PRIMARY COOLANT FISSION AND CORROSION PRODUCT ACTIVITIES

Isotope	Design Activity (1% Failed Fuel) (Microcuries/ Cubic Centimeter)	Normal Activity (Microcuries/Cubic Centimeter)(a)	Design Inventory (Curies)	Normal Inventory (Curies)
H-3	2.80	0.21	860	65
Br-84	4.66×10^{-2}	-	13.4	-
Kr-85(m)	1.50	0.030	432	8.6
Kr-85	2.34	3.52×10^{-4}	674	0.10
Kr-87	0.81	0.037	233	10.6
Kr-88	2.48	0.060	714	17.3
Rb-88	2.44	0.122	702	35.1
Rb-89	6.10×10^{-2}	3.05×10^{-4}	0.18	9.0×10^{-4}
Sr-89	5.33×10^{-3})	2.28×10^{-5}(b)	1.53)	7.0×10^{-3}(b)
Sr-90	1.50×10^{-4})		4.3×10^{-2})	
Y-90	5.77×10^{-4}	-	0.17	-
Sr-91	3.70×10^{-3}	8.01×10^{-5}	1.06	0.023
Y-91(m)	0.24	1.76×10^{-3}	68.4	0.50
Mo-99	2.26	3.70×10^{-5}	649	0.010
Te-129	2.72×10^{-2}	-	7.84	-
I-129	5.66×10^{-8}	-	1.63×10^{-5}	-
I-131	4.40	0.114	1,266	32.8
Te-132	0.36	3.22×10^{-5}	102	9.1×10^{-3}

(a) Based on typical data from January 14, 1981; primary coolant at 17% of Technical Specifications limit for dose equivalent I-131.
(b) Total value consisting of summation of Sr-89 and Sr-90.

PRIMARY COOLANT FISSION AND CORROSION PRODUCT ACTIVITIES

Isotope	Design Activity (1% Failed Fuel) (Microcuries/ Cubic Centimeter)	Normal Activity (Microcuries/Cubic Centimeter)(a)	Design Inventory (Curies)	Normal Inventory (Curies)
I-132	1.13	0.095	324	27.2
I-133	6.38	0.141	1,830	40.4
Xe-133	255	0.472	6.47×10^{4}	135.7
Cs-134	1.42	1.35×10^{-5}	725	6.9×10^{-3}
Te-134	2.63×10^{-2}	-	7.55	-
I-134	0.64	0.134	184	38.5
I-135	2.78	0.142	801	40.9
Xe-135	6.75	0.090	1,943	25.9
Cs-136	0.15	1.90×10^{-5}	43.4	5.5×10^{-3}
Cs-137	10.6	2.32×10^{-5}	3,064	6.7×10^{-3}
Xe-138	0.36	(b)	103	(b)
Cs-138	0.69	0.059	198	16.9
Ba-140	6.78×10^{-3}	5.09×10^{-4}	1.95	0.15
La-140	6.52×10^{-3}	6.97×10^{-4}	1.88	0.20
Co-60	1.1×10^{-3}	2.78×10^{-5}	0.37	9.4×10^{-3}
Fe-59	7.7×10^{-6}	1.41×10^{-5}	2.6×10^{-3}	4.8×10^{-3}
Co-58	7.9×10^{-3}	4.28×10^{-4}	2.67	0.14
Mn-56	2.3×10^{-2}	1.55×10^{-4}	7.77	0.052

(a) Based on typical data from January 14, 1981; primary coolant at 17% of Technical Specifications limit for dose equivalent I-131.
(b) Data for nuclides with less than 15 minute half-lives is not documented.

PRIMARY COOLANT FISSION AND CORROSION PRODUCT ACTIVITIES

Isotope	Design Activity (1% Failed Fuel) (Microcuries/ Cubic Centimeter)	Normal Activity (Microcuries/Cubic Centimeter)(a)	Design Inventory (Curies)	Normal Inventory (Curies)
Mn-54	2.0×10^{-5}	2.70×10^{-5}	6.8×10^{-3}	9.2×10^{-3}
Cr-51	2.4×10^{-3}	5.35×10^{-4}	0.81	0.18
Zr-95	1.9×10^{-5}	1.08×10^{-5}	6.4×10^{-3}	3.6×10^{-3}
Total	275.7	1.708	79,663	497

(a) Based on typical data from January 14, 1981; primary coolant at 17% of Technical Specifications limit for dose equivalent I-131.

RADIOACTIVE WASTE QUANTITIES OF SIGNIFICANT ACTIVITY

Liquid Waste Sources	Quantity/Year-Gallons	Assumptions
Chemical and Volume Control System	69,500	Start-up after refueling
	900	Cold shutdown Day 1
	37,200	Start-up from cold condition Day 1
	13,200	Hot shutdown(a) Day 50
	1,200	Start-up from hot condition Day 50
	17,400	Hot shutdown(a) Day 140
	1,700	Start-up from hot condition Day 140
	32,300	Hot shutdown (a) Day 230
	2,000	Start-up from hot condition Day 230
	2,200	Cold shutdown Day 240
	104,300	Start-up from cold condition Day 240
	68,900	Hot shutdown(a) Day 270
	2,300	Start-up from hot condition Day 270
	17,500	cold shutdown to refuel
	216,000	Boron reduction for cycle shim bleed
Total	586,600	
Primary System Drain Tank	1,500	Primary coolant pump seal leakage at 1 gpd per pump for four pumps
	1,000	Safety injection check valve leakage
	64,900	Drain primary system for maintenance at Day 240
	13,800	Drain primary system for refueling
	21,300	Drain refueling shield
Total	102,500	

(a) Hot shutdown quantities are based on maintaining the shutdown margin during xenon buildup by boron dilution and on Plant start-up eight hours after shutdown during the xenon buildup peak.

RADIOACTIVE WASTE QUANTITIES OF SIGNIFICANT ACTIVITY

Liquid Waste Sources	Quantity/Year-Gallons	Assumptions
Equipment Drain Tank	11,400	Coolant charging pump seal leakage at 31 gpd maximum leakage
	7,000	Spent fuel pool overflow
	3,900	Spent resin tank overflow from resin flushing - 260 ft^3/year of resin replacement at 2 ft^3/ft^3 resin
	1,900	Demineralizers drain from resin charging - 260 ft^3/year of resin replacement at 1 ft^3/ft^3 resin
Total	24,200	
Radiochemistry Lab Drain Tank	11,000	12 samples per day at 2.5 gallons per sample
Total Liquid Waste of Significant Activity	724,300	

Gaseous Waste Sources	Quantity/Year-ft^3	Assumptions
Degas of Primary System	2,418	Degas to 5 cm^3/kg prior to 3 cold shutdowns including gas in volume control tank
Off-Gas Liquid Waste From Shutdowns and Start-Ups	867	See start-up and shutdown schedule above
Off-Gas for Chemical Shim Reduction	1,011	Boron dilution generates 216,000 gallons liquid waste with 35 cm^3/kg gas content
Off-Gas Liquid Drained for Refueling Maintenance and Miscellaneous	243	
Total Gaseous Waste of Significant Activity	4,539	

EQUIPMENT RATINGS AND CONSTRUCTION CODES - ORIGINAL EQUIPMENT

1. CLEAN WASTE RECEIVER TANKS (T-64A, B, C, D)

Number	4
Material	Type 304 Stainless Steel
Capacity (Each)	50,000 gal (7,000 ft^3)
Design Pressure	5 psig (Vapor Space)
Design Temperature	103°F
Code	API 620

