/A	Unclassified operational emergency (UOE)

Table D-31. (continued).

Scenario Release Designator	Short Description	Downwind TEDE[a] Estimates for 95% Worst-Case Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF[a] Boundary (2,865 m)	Site Boundary (10,855 m)			
ATRCCRIT (Fission product release)	Criticality in ATRC Facility canal	4.18E+0	4.18E−1	4.11E−1	1.70E−3	1.71E−4	100	Not exceeded	Alert

a. TEDE = total effective dose equivalent
ICDF = Idaho Comprehensive Environmental Response, Compensation, and Liability Act Disposal Facility.
b. 7,100 m actual distance to PA Guide (PAG) 4 hours after release start.
c. 8,600 m actual distance to PAG 4 hours after release start.
d. The thyroid CDE is controlling and is used for all PA distances.
e. Derived from TRA-NMIS-1276.[11]

Table D-32. Advanced Test Reactor 4- and 48-hour and Advanced Test Reactor Critical Facility radiological material release scenario calculation results (thyroid committed dose equivalent) for 95% worst-case meteorology.

Scenario Release Designator	Short Description	Downwind Thyroid CDE Estimates for 95% Worst-Case Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF Boundary (2,865 m)	Site Boundary (10,855 m)			
ATRPDS-1	Loss of primary coolant due to LPBO from failure of pressurizing system with no low-pressure coolant injection	8.91E+4 (4 hr)	8.91E+3 (4 hr)	8.75E+3 (4 hr)	3.51E+1 (4 hr)	3.58E+0 (4 hr)	8,600 (4 hr)	N/A	SAE (release less than or equal to 4 hours; potential for ingestion advisories)
		1.07E+6 (48 hr)	1.07E+5 (48 hr)	1.05E+5 (48 hr)	4.21E+2 (48 hr)	4.30E+1 (48 hr)	30,000 (48 hr)	N/A	GE (release greater than 4 hours; potential for ingestion advisories)

Table D-32. (continued).

Scenario Release Designator	Short Description	Downwind Thyroid CDE Estimates for 95% Worst-Case Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF Boundary (2,865 m)	Site Boundary (10,855 m)			
ATRPDS-2	Loss of primary coolant due to HPBO from failure of emergency PCPs and failure to depressurize PCS	2.50E+5 (4 hr)	2.50E+4 (4 hr)	2.45E+4 (4 hr)	9.85E+1 (4 hr)	1.00E+1 (4 hr)	16,000[a] (4 hr)	N/A	SAE (release less than or equal to 4 hours; potential for ingestion advisories)
		3.00E+6 (48 hr)	3.00E+5 (48 hr)	2.94E+5 (48 hr)	1.18E+3 (48 hr)	1.20E+2 (48 hr)	50,000 (48 hr)	N/A	GE (release greater than 4 hours; potential for ingestion advisories)

Table D-32. (continued).

Scenario Release Designator	Short Description	Downwind Thyroid CDE Estimates for 95% Worst-Case Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF Boundary (2,865 m)	Site Boundary (10,855 m)			
ATRPDS-3	Loss of primary coolant due to small break (3 in. diameter) in coolant inlet piping and failure of low-pressure injection system	6.44E+5 (4 hr)	6.44E+4 (4 hr)	6.33E+4 (4 hr)	2.54E+2 (4 hr)	2.59E+1 (4 hr)	27,000[b] (4 hr)	N/A	SAE (release equal to or less than 4 hours; potential for ingestion advisories)
		7.73E+6 (48 hr)	7.73E+5 (48 hr)	7.60E+5 (48 hr)	3.05E+3 (48 hr)	3.11E+2 (48 hr)	115,000 (48 hr)	N/A	GE (release greater than 4 hours; potential for ingestion advisories)

Table D-32. (continued).

