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VAN BRUNT,E.E. Arizona Public Service Co.
RECIP.NAME RECIPIENT AFFILIATION
TEDESCO,R.L. Assistant Director for Licensing

SUBJECT: Forwards draft FSAR clarifications re facility sampling parameters (Table 9.3-3),secondary sys drain sampling (Section 9.3.2.2.3),revised Pages 11.2-20 through 22 & Pages 11.4-1 & 11.4-2.Info will be included in FSAR amend.

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October 28, 1981
ANPP-19292 - JMA/WFQ

Mr. R. L. Tedesco
Assistant Director for Licensing
Division of Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Palo Verde Nuclear Generating Station
(PVNGS) Units 1, 2 and 3
Docket Nos. STN-50-528/529/530
File: 81-056-026; G.1.10

Dear Mr. Tedesco:

Attached please find draft FSAR clarifications regarding PVNGS sampling parameters (Table 9.3-3), secondary systems drain sampling (Section 9.3.2.2.3), revised pages 11.2-20 thru 22 and pages 11.4-1, 11.4-2.

This information is provided in response to telephone requests for clarification from the NRC's Effluent Treatment Systems Branch and will be included in a future FSAR amendment.

Very truly yours,

JM Allen for

E. E. Van Brunt, Jr.
APS Vice President,
Nuclear Projects
ANPP Project Director

EEVBJr/WFQ/av
Attachment

cc: J. Kerrigan (w/a)
P. Hourihan (w/a)
A. C. Gehr (w/a)
T. Chandrasekaran (w/a)

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STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, John M. Allen, represent that I am Nuclear Engineering Manager of Arizona Public Service Company, that the foregoing document has been signed by me for Edwin E. Van Brunt, Jr., Vice President Nuclear Projects, on behalf of Arizona Public Service Company with full authority so to do, that I have read such document and know its contents, and that to the best of my knowledge and belief, the statements made therein are true.

John M Allen

John M. Allen

Sworn to before me this 28th day of October, 1981.

Connie Lou Armstrong

Notary Public

My Commission expires:

June 24, 1983

Table 9.3-3

SAMPLING SYSTEM DESIGN PARAMETERS (Sheet 2 of 13) 4

Sample Origin	Type of Sample Cooler	Typical Discrete Sample Analysis(b)	Pressurized Sample Capability	Continuous On Line Analysis Provided	Mode of Sample Removal and Location	Nominal Pressure (psig)	Nominal Temperature (°F)	Figure No.
Primary Sampling System (Cont'd)								
Pressurizer Surge Line	Rough	Boron	No	None	Remote Aux Bldg El-140'	2500	700	5.1-1 9.3-2
Reactor Drain Pump Discharge Before Filter	None	Conductivity pH, Cl^- Boron	No	None	Local Aux Bldg El-120'	65	120	9.3-13
Reactor Drain Pump Discharge After Filter	None	Conductivity pH, Cl^- Boron	No	None	Local Aux Bldg El-120'	65	120	9.3-13
Pre-holdup Ion Exchanger Outlet	None	Conductivity pH	No	None	Local Aux Bldg El-120'	65	120	9.3-13
Holdup Tank Inlet	None	Conductivity pH, Boron, Cl^-	No	None	Local Aux Bldg El-120'	60	130	9.3-13
Boric Acid Condensate Ion Exchanger Inlet	None	Conductivity pH, Boron	No	None	Local Aux Bldg El-120'	60	140	9.3-13
Boric Acid Condensate Ion Exchanger Outlet	None	Conductivity pH, Boron	No	None	Local Aux Bldg El-120'	60	140	9.3-13
Reactor Makeup Water Pump Discharge	None	Conductivity pH, Boron, Cl^-	No	None	Local Aux Bldg El-120'	130	120	9.3-13
Reactor Makeup Water Pump Recirculation	None	Conductivity pH, Boron	No	None	Local Aux Bldg El-120'	130	120	9.3-13
Boric Acid Makeup Pump Recirculation	None	Boron	No	None	Local Aux Bldg El-120'	130	120	9.3-13

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Table 9.3-3

SAMPLING SYSTEM DESIGN PARAMETERS (Sheet 1 of 13)