2. PRIMARY SYSTEM DRAIN TANK (T-74)

Number	1
Material	Type 304 Stainless Steel
Capacity	900 gal
Design Pressure	50 psig
Design Temperature	250°F
Code	ASME B&PV Code, Section III, Class C

3. EQUIPMENT DRAIN TANK (T-80)

Number	1
Material	Type 304 Stainless Steel
Capacity	550 gal
Design Pressure	50 psig
Design Temperature	150°F
Code	ASME B&PV Code, Section VIII

4. SPENT RESIN STORAGE TANK (T-69)

Number	1
Material	Type 304 Stainless Steel
Capacity	3,000 gal (400 ft^3)
Design Pressure	125 psig
Design Temperature	200°F
Code	ASME B&PV Code, Section III, Class C

5. CONTROLLED CHEM LAB DRAIN TANK (T-76)

Number	1 Divided Into 2 Compartments
Material	Type 304 Stainless Steel
Capacity	900 gal (Total)
Design Pressure	50 psig
Design Temperature	150°F
Code	ASME B&PV Code, Section VII

EQUIPMENT RATINGS AND CONSTRUCTION CODES - ORIGINAL EQUIPMENT

6. TREATED WASTE MONITOR TANKS (T-66A, B)

Number	2
Material	Carbon Steel
Internal Coating	Baked Phenolic, 6-8 Mils
Capacity	5,500 gal
Design Pressure	10 psig
Design Temperature	150°F
Code	ASME B&PV Code, Section VIII

7. DIRTY WASTE DRAIN TANK (T-60)

Number	1 Divided Into 2 Compartments
Material	Carbon Steel
Capacity	3,800 gal
Design Pressure	10 psig
Design Temperature	150°F
Code	ASME B&PV Code, Section VIII Requirements

8. FILTERED WATER MONITORING TANKS (T-63)

Number	1 With 2 Compartments
Material	Carbon Steel
Internal Coating	Baked Phenolic, 6-8 Mils
Capacity	5,500 gal
Design Pressure	10 psig
Design Temperature	150°F
Code	ASME B&PV Code, Section VIII

9. WASTE GAS SURGE TANK (T-67)

Number	1
Material	Carbon Steel
Capacity	550 gal (80 ft^3)
Design Pressure	20 psig
Design Temperature	150°F
Code	ASME B&PV Code, Section III, Class C

EQUIPMENT RATINGS AND CONSTRUCTION CODES - ORIGINAL EQUIPMENT

10. WASTE GAS DECAY TANKS (T-68A, B, C)

Number	3
Material	Carbon Steel
Capacity	800 gal (100 ft^3)
Design Pressure	120 psig
Design Temperature	550°F
Code	ASME B&PV Code, Section III, Class C

11. LAUNDRY DRAIN TANK (T-70)

Number	1 Divided Into 2 Compartments
Material	Carbon Steel
Capacity	1,000 gal (Total)
Design Pressure	15 psig
Design Temperature	150°F
Code	ASME P&PV Code, Section VIII

12. VACUUM DEGASIFIER

a. Tank (T-57)

Number	1
Performance	Handle Solution With 0-50 Std cm^3 H_2 (kg of Liquid Waste. Reduced H_2 Concentration to 1/40 of Influent Concentration)
Design Flow	0-160 gpm
Design Pressure	75 psig & 30" Hg
Design Temperature	200°F
Material	Stainless steel
Code	ASME B&PV Code, Section III, Class C

b. Vacuum Pumps (C-51A, B)

Number	2
Capacity	28 scfm @ 28" Hg
Type	Rotary, Water-Sealed, Water-Lubricated with Closed Cooling Loop
Motor	3 hp
Material	Stainless steel

EQUIPMENT RATINGS AND CONSTRUCTION CODES - ORIGINAL EQUIPMENT

13. RADWASTE DEMINERALIZER

a. Demineralizer Tanks (T-55A, B, C)

Number	3
Material of Tank	Stainless Steel
Flow Rate (Each)	48 gpm (Rated), 100 gpm (Max)
Unit Flow Rate (at Ratings)	5.0 gpm/ft^2
Resin Volume (Each)	32 ft^3
Resin Type	Equivalent Capacity Mixture of Nuclear Grade Cation and Anion
Design Pressure	125 psig
Design Temperature	160°F
Code	ASME B&PV Code, Section III, Class C and ASME B&PV Code, Section VIII, Para UW-2 (a)

b. Clean Resin Transfer Tank (T-61)

Number	1
Material	PVC Lined Carbon Steel
Capacity	32 ft^3
Design Pressure	125 psig
Design Temperature	125°F
Code	ASME B&PV Code, Section VIII

14. CLEAN WASTE FILTERS (F-57A, B, C)

Type	Cartridge Type With Replaceable Elements
Number	3
Material, Container	Stainless Steel
Material, Filter Media	Polypropolene
Filter Media Rating	150 Micron
Flow Rate	100 gpm
Design Pressure	125 psig
Design Temperature	160°F
Code	ASME B&PV Code, Section III, Class C and ASME B&PV Code, Section VIII, Para UW-2 (a)

EQUIPMENT RATINGS AND CONSTRUCTION CODES - ORIGINAL EQUIPMENT

15. EQUIPMENT DRAIN FILTER (F-56)

Number	Cartridge Type with Replaceable Elements
Material, Container	Stainless Steel
Material, Filter Media	Polypropolene
Filter Media Rating	25 Microns
Design Pressure	125 psig
Design Temperature	212°F
Code	ASME B&PV Code, Section III, Class C and ASME B&PV Code, Section VIII, Para UW-2 (a)

16. DIRTY WASTE FILTER (F-53)

Type	Cartridge Type With Replaceable Elements
Number	1
Material, Container	Stainless Steel
Material, Filter Media	Polypropolene
Filter Media Rating	200 Microns
Flow Rate	75 gpm
Design Pressure	100 psig
Design Temperature	160°F
Code	ASME B&PV Code, Section III, Class C and ASME B&PV Code, Section VIII, Para UW-2 (a)

17. LAUNDRY DRAIN FILTER (F-55)

Type	Cartridge Type With Replaceable Elements
Number	1
Material, Container	Stainless Steel
Material, Filter Media	Polypropolene
Filter Media Rating	25 Microns
Flow Rate	20 gpm
Design Pressure	100 psig
Design Temperature	160°F
Code	ASME B&PV Code, Section III, Class C and ASME B&PV Code, Section VIII, Para UW-2 (a)

EQUIPMENT RATINGS AND CONSTRUCTION CODES - ORIGINAL EQUIPMENT

18. PRIMARY SYSTEM DRAIN TANKS PUMPS (T-71A, B)

Type	Horizontal Centrifugal With Mechanical Seals
Number	2
Capacity (Each)	75 gpm
Head	80 ft TDH
Material	Type 316 Stainless Steel
Motor	5 hp, 3 Phase, 60 Hertz, 460 Volt
Codes	Motor NEMA; Pump, Standards of Hydraulic Institute

19. DEGASIFIER PUMPS (P-68A, B)

Type	Horizontal Centrifugal With Mechanical Seals
Number	2
Capacity (Each)	160 gpm
Head	190 ft TDH
Material	Type 316 Stainless Steel
Motor	20 hp, 3 Phase, 60 Hertz, 460 Volt
Codes	Motor NEMA; Pump, Standards of Hydraulic Institute