Scenario Release Designator	Short Description	Downwind Thyroid CDE Estimates for 95% Worst-Case Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF Boundary (2,865 m)	Site Boundary (10,855 m)			
ATRPDS-3M	Loss of primary coolant due to large break in outlet coolant piping, resulting in core flow stagnation	2.51E+5 (4 hr)	2.51E+4 (4 hr)	2.46E+4 (4 hr)	9.87E+1 (4 hr))	1.00E+1 (4 hr)	16,000 (4 hr)	N/A	SAE (release equal to or less than 4 hours; potential for ingestion advisories)
		1.51E+6 (24 hr)	1.51E+5 (24 hr)	1.48E+5 (24 hr)	5942E+2 (24 hr	6.00E+1 (24 hr)	32,500 (24 hr)	N/A	GE (release greater than 4 hours; potential for ingestion advisories)

Table D-32. (continued).

Scenario Release Designator	Short Description	Downwind Thyroid CDE Estimates for 95% Worst-Case Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF Boundary (2,865 m)	Site Boundary (10,855 m)			
ATRPDS-4	Anticipated transient without scram (loss of ATR control, which may result in loss of coolant)	8.91E+4 (4 hr)	8.91E+3 (4 hr)	8.75E+3 (4 hr)	3.51E+1 (4 hr)	3.58E+0 (4 hr)	8,600 (4 hr)	N/A	SAE (release less than or equal to 4 hours; potential for ingestion advisories)
		1.07E+6 (48 hr)	1.07E+5 (48 hr)	1.05E+5 (48 hr)	4.21E+2 (48 hr)	4.30E+1 (48 hr)	30,000 (48 hr)	N/A	GE (release greater than 4 hours; potential for ingestion advisories)

Table D-32. (continued).

Scenario Release Designator	Short Description	Downwind Thyroid CDE Estimates for 95% Worst-Case Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF Boundary (2,865 m)	Site Boundary (10,855 m)			
ATRPDS-5	A perched fuel element drops into core after criticality is achieved, causing very large and rapid reactivity insertion that causes vessel movement and rupture of piping leading to loss of coolant	6.44E+5 (4 hr)	6.44E+4 (4 hr)	6.33E+4 (4 hr)	2.54E+2 (4 hr)	2.59E+1 (4 hr)	27,000 (4 hr)	N/A	SAE (release equal to or less than 4 hours; potential for ingestion advisories)
		7.73E+6 (48 hr)	7.73E+5 (48 hr)	7.60E+5 (48 hr)	3.05E+3 (48 hr)	3.11E+2 (48 hr)	115,000 (48 hr)	N/A	GE (release greater than 4 hours; potential for ingestion advisories)

Table D-32. (continued).

Scenario Release Designator	Short Description	Downwind Thyroid CDE Estimates for 95% Worst-Case Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF Boundary (2,865 m)	Site Boundary (10,855 m)			
ATRPDS-5M	A sudden rupture of experiment loop pressure tube ruptures insulating gas envelope tube in core region of ATR flux trap; fuel melt due to extremely rapid, positive ramp insertion of reactivity in ATR core from voiding in a high positive reactivity worth experiment flux trap	1.29E+4 (4 hr)	1.29E+3 (4 hr)	1.27E+3 (4 hr)	5.09E+0 (4 hr))	5.18E−1 (4 hr)	2,900 (4 hr)	N/A	SAE (release less than or equal to 4 hours; potential for ingestion advisories)
		1.55E+5 (48 hr)	1.55E+4 (48 hr)	1.52E+4 (48 hr)	6.11E+1 (48 hr	6.22E+0 (48 hr)	12,000 (48 hr)	N/A	GE (release greater than 4 hours; potential for ingestion advisories)

Table D-32. (continued).