Sample Origin	Type of Sample Cooler	Typical Discrete Sample Analysis (b)	Pressurized Sample Capability	Continuous On Line Analysis Provided	Mode of Sample Removal and Location	Nominal Pressure (psig)	Nominal Temperature (°F)	Figure No.
Primary Sampling System								
Hot Leg Loop 1	Rough	pH, O_2, H_2, Total Dissolved Gas, NH_3, Lithium, Boron, Cl^-, F^-, Radioactivity	Yes	None	Remote Aux Bldg El-140'	2485	621	5.1-1 9.3-2
Pressurizer Steam Space	Rough	H_2	Yes	None	Remote Aux Bldg El-140'	2500	700	5.1-1 9.3-2
Shutdown Cooling Suction Lines 1 & 2	Rough	Boron, Radioactivity	No	None	Remote Aux Bldg El-140'	435	350	6.3-1 9.3-2
ESF A&B Train Safety Injection Pump Mini Flow Line	Rough	Boron, Radioactivity	No	None	Remote Aux Bldg El-140'	2050	350	6.3-1 9.3-2
Purification Filter Inlet	None	pH, NH_3, Lithium, Boron, Cl^-, F^-, Radioactivity	No	None	Remote Aux Bldg El-140'	60	120	9.3-13 9.3-2
Purification Filter Outlet, Ion Exchanger Inlet	None	Suspended Solids	No	Radioactivity (c)	Remote Aux Bldg El-140'	50	120	9.3-13 9.3-2
Purification Ion Exchanger Outlet	None	pH, Lithium, Boron Cl^-, F^-, Radioactivity	No	None	Remote Aux Bldg El-140'	50	120	9.3-13 9.3-2

a. Pressure value in PSIA.
b. Radioactivity samples can be analyzed for gross activity, isotopic composition, tritium or alpha activity.
c. Refer to section 11.5 for detailed descriptions of process and effluent radiation monitors.
d. Refer to section 11.3 for a description of the explosive mixtures monitoring.

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Table 9.3-3

SAMPLING SYSTEM DESIGN PARAMETERS (Sheet 3 of 13)

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Sample Origin	Type of Sample Cooler	Typical Discrete Sample Analysis[b]	Pressurized Sample Capability	Continuous On Line Analysis Provided	Mode of Sample Removal and Location	Nominal Pressure (psig)	Nominal Temperature (°F)	Figure No.
Primary Sampling System (Cont'd)								
Boric Acid Makeup Pump Discharge	None	Boron	No	None	Local Aux Bldg El-120'	130	120	9.3-13
Boric Acid Batching Tank	Portable	Boron	No	None	Local Aux Bldg El 120'	5	160	9.3-13
Reactor Makeup Water to Volume Control Tank	None	Conductivity pH, Boron Cl	No	None	Local Aux Bldg El-120'	130	120	9.3-13
Volume Control Tank Drain to Recycle Drain Header	None	Conductivity pH, Boron	No	None	Local Aux Bldg El-120'	50	120	9.3-13
CVCS Letdown	None	Boron	No	Yes Boron	Remote Aux Bldg El-120'	50	120	9.3-13
Shutdown Cooling Heat Exchanger Outlet	Portable	Boron, Radioactivity	No	None	Local Aux Bldg El-120'	650	160	6.3-1
Safety Injection Tanks 1,2,3,4	None	Conductivity, pH, Boron	No	None	Local Containment El-80'	610	120	6.3-1
Secondary Sample Points								
Hotwell 1A, 2A, 1B, 2B, 1C, and 2C	Fine	Yes Cation Conductivity Sodium	No	Yes Cation Conductivity Sodium	Remote Hotwell Analysis Station Turbine Bldg El 100'	2[a]	121	10.4-9 9.3-3

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Table 9.3-3

SAMPLING SYSTEM DESIGN PARAMETERS (Sheet 4 of 13)

Sample Origin	Type of Sample Cooler	Typical Discrete Sample Analysis(b)	Pressurized Sample Capability	Continuous On Line Analysis Provided	Mode of Sample Removal and Location	Nominal Pressure (psig)	Nominal Temperature (°F)	Figure No.
Secondary Sample Points (Cont'd)								
S/G 1 and 2 Hotleg Blowdown	Rough & Fine	Yes Conductivity pH & Radioactivity	No	Yes, Conductivity pH, Radioactivity(c)	Remote Cold Lab Aux Bldg El-140'	1179	554	10.3-1 9.3-3
S/G 1 and 2 Coldleg Blowdown	Rough & Fine	Yes Conductivity pH & Radioactivity	No	Yes, Conductivity pH, Radioactivity(c)	Remote Cold Lab Aux Bldg El-140'	1179	450	10.3-1 9.3-3
S/G 1 and 2 Downcomer Blowdown	Rough & Fine	Yes Conductivity pH & Radioactivity	No	Yes, Conductivity pH & Radioactivity(c)	Remote Cold Lab Aux Bldg El-140'	1179	554	10.3-1 9.3-3
Condensate LP Heater Train A, B, and C Outlet	Portable	Yes Conductivity	No	None	Local Turbine Bldg, El-140'	400	396	10.4-9
FW Pump A and B Suction	Portable	Yes Conductivity	No	None	Local Turbine Bldg El-140'	400	396	10.4-10
HP Heater Train A and B Outlet	Portable	Yes Conductivity	No	None	Local Turbine Bldg El-140'	1225	450	10.4-10
MSR A, B, C and D Drain	Portable	Yes Conductivity Iron, Copper	No	None	Local Turbine Bldg El 140'	202(a)	383	10.2-2
First Stage RHTR Drain Tank A, B, C and D	Portable	Yes Conductivity Iron, Copper	No	None	Local Turbine Bldg El-140'	432(a)	452	10.2-2
Second Stage RHTR Drain Tank A, B, C and D	Portable	Yes Conductivity Iron, Copper	No	None	Local Turbine Bldg El-140'	985(a)	543	10.2-2