20. EQUIPMENT DRAIN TANK PUMPS (P-75A, B)

Type	Horizontal Centrifugal With Mechanical Seals
Number	2
Capacity (Each)	100 gpm
Head	266 ft TDH
Material	Type 316 Stainless Steel
Motor	25 hp, 3 Phase, 60 Hertz, 460 Volt
Codes	Motor NEMA; Pump, Standards of Hydraulic Institute

21. CONTROLLED CHEM LAB DRAIN PUMPS (P-61A, B)

Type	Horizontal Centrifugal With Mechanical Seals
Number	2
Capacity (Each)	10 gpm
Head	158 ft TDH
Material	Type 316 Stainless Steel
Motor	7.5 hp, 3 Phase, 60 Hertz, 460 Volt
Codes	Motor NEMA; Pump, Standards of Hydraulic Institute

EQUIPMENT RATINGS AND CONSTRUCTION CODES - ORIGINAL EQUIPMENT

22. RECEIVER TANK (CWRT) PUMPS (P-69A, B)

Type	Horizontal Centrifugal With Mechanical Seals
Number	2
Capacity (Each)	100 gpm
Head	200 ft TDH
Material	Type 316 Stainless Steel
Motor	15 hp, 3 Phase, 60 Hertz, 460 Volt

23. RECEIVER TANK (CWRT) CIRCULATING PUMP (P-70)

Type	Horizontal Centrifugal With Mechanical Seals
Number	1
Capacity (Each)	250 gpm
Head	121 ft TDH
Material	Type 316 Stainless Steel
Motor	15 hp, 3 Phase, 60 Hertz, 460 Volt
Codes	Motor NEMA; Pump, Standards of Hydraulic Institute

24. TREATED WASTE MONITOR PUMPS (P-58A, B)

Type	Horizontal Centrifugal With Mechanical Seals
Number	2
Capacity (Each)	150 gpm
Head	140 ft TDH
Material	Type 316 Stainless Steel
Motor	15 hp, 3 Phase, 60 Hertz, 460 Volt
Codes	Motor NEMA; Pump, Standards of Hydraulic Institute

25. SAFETY INJECTION ROOM SUMP PUMPS (P-72A, B AND P-73A, B)

Type	Vertical Centrifugal
Number	4 (2 Sets With 2 Pumps per Set)
Capacity (Each)	25 gpm
Head	35 ft TDH
Material	Stainless Steel
Motor	1 hp, 3 Phase, 60 Hertz, 460 Volt
Codes	Motor NEMA,

EQUIPMENT RATINGS AND CONSTRUCTION CODES - ORIGINAL EQUIPMENT

26. DIRTY WASTE DRAIN TANK PUMPS (P-60A, B)

Type	Horizontal Centrifugal With Mechanical Seals
Number	2
Capacity (Each)	75 gpm
Head	160 ft TDH
Material	Type 316 Stainless Steel
Motor	10 hp, 3 Phase, 60 Hertz, 460 Volt
Codes	Motor NEMA; Pump, Standards of Hydraulic Institute

FILTERED WASTE MONITOR PUMP (P-63)

Type	Horizontal Centrifugal With Mechanical Seals
Number	1
Capacity (Each)	75 gpm
Head	150 ft TDH
Material	Type 316 Stainless Steel
Motor	10 hp, 3 Phase, 60 Hertz, 460 Volt
Codes	Motor NEMA; Pump, Standards of Hydraulic Institute

28. WASTE GAS COMPRESSORS (C-50A, B)

a. Compressor

Number	2
Type	Single Head, Single Stage Diaphragm Type
Capacity (Each)	2.35 scfm at 14.7 psia Suction, 0.44 scfm at 7.5 psia Suction
Discharge Pressure	100 psig at Maximum Delivery
Material	Stainless Steel
Motor	2 hp, 3 Phase, 60 Hertz, 460 Volt, TEFC

b. Aftercoolers

Number	2
Type	Shell and Tube With Moisture Separator and Drain Trap
Material	Tube Side (Gas) Stainless Steel, Shell Side (Water) Carbon Steel

EQUIPMENT RATINGS AND CONSTRUCTION CODES - ORIGINAL EQUIPMENT

29. WASTE GAS COMPRESSOR (C-54)

a. Compressor

Number	1
Type	Diaphragm Type
Capacity (Each)	5 scfm Avg Between Suction Pressures of 7.5 and 15.0 psia
Discharge Pressure	100 psig
Material	
Motor	7.5

b. Aftercoolers

Number	1

30. PIPING, FITTING AND VALVES

a. Liquid Systems

Material	Stainless Steel
Design Pressure	Floor Drains - Atmosphere, Process - 50 psig
Joints, 2" and Larger	Butt Weld
1-1/2" and Smaller	2,000 lb SW
Valves, 2" and Larger	Stainless Steel, Butt Weld Ends, 150 lb
1-1/2" and Smaller	Stainless Steel, 2,000 lb SW Ends, 150 lb
Butterfly Valves	Stainless Steel, Flangeless, 150 lb
Plug Vales	Stainless steel, FF Flanged, 150 lb
Code	ASA B31.1, Code for Pressure Piping, Including Applicable Nuclear Code Cases, ASA B16.5
Radiography	All Butt Weld in Nuclear Service Systems Rated for Higher Than 50 psig and 212°F Are Radiographed 100. All Butt Welds in Nuclear Systems Rated for Less Than 50 psig and 212°F Are Radiographed 10%

EQUIPMENT RATINGS AND CONSTRUCTION CODES - ORIGINAL EQUIPMENT

b. Gaseous Systems

Material	Carbon Steel
Design Pressure	100 psig
Joints, 2" and Larger	Butt Weld
1-1/2" and Smaller	3,000 lb SW
Valves, 2" and Larger	Carbon Steel, 150 lb BW
1-1/2" and Smaller	Carbon Steel, 600 lb, 3,000 lb SW
Butterfly	Carbon Steel, 150 lb, FF Flanged
Plug	Ductile Iron, 150 lb, FF Flanged
Code	ASA B31.1, Code for Pressure Piping, Including Applicable Nuclear Code Cases, ASA B16.5
Radiography	All Welds Are 100% Radiographed

EQUIPMENT RATINGS AND CONSTRUCTION CODES - ADDITIONAL EQUIPMENT INSTALLED 1971-1973

1. CLEAN WASTE HOLDUP TANK (T-85)

Number	1
Material of Tank	SA240 Type 304 SS
Capacity	5,000 gal
Design Pressure	Atm
Design Temperature	212°F
Code	API-620, 1970 Exam ASME B&PV Code, Section III, 1971

2. CLEAN WASTE TRANSFER PUMP (P-94)

Type	Gould 3196
Number	1
Capacity	80 gpm
Head	85 ft
Material	Stainless Steel
Motor	5 hp
Code	ASME B&PV Code, Section III, Class 3, 1971

3. CLEAN AND DIRTY WASTE EVAPORATORS (M-59A, B)

   a. Evaporator Vessel

Number	2
Material	316 SS
Capacity	1,600 gal
Design Pressure	15 psig
Design Temperature	200°F
Code	ASME B&PV Code, Section III, Class 3, 1971

   b. Recirculation Pump

Type	Gould 3196 - 3 x 4-13
Number	4
Capacity	200 gpm
Head	30 ft
Material	316 SS
Motor	5 hp, 3 Phase, 60 Hertz, 460 Volt
Code	ASME B&PV Code, Section III, Class 3, 1971