Scenario Release Designator	Short Description	Downwind Thyroid CDE Estimates for 95% Worst-Case Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF Boundary (2,865 m)	Site Boundary (10,855 m)			
ATRPDS-6	Interfacing system LOCA due to failure of valve or piping in an interfacing system connected to PCS and failure of low-pressure injection system	3.09E+1 (4 hr)	3.09E+0 (4 hr)	3.04E+0 (4 hr)	1.12E−2 (4 hr)	7.06E−4 (4 hr)	N/A (4 hr)	N/A	Not an emergency (4 hr)
		9.27E+1 (12 hr)	9.27E+0 (12 hr)	9.12E+0 (12 hr)	3.36E−2 (12 hr)	2.12E−3 (12 hr)	210 (12 hr)	N/A	SAE (12 hr)
ATRPDS-7	Canal drain, loss of coolant water due to breach of canal wall or floor from dropping shield cask, falling overhead crane, or seismic event	8.60E+7 (2.5 hr)	8.60E+6 (2.5 hr)	8.46E+6 (2.5 hr)	3.38E+4 (2.5 hr)	3.41E+3 (2.5 hr)	105,000 (2.5 hr)	N/A	GE (potential for ingestion advisories)

Table D-32. (continued).

Scenario Release Designator	Short Description	Downwind Thyroid CDE Estimates for 95% Worst-Case Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF Boundary (2,865 m)	Site Boundary (10,855 m)			
ATREXPLR-1	Loss of experiment loop coolant due to break in PCS piping, causing fission product release from a 1-MW experiment	2.28E+4 (4 hr)	2.28E+3 (4 hr)	2.24E+3 (4 hr)	8.98E+0 (4 hr))	9.16E−1 (4 hr)	3,900 (4 hr)	N/A	SAE (release less than or equal to 4 hours; potential for ingestion advisories)
		2.74E+5 (48 hr)	2.74E+4 (48 hr)	2.69E+4 (48 hr)	1.08E+2 (48 hr	1.10E+1 (48 hr)	16,900 (48 hr)	N/A	GE (release greater than 4 hours; potential for ingestion advisories)
ATREXPLR-2	Loss of experiment loop coolant due to break in PCS piping, causing fission product release from a 200-kW experiment	4.57E+3 (4 hr)	4.57E+2 (4 hr)	4.49E+2 (4 hr)	1.80E+0 (4 hr)	1.83E−1 (4 hr)	2,190 (4 hr)	N/A	SAE
		5.48E+4 (48 hr)	5.48E+3 (48 hr)	5.39E+3 (48 hr)	2.16E+1 (48 hr)	2.20E+0 (48 hr)	6,300 (48 hr)	N/A	SAE

Table D-32. (continued).

Scenario Release Designator	Short Description	Downwind Thyroid CDE Estimates for 95% Worst-Case Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF Boundary (2,865 m)	Site Boundary (10,855 m)			
ATRFCB-1	Fuel element damage or fuel channel blockage due to failure of large structural elements in ATR vessel, above or in the core, with possible damage to PCS	1.25E+4 (4 hr)	1.25E+3 (4 hr)	1.23E+3 (4 hr)	4.92E+0 (4 hr)	5.00E−1 (4 hr)	2,830 (4 hr)	N/A	SAE
		7.50E+4 (24 hr)	7.59E+3 (24 hr)	7.38E+3 (24 hr)	2.95E+1 (24 hr)	3.00E+0 (24 hr)	7,600 (24 hr)	N/A	SAE
ATRCaskDp-1	Cask drop from above lift limits onto open ATR vessel may damage EFIS, causing experimental fuel to melt	1.57E+3 (4 hr)	1.57E+2 (4 hr)	1.55E+2 (4 hr)	6.19E−1 (4 hr)	6.28E−2 (4 hr)	1,450 (4 hr)	N/A	SAE (4 hr)
		9.42E+3 (24 hr)	9.42E+2 (24 hr)	9.30E+2 (24 hr)	3.71E+0 (24 hr)	3.77E−1 (24 hr)	2,650 (24 hr)	N/A	SAE (24 hr)

Table D-32. (continued).