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Table 9.3-3

SAMPLING SYSTEM DESIGN PARAMETERS (Sheet 5 of 13)

Sample Origin	Type of Sample Cooler	Typical Discrete Sample Analysis[b]	Pressurized Sample Capability	Continuous On Line Analysis Provided	Mode of Sample Removal and Location	Nominal Pressure (psig)	Nominal Tempera-ture (°F)	Figure No.
Secondary Sample Points (Cont'd)								
Htr Drain Tank A and B Drain	Portable	Conductivity Iron, Copper	No	None	Local Turb Bldg El-100'	433[a]	371	10.2-2
Htr Drain Pump A and B Discharge	Portable	Conductivity Iron, Copper	No	None	Local Turb Bldg El 100'	202[a]	383	10.2-2
Spray Pond Water	None	Hardness Alkalinity pH, TDS Conductivity	No	Yes Conduc-tivity	Remote Yard Area	15[a]	97	9.2-1
Circulating Water Outlets	Fine	Conductivity pH, Chlorine	No	Yes Conduc-tivity pH Chlorine	Remote Cold Lab Aux Bldg 140' Chlorine Analy-sis Sta Tur-bine Bldg 100'	30	108	10.4-4 9.3-3
Condensate Tank Sample	None	Conductivity pH, Chlorides Fluorides, Dissolved Solids, Silica	No	None	Local Yard Area	25	Ambient	9.2-8
Essential Chiller A and B Outlets	None	pH, Chromate	No	None	Local Control Bldg El 74'	45	44	9.2-11
Essential Cooling Water Pumps A and B Discharge	None	pH, Chromate	No	Radio-activ-ity[c]	Local Aux Bldg El 70'	105	89	9.2-4
Normal Chillers A, B, and C Outlet Headers	None	pH, Chromate	No	None	Local Aux Bldg Roof El 156'-4"	45	44	9.2-10

Table 9.3-3

SAMPLING SYSTEM DESIGN PARAMETERS (Sheet 6 of 13)

Sample Origin	Type of Sample Cooler	Typical Discrete Sample Analysis(b)	Pressurized Sample Capability	Continuous On Line Analysis Provided	Mode of Sample Removal and Location	Nominal Pressure (psig)	Nominal Temperature (°F)	Figure No.
Secondary Sample Points (Cont'd)								
Nuclear Cooling Water Pump Discharge Header	None	pH, Chromate	No	Radioactivity(c)	Local Aux Bldg El-88'	80	105	9.2-5
Shutdown Cooling Heat Exchanger Room A and B Drain	None	pH	No	None	Local Radwaste Bldg El-88'	Atmos.	120	9.3-7
LRS Hold-Up Tank Leak Drain	None	Radioactivity	No	None	Local LRS Hold-up Tank Area El-100'	Atmos.	120	9.3-7
LRS Recycle Monitor Tank Leak Drain	None	Radioactivity	No	None	Local LRS Hold-up Tank Area El-100'	Atmos.	120	9.3-7
Main Turbine Lube Oil Centrifuge Outlet	None	Suspended Solids	No	None	Local Turbine Bldg El-100'	35	120	-
FWPT Lube Oil Centrifuge Outlet	None	Suspended Solids	No	None	Local Turbine Bldg El-100'	52	120	-
Cooling H_2O Hold-up Tank	None	Radioactivity pH, Chromate	No	None	Local Aux Bldg El-40'	10	75	9.3-10
Chemical Waste Neutralizer Tank (1 Sample Point at Each Tank)	None	Radioactivity pH, Chromate	No	None	Local Yard Area El-100' (V088-V195)	10	75	9.3-10
Condensate Polishing Demineralizer (LO-TDS) Sump (2 Sample Points)	None	Radioactivity	No	None	Local Yard Area El-100' (V028, V031)	60	100	9.3-10

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Table 9.3-3

SAMPLING SYSTEM DESIGN PARAMETERS (Sheet 7 of 13)

Sample Origin	Type of Sample Cooler	Typical Discrete Sample Analysis(b)	Pressurized Sample Capability	Continuous On Line Analysis Provided	Mode of Sample Removal and Location	Nominal Pressure (psig)	Nominal Temperature (°F)	Figure No.
Secondary Sample Points (Cont'd)								
Condensate Polishing Demineralizer (HI-TDS) Sump (2 Sample Points)	None	Radioactivity	No	None	Local Yard Area El-100' (V034, V037)	60	100	9.3-10
Retention Basin (Holdup Prior to Evaporation Pond) (2 Sample Points)	None	pH, Conductivity Radioactivity	No	None	South of Unit 3 El-100' (V089, V090)	Atmos.	116	9.3-11
Spent Regeneration Sump (Water Reclamation Facility)	None	pH	No	Yes pH	Water Rec Facility	40	75	9.3-10
TCW Heat Exchanger A and B Outlet	None	Chlorine	No	Yes Chlorine	Remote Yard Area	25	110	9.2-9
ESF Sump Pump A and B Discharge	None	Chlorine	No	None	Local Aux Bldg El-40'	50	120	9.3-5
Non-ESF Sump Discharge	None	Chlorine	No	None	Local Aux Bldg El-40'	15	120	9.3-5
Blowdown Demineralizer Effluent (1)	Rough	Na, Si, pH, Conductivity Radioactivity	Yes	Yes, Na, pH, Si, Conductivity	Remote Yard Area	225	135	10.4-8
Blowdown Demineralizer Effluent (2)	Rough	Na, Si, pH Conductivity Radioactivity	Yes	Yes, Na, Si, pH, Conductivity	Remote Yard Area	225	135	10.4-8
Blowdown Demineralizer Strainer Influent (1)	None	Conductivity	Yes	Yes Conductivity	Remote Yard Area	225	135	10.4-8
Blowdown Demineralizer Strainer Influent (2)	None	Conductivity	Yes	Yes Conductivity	Remote Yard Area	225	135	10.4-8

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Table 9.3-3

SAMPLING SYSTEM DESIGN PARAMETERS (Sheet 8 of 13) 4

Sample Origin	Type of Sample Cooler	Typical Discrete Sample Analysis[b]	Pressurized Sample Capability	Continuous On Line Analysis Provided	Mode of Sample Removal and Location	Nominal Pressure (psig)	Nominal Temperature (°F)	Figure No.	
									7
Secondary Sampling Points (Cont'd)									
Blowdown Demineralizer Waste (High TDS)	None	Conductivity Radioactivity	Yes	Yes Conductivity	Remote Yard Area (V182, V204)	225	135	10.4-5	7
Blowdown Demineralizer Waste (Low TDS)	None	Conductivity Radioactivity	Yes	Yes Conductivity	Remote Yard Area (V172, V169)	225	135	10.4-5	7
Blowdown Demineralizer Caustic Day Tank Effluent	None	Conductivity	Yes	Yes Conductivity	Remote Yard Area	50	85	10.4-8	
Blowdown Demineralizer Acid Day Tank Effluent	None	Conductivity	Yes	Yes Conductivity	Remote Yard Area	50	85	10.4-8	
Diesel Fuel Oil Storage Tank A and B	None	API°, Viscosity, HVV, Sediment	No	None	Local Outside by D.G. Bldg El-100'	35	75	9.5-7	
Condenser Sump (North and South) Pump Discharges	None	pH, Suspended Solids, Radioactivity	No	None	Local Turb Bldg El-100' (V075, V078)	20	75	9.3-11	7
Turbine Building Sump	None	pH, Suspended Solids, Radioactivity	No	None	Local Turb Bldg El-100' (V076)	20	75	9.3-11	7
TCW Pump A and B Discharge	None	pH Chloride, ions	No	None	Local Turb Bldg El-105'	90	110	9.2-9	
Auxiliary Steam Condensate Receiver Tank	Portable	pH, Conductivity	No	Radioactivity[c]	Local Turb. Bldg El-100'	15	212	13-M-ASP-001	7
Auxiliary Steam	Rough	pH, Conductivity	No	None	Local Yard Area	250	405	AO-M-ASP-002	

Table 9.3-3

SAMPLING SYSTEM DESIGN PARAMETERS (Sheet 9 of 13)

Sample Origin	Type of Sample Cooler	Typical Discrete Sample Analysis(b)	Pressurized Sample Capability	Continuous On Line Analysis Provided	Mode of Sample Removal and Location	Nominal Pressure (psig)	Nominal Temperature (°F)	Figure No.
Secondary Sampling Points (Cont'd)								
Circulating Water Cooling Towers	None	Foam	No	Yes Foam	Local Cooling Tower Area	Atmos.	108	10.4-4
Demineralized Water Surge-Rinse Tank	None	Water Chemistry	No	None	Wtr Treatment Area	20	Ambient	9.2-6
Demineralized Water Storage Tank	None	Water Chemistry	No	None	Local Yard Area	288" H_2O	Ambient	9.2-6
Fuel Pool Clean-up Pump (1 & 2) Discharge (Spent Fuel Pool or Refueling Pool)	None	pH, Chloride, ions, Fluoride ions, Boric Acid, Hydrazine, Ammonia, Lithium, Radioactivity	No	None	Local Fuel Bldg El-100'	90	125	9.1-9
Fuel Pool Cleanup Filter 1 and 2 Outlet (Spent Fuel Pool or Refueling Pool)	None	Conductivity, pH, Chloride ions, Suspended Solids, Sodium, Radioactivity	No	None	Local Aux Bldg El-120'	50	125	9.1-9
Fuel Pool Cleanup Demineralizer 1 2 Outlet (Spent Fuel Pool or Refueling Pool)	None	Conductivity, pH, Chloride ions, Suspended Solids, Sodium, Radioactivity	No	None	Local Aux Bldg El-120'	50	125	9.1-9
Radwaste Sampling Points								
Evaporator Feed from LRS Holdup Pumps	None	pH	No	None	Local Radwaste Bldg El-100'	107 psia	60 to 120	11.2-2
Chemical Drain Pump Discharge	None	pH, Conductivity	Yes	None	Local Radwaste Bldg El-40'	88 psia	60 to 120	11.2-2

Table 9.3-3

SAMPLING SYSTEM DESIGN PARAMETERS (Sheet 10 of 13)

Sample Origin	Type of Sample Cooler	Typical Discrete Sample Analysis[b]	Pressurized Sample Capability	Continuous On Line Analysis Provided	Mode of Sample Removal and Location	Nominal		Figure No.
						Pressure (psig)	Tempera-ture (°F)	
Radwaste Sampling Points (Cont'd)								
Hi-Lo TDS Holdup Pump Recycle	None	pH, Conductivity Boric Acid Concentration	Yes	None	Local Radwaste Bldg El-100'	Hi-TDS 55 psia LO-TDS 42 psia	60-120	11.2-2
Evaporator Concentrate Pumps Recycle to Vapor Body	Portable	Boric Acid Concentration, pH, Wt% Solids	Yes	None	Local Radwaste Bldg El-120'	34	224	11.2-2
Gas Sampling System								
Gas Surge Tank	None	Radioactivity, H_2, O_2	No	H_2,O_2[d]	Remote Radwaste Bldg El-140'	380	200	11.3-2 9.3-2
Gas Decay Tank	None	Radioactivity, H_2, O_2	Yes	H_2,O_2[d]	Remote Radwaste Bldg El-140'	380	200	11.3-2 9.3-2
Gas Stripper	None	Radioactivity, H_2, O_2	Yes	H_2,O_2[d]	Remote Radwaste Bldg El-140'	200	120	11.3-2 9.3-2
Volume Control Tank	None	Radioactivity, ity, H_2, O_2	No	H_2,O_2[d]	Remote Radwaste Bldg El-140'	50	120	9.3-13 9.3-2
Equipment Drain Tank	None	Radioactivity, H_2, O_2	No	H_2,O_2[d]	Remote Radwaste Bldg El-140'	3	120	9.3-13 9.3-2
Reactor Drain Tank	None	Radioactivity, H_2, O_2	No	H_2,O_2[d]	Remote Radwaste Bldg El-140'	3	120	11.3-2 9.3-2

Table 9.3-3

SAMPLING SYSTEM DESIGN PARAMETERS (Sheet 11 of 13)

Sample Origin	Type of Sample Cooler	Typical Discrete Sample Analysis(b)	Pressurized Sample Capability	Continuous On Line Analysis Provided	Mode of Sample Removal and Location	Nominal Pressure (psig)	Nominal Temperature (°F)	Figure No.
Holdup Tank	None	Radioactivity, H_2, O_2	No	H_2,O_2(d)	Remote Radwaste Bldg El-140'	Atmos.	120	9.3-13 9.3-2
Containment Atmosphere	None	Radioactivity	No	Radioactivity(c)	Local Aux Bldg 100' Level NE Quad	5	122	9.4-13
Containment Purge Exhaust	None	Radioactivity	No	Radioactivity(c)	Local Aux. Bldg 140' Level NE Quad	Atmos.	120	9.4-13
Plant Vent	None	Radioactivity	No	Radioactivity(c)	Local Turb Bldg 160' Level	Atmos.	120	9.4-13
Containment Atmosphere	None	Moisture (4 points)	No	Yes Moisture (4 points)	Local 1 at El-104'-6" NW Quad; 1 at El 124'-9" NW Quad; 2 later	5	122	9.4-12
Control Building Outside Air Intake	None	Radioactivity Smoke, Cl_2, 2 points each	No	Radioactivity(c) Smoke, Cl_2, 2 points each	Remote Control Bldg, 140' Level in Outside Air Chase	Atmos.	113	9.4-1
Post-Accident Sampling System								
Hot Leg Loop 1	Rough	Isotopic, Gross Gamma, pH, Oxygen, Hydrogen, Chloride, Boron	Yes	Isotopic, Gross Gamma, pH, Oxygen, Hydrogen, Chloride, Boron	Remote Aux Bldg, Elevations 140' and 70' Syringe Grab Sample	2485	621	9.3-2A

Table 9.3-3

SAMPLING SYSTEM DESIGN PARAMETERS (Sheet 12 of 13)

Sample Origin	Type of Sample Cooler	Typical Discrete Sample Analysis(b)	Pressurized Sample Capability	Continuous On Line Analysis Provided	Mode of Sample Removal and Location	Nominal Pressure (psig)	Nominal Temperature (°F)	Figure No.
Post-Accident Sampling System (Cont'd)								
Hot Leg Loop 2	Rough	Isotopic, Gross Gamma, pH, Oxygen, Hydrogen, Chloride, Boron	Yes	Isotopic, Gross Gamma, pH, Oxygen, Hydrogen, Chloride, Boron	Remote Aux Bldg, Elevations 140' and 70' Syringe Grab Sample	2485	621	9.3-2A
ESF A&B Safety Injection Sumps	Rough	Isotopic, Gross Gamma, pH, Oxygen, Hydrogen, Chloride, Boron	Yes	Isotopic, Gross Gamma, pH Oxygen, Hydrogen, Chloride, Boron	Remote Aux Bldg, Elevations 140' and 70' Syringe Grab Sample	60	350	9.3-2A
ESF A&B Safety Injection Mini Flow Line	Rough	Isotopic, Gross Gamma, pH, Oxygen, Hydrogen, Chloride, Boron	Yes	Isotopic, Gross Gamma, pH, Oxygen, Hydrogen, Chloride, Boron	Remote Aux Bldg, Elevations 140' and 70' Syringe Grab Sample	2050	350	9.3-2A
Containment Radwaste Sumps	Rough	Isotopic, Gross Gamma, pH, Oxygen, Hydrogen, Chloride, Boron	Yes	Isotopic, Gross Gamma, pH, Oxygen, Hydrogen, Chloride, Boron	Remote Aux Bldg, Elevations 140' and 70' Syringe Grab Sample	60	120	9.3-2A

Table 9.3-3

SAMPLING SYSTEM DESIGN PARAMETERS (Sheet 13 of 13)

Sample Origin	Type of Sample Cooler	Typical Discrete Sample Analysis(b)	Pressurized Sample Capability	Continuous On Line Analysis Provided	Mode of Sample Removal and Location	Nominal		Figure No.
						Pressure (psig)	Temperature (°F)	
<u>Post-Accident Sampling System (Cont'd)</u>								
Auxiliary Building Sumps	Rough	Isotopic, Gross Gamma, pH, Oxygen, Hydrogen, Chloride, Boron	Yes	Isotopic, Gross Gamma, pH, Oxygen, Hydrogen, Chloride, Boron	Remote Aux Bldg, Elevations 140' and 70' Syringe Grab Sample	50	120	9.3-2A
Containment Air	Rough	Isotopic, Gross Gamma, Oxygen (Hydrogen provided by Containment Hydrogen Control System)	Yes	Isotopic, Gross Gamma, Oxygen (Hydrogen provided by Containment Hydrogen Control System)	Remote Aux Bldg, Elevations 140' and 70' Syringe Grab Sample	60	350	9.3-2A

9.3.2.2.2 Post-Accident

Liquid samples are taken from both RCS hot legs, containment sumps, auxiliary building sumps and the ESF A&B mini-flow line. All samples are routed to a liquid input header. After sample selection, isotopic analysis is performed. The sample is then depressurized and cooled to allow chemical analyses to be performed. At this point a syringe grab sample can be taken;
4 or the sample can be discharged to the RDT or EDT. Upon completion of the analysis, the source is isolated, and the system is then purged with demineralized water, then nitrogen gas.

Gas samples are taken from containment air via the containment hydrogen control system. Samples are routed to a gas input header. Isotopic analysis is performed then the sample is depressurized and cooled to STP conditions in order to perform O_2 analysis. A syringe grab sample can be taken or the sample is returned to the containment. The normal hot lab counting
5 room at the 140-foot elevation in the auxiliary building is shielded to provide low background post accident. The counting chamber can be purged with instrument air or bottled gas. When the analysis is complete, the source is isolated, and the system is purged with nitrogen gas.

Liquid samples will provide information on isotopic content,
4 gross gamma, pH, chloride concentration, dissolved oxygen, dissolved hydrogen and boron. Gas samples will provide information on isotopic content, gross gamma, gaseous oxygen, and hydrogen (from hydrogen monitor of the containment hydrogen control system).

9.3.2.2.3 Secondary Systems Drain Sampling

7 There are eight sumps in or near Turbine Building Structures with potential for transferring radioactivity to flow paths leading to the retention basins/evaporation ponds. There are

three drainage sumps in the turbine building: the north sump, the south sump, and the turbine building sump. Each sump has an analysis point on its discharge piping and can transfer fluids to the liquid radwaste system (LRS), either of two chemical waste neutralizing tanks (CWNT), or to an oil/water separator. Each CWNT has separate analysis points and can be sampled prior to discharge. Each CWNT can discharge to the LRS or the retention basins. The oil/water separator discharges to its sump (sump four), which in turn discharges to the retention basins.

There is not a very great potential of introducing significant radioactivity to these sumps, and it is not likely that the sumps would be aligned to discharge radioactivity to the retention basins. The following are the sources to these sumps: 7

North Sump

Battery room neutralizing pit (nonradioactive)

Floor drains (equipment leakage and cleaning liquids)

Feedwater heaters

Heater drain tank and pump

Instrument air compressor drains (nonradioactive)

Air dryer/prefilter drains (nonradioactive)

Blowdown flash tank liquid drain

Turbine cooling water heat exchanger drain (nonradioactive)

Turbine cooling water surge tank drain (nonradioactive)

Heater blowdown stack

Condensate storage tank

Condenser drains

Generator stator cooler drain (nonradioactive)

South Sump

Floor drains (equipment leakage and cleaning liquids)

Low pressure heaters and condenser drains

Condenser evacuation drain

Steam seal exhauster drain

Isophase bus cooler drain (nonradioactive)

H_2 seal oil cooler (nonradioactive)

Condensate pump drainage

Turbine Building Sump

Feedwater pump lube oil reservoir drains (nonradioactive)

7 Feedwater pump drain

Turbine lube oil drains (nonradioactive)

Oil/Water Separator Sump

North, South, and turbine building sumps.

Control building sumps (nonradioactive)

The only sources noted above that could contain any radioactivity are secondary system component sources - condensate or blowdown. No regenerant chemicals are present. Thus, any radioactivity which is present must be at least as dilute as the secondary system.

The activity level in the secondary is monitored at two points. Steam generator blowdown monitors 13-J-SQN-RU-4 and RU-5 will detect abnormal activity in the secondary as it is diverted to the blowdown processing equipment. The condenser gland seal exhauster monitors 13-J-SQN-RU-141 and RU-142 (low and high range) will detect abnormal activity in the condenser.

If abnormal activity levels are present, sump transfer paths will be aligned to transfer to the LRS or the CWNT's with subsequent alignment to the LRS. However, if it is determined during operating (by sampling or monitoring) that the sumps do not contain significant radioactivity, they may be realigned to discharge to the CWNT's (aligned to the retention basins) or the oil water separator and thence to the retention basins.

The remaining four sumps are the high and low total dissolved solids (TDS sumps that receive regenerant wastes from the condensate polishing demineralizers or the blowdown demineralizers, respectively each sump has local drains that will be used for grab sampling. For either processing stream, initial regenerant eluent is fed to the resin and subsequently directed to the high TDS sumps. These discharge to the CWNT's. As noted previously, the CWNT's can discharge to the LRS or retention basins and are sampled prior to discharge. Only after the TDS level of the regenerant has drops (associated with activity levels), as measured by on-line conductivity cells, would flow be directed to the low TDS sumps, or the circulating water system (and thence to the evaporation ponds via blowdown). Thus, the systems are designed to send radioactive waste to the LRS and yet recover clean liquid for recycle to the greatest extent practical. 7

To ensure that abnormal levels of activity are not sent to clean systems, design provisions for sampling are being clarified. FSAR Table 9.3-3 is being revised to show the sampling capabilities at these sumps. Operationally, when significant activity is present in the secondary (as detected by the steam generator blowdown or condenser gland seal exhaust monitors) the low TDS sumps will be aligned to discharge to the high TDS sumps. A grab sample analysis for radioactivity will be required prior to changing this alignment to allow discharge to the circulating water.

In summary, the secondary systems are continuously monitored for activity. If abnormal activity is present, this will lead to alignment of leakage and cleanup stream discharge to the LRS. If after grab sampling, no abnormal activity is present in effluents they can be directed to the circulating water or retention basins.

9.3.2.2.4 Retention Basin Sampling

The divided retention basin is located south of the Unit 3 spray ponds. It has a one million gallon capacity and is divided into identical compartments. The compartments have sloping sides and are approximately 172' x 98' at top and 121' x 47' at bottom. Nominal depth is 6-1/2 feet with 2 feet freeboard. The top of the dikes are 4-1/2 feet above grade to provide flood protection.

The basins act as storage in the event the effluent is not
7 within the standards for pH, conductivity, and radioactivity prior to discharge to the evaporation pond. One retention basin can store the normal waste effluent of 800 gal/min for a 10-hour period. The offline basin is monitored, chemically treated (if necessary) and discharged to the evaporation pond.

Sampling can be conducted directly by dip grab sampling or by sampling retention basin sump discharge (Figure 9.3-11, valves V089 or V090).

If a portable ion exchanger is used to purify the retention basin, expended resins will be disposed of in one of two ways. If resins are radioactive, they will be transferred by truck or drum to the solid radwaste system of either Unit 1, 2, or 3. If resins are not radioactive but do not meet chemistry limits (excess chromate or other ions), resins will be hauled to a licensed disposal site. Regeneration is not currently contemplated due to the low frequency projected for this operation.

Table 11.2-7

FPCCS EXPECTED PROCESS POINT ACTIVITIES (μCi/g) (Sheet 3 of 3)

Radionuclide	Spent Fuel Pool	Refueling Pool	Fuel Pool IX No. 1 Outlet[a]	Fuel Pool IX No. 2 Outlet[a]
CE-144			8.8E-9	1.2E-10
PR-143			4.8E-9	5.0E-11
PR-144			0.0	0.0
NP-239			6.9E-8	2.1E-10
CR-51			1.6E-7	1.9E-9
MN-54	See table 11.1-5	See table 11.1-5	3.3E-8	1.9E-9
FE-55			1.7E-7	2.3E-9
FE-59			8.8E-8	1.1E-9
CO-58			1.5E-6	1.9E-8
CO-60			2.2E-7	3.0E-9

through the LRS than necessary, non-radioactive turbine building drains are processed by the chemical waste system. Besides the low TDS tank, an additional holdup tank is provided to accommodate overflow from either the low TDS or the high TDS holdup tank and is normally isolated from the supply headers. If necessary, this tank can be used to collect either low TDS or high TDS liquid waste. An internal mixing header uniformly mixes the contents of each holdup tank prior to and during processing. Acidic or caustic agents may be added for pH control, and anti-foaming agents may be added if surfactants exist in the tank contents. Decontamination facility wastes
7 from Unit 1 only (including laundry liquid waste) and radiochemistry laboratory wastes are collected in the chemical
7 drain tanks prior to processing. Refer to section 12.5.2 for further details on laundry system wastes.

Table 11.2-8

WASTE INPUTS TO THE LRS (Sheet 1 of 2)

LRS Inputs	Expected Flow (gal/d-unit)	Design Flow (gal/d-unit)	Activity
High TDS Holdup Tanks			
Containment sump	40	40	1 PCA[a]
Auxiliary building floor drains	200	200	0.1 PCA
Condensate polisher regenerants	--	20,000	100% of regenerant waste activity
Blowdown demineralizer regenerants	12,000 gal/ 15 days	12,000 gal/ 15 days	100% of regenerant waste activity
Chemical drain tank (includes laundry inputs)	115	115	See chemical drain tank inputs
Laboratory drains	400	400	0.002 PCA
Miscellaneous sources	700	700	0.01 PCA
Total	2,255	22,255	
Low TDS Holdup Tank			
Turbine building floor drains	7,200	7,200	100% of main steam activity
Secondary system samples	300	300	100% of main steam activity

7

a. PCA = Primary Coolant Activity.

Table 11.2-8

WASTE INPUTS TO THE LRS (Sheet 2 of 2)

LRS Inputs	Expected Flow (gal/d-unit)	Design Flow (gal/d-unit)	Activity
Low TDS Holdup Tank (cont.)			
Condensate polisher regenerants	--	36,000	100% of regenerant waste activity
Blowdown demineralizer regenerants	12,000 gal/ 15 days	12,000 gal/ 15 days	100% of regenerant waste activity
Total	8,300	44,300	
Chemical Drain Tanks			
7 Decon station waste plus showers (includes laundry waste)	100	100	See NUREG 0017, Table 2-20
Primary system samples	15	15	1 PCA
Total	115	115	

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11.4 SOLID WASTE MANAGEMENT SYSTEM

Solid waste management is provided by the solid radwaste system (SRS) which is designed to provide holdup, solidification, and packaging of radioactive wastes generated by plant operation, and to store these wastes until they are shipped offsite for burial. The system is located in the radwaste building, which is designed to withstand an operating basis earthquake.

11.4.1 DESIGN BASES

The design bases of the solid waste management system are:

A. The SRS provides the capability for solidifying and packaging concentrated waste solutions from the miscellaneous waste evaporator, spent resins from radioactive ion exchangers, and chemical drain tank wastes.

B. The SRS provides a means for packaging and disposal of spent radioactive cartridge filters and solid wastes from the LRS, CVCS, and laundry (unit 1 only). 7

C. The SRS provides a means of compacting and packaging miscellaneous dry radioactive materials, such as paper, rags, contaminated clothing, gloves, and shoe coverings, and a means for packaging contaminated metallic materials and incompressible solid objects, such as small tools and equipment parts.

D. The SRS provides an alternate method of disposal of the liquid and crud from the backflushable filter crud tank. Note that the crud is normally removed by a disposable filter and the liquid is normally processed by the chemical and volume control system discussed in section 9.3.4.

E. The SRS provides a method of solidifying and packaging blowdown demineralizer resin and condensate polishing resin in the event that they become contaminated.

The maximum and expected input volumes to the SRS from each source of solid waste material are presented in table 11.4-1. The SRS input activities associated with the expected input volumes are presented in table 11.4-2.

Codes and standards applicable to the solid radwaste system are listed in table 3.2-1.

Collection, solidification, packaging, and storage of radioactive wastes will be performed so as to maintain any potential radiation exposure to plant personnel to "as low as is reasonably achievable" (ALARA) levels, consistent with the recommendations of Regulatory Guide 8.8 and within the dose limits of 10CFR20. Some of the design features incorporated to maintain ALARA criteria include remote system operation, remotely actuated flushing, quick disconnect, equipment layout permitting the shielding of components containing radioactive materials, and use of shielded casks for in-plant movement of high activity waste. Additional ALARA provisions of the SRS are described in section 12.1.

Packaging and transport of radioactive wastes will be in conformance with 10CFR71. Packaged wastes will be shipped in conformance with 49CFR170-178. Collection, solidification, packaging, and storage of radioactive wastes will be performed in conformance with 10CFR50.

Laundry is cleaned by a dry-cleaning system. Solid wastes are
7 manually transfered to the SRS for packaging. Refer to
section 12.5.2.