EQUIPMENT RATINGS AND CONSTRUCTION CODES - ADDITIONAL EQUIPMENT INSTALLED 1971-1973

c. Distillate Pump

Type	Gould 3196 - 1 x 1-1/2-6
Number	4
Capacity	25 gpm
Head	130 ft
Material	316 SS
Motor	5 hp
Code	ASME B&PV Code, Section III, Class 3, 1971

d. Concentrate Pump

Type	Gould 3196 - 1 x 1-1/2-6
Number	4
Capacity	25 gpm
Head	100 ft
Material	316 SS
Motor	3 hp
Code	ASME B&PV Code, Section III, Class 3, 1971

e. Vacuum Pump

Type	Nash
Number	4
Capacity	48 cfm @ 20" vacuum
Head	2 psig
Material	316 SS
Motor	3 hp
Code	N/A

4. CLEAN WASTE DISTILLATE TANK (T-86)

Number	1
Material	SA240 Type 304 SS
Capacity	5,000 gal
Design Pressure	Atm
Design Temperature	212°F
Code	API-650, 1970 Exam ASME B&PV Code, Section III, 1971

EQUIPMENT RATINGS AND CONSTRUCTION CODES - ADDITIONAL EQUIPMENT INSTALLED 1971-1973

5. CLEAN WASTE DISTILLATE PUMP (P-97A, B)

Type	Gould 3196
Number	2
Capacity	80 gpm
Head	85 ft
Material	316 SS
Motor	5 hp - Pacemaker
Code	ASME B&PV Code, Section III, Class 3, 1971

6. CLEAN (MISCELLANEOUS) WASTE CONCENTRATE TANKS (T-94, T-95)

Number	2
Material	SA240 Type 304 SS
Capacity	1,500 gal
Design Pressure	Atm
Design Temperature	212°F
Code	API-650, 1970 Exam ASME B&PV Code, Section III, 1971

7. MISCELLANEOUS WASTE FILTER (F-59)

Type	Cartridge Type With Replaceable Elements
Number	1
Material, Container	304 SS
Material, Filter Media	Epoxy Impregnated Cellulose
Filter Media Rating	150 Micron*
Flow Rate	30 gpm
Design Pressure	50 psig
Design Temperature	212°F
Code	ASME B&PV Code, Section III, Class 3, 1971

*May be in service with element removed.

8. CLEAN (MISCELLANEOUS) WASTE CONCENTRATE PUMPS (P-95A, B)

Type	Gould 3196, 1 x 2-8
Number	2
Capacity	30 gpm
Head	75 ft
Material	316 SS
Motor	3 hp - Pacemaker
Code	ASME B&PV Code, Section III, Class 3, 1971

EQUIPMENT RATINGS AND CONSTRUCTION CODES - ADDITIONAL EQUIPMENT INSTALLED 1971-1973

9. POLISHING (MISCELLANEOUS WASTE) DEMINERALIZERS (T-88, T-89A, B)

Number	3
Material of Tank	304 SS
Flow Rate	50 gpm (Rated), 100 gpm (Max)
Unit Flow Rate (At Max)	10 gpm/ft^2
Resin Volume	32 ft^3
Resin Type	Equivalent Capacity Mixture of Nuclear Grade Cation and Anion

10. MISCELLANEOUS WASTE HOLDUP TANKS (T-92A, B, C)

Number	3
Material	SA240 Type 304 SS
Capacity	20,000 gal
Design Pressure	Atm
Design Temperature	212°F
Code	API-620, 1970 Exam ASME B&PV Code, Section III, 1971

11. MISCELLANEOUS WASTE TRANSFER PUMPS (P-92A, B)

Type	Gould 3196, 2 x 3-13
Number	2
Capacity	80 gpm
Head	120 ft
Material	316 SS
Motor	10 hp - Pacemaker
Code	ASME B&PV Code, Section III, Class 3, 1971

12. MISCELLANEOUS WASTE DISTILLATE TANK (T-87)

Number	1
Material	SA240 Type 304 SS
Capacity	8,000 gal
Design Pressure	Atm
Design Temperature	212°F
Code	API-650, 1970 Exam ASME B&PV Code, Section III, 1971

EQUIPMENT RATINGS AND CONSTRUCTION CODES - ADDITIONAL EQUIPMENT INSTALLED 1971-1973

13. MISCELLANEOUS WASTE DISTILLATE PUMPS (P-89A, B)

Type	Gould 3196, 1-1/2 x 3-6
Number	2
Material	316 SS
Capacity	80 gpm
Head	110 ft
Motor	7-1/2 hp - Pacemaker
Code	ASME B&PV Code, Section III, Class 3, 1971

14. RADWASTE SPENT RESIN STORAGE TANK (T-100)

Number	1
Material	304 SS
Capacity	200 ft^3
Design Pressure	125 psig
Design Temperature	200°F
Code	ASME B&PV Code, Section III, Class 3, 1971

15. WASTE GAS DECAY TANKS (T-101A, B, C)

Number	3
Material	Carbon Steel
Capacity	225 ft^3
Design Pressure	120 psig
Design Temperature	550°F
Code	ASME B&PV Code, Section III, Class 3, 1971

EQUIPMENT RATINGS AND CONSTRUCTION CODES - ADDITIONAL EQUIPMENT INSTALLED 1971-1973

16. PIPING, FITTINGS AND VALVES

a. Liquid Radwaste System (Process)

Material	Stainless Steel
Design Pressure	125 psig and 150 psig
Fittings	
2-1/2" and Larger	150 lb Thickness To Match Pipe Butt Weld Ends
2-1/2" and Smaller	3,000 lb Socket Weld
Valves	
2-1/2" and Larger	150 lb Butt Weld Ends
2" and Smaller	150 lb Socket Weld Ends
Joints	
2-1/2" and Larger	Butt Weld Ends
2" and Smaller	Socket Weld Ends
Code	ASME B&PV Code, Section III, Nuclear Power Plant Components, Nuclear Class 3, 1971, per AEC Safety Guide 26, March 27, 1972

b. Atmospheric Radwaste Drainage Piping

Material	Stainless Steel
Design Pressure	Atmospheric
Fittings	
8" and Smaller	Butt Weld Ends
Joints	
8" and Smaller	Butt Weld
Code	ANSI B31.1.0 - 1967 Power Piping

c. Gaseous Radwaste System (Process)

Material	Carbon Steel
Design Pressure	150 psig
Fittings	
2-1/2" and Larger	150 lb Thickness To Match Pipe Butt Weld Ends
2" and Smaller	3,000 lb Socket Weld Ends
Valves	
2-1/2" and Larger	150 lb Butt Weld Ends
2" and Smaller	600 lb Socket Weld Ends
Joints	
2-1/2" and Larger	Butt Weld Ends
2" and Smaller	Socket Weld
Code	ASME B&PV Code, Section III, Nuclear Power Plant Components, Nuclear Class 3, 1971, per AEC Safety Guide 26, March 23, 1972

EQUIPMENT RATINGS AND CONSTRUCTION CODES - ADDITIONAL EQUIPMENT INSTALLED 1971-1973

17. PRIMARY SYSTEM MAKEUP STORAGE TANK (T-90)

Number	1
Material	Carbon Steel
Capacity	200,000 gal
Design Pressure	Atmospheric
Code	API-650, 1970

18. UTILITY WATER STORAGE TANK (T-91)

Number	1
Material	Carbon Steel
Capacity	75,000 gal
Design Pressure	Atmospheric
Code	API-650, 1970

PRIMARY SYSTEM DRAIN TANK

Letdown and Regenerative HX Drain
Shutdown Cooling Header Relief
SI Tanks Leakage
PCS Loop Drains
Quench Tank Drains
Flange Leak Detector Drain
Controlled Bleed-Off Relief
PCS Pump Seal Leakage

EQUIPMENT DRAIN TANK

Spent Resin Storage Tanks
Primary Coolant Sample Drain
Clean Resin Transfer Tank
Radwaste Demineralizer Drains
Fuel Pool Overflow
Fuel Pool HX Drains
Fuel Pool Demineralizer Drains
Fuel Pool Filter Drains
Blowdown Drain Tank
HPI Header Relief
SIRW Tank Overflow Drain
SIRW Tank HX Drain
SI Tank Sample Flush
Waste Gas Surge Tank Drain
Chemical Addition Tank Drain
Charging Pump Relief and Drains
VCT Drain
Purification Filters Drain

DIRTY WASTE DRAIN TANK

Radwaste Addition Area Sample Sink Drains
Clean Resin Transfer Tank Drains
Pump Leak-Offs
Auxiliary Building Floor Drains
Decontamination Pit Drains
Cask Washdown Area Drains
Controlled Chemical Laboratory Drain Tank Drains
Component Cooling Surge Tank Drain
Boric Acid Batching Tank Drain
Boric Acid Filter Drains
Treated Waste Monitor Tanks
VCT Relief
Vacuum Degasifier Relief
Turbine Building Sump Pump Discharge
Containment Sump Drains
Shutdown Cooling HX Drains
Spent Resin Storage Tank (T-100)
Primary System Makeup and Utility Water Tanks Overflow
Laundry Drain Tank Drains
Auxiliary Building Sump Pumps

LIQUID RADWASTE

		Clean Liquid Waste Activities ($\mu Ci/cm^3$)*					Dirty Liquid Waste Activities ($\mu Ci/cm^3$)*		
Isotope	Half-Life	As Received in Receiver Tanks	After 30 Days' Decay	After Processing Through Two Demineralizers	After Processing Through Evaporator	After Processiong Through Polishing Demineralizer	As Received in Drain Tank	After Processing Through Evaporator	After Processing Through Demineralizers
Fission Products									
Br-84	32m	1.25×10^{-2}	(a)	(a)	(a)	(a)	4.66×10^{-4}	4.66×10^{-8}	(a)
Rb-88	18m	6.61×10^{-1}	(a)	(a)	(a)	(a)	2.44×10^{-2}	2.44×10^{-6}	2.44×10^{-8}
Rb-89	15m	1.66×10^{-2}	(a)	(a)	(a)	(a)	6.10×10^{-4}	6.10×10^{-8}	(a)
SR-89	54d	1.44×10^{-3}	9.80×10^{-4}	9.80×10^{-6}	(a)	(a)	5.33×10^{-5}	(a)	(a)
Sr-90	28y	4.00×10^{-5}	4.00×10^{-5}	4.00×10^{-7}	(a)	(a)	1.50×10^{-6}	(a)	(a)
Y-90	64h	1.55×10^{-4}	6.51×10^{-8}	(a)	(a)	(a)	5.77×10^{-6}	(a)	(a)
Sr-91	9.7h	1.00×10^{-3}	(a)	(a)	(a)	(a)	3.70×10^{-5}	(a)	(a)
Y-91	58d	6.50×10^{-2}	4.53×10^{-2}	4.53×10^{-4}	4.53×10^{-8}	(a)	2.40×10^{-3}	2.40×10^{-7}	(a)
Mo-99	67h	6.12×10^{-1}	3.67×10^{-4}	3.67×10^{-6}	(a)	(a)	2.26×10^{-2}	2.26×10^{-6}	2.26×10^{-8}
Te-129	33d	7.36×10^{-3}	3.93×10^{-3}	3.93×10^{-5}	(a)	(a)	2.72×10^{-4}	2.72×10^{-8}	(a)
I-129	1.7×10^{7}y	1.52×10^{-8}	1.52×10^{-8}	(a)	(a)	(a)	(a)	(a)	(a)
I-131	8.0d	1.18	8.87×10^{-2}	8.87×10^{-4}	8.87×10^{-7}	8.87×10^{-8}	4.40×10^{-2}	4.40×10^{-5}	4.40×10^{-7}
Te-132	77h	9.75×10^{-2}	1.46×10^{-4}	1.46×10^{-6}	(a)	(a)	3.60×10^{-3}	3.60×10^{-7}	(a)
I-132	2.3h	3.05×10^{-1}	(a)	(a)	(a)	(a)	1.13×10^{-2}	1.13×10^{-5}	1.13×10^{-7}
I-133	21h	1.73	(a)	(a)	(a)	(a)	6.38×10^{-2}	6.38×10^{-5}	6.38×10^{-7}
Cs-134	2.3y	3.84×10^{-1}	3.78×10^{-1}	3.70×10^{-3}	3.78×10^{-7}	3.78×10^{-8}	1.42×10^{-2}	1.42×10^{-6}	1.42×10^{-8}
Te-134	44m	7.12×10^{-3}	(a)	(a)	(a)	(a)	2.63×10^{-4}	2.63×10^{-8}	(a)
I-134	52m	1.73×10^{-1}	(a)	(a)	(a)	(a)	6.40×10^{-3}	6.40×10^{-5}	6.40×10^{-7}
I-135	6.7h	7.53×10^{-1}	(a)	(a)	(a)	(a)	2.78×10^{-2}	2.78×10^{-6}	2.78×10^{-8}
Cs-136	13d	4.06×10^{-2}	8.20×10^{-3}	8.20×10^{-5}	(a)	(a)	1.50×10^{-3}	1.50×10^{-7}	(a)
Cs-137	30y	2.87	2.87	2.87×10^{-2}	2.87×10^{-6}	2.87×10^{-7}	1.06×10^{-1}	1.06×10^{-5}	1.06×10^{-7}
Cs-138	32m	1.87×10^{-1}	(a)	(a)	(a)	(a)	6.90×10^{-3}	6.90×10^{-7}	(a)
Ba-140	12.8d	1.84×10^{-3}	3.65×10^{-4}	3.65×10^{-6}	(a)	(a)	6.78×10^{-5}	(a)	(a)
La-140	40.2h	1.27×10^{-3}	(a)	(a)	(a)	(a)	6.52×10^{-5}	(a)	(a)
Corrosion Products									
Cr-51	27d	6.50×10^{-4}	3.02×10^{-4}	3.02×10^{-6}	(a)	(a)	2.4×10^{-5}	(a)	(a)
Mn-54	300d	5.22×10^{-6}	4.87×10^{-6}	4.87×10^{-8}	(a)	(a)	2.0×10^{-7}	(a)	(a)
Mn-56	2.58h	6.00×10^{-3}	(a)	(a)	(a)	(a)	2.3×10^{-4}	2.3×10^{-8}	(a)
Co-58	71d	2.07×10^{-3}	1.55×10^{-3}	1.55×10^{-5}	(a)	(a)	7.9×10^{-5}	(a)	(a)
Fe-59	45d	2.02×10^{-6}	1.27×10^{-6}	1.27×10^{-8}	(a)	(a)	7.7×10^{-8}	(a)	(a)
Co-60	5.2y	2.98×10^{-4}	2.95×10^{-4}	2.95×10^{-6}	(a)	(a)	1.1×10^{-5}	(a)	(a)
Zr-95	65d	4.96×10^{-6}	3.61×10^{-6}	3.61×10^{-8}	(a)	(a)	1.9×10^{-7}	(a)	(a)

(a) Less Than 10^{-8}

LIQUID RADWASTE

Assumptions:

Factor of 10 reductionin each demineralizer for all isotopes except tritium.
10^3 reduction for iodine in evaporator.
10^4 reduction for all other isotopes except tritium.
19% of clean waste is direct from primary system.
81% of clean waste is from Chemical and Volume JControl System and passes through one ion exchanger prior to entering clean waste receiver tanks.
No holdup period assumed in Miscellaneous Waste Holdup Tank.
1% defective fuel.
Dirty waste activity is 1% of primary coolant activity.