Scenario Release Designator	Short Description	Downwind Thyroid CDE Estimates for 95% Worst-Case Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF Boundary (2,865 m)	Site Boundary (10,855 m)			
TRA670RR-1 (ATR ground-level release)	Fuel cladding imperfections cause PCS concentrations greater than 20 μCi/mL	3.53E+0 (4 hr)	3.53E−1 (4 hr)	3.47E−1 (4 hr)	1.39E−3 (4 hr)	1.420E−4 (4 hr)	N/A	N/A	Not an emergency
		4.24E+1 (48 hr)	4.24E+0 (48 hr)	4.16E+0 (48 hr)	1.67E−2 (48 hr)	1.70E−3 (48 hr)	100 (48 hr)	N/A	Alert
ATRCCD-1	Fuel handling accident, control bridge drops onto ATRC Facility reactor core, damaging fuel cladding	4.09E+1	4.09E+0	4.02E+0	1.61E−2	1.62E−3	100	N/A	Alert

Table D-32. (continued).

Scenario Release Designator	Short Description	Downwind Thyroid CDE Estimates for 95% Worst-Case Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF Boundary (2,865 m)	Site Boundary (10,855 m)			
ATRCFM-1	Severe accident, multiple system failures at maximum operating power cause fuel to melt	4.49E+2	4.49E+1	4.42E+1	1.77E−1	1.78E−2	680	N/A	SAE
ATRCCRIT	Criticality in ATRC Facility canal	4.51E+1	4.51E+0	4.43E+0	1.77E−2	1.79E−3	100	N/A	Alert

a. 9,000 m actual distance to PAG 4 hours after release start.
b. 10,850 m actual distance to PAG 3.7 hours after release start.

Table D-33. Advanced Test Reactor 4- and 48-hour and Advanced Test Reactor Critical Facility radiological material release scenario calculation results (total effective dose equivalent) for 50% typical meteorology.

Scenario Release Designator	Short Description	Downwind TEDE Estimates for 50% Typical Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF Boundary (2,865 m)	Site Boundary (10,855 m)			
ATRPDS-1	Loss of primary coolant due to LPBO from failure of pressurizing system with no low-pressure coolant injection	3.40E+1 (4 hr)	3.40E+0 (4 hr)	2.30E+0 (4 hr)	6.85E−2 (4 hr)	1.04E−2 (4 hr)	320 (4 hr)	Not exceeded (4 hr)	SAE (release less than or equal to 4 hours; potential for ingestion advisories)
		4.08E+2 (48 hr)	4.08E+1 (48 hr)	2.76E+1 (48 hr)	8.22E−1 (48 hr)	1.25E−1 (48 hr)	2,600 (48 hr)	50 (48 hr)	SAE (release greater than 4 hours; potential for ingestion advisories)

Table D-33. (continued).

Scenario Release Designator	Short Description	Downwind TEDE Estimates for 50% Typical Meteorology (rem)					Protective Action Distance (m)	Threshold for Early Lethality Distance (m)	Emergency Class
		30 m	100 m	Facility Boundary (124 m)	INTEC/ ICDF Boundary (2,865 m)	Site Boundary (10,855 m)			
ATRPDS-2	Loss of primary coolant due to HPBO from failure of emergency PCPs and failure to depressurize PCS	1.56E+2 (4 hr)	1.56E+1 (4 hr)	1.04E+1 (4 hr)	2.91E−1 (4 hr)	4.47E−2 (4 hr)	1,200 (4 hr)	50 (4 hr)	SAE (release less than or equal to 4 hours; potential for ingestion advisories)
		1.87E+3 (48 hr)	1.87E+2 (48 hr)	1.25E+2 (48 hr)	3.49E+0 (48 hr)	5.36E−1 (48 hr)	6,900 (48 hr)	200 (48 hr)	SAE (release greater than 4 hours; potential for ingestion advisories)