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AUTH.NAME AUTHOR AFFILIATION
VAN BRUNT,E.E. Arizona Public Service Co.
RECIP.NAME RECIPIENT AFFILIATION
KERRIGAN,J. Licensing Branch 3

SUBJECT: Forwards responses to NRC Questions 460.1,460.3,460.6,
460.7460.9,460.10,460.13,460.14 & 460.16,per telcon requests
from Effluent Treatment Sys Branch.Responses will be
incorporated into future FSAR amend.

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September 3, 1981
ANPP-18846-JMA/WFQ

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U.S. NUCLEAR REGULATORY COMMISSION

Ms. Janis Kerrigan
Licensing Branch 3
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

Reference: Letter from J. Kerrigan, NRC, to PVNGS Docket File, dated August 3, 1981, Subject: Telecons with Arizona Public Service (ETSB)

Dear Janis:

The APS responses to the telecon requests for additional information on NRC (ETSB) questions 460.1, 460.3, 460.5, 460.6, 460.7, 460.9, 460.10, 460.13, 460.14 and 460.16 are enclosed. This information will be incorporated in a future FSAR amendment.

Please contact me if you have any questions.

Very truly yours,

E. E. Van Brunt

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

EEVBJr/WFQ/bj

Enclosures

cc: P. Hourihan (w/a)
A. C. Gehr (w/a)

B001 S/1

2. In telephone conversations with the applicant in July, 1981, applicant's attention was drawn to some deficiencies in responses to the questions listed below. The applicant has committed to correct these deficiencies by documenting additional information on these questions by August 31, 1981. Applicant's oral commitments on these questions are acceptable pending documentation. The additional information that will be required to be documented by August 31, 1981 are given:

a) Q.460.5 - This question deals with continuous process monitoring capability for the spent fuel pool and refueling pool treatment systems.

Action - 1) Applicant will include the 2 additional sample points, one for the SFP and the other for the FPF cleanup demineralizer outlets in Table 9.3-3. (For these sample points also, discrete sample analyses will be available.)

2) Applicant will make it clear that appropriate sampling points will be available for the refueling pool also (currently, it appears that only the SFP is covered).

3) Applicant will correct the figure number given in Column 9 corresponding to fuel pool sampling points entries to Fig. 9.1-9 in the Table 9.3-3.

RESPONSE

The response is given in amended Section 9.3 (Table 9.3-3), Attachment A.

b) Q.460.14 - This question deals with the cost-benefit analysis.

Action - Applicant does not have to incorporate any change in the FSAR relating to this question. However, the applicant will have to update the cost of money and re-evaluate cost-benefit analysis using the updated cost of money in the Environmental Report (ER). The applicant is expected to complete this change in Supplement 3 to the ER which is due before the end of July.

RESPONSE

The response is given in the PVNGS ER-OL Supplement 3 (Appendix 5B).

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, Edwin E. Van Brunt, Jr., represent that I am Vice President Nuclear Projects of Arizona Public Service Company, that the foregoing document has been signed by me 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.

Edwin E. Van Brunt

Edwin E. Van Brunt, Jr.

Sworn to before me this 11th day of SEPTEMBER, 1981.

Connie Lou Armstrong

Notary Public

My Commission expires:

June 24, 1983

c) Q.460.13 - This question deals with the correction of a large number of typographical errors in Table 11.3-6.

Action - Applicant will correct all the typographical errors in Table 11.3-6.

RESPONSE

The response is given in amended Section 11.3 (Table 11.3-6), Attachment B.

Attachment A

Table 9.3-3
SAMPLING SYSTEM DESIGN PARAMETERS (Sheet 9 of 13)

4

Sample Origin	Type of Sample Cooler	Typical Discrete Sample Analysis	Pressurized Sample Capability	Continuous On Line Analysis Provided	Mode of Sample Removal and Location	Nominal		Figure No.
						Pressure (psig)	Temperature (°F)	
Secondary Sampling Points (Cont'd)								
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 Discharge	None	pH, Suspended Solids	No	None	Local Turb Bldg El-100'	20	75	9.3-11
Turbine Building Sump	None	pH, Suspended Solids	No	None	Local Turb Bldg El-100'	20	75	9.3-11
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	None	Local Turb Bldg El-100'	15	212	13-M-ASP-001
Auxiliary Steam	Rough	pH, Conductivity	No	None	Local Yard Area	250	405	AO-M-ASP-002
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

Attachment A

May 1981

Table 9.3-3

SAMPLING SYSTEM DESIGN PARAMETERS (Sheet 10 of 13)

4

Sample Origin	Type of Sample Cooler	Typical Discrete Sample Analysis	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)								
Fuel Pool Cleanup Filter 1 and 2 Outlet (Spent Fuel Pool or Refueling Pool)	None	Conductivity, pH, Chloride ions, Suspended Solids and Corrosion products content, Sodium	No	None	Local Aux Bldg El-120'	50	125	9.1-9 ~~9.2-6~~
Fuel Pool Cleanup Demineralizer 1 and 2 outlet (Spent Fuel Pool or Refueling Pool)	None	(same wording as above)	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
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 Storage Tank	None	Gaseous Activity, H_2, O_2	No	Yes	Remote Radwaste Bldg El-140'	380	200	11.3-2 9.3-2
Gas Decay Tank	None	Gaseous Activity, H_2, O_2	Yes	Yes	Remote Radwaste Bldg El-140'	380	200	11.3-2 9.3-2

Table 11.3-6

ANNUAL RELEASES PER UNIT FOR NORMAL OPERATION (ANSI N237 failed fuel)