*The above information pertaining to isotopic activities are based on decontamination factors (DF) which were provided as part of the initial safety analysis or added as changes to the systems were made. Operating experience has demonstrated that the reactor coolant activity levels are much lower than the activity levels assumed in the radwaste system design. The ODCM provides information pertaining to the monitoring of waste streams and ensures the resultant offsite doses are in compliance with current regulatory requirements. The above information is considered historical.

MAXIMUM CALCULATED TRITIUM RELEASE DUE TO EVAPORATION FROM REFUELING CAVITY AND SPENT FUEL POOL

Yr of Oper	Conc in Contain Bldg (Ci/cm^3)	Release From Contain Bldg (Ci/Yr)	Conc in Spent Fuel Bldg (Ci/cm^3)	Release From Spent Fuel Bldg (Ci/Yr)	Total Release (Ci/Yr)
5	1.1×10^{-13}	18	8.5×10^{-14}	13	31
10	2.1×10^{-13}	35	2.2×10^{-13}	33	68
15	3.0×10^{-13}	50	3.6×10^{-13}	53	103
20	3.8×10^{-13}	63	4.9×10^{-13}	72	135
25	4.5×10^{-13}	75	6.1×10^{-13}	90	165
30	5.1×10^{-13}	85	7.1×10^{-13}	105	190
35	5.6×10^{-13}	93	8.0×10^{-13}	118	211
40	6.0×10^{-13}	100	8.6×10^{-13}	127	227

LADTAP INPUT DATA AND RESULTS
MAXIMUM INDIVIDUAL DOSE CALCULATIONS

Exposure Pathway	Dilution Factor	Transit Time (h)	Usage Rates (kg/yr or h/yr) Adult	Teen	Child	Infant
Fish Ingestion	15	12	21.0	16.0	6.9	0.0
Water Ingestion	1,000	24	730.0	510.0	510.0	510.0
Shoreline Use	1	0	12.0	67.0	14.0	0.0
Swimming	1	0	12.0	67.0	14.0	0.0
Boating	15	0	52.0	52.0	29.0	0.0

Dose Results (mrem/yr)(a)

	Adults			Teenager		
Exposure Pathway	T Body	Liver	Skin	T Body	Liver	Skin
Fish Ingestion	5.25(-1)(b)	6.96(-1)	-	2.97(-1)	6.91(-1)	-
Water Ingestion	5.66(-4)	6.13(-4)	-	3.10(-4)	4.06(-4)	-
Shoreline Use	7.96(-3)	7.96(-3)	9.3(-3)	4.45(-2)	4.45(-2)	5.19(-2)
Swimming	8.24(-5)	8.24(-5)	-	4.6 (-4)	4.6 (-4)	-
Boating	1.19(-5)	1.19(-5)	-	1.19(-5)	1.19(-5)	-
Totals	5.34(-1)	7.04(-1)	9.3(-3)	3.43(-1)	7.36(-1)	5.19(-2)

(a) Doses to other individuals and organs are smaller than those presented.
(b) 5.25(-1) = 5.25×10^{-1}

ACTIVITY IN COOLANT AND GASEOUS WASTE

Isotope	Half-Life	Activity $\mu Ci/cm^3$ Coolant	Activity in Surge Tank $\mu Ci/cm^3$ H_2 As Received	Activity in Surge Tank $\mu Ci/cm^3$ H_2 60-Day Hold	10 CFR 20 $\mu Ci/cm^3$	Fraction of 10 CFR 20 Limit at Boundary No Hold	Fraction of 10 CFR 20 Limit at Boundary 60-Day Hold
Kr-85(m)	4.4h	1.50	42.9	(a)	1×10^{-7}	.0065	(a)
Kr-85	10.4y	2.34	66.9	65.6	3×10^{-7}	.0034	.0034
Kr-87	78m	0.81	23.1	(a)	2×10^{-8}	.017	(a)
Kr-88	2.8h	2.48	70.9	(a)	(b)	(b)	(b)
Xe-133	5.27d	225	6,430	2.48	3×10^{-7}	0.32	.00012
Xe-135	9.2h	6.75	193	(a)	1×10^{-7}	.029	(a)
Xe-138	17m	0.36	10.3	(a)	(b)	(b)	(b)

(a)Less than 10^{-8}
(b)Unlisted in 10 CFR 20

SPECIAL LOCATION GASPAR INPUT DATA

Number	Distance (Miles)	Direction	Description	Normal X/Q(s/m^3)	Depleted X/Q(s/m^3)	Deposition D/Q(1/m^2)
1	0.63	S	Residence	5.56(-6)	4.66(-6)	3.08(-8)
2	0.88	ENE	Garden	2.06(-6)	1.67(-6)	2.31(-8)
3	1.00	ESE	Meat Animal	2.13(-6)	1.69(-6)	1.49(-8)
4	2.50	NE	Goat Milk	2.60(-7)	1.85(-7)	8.14(-10)
5	2.75	ENE	Milk Cow	1.81(-7)	1.26(-7)	1.59(-9)

Parameter	Value for Appropriate Locations
Fraction fresh leafy vegetables grown locally	1.0
Fraction of year cows, cattle, goats on pasture	0.5
Fraction of vegetable intake grown in garden	0.76
Fraction of feed from pasture while on pasture	1.0
Air water content, g/m^3	8.0

DOSE RESULTS FOR SPECIAL LOCATIONS
MAXIMUM INDIVIDUAL DOSES BY AGE GROUP AND ORGAN
mrem/yr(a)

		Adults			Teenagers			Children			Infants		
Location(a)	Description	T Body	Skin	Thyroid	T Body	Skin	Thyroid	T Body	Skin	Thyroid	T Body	Skin	Thyroid
1	Plume	1.13(-1)	3.38(-1)	1.13(-1)	1.13(-1)	3.38(-1)	1.13(-1)	1.13(-1)	3.38(-1)	1.13(-1)	1.13(-1)	3.38(-1)	1.13(-1)
	Ground	1.43(-1)	1.68(-2)	1.43(-2)	1.43(-2)	1.68(-2)	1.43(-2)	1.43(-2)	1.60(-2)	1.43(-2)	1.43(-2)	1.68(-2)	1.43(-2)
	Inhalation	9.25(-2)	9.20(-2)	3.40(-1)	5.13(-2)	5.09(-2)	2.58(-1)	5.22(-2)	5.16(-2)	3.25(-1)	5.57(-2)	5.49(-2)	5.23(-1)
2	Garden	2.05(-1)	1.99(-1)	1.71(0)	2.43(-1)	2.37(-1)	1.43(0)	5.02(-1)	4.95(-1)	2.30(0)	-	-	-
3	Meat	5.09(-2)	5.06(-2)	1.10(-1)	3.52(-2)	3.50(-2)	7.62(-2)	6.16(-2)	6.14(-2)	1.24(-2)	-	-	-
4	Goat Milk	1.45(-2)	1.36(-2)	2.58(-1)	1.84(-2)	1.72(-2)	3.84(-1)	3.66(-2)	3.46(-2)	7.60(-1)	6.84(-2)	6.49(-2)	1.81(0)
5	Cow Milk	6.79(-3)	6.33(-3)	1.84(-1)	9.47(-3)	8.77(-3)	2.76(-1)	2.03(-2)	1.90(-2)	5.48(-1)	3.89(-2)	3.74(-2)	1.31(0)

(a) See Table 11-12 for location data

PROCESS RADIATION SERVICE AND EQUIPMENT

Process Radiation Monitoring Systems	Detection Equipment/ Sampling Equipment	Readout Equipment	Sensitivity	Alarm and Control
Service Water, RE0833	Scintillation detector/detector well in service water line to discharge structure.	Digital indicator $10\text{-}10^7$ CPM.	5×10^{-6} $\mu Ci/cm^3$ of Cs-137 equivalent.	Alarm on high radiation, circuit failure.
Steam Generator Blowdown, RE0707	Scintillation detector/external to blowdown tank, drain to P98A/B suction.	Digital rate meter $10\text{-}10^7$ CPM.	5×10^{-6} $\mu Ci/cm^3$ of Cs-137 equivalent.	Alarm on high radiation signal; isolates blowdown tank.
Radwaste Liquid Discharge, RE1049	Scintillation detector on radwaste liquid line to discharge structure.	Digital rate meter $10\text{-}10^7$ CPM.	5×10^{-6} $\mu Ci/cm^3$ of Cs-137 equivalent.	Alarm on high radiation, cirtuit failure. Isolates radwaste release.
Component Cooling Water, RE0915	Scintillation detector/piping, valves, and detector housing. CC pump dP for flow.	Digital indicator $10\text{-}10^7$ CPM.	5×10^{-5} $\mu Ci/cm^3$ of Cs-137 equivalent.	Alarm on high radiation, circuit failure; isolates component cooling water surge tank vent.
Circ Water Discharge, RE1323	Scintillation detector/piping, valves, sample pump and detector housing; circulating from mixing basin prior to discharge.	Digital indicator $10\text{-}10^7$ CPM.	4×10^{-6} $\mu Ci/cm^3$ of Cs-137 equivalent.	Alarm on high radiation, circuit failure.
Off-Gas Monitoring, RE0631	Scintillation detector/piping, valves and detector housing; main condenser steam jet air ejector noncondensibles to stack.	Digital rate meter analyzer $10\text{-}10^7$ CPM.	1×10^{-5} $\mu Ci/cm^3$ of Xe-133 equivalent.	Alarm on high radiation and circuit failure.

PROCESS RADIATION SERVICE AND EQUIPMENT

Process Radiation Monitoring Systems	Detection Equipment/ Sampling Equipment	Readout Equipment	Sensitivity	Alarm and Control
Radwaste Area Ventilation, RE1809	Geiger-Mueller tube/piping, valves, sample pump and detector housing; air monitoring prior to discharge to stack.	Linear rate meter $0\text{-}10^6$ CPM.	4×10^{-5} $\mu Ci/cm^3$ of Xe-133 equivalent.	Alarm on high radiation and circuit failure; isolates radwaste vent system.
Engineered Safeguards Pump Rooms Vent, RE1810, 1811	Geiger-Mueller tube; piping, valves, sample pump and detector housing; to stack, 2 systems, East and West rooms.	Digital rate meter $10\text{-}10^7$ CPM.	1×10^{-4} $\mu Ci/cm^3$ of Xe-133 equivalent.	Alarm on high radiation and circuit failure; isolates pump room vent supply and exhausts.
Waste Gas Radiation, RE1113	Geiger-Mueller tube/piping, valves and detector housing; from the waste gas surge tank and waste gas decay tanks to stack.	Digital rate meter $10\text{-}10^7$ CPM.	1×10^{-4} $\mu Ci/cm^3$ of Xe-133 equivalent.	Alarm on high radiation and circuit failure; isolation waste gas surge tank and decay tanks.
Containment Building Gas Monitoring System, RE1817	Geiger-Mueller tube/piping solenoid valves and detector housing; from 5 sample locations on (4) cooler fan discharges.	Linear rate meter $10\text{-}10^7$ CPM.	1×10^{-4} $\mu Ci/cm^3$ of Xe-133 equivalent.	Alarm on high radiation and circuit failure.
Failed Fuel, RE0202	Scintillation detector/detector housing in letdown line.	Linear rate meter, $0\text{-}10^6$ CPM, local.	N/A	Alarm on high radiation, circuit failure.

PROCESS RADIATION SERVICE AND EQUIPMENT

Process Radiation Monitoring Systems	Detection Equipment/ Sampling Equipment	Readout Equipment	Sensitivity	Alarm and Control
Steam Generator Blowdown Vent, RE2320	Scintillation detector/in well on blowdown vent line.	Digital rate meter, $10\text{-}10^7$ CPM.	2×10^{-5} μCi/cm^3 of Cs-137 equivalent.	Alarm on high radiation, circuit failure.
Turbine Building Sump, RE5211	Scintillation detector/piping, valves, and detector housing, sump pump discharge to drain.	Digital rate meter, $10\text{-}10^7$ CPM.	5×10^{-6} μCi/cm^3 of Cs-137 equivalent.	Alarm on high radiation, circuit failure.
Radwaste Addition Vent, RE5711	Beta scintillation/dP across roughing filter used for flow.	Digital rate meter, $10\text{-}10^7$ CPM.	5×10^{-6} μCi/cm^3 of Xe-133 equivalent.	Alarm on high radiation circuit failure; high radiation isolates radwaste addition vent.
Fuel Building Addition Vent, RE5712	Beta scintillation/dP across roughing filter used for flow.	Digital rate meter, $10\text{-}10^7$ CPM.	5×10^{-6} μCi/cm^3 of Xe-133 equivalent.	Alarm on high radiation circuit failure; high radiation isolates fuel building vent.
RGEMS 2327	Scintillation detectors for beta, gamma, ionization chamber/piping, valves, filters, sample collection bottle; discharge to stack inlet.	Log count rate meter, recorded; stack flow, recorded; sample flow recorded; $10\text{-}10^6$ CPM beta (log), $10\text{-}10^7$ CPM (log), gamma $1\text{-}10^7$ mr/h (ion chamber) or 4×10^6 Ci/s digital.	1×10^{-6} μCi/cm^3 of Xe-133 equivalent.	Alarm, set recorder speed, isolate samples on alert level. Alarm transfer flow to upper range on high radiation.

PROCESS RADIATION SERVICE AND EQUIPMENT

Process Radiation Monitoring Systems	Detection Equipment/ Sampling Equipment	Readout Equipment	Sensitivity	Alarm and Control
RGEMS RE2325, RE2326	Scintillation detectors for beta, gamma, ionization chamber/piping, valves, filters, sample collection bottle; discharge to stack inlet.	Digital rate meter RIA-2325: 10-10^6 CPM RIA-2326: 10-10^7 CPM	3.9 x 10^{-7} $\mu Ci/cm^3$ of Xe-133 equivalent.	Alarm, set recorder speed, isolate samples on alert level. Alarm transfer flow to upper range on high radiation.
Main Steam, RE2323, 2324	Geiger-Mueller tube/in lead collimator adjacent to main steam lines.	Digital rate meter 10-10^7 CPM.	5 x 10^{-2} $\mu Ci/cm^3$ of dose equivalent I-131	Alarm on high radiation.

AREA RADIATION DETECTORS

Instrument(a), (b)	Range
Containment 590' Elev NW Side (b)	10^{-2}-10^{4} Rem/hr
Containment 590' Elev SW Side (b)	10^{-2}-10^{4} Rem/hr
Containment 590' Elev NE Side (b)	10^{-2}-10^{4} Rem/hr
Containment 590' Elev SE Side (b)	10^{-2}-10^{4} Rem/hr
East Engineering Safeguards Room	0.1-10^{7} mrem/hr
Radwaste Service Corridor	0.1-10^{7} mRem/hr
Radwaste Control Area (C-40 Panel)	0.1-10^{7} mrem/hr
2.4 kV Switchgear Room (1C)	0.1-10^{7} mRem/hr
Control Lab Corridor	0.1-10^{7} mrem/hr
Access Control Station	0.1-10^{7} mrem/hr
Outside Cont Personnel Air Lock 607' Elev	0.1-10^{7} mrem/hr
Containment Purge Unit Room-North	0.1-10^{7} mrem/hr
Radwaste Demineralizer Room Roof	0.1-10^{7} mrem/hr
Control Room/Turbine Bldg Corridor	0.1-10^{7} mrem/hr
Control Room Entrance	0.1-10^{7} mrem/hr
Turbine Floor East Side	0.1-10^{7} mrem/hr
Health Physics Offices	0.1-10^{7} mrem/hr
Spent Fuel Pool-South	0.1-10^{7} mrem/hr
Air Room 590' Elev	0.1-10^{7} mrem/hr
Inside of Cont Personnel Air Lock	1.0-10^{7} mrem/hr
Containment 649' Elev Rx Cavity	1.0-10^{7} mRem/hr
Containment 649' Elev Rx Cavity	1.0-10^{7} mRem/hr
Containment Hi range-left channel	1-10^{7} Rem/hr
Containment Hi range-right channel	1-10^{7} Rem/hr
Decontamination Room	0.1-10^{7} mrem/hr
Evaporator "A"	0.1-10^{7} mrem/hr
Evaporator "B"	0.1-10^{7} mrem/hr
Evaporator Control Panel C-105	0.1-10^{7} mrem/hr
Waste Gas Decay Tank T-101, A, B & C	0.1-10^{7} mrem/hr

(a) Sensitivity for all instruments except containment detectors has energy dependence of ±20% of the actual radiation intensity over a photon energy spectrum of 100 keV to 2.5 MeV

(b) Sensitivity for containment detector instruments has an energy dependence of ±15% of actual radiation intensity over a photon energy spectrum of 100 keV to 2.5 MeV.

(c) Sensitivity for the radwaste monitor is ±30% of the actual intensity over a photon energy spectrum from 80 keV to 1.33 MeV.

AREA RADIATION DETECTORS

Environmental Lab Entrance	0.1-10^7 mrem/hr
Radwaste Packaging Area-East	0.1-10^7 mrem/hr
Radwaste Packaging Area-West	0.1-10^7 mrem/hr
Radwaste Demineralizer 649' Elev	0.1-10^7 mrem/hr
Steam Dumps Area	0.1-10^7 mrem/hr
Radwaste Monitors (c) Local Readout	
East Processing Building	1.0-10^5 mRem/hr
East Storage Building	1.0-10^5 mRem/hr
South Storage Building	1.0-10^5 mRem/hr

(Not Used for Radwaste Storage at this time)

(a) Sensitivity for all instruments except containment detectors has energy dependence of ±20% of the actual radiation intensity over a photon energy spectrum of 100 keV to 2.5 MeV

(b) Sensitivity for containment detector instruments has an energy dependence of ±15% of actual radiation intensity over a photon energy spectrum of 100 keV to 2.5 MeV.

(c) Sensitivity for the radwaste monitor is ±30% of the actual intensity over a photon energy spectrum from 80 keV to 1.33 MeV.

Primary Coolant Fission and Corrosion Product Activities for AST Dose Analyses

Nuclide	Activity* (μCi/g)	Nuclide	Activity* (μCi/g)
Co-58	7.0E-03	Np-239	-
Co-60	8.0E-04	Pu-238	-
Cr-51	4.7E-03	Pu-239	-
Fe-55	1.8E-03	Pu-240	-
Fe-59	4.5E-04	Pu-241	-
Mn-54	2.4E-03	Am-241	-
Kr-85	5.3E-01	Cm-242	-
Kr-85m	1.2E+00	Cm-244	-
Kr-87	7.5E-01	I-130	1.1E-01
Kr-88	2.2E+00	Kr-83m	3.2E-01
Rb-86	1.5E-02	Xe-138	4.7E-01
Sr-89	5.4E-03	Xe-131m	4.5E-01
Sr-90	4.9E-04	Xe-133m	1.7E+00
Sr-91	1.5E-03	Xe-135m	4.8E-01
Sr-92	5.9E-04	Cs-138	7.0E-01
Y-90	6.4E-04	Cs-134m	4.6E-02
Y-91	1.8E-02	Rb-88	2.3E+00
Y-92	7.2E-04	Rb-89	5.8E-02
Y-93	4.4E-04	Sb-124	1.1E-03
Zr-95	1.2E-03	Sb-125	9.2E-03
Zr-97	4.9E-04	Sb-126	6.2E-04
Nb-95	1.2E-03	Te-131	1.5E-02
Mo-99	4.2E+00	Te-133	6.1E-03
Tc-99m	3.2E+00	Te-134	2.1E-02
Ru-103	1.2E-03	Te-125m	2.0E-03
Ru-105	1.4E-04	Te-133m	1.2E-02
Ru-106	5.3E-04	Ba-141	9.1E-05
Rh-105	5.5E-04	Ba-137m	2.5E+01
Sb-127	4.3E-02	Pd-109	-
Sb-129	2.4E-02	Rh-106	5.3E-04
Te-127	4.6E-02	Rh-103m	1.2E-03
Te-127m	7.2E-03	Tc-101	1.5E-02
Te-129	3.8E-02	Eu-154	-
Te-129m	2.2E-02	Eu-155	-
Te-131m	3.7E-02	Eu-156	-
Te-132	4.8E-01	La-143	1.1E-05
I-131	5.2E+00	Nb-97	8.1E-05
I-132	1.2E+00	Nb-95m	8.5E-06

Primary Coolant Fission and Corrosion Product Activities for AST Dose Analyses

Nuclide	Activity* (μCi/g)	Nuclide	Activity* (μCi/g)
I-133	5.4E+00	Pm-147	1.2E-04
I-134	4.7E-01	Pm-148	1.7E-04
I-135	2.3E+00	Pm-149	3.0E-04
Xe-133	7.0E+01	Pm-151	8.3E-05
Xe-135	7.4E+00	Pm-148m	2.6E-05
Cs-134	4.9E+01	Pr-144	9.3E-04
Cs-136	4.3E+00	Pr-144m	1.6E-05
Cs-137	2.6E+01	Sm-153	-
Ba-139	4.3E-04	Y-94	1.4E-05
Ba-140	7.1E-03	Y-95	8.6E-06
La-140	3.4E-03	Y-91m	8.9E-04
La-141	2.4E-04	Br-82	2.5E-02
La-142	6.8E-05	Br-83	6.6E-02
Ce-141	1.1E-03	Br-84	2.7E-02
Ce-143	6.3E-04	Am-242	-
Ce-144	9.3E-04	Np-238	-
Pr-143	1.0E-03	Pu-243	-
Nd-147	4.3E-04		

*Activities based on 1% failed fuel. Listed activities are adjusted to Technical Specification limits for performance of AST dose calculations.