Nuclide	Release Point (Ci/y)							Total Release Per Unit (Ci/y)	Per Unit Site Boundary Annual Average Conc. (μCi/cm^3)	10CFR20 MPC Limit (μCi/cm^3)	Per Unit Fraction of MPC at Site Boundary
	Main Condenser Vacuum Pump/ Gland Seal Exhaust	Turbine Building	Plant Vent Stack				Fuel Building				
			Containment Building	Auxiliary/ Radwaste Buildings	BAC Discharge	GRS					
KR-83M	2.7E-1	6.4E-5	2.1E-1	4.2E-1	-	1.5E-1	-	1.1	2.8E-13	3E-8	9.4E-6
KR-85M	1.4	3.6E-4	2.4	2.3	-	7.4E-1	-	6.8	1.7E-12	1E-7	1.7E-5
KR-85	2.0	5.2E-4	1.4E+2	3.3	8.5E-2	2.0E+4	-	2.0E+4	5.1E-9	3E-7	1.7E-2
KR-87	7.6E-1	1.8E-4	4.2E-1	1.1	-	4.1E-1	-	2.7	6.9E-13	2E-8	3.5E-5
KR-88	2.7	6.2E-4	2.9	4.1	-	1.4	-	1.1E+1	2.8E-12	2E-8	1.4E-4
KR-89	3.8E-2	7.3E-6	1.5E-3	2.4E-2	-	3.4E-2	-	9.8E-2	2.5E-14	3E-8	8.4E-7
XE-131M	1.5	3.7E-4	6.4E+1	2.4	1.8E-2	3.3E+2	-	4.0E+2	1.0E-10	4E-7	2.6E-4
XE-133M	2.9	7.4E-4	4.6E+1	4.8	1.8E-4	1.5	-	5.5E+1	1.4E-11	3E-7	4.7E-5
XE-133	2.4E+2	6.1E-2	7.1E+3	4.0E+2	6.7E-1	1.1E+3		8.8E+3	2.3E-9	3E-7	7.5E-3
XE-135M	1.4E-1	3.0E-5	1.9E-2	1.6E-1	-	9.2E-2	-	4.1E-1	1.1E-13	3E-8	3.5E-6
XE-135	4.6	1.2E-3	1.5E+1	7.5	-	2.5	-	3.0E+1	7.7E-12	1E-7	7.7E-5
XE-137	7.3E-2	1.4E-5	3.4E-3	4.9E-2	-	6.1E-2	-	1.9E-1	4.9E-14	3E-8	1.6E-6
XE-138	4.8E-1	9.8E-5	6.1E-2	5.3E-1	-	3.0E-1	-	1.4	3.6E-13	3E-8	1.2E-5
BR-83	9.3E-5	8.0E-6	1.8E-5	2.1E-4	-	1.1E-5	-	3.4E-4	8.7E-17	1E-10	8.7E-7
BR-84	1.4E-5	1.2E-6	2.4E-6	9.3E-5	-	5.7E-6	-	1.2E-4	3.1E-17	3E-8	1.0E-9
BR-85	1.6E-7	1.4E-8	2.5E-8	2.9E-6	-	6.6E-7	-	3.8E-6	9.8E-19	3E-8	3.3E-11
I-130	1.0E-4	8.8E-6	3.5E-5	9.9E-5	-	5.3E-6	-	2.5E-4	6.4E-17	1E-10	6.4E-7
I-131	~~1.0E-2~~ 2.0E-2	1.7E-3	4.0E-2	1.3E-2	2.9E-3	3.8E-3	-	8.1E-2	2.1E-14	1E-10	2.1E-4
I-132	1.9E-3	1.6E-4	3.6E-4	4.5E-3	-	2.3E-4	-	7.2E-3	1.9E-15	3E-9	6.2E-7
I-133	2.2E-2	1.9E-3	1.0E-2	1.8E-2	1.5E-9	9.6E-4	-	5.2E-2	1.3E-14	4E-10	3.3E-5
I-134	3.9E-4	3.4E-5	6.9E-5	1.9E-3	-	1.0E-4	-	2.5E-3	6.4E-16	6E-9	1.1E-7
I-135	7.2E-3	6.1E-4	1.8E-3	9.0E-3	-	4.4E-4	-	1.9E-2	4.9E-15	1E-9	4.9E-6
CO-60	-	-	3.4E-4	2.7E-4	1.8E-5	7.0E-5	-	7.0E-4	1.8E-16	3E-10	6.0E-7
CO-58	-	-	7.5E-4	6.0E-4	1.1E-4	1.5E-4	-	1.6E-3	4.1E-16	2E-9	2.1E-7
FE-59	-	-	7.5E-5	6.0E-5	6.0E-6	1.5E-5	-	1.6E-4	4.0E-17	2E-9	2.0E-8
MN-54	-	-	2.2E-4	1.8E-4	2.5E-6	4.5E-5	-	4.5E-4	1.2E-16	1E-9	1.2E-7
CS-137	-	-	3.8E-4	3.0E-4	4.9E-5	7.5E-5	-	8.0E-4	2.1E-16	5E-10	4.1E-7
CS-134	-	-	2.2E-4	1.8E-4	6.7E-5	4.5E-5	-	5.0E-4	1.3E-16	4E-10	3.3E-7
SR-90	-	-	3.0E-6	2.0E-6	8.5E-8	6.0E-7	-	5.6E-6	1.5E-18	3E-11	4.9E-8
SR-89	-	-	1.7E-5	1.3E-5	2.2E-6	3.3E-6	-	3.6E-5	9.1E-18	3E-10	3.0E-8
H-3	-	7.2	3.8E+1	4.2	3.3E+2	7.9E-4	6.7E+2	1.0E+3	2.7E-10	2E-7	1.3E-3
C-14	-	-	1.0	-	-	7.0		8.0	2.1E-12	1E-7	2.1E-5
AR-41	-	-	2.5E+1	-	-	-	-	2.5E+1	6.4E-12	4E-8	1.6E-4
TOTAL	2.6E+2	7.3	~~2.1E-2~~ 7.4E+3	4.3E+2	3.3E+2	2.1E+4	6.7E+2	3.0E+4	-	-	0.026

Attachment B

d) Q.460.16 - This question deals with solid waste output given in Table 11.4-6.

Action - The applicant will correct the typographical error for I.131 in Table 11.4-6. Evaporator concentrates solid waste output for I-131 in that Table will be corrected as $1.4x10^{-4}$ (currently, it is $1.4x10^{-3}$).

RESPONSE

The response is given in amended Section 11.4 (Table 11.4-6), Attachment C.

Attachment C

Table 11.4-6

SRS OUTPUT ACTIVITIES[a] (Ci/yr/unit) (Sheet 1 of 4)

Nuclide	Evaporator Concentrates	Spent Resin Beads	Cartridge Filters	Disposable Crud Filters	Dry Wastes
BR-83	0.0	0.0	0.0	0.0	(b)
BR-84	0.0	0.0	0.0	0.0	(b)
BR-85	0.0	0.0	0.0	0.0	(b)
I-129	0.0	4.4(-03)	0.0	0.0	(b)
I-130	0.0	0.0	0.0	0.0	(b)
I-131	1.4 ~~(-03)~~ (-04)	1.9(-04)	0.0	0.0	(b)
I-132	0.0	0.0	0.0	0.0	(b)
I-133	0.0	0.0	0.0	0.0	(b)
I-134	0.0	0.0	0.0	0.0	(b)
I-135	0.0	0.0	0.0	0.0	(b)
RB-86	3.9(-05)	0.0	0.0	0.0	(b)
RB-88	0.0	0.0	0.0	0.0	(b)
RB-89	0.0	0.0	0.0	0.0	(b)
CS-134	4.8	5.5(+03)	0.0	0.0	(b)
CS-136	6.5(-04)	4.1(-03)	0.0	0.0	(b)
CS-137	4.2	1.9(+04)	0.0	0.0	(b)

a. Expected waste generation conditions only. Maximum waste generation conditions are not tabulated because they are short-term inputs that are not representative of 1 year's continuous operation.

b. Nuclide breakdown was not made. Total activity is based on WASH 1268 estimates.

e) Q.460.1 - This question deals with compliance with Reg. Guide 1.143.

Action - Applicant will state compliance with the salient features of the QA program for the Radwaste management systems given in Sections 4 and 6 of Reg. Guide 1.143. (The applicant will also include the condenser vacuum pump/gland seal exhaust monitor sampler and waste gas decay tank monitor.) Acceptable deviations to individual positions stated in the guide would be spelled out briefly.

RESPONSE

The response is given in amended response to Question 11.A.1 (NRC Question 460.1), Attachment D.

QUESTION 11A.1 (NRC Question 460.1) (1.8, 11.2, 11.3, and 11.4)

Provide a table under Section 1.8 comparing the design features of the liquid, gaseous and solid radwaste systems with the positions of Regulatory Guide 1.143 (July 1978), "Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants." For each item for which an exception is taken, the applicability of the proposed exception should be justified. If sufficient justification is provided in other sections for the individual items, cross references to those sections will be adequate.

RESPONSE: PVNGS complies with the position of Regulatory Guide 1.143 (Refer to sections 9.3, 11.2, 11.3, 11.4 and 17.2 ~~11.4~~) including implementation of quality assurance requirements for radwaste management systems.

QUESTION 11A.2 (NRC Question 460.7)

Provide the data required for radioactive source term calculations for PWRs using the format given in Chapter 4 of NUREG-0017, April 1976, "Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Pressurized Water Reactors." 4

RESPONSE: As stated in section 3.5 of the Environmental Report, there are no liquid releases from PVNGS. Therefore, the data required for the liquid source term calculation is not applicable to PVNGS. The data required for the gaseous source term calculation is summarized on a per unit basis as follows:

1. General

   a. Maximum core thermal power is 4100 MWt (CESSAR-F Table 11.1.1-1).

   b. Expected tritium released is 1224 Ci/yr (CESSAR-F Table 11.1.3-3).

[illegible]

f) <u>Q.460.3</u> - Compliance with Reg. Guide 1.52, Rev. 2. For additional comments on this question, see at the end of Section 2.

Action - 1) Applicant will elaborate the response to position C.2.g of Reg. Guide 1.52, REv. 2 which requires instrumentation to signal, record and alarm pressure drops and flow rates through the ESF filter systems in the control room. Towards this purpose, the applicant will provide additional information in paragraph D under Reg. Guide 1.52 in Section 1.8 of the FSAR. This information will include:

a) the nature of alarm, i.e., both visual and audible;

b) assurance that this will be triggered by the computer and is automatic and does not involve any operator action;

c) alarms will be available for both high and low differential pressures in the control room, and;

d) where the pressure differentials are measured for example, across the HEPAS, across the HEPAS and charcoal absorbers, etc.;

e) the nature of the pressure measuring instrument, i.e., recorder or indicator or transmitter, etc.

2) Applicant will elaborate the response to position C.2.g of Reg. Guide 1.52, Rev. 2 given in paragraph E under Reg. Guide 1.52 in Section 1.8. The applicant will explain how the radiation exposures to operating

personnel will be maintained at as low as is reasonably achievable levels during plant maintenance and thereby meet the guidelines of Reg. Guide 8.8.

RESPONSE

No direct flow rate measuring devices are provided, high and low differential pressure alarms are provided in the control room. The high alarm is set at approximately 110 percent of design differential pressure. The low alarm is set below the differential pressure at clean conditions. A high differential pressure alarm indicates high filter loading. A low differential pressure alarm indicates abnormally low flow. Lack of either high or low alarms indicates normal flow conditions. This is verified during in-place filter testing. During the testing, flow rates are measured using local flow rate measuring devices. Any bypass leakage of abnormal flow conditions are corrected at this time. Upon completion of successful in-place testing, the filter units are placed in standby mode and are not operated unless accident conditions warrant their use. Since the blower motors are single speed devices, the flowrate through the filter unit is precisely the measured flowrate as determined during in-place testing when the blowers are running and no differential pressure alarms are present.

Refer to amended Section 1.8, Attachment E.

D. Position C.2.g

There are no class IE alarms associated with the control building and fuel building essential ventilation systems nor are there any recorders for pressure drops or flow rates.

4 Alarm status information is, however, logged in the plant computer. The annunciated and alarm status information is available in the main control room via the alarm CRT/computer log for pertinent pressure drops in these systems. The alarm is both visual and audible and no operator action is required to retrieve the alarm status from the computer

Insert A

E. Position C.2.i

The filter unit Curie loading following a postulated DBA will consist mostly of short-lived isotopes. Credit will be taken for decay time to achieve permissible handling levels prior to workers removing components. Consequently, filter trains are not designed for intact removal. The charcoal adsorber section is designed to keep operator exposure as low as reasonably achievable during charcoal bed replacement. The change out process involves only a few operator actions for hookup.

F. Position C.3.e

Upstream mounting of filters may be employed in some cases. Corrosion-resistant steel or carbon steel coated with inorganic nuclear grade paint will be used for construction of filter and adsorber mounting frames.

G. Position C.3.i

Charcoal to meet the requirements of the 1973 version of Regulatory Guide 1.52 will be provided.

H. Position C.3.k

There are no ESF filter units where the carbon bed temperature can exceed 200F following a postulated DBA as a result of loss of air flow.

Insert A to Page 1.8-36

Pertinent pressure drops are measured (ΔP indicators) across each section of the filter unit and across the entire filter unit itself. Both high and low pressure drop alarms are generated and provided in the main control room. A high pressure drop alarm is indicative of high filter loading. A low pressure drop alarm is indicative of a zero or low flow condition. Since the filter unit blower and blower motor are single speed devices, operation of the unit with no alarms present indicates delivery of rated flow to the filter unit. Pressure drop information is also indicated locally.

g) Q.460.6 - Compliance with Reg. Guide 1.140, Rev. 1. For additional comments on this section, see the end of this section.

Action - 1) Applicant will include the turbine building vacuum pump exhaust filters and the containment air cleanup recirculation or kidney system filters in the Table 9A-1.

2) Applicant will elaborate the assurance relating to relative humidity of the exhaust air from the auxiliary building.

3) Applicant will state explicity what kind of instrumentation is available for signalling, recording and alarming the pressure drops and flow rates through the normal filters. Applicant will describe the nature of the alarm, i.e., both visual and audible, what causes the alarm, i.e., high or low ΔP or both, whether the alarm is automatic and where the ΔPs are measured.

RESPONSE

The response is given in the amended response to Question 9A.38, NRC Question 460.6 (Table 9A-1), and Table 9.4-3, Attachment F.

Attachment F

Insert A

Table 9A-1

COMPARISON BETWEEN DESIGN FEATURES AND REGULATORY GUIDE 1.140 POSITIONS (Sheet 1 of 2)

Regulatory Guide 1.140 Positions / Radioactivity Removal Normal Ventilation Systems	Containment Power Access Purge (AFU)	Auxiliary Building	Radwaste Building
C.1.b.	System is not located in an area of high radiation during normal plant operation.	System is not located in an area of high radiation during normal plant operation.	System is not located in an area of high radiation during normal plant operation.
C.2.a.	HEPA filters have been included after the adsorber. ~~No heater or cooling coils are used. Moisture separators are installed upstream of the HEPA filters.~~	A prefilter is used, also a HEPA filter is included after the adsorber. No heater or cooling coils are used.	No adsorber has been included in this system. System is to remove particulate materials only. No heater or cooling coils are used.
C.2.b.	No exception taken.	All three filter banks, one prefilter and two HEPA, are arranged 5 wide by 6 high. A floor has placed between the third and fourth level of filters.	Both filter banks, prefilter and HEPA, are arranged 4 wide by 6 high. A floor has been placed between the third and fourth level of filters.
C.2.c Local pressure drop indication provided. Refer to Section 9.4 for location. All alarms are automatic, visual and audible.	High and low pressure drop alarms in control room.	High pressure drop alarm in control room	High pressure drop alarm in radwaste control room
C.2.e.	No outdoor air is brought through the system.	Outdoor air is not brought through the system.	Outdoor air is not brought through the system.
C.3.a.	No exception taken ~~The containment purge supply system has been designed to insure that the exhaust atmosphere will be less than 70%. Therefore neither heaters or cooling coils have been included in the radioactive normal ventilation system.~~	The auxiliary building normal supply system has been designed to insure that the exhaust atmosphere will have a relative humidity of less than 70%. As a result neither heaters or cooling coils have been included in the ~~radioactive~~ normal ventilation system. exhaust unit.	No adsorber in this system ~~The radwaste building normal supply system has been designed with a duct heater to insure that the exhaust atmosphere will have a relative humidity of less than 70%. As a result neither heaters or cooling coils have been designed as part of the radioactive normal ventilation system.~~
C.3.c.	Upstream mounting of filters may be employed in some cases.	Upstream mounting of filters may be employed in some cases.	Upstream mounting of filters may be employed in some cases.

The supply unit contains cooling coils to remove moisture from the air. Both supply and exhaust units are in continuous operation, precluding relative humidity buildup from within the building.

4

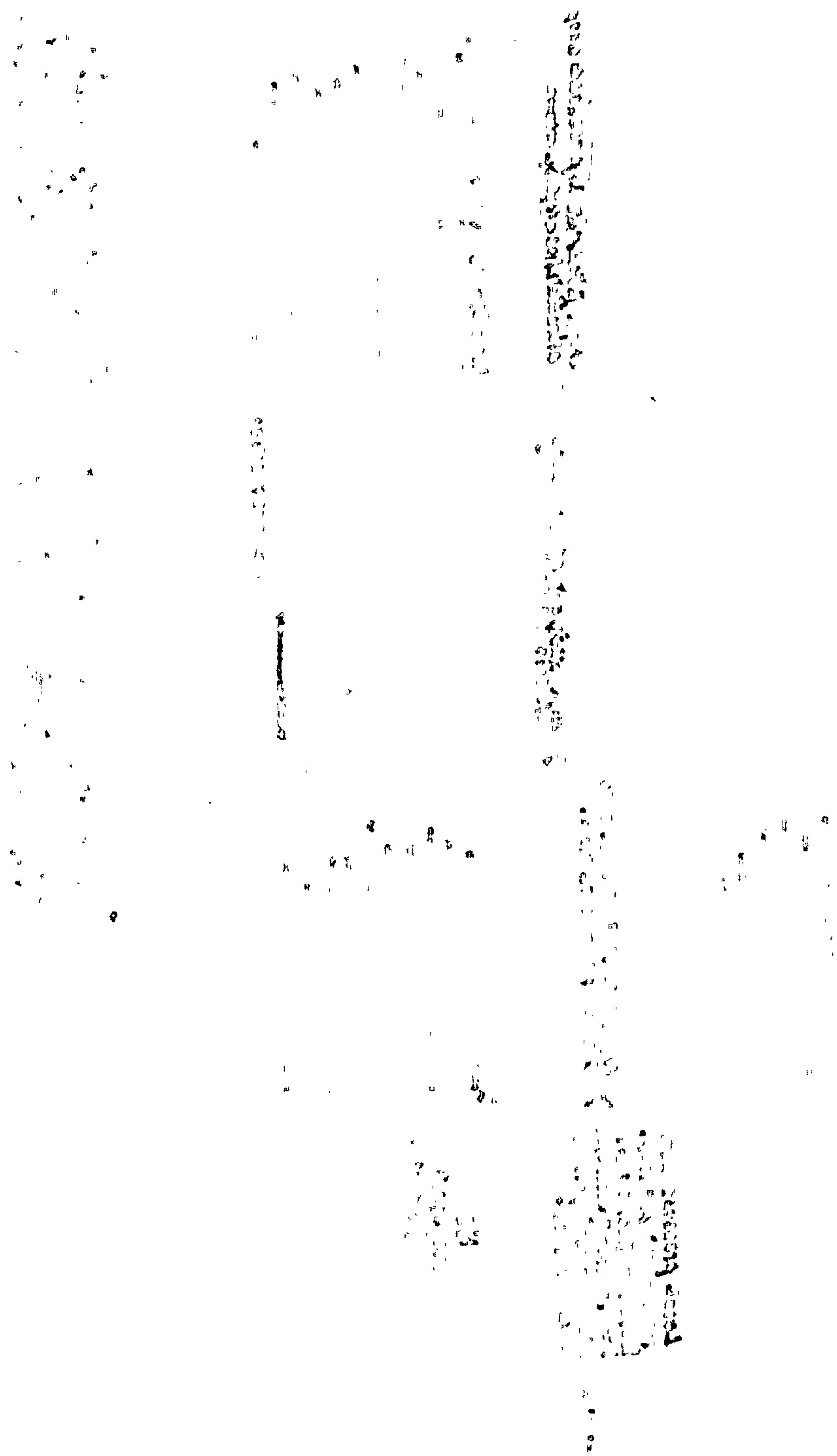

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Table 9A-1

COMPARISON BETWEEN DESIGN FEATURES AND REGULATORY GUIDE 1.140 POSITIONS (Sheet 2 of 2)

Regulatory Guide 1.140 Positions / Radioactivity Removal Normal Ventilation Systems	Containment Power Access Purge APL	Auxiliary Building	Radwaste Building
C.3.g.	Charcoal to meet the requirements of 1973 version of Regulatory Guide 1.52 will be provided.	Charcoal to meet the requirements of 1973 version of Regulatory Guide 1.52 will be provided.	No charcoal adsorber has been designed in the system.
C.3.h.	No exception taken.	No exception taken.	Position does not apply, since no charcoal adsorber has been provided in the system.
C.3.m.	No exception taken ~~No prefilter included in this system.~~	No exception taken.	No exception taken.
C.4.b.	No exception taken.	Accessibility for ease of maintenance is provided by removing opposing filters in opposite directions. This fulfills the suggested standard distance of 3 feet plus length of component for filter.	Accessibility for ease of maintenance is provided by removing opposing filters in opposite directions. This fulfills the suggested standard distance of 3 feet plus length of component for filter.
C.5.d.	No exception taken.	No exception taken.	Position does not apply, since no charcoal adsorber has been provided in the system.
C.6.a.	Charcoal to meet the requirements of 1973 version ~~or~~ of Regulatory Guide 1.52 will be provided.	Charcoal to meet the requirements of 1973 version of Regulatory Guide 1.52 will be provided.	No charcoal adsorber has been designed in the system.
Table 1.	Charcoal will be provided to meet the requirements of Regulatory Guide 1.52, Table 1.	Charcoal will be provided to meet the requirements of Regulatory Guide 1.52, Table 1.	No charcoal adsorber has been designed in the system.

4

Attachment F

Attachment F

Insert A to pages 9A-27 and 9A-28

Comparison Between Design Features and Regulatory Guide 1.140 Positions

Radioactivity Removal Normal Ventilation Systems / Regulatory Guide 1.140 Position	Turbine Building Vacuum Pump Exhaust	Containment Preaccess (Air Cleanup Recirculation)
C. 1. b	System is not located in an area of high radiation during normal plant operation.	Adequate shielding is provided.
C. 2. a	No exception taken.	No exception taken.
C. 2. b	No exception taken.	No exception taken.
C. 2. c	High pressure drop alarm in control room.	High passupe drop alarm in control room.
C. 2. e	Outdoor air is not brought through the system.	Outdoor air is not brought through the system.
C. 3. a	No exception taken.	No exception taken.
C. 3. c	Upstream mounting of filters may be employed in same cases.	Upstream mounting of filters may be employed in same cases.
C. 3. g	No exception taken.	No exception taken.
C. 3. h	No exception taken.	No exception taken.
C. 3. m	No prefilter included in this system.	No exception taken.
C. 4. b	No exception taken.	No exception taken.
C. 5. d	No exception taken.	No exception taken.
C. 6. a	Charcoal to meet the requirements of 1973 version of Regulatory Guide 1.52 will be provided.	Charcoal to meet the requirements of 1973 version of Regulatory Guide 1.52 will be provided.
Table 1	No exception taken.	No exception taken.

[illegible]

Attachment F

Table 9.4-3

HVAC SYSTEMS--SUMMARY OF DESIGN PARAMETERS AND DESIGN DETAILS (Sheet 1 of 6)

Area or Location	Operational Mode: Normal	Operational Mode: Essential	Type Systems	Heat Load (Btu/h)	Flow Rate/Unit: Air (ft^3/min)	Flow Rate/Unit: Cooling Water (gal/min)	No. Units & Capacity	Power Supply	Equipment Listing	Water Source	Water Makeup
Containment - essential		X	Hydrogen purge	N/A	50	N/A	1/100	Emergency trains	Demister, HEPA & charcoal filters (backup for recombiner)	-	-
Containment - normal	X		Cooling	10.2×10^6	80,000	690	4/50	Normal 120V & 460V	Cooling coil, fan, heater	Normal chilled water	-
	X		Power access filter	-	15,000	-	2/50	Normal 120V & 460V	HEF, HEPA, charcoal, fan	-	-
	X		Purge-supply refueling	1.28×10^6	30,000	171	1/100	Normal 120V & 460V	OIF, cooling coil, fans (2), heater	Normal chilled water	-
			power access	6.07×10^4	2,000	8.1	1/100	Normal 120V & 460V	MEF, HEF, cooling coil, heater, fan	-	-
	X		Purge-exhaust refueling fan	-	30,000	-	1/100	Normal 120V & 460V	Fans (2)		
			power access filter fan	-	2,000	-	1/100	Normal 120V & 460V	Heating coil, Fan, MEF, HEPA, and charcoal filters		
	X		CEDM cooling	3.2×10^6	85,400	400	2/100	Normal 120V & 460V	Cooling coil, fan	NCWS	-
	X		Cavity cooling	-	23,000	-	4/50	Normal 120V & 460V	Fan	-	-
Tendon gallery	X		Outside air supply	-	5,000	-	1/100	Normal 120V & 460V	Fan	-	-
			exhaust	-	5,500	-	1/100	Normal 120V & 460V	Fan	-	-
MSSS MSSS and containment main steam and feedwater penetrations	X		Outside air supply	-	32,400	-	2/100	Normal 120V & 460V	OIF, fan	-	-

Notes: MEF - Moderate efficiency filter
HEF - High efficiency filter
OIF - Oil impingement filter

h) Q.460.10 - This question deals with hydrogen and oxygen gas analyzers. for the waste gas system. For additional comments on this question, see at the end of this section.

Action - a. Applicant will state explicitly that both high and high-high alarms are available at approximately 2 percent and 4 percent oxygen concentrations.

b. Applicant will make correction regarding the gas surge header referred to in Section 11.3.1.1.6.

RESPONSE

Refer to amended pages 9.3-35A, 11.3-7 and 11.3-8 Attachment G.

{ Continuous sampling capability is provided for the surge tank

9.3.2.3.7 Gas Analyzers

Redundant hydrogen, redundant oxygen, and gas analysis equipment located in the radwaste building has the capability to analyze selected sample points. Automatically sequenced sampling capability is provided for the gas stripper, volume control tank, equipment drain tank, reactor drain tank, the on-line decay tank ~~and~~ and holdup tank. These analyzers provide a direct readout of hydrogen and oxygen concentration. The redundant oxygen monitors have automatic control functions which preclude the formation of explosive hydrogen and oxygen mixtures. Alarms are provided in the radwaste panel and main control room to notify the operators of high oxygen and hydrogen detection. Samples may be collected in a sample vessel and taken to the hot lab for further analysis.

The sampling sequence involves taking a sample, performing the analysis, purging the system with nitrogen to the GRS surge tank, and then recommencing the cycle with a new sample. This is done until the CVCS holdup tank is sampled. The holdup tank sample is vented to the radwaste building HVAC, as is the nitrogen purge which follows. This venting process prevents oxygen from being flushed to the gas surge tank. After this nitrogen purge, the sample cycle begins as before.

4 Automatic control functions are provided to stop compressor operation on high-high oxygen alarm at 4%. ~~content.~~ Analyses are provided on the suction side of the compressor (by sampling the surge tank and surge tank inputs) and discharge side of the compressor (by sampling the on-line decay tank).

The O_2 and H_2 content of the sampled gas is indicated in the radwaste control room. Annunciating alarms are provided locally in the radwaste control room for each train of the gas analyzer, and a common gas analyzer alarm is provided in the main control room via the plant computer. The O_2 and H_2 high alarm is set at 2% and the high-high alarm is set at 4%.

The following table provides sample points, alarms, frequency:

Sample Point	Frequency	Alarm
Train A		
Gas Surge Tank	Continuous	Oxygen
Train B		
On-line Gas Decay Tank	1/sample period[b][c]	Oxygen
Volume Control Tank	1/sample period	Oxygen
Equipment Drain Tank	1/sample period	Oxygen
Reactor Drain Tank	1/sample period	Oxygen
Holdup Tank[a]	1/sample period	Hydrogen
Gas Stripper	1/sample period[b][c]	Oxygen

[a]Sampled gas from the CVCS Holdup Tank is discharged to the radwaste building exhaust. All other samples are discharged to the GRS Surge Tank.

[b]One sample period may vary from 45 seconds to 10 minutes.

[c]The system is purged with nitrogen once each sample period. 4

9.3.2.3.8 Analysis Equipment and Instruments

Conductivity bridges, pH meters, in line measurement devices, various radiation detectors, gas detectors, ovens, centrifuges, laboratory glassware, chemical reagents, and portable test units are provided. Most sampling materials and devices are located in the sampling room. The hotwell analysis, circulating water chlorine, and feedwater and demineralizer turbidity stations are all located locally. Instruments for monitoring 4

11.3.1.1.5 Instrumentation

The GRS instrumentation is shown in figure 11.3-2. The hydrogen and oxygen analyzers are discussed in section 9.3.2. The GRS radiation monitors are discussed in section 11.5. Compressor instrumentation necessary for operation can be read at a local panel outside the compressor room. Remote indication and alarms are provided in the radwaste system control panel area in the radwaste building. GRS alarm conditions are retransmitted to the main control room.

The automatic isolation valves in the decay tank discharge header are interlocked to close on high radiation signals from the waste gas header monitor, high discharge flow, or low radwaste building exhaust flow. Therefore, even during the improbable instance where the discharge valve from the wrong decay tank is inadvertantly opened, the release would be automatically terminated when the radiation setpoint is exceeded. The resultant activity released to the environment would be within technical specifications limits for radioactive gaseous releases described in chapter 16.

11.3.1.1.6 Hydrogen Control

The major sources of hydrogen in the GRS are the off-gas from the gas stripper, the volume control tank, and the reactor drain tank. These sources will produce a gas consisting primarily of hydrogen and nitrogen with trace quantities of oxygen and fission gases. These sources are piped to the waste gas surge tank from which gas is compressed into decay tanks.

The GRS and its input sources are initially purged at plant startup with nitrogen. The surge tank (gas surge header), decay tanks, ~~gas surge header,~~ and various input sources are monitored for oxygen and hydrogen as described in section 9.3.2. The hydrogen and oxygen 4

analyzer sequentially samples the major GRS inputs and on-line decay tank, and continuously samples the gas surge tank. On high oxygen alarm from any of these sources the waste gas compressors will automatically trip. This alarm is set at a
4 predetermined point prior to reaching a potentially explosive mixture. A gas analyzer alarm in the main control room gives operating personnel ample time to mitigate the situation via nitrogen dilution, purge, etc. In addition to the analyzer high oxygen alarm for the surge tank, low surge tank pressure automatically initiates an alarm to alert operating personnel of a tank leak which could potentially result in oxygen inleakage to the system. Thus, it is not necessary for the waste gas surge header, surge tank, decay tanks, valves, piping, and compressors to be designed to withstand an internal hydrogen explosion.

After a suitable storage period, the gas is released to the radwaste building exhaust vent. The release rate is controlled by a flow controller set for a maximum discharge of 50 standard ft^3/min. The air-flow rate through the vent is 25,500 standard ft^3/min, which results in a hydrogen concentration of less than 1%, well below the combustion limit of hydrogen in air. The gaseous discharge isolation valves will automatically shut on high discharge flow rate, low radwaste building exhaust or high radiation level in the discharge line.

Potential buildup of hydrogen in the ventilation exhaust systems can come from storage tanks that contain liquids previously processed through the gas stripper. Consequently, with a gas stripper efficiency of 99.9% and a maximum hydrogen pressure of 50 psig (administrative limit) in the volume control tank, the maximum hydrogen concentration that can exist in the gas space above a liquid surface downstream of the gas stripper is 0.44%, well below the combustion limit of hydrogen in air.

Another potential source of hydrogen is liquids fed to the equipment drain tank and chemical drain tanks, but these will contain only small quantities of dissolved hydrogen. The

INSERT A

analyzer sequentially samples the major GRS inputs and on-line decay tank, and continuously samples the gas surge tank. On high oxygen alarm from any of these sources the waste gas compressors will automatically trip. This alarm is set at a predetermined point prior to reaching a potentially explosive mixture. A gas analyzer alarm in the main control room gives operating personnel ample time to mitigate the situation via nitrogen dilution, purge, etc. In addition to the analyzer high oxygen alarm for the surge tank, low surge tank pressure automatically initiates an alarm to alert operating personnel of a tank leak which could potentially result in oxygen inleakage to the system. Thus, it is not necessary for the waste gas surge header, surge tank, decay tanks, valves, piping, and compressors to be designed to withstand an internal hydrogen explosion.

4

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Another potential source of hydrogen is liquids fed to the equipment drain tank and chemical drain tanks, but these will contain only small quantities of dissolved hydrogen. The

INSERT A TO PAGES 11.3-8

An alarm on high oxygen (2 percent) from any of these sources is annunciated in the main control room and in the radwaste control room. Operating personnel can be dispatched to mitigate the situation via nitrogen dilution, purge, etc. An alarm on high-high oxygen (4 percent) from any of these sources is annunciated in the main control room and in the radwaste control room. Under these conditions, the waste gas compressors will automatically trip and nitrogen will be automatically injected into the GRS surge tank. Automatic nitrogen dilution will mitigate the situation. In addition,

[illegible]

[illegible]

[illegible]

i) Q.460.7 - Source term information using the format given in Chapter 4 of NUREG-0017.

Action - 1) Applicant will give shim bleed rate under Item 2d. This is 0.48 gpm.

2) Under Item 3e, applicant will state that a blowdown flash tank has been provided and that the flashed steam is returned to the cycle via the #4 feedwater heaters. (The applicant will delete the references to DFS for the flash tank vent releases since the flash tank vent is not released to the environment.)

3) Under Item 3f, applicant will give the fraction of feedwater to the steam generator processed through the condensate demineralizer when it is on line.

4) Applicant will give information on condensate demineralizers, i.e., average flow rate, demineralizer type, number and size, regeneration frequency and whether ultrasonic resin cleaning is used.

5) Under 4a, applicant will add a cross reference to the Section 11.2 where liquid waste source terms are discussed.

6) The applicant will provide the vent size, release elevation, effluent velocity and temperature for the turbine building exhaust either under Item 6 or in Section 11.3.

RESPONSE

The response is given in amended Section 11.3.3.3 and in amended response to Questions 11A.2 (NRC Question 460.7) and 11A.3 (NRC Question 460.8), Attachment H.

11.3.3.2 Fuel Building Ventilation Exhaust

The fuel building ventilation exhaust is directed to a cylindrical vent in the roof of the fuel building. Exhaust to the atmosphere is vertical at 116 feet above grade. The vent is designed for a minimum effluent velocity of 2000 ft/min, and has a maximum temperature of 120F.

11.3.3.3 Turbine Building Ventilation Exhaust

The operating deck of the turbine building exhausts to four power roof ventilators located on top of the turbine building. The turbine building lube oil room, demineralizer room and battery room exhaust through their own exhaust fans to the outside atmosphere.

11.3.3.4 Condenser Air Removal System

Air and noncondensable gases are removed from the shell side of the condenser by four mechanical vacuum pumps. Normally three vacuum pumps are operating, with one pump drawing air from each condenser shell and the fourth pump is in standby. The vacuum pumps discharge to atmosphere unless radioactivity is detected by the radiation monitor in the discharge line. If radiation is detected, the vacuum pump discharge is automatically shifted to a charcoal adsorption train consisting of a moisture separator, electric heater, prefilter, activated charcoal filter, post-exhaust filter and post-exhaust filter blower. The exhaust to the atmosphere is through a cylindrical stack located on the turbine building, with a horizontal exhaust, at 2400 ft/min (minimum) at an elevation of 84 feet above the grade and a normal temperature of 165F. The charcoal adsorption train electric heaters add heat as required to maintain 20F of superheat in the exhaust line.

The turbine building exhaust to the atmosphere is through four cylindrical, 97-inch ID vents. Exhaust to the atmosphere is vertical at 248.7 feet above grade. The vents are designed for a minimum effluent velocity at 2000 ft/min, and have a normal temperature of 120F.

2. Primary System

   a. Normal primary coolant mass is 571,300 lb (CESSAR-F Table 11.1.1-1),

   b. Average letdown rate is 72 gal/min (CESSAR-F Table 11.1.1-1),

   c. Average purification flow is 14.4 gal/min (CESSAR-F Table 11.1.1-1).

   d. Average Shim bleed flow is 0.48 gal/min ~~processing assumes continuous degasification of the full letdown flow.~~ (CESSAR-F Table 11.1.1-1)

3. Secondary System

   a. 2 vertical U-tube steam generators with iodine and non-volatile carryover factor of 1/400,

   b. Total secondary steam flow is 17,452,271 lb/hr,

   c. Mass of liquid per steam generator is 167,000 lb,

4 d. Average primary-to-secondary leakage rate is 100 lb/day,

   e. Average steam generator blowdown rate is 34,905 lb/hr. Flashed steam from the blowdown flash tank is returned back to the system via the Number 4 feedwater heaters. ~~Blowdown flash tank provides DF of 20 for iodines, 1 for noble gases, tritium, and nitrogen, and 1000 for all others.~~ Two blowdown demineralizers provide a total DF of 1 for noble gases, tritium, and nitrogen, 100 for Cs and Rb, and 1000 for all others,

   f. The condensate demineralizers are not expected to be normally placed into service, therefore, DF is 1. However, when on line, the feedwater fraction processed is approximately 0.7. On-line DF's are two for Cs and Rb, one for Noble gases, and 10 for all others

   g. A detailed description of the condensate demineralizers is given in section 10.4.6.

4. Liquid Waste Processing Systems

   a. As stated above, liquid source term data is not applicable to PVNGS. Refer to section 11.2 for a discussion of processing capability and system description.

5. Gaseous Waste Processing System

   a. Gaseous source term data is provided in sections 11.3.1 and 11.3.2, tables 11.3.-4 and 11.3-7, and figures 11.3-1 and 11.3-2.

6. Ventilation and Exhaust Systems
   Refer to section 11.3.3 for ventilation and exhaust data. In addition:

   a. Data regarding provisions for reducing radioactivity releases through the ventilation or exhaust systems, DFs assumed, and their bases is provided in table 11.3-7,

   b. Release rates are provided in table 11.3-6,

   c. Data on release points is provided in PVNGS Environmental Report - OL Stage, section 3.1.3.1.

   d. The plant vent is a 72" x 84" rectangular duct discharging vertically. The vacuum pump exhaust is a 12" pipe discharging horizontally. The fuel building exhaust is a 60" circular duct discharging vertically. 4

   e. Containment building internal circulation filtration data is provided in section 9.4.6 and table 11.3-7.

<u>QUESTION 11A.3</u> (NRC Question 460.8) (9.3 and 11.2)

Section 9.3 of the FSAR states that the turbine building liquid wastes will be pumped to the evaporation pond if the effluent quality will meet the standards for pH, conductivity and radioactivity. Explain how tests will be conducted for the radioactivity of these wastes, and also give information on the ultimate disposal of the wastes that get collected in the evaporation pond.

RESPONSE: Tests will be conducted for the radioactivity of the turbine building liquid wastes if on-line radiation monitors for the condensor air ejector or steam generator

[illegible]

Additional Comments on Questions Under Section 2

Q.460.3 Compliance with Reg. Guide 1.52, Rev. 2

a) Applicant has stated the testing requirements for the ESF filters in paragraphs M and N under Reg. Guide 1.52 in Section 1.8 of the FSAR. The applicant has been informed that when the Technical Specifications for Palo Verde Units 1, 2, and 3 are formalized, they will state that these will be in accordance with Reg. Guide 1.52, Rev. 2.

b) Applicant has been informed that flow measuring instrumentations should be provided for the ESF filter systems and the lack of these instrumentations will be identified as an open item in the SER.

RESPONSE

a) No action required.

b) Flow measuring capability is discussed on revised FSAR page 1.8-36, attachment E.

PVNGS currently complies with Reg. Guide 1.52, Rev. 1, as modified in FSAR Section 1.8, for the Fuel Building and Control Building ESF filtration systems. As such, the design provides local differential pressure indication across each filter. The design also provides high and low differential pressure alarms in the main control room. Full compliance with the Regulatory Guide would require direct flow measuring instrumentation with indication in the main control room. Although no direct flow rate measuring devices are provided, high and low differential pressure alarms are provided in the control room. The high alarm is set at approximately 110 percent of design differential pressure. The low alarm is set below the differential pressure at clean conditions. A high differential pressure alarm indicates high filter loading. A low differential pressure alarm indicates abnormally low conditions. This is verified during in-place filter testing as required by PVNGS Technical Specifications. During the testing, flow rates are measured using local flow rate measuring devices. Any bypass leakage or abnormal flow conditions are corrected at this time. Upon completion of successful in-place testing, the filter units are placed in standby mode and are not operated unless accident conditions warrant their use. Since the blower motors are single speed devices, the flowrate through the filter unit is precisely the measured flowrate as determined during in-place testing when the blowers are running and no differential pressure alarms are present.

Q.460.6 Compliance with Reg. Guide 1.140, Rev. 1

a) Applicant has been informed that the containment exhaust air should have a RH $\leq$ 70 percent for 70% filter efficiency for iodine capture by charcoal absorbers (The applicant had quoted 70% filter efficiency for these absorbers). If an electric heater is needed in the exhaust

[illegible]

filter system to assure this condition, then it should be provided. In case the applicant elects to provide the heater so as to take credit for 70% filter efficiency for the charcoal absorbers, the applicant should state it in the FSAR by August 31. Applicant is requested to clarify orally now what is proposed regarding this issue.

b) Applicant has been informed that flow measuring instrumentation is required for the normal filters. Applicant is required to clarify now, how the applicant proposes to measure flow rates through these normal filters.

c) Applicant should clarify now (can be done orally) whether the HEPA and pre-filters will be tested in accordance with C5C and C3M of Reg. Guide 1.140, Rev. 1.

RESPONSE

a) Revised FSAR pages 9.4-4 and 9A-27 provide a commitment for an electric heater in the exhaust filter system of the containment purge, Attachment F.

b) Instrumentation is discussed on revised Table 9A-1, Attachment F. The PVNGS design provides local differential pressure indication across each filter. The design also provides high and low differential pressure alarms in the main control room for the Containment Purge, a high differential pressure alarm in the Radwaste control room for the Radwaste Building Exhaust, and high differential pressure alarms in the main control room for the Turbine Building Vacuum Pump Exhaust, Auxiliary Building exhaust normal AFU and Containment Preaccess (Air Cleanup Recirculation) filtration units. Indirect flow measurement is provided by the differential pressure alarms. In addition, flowrates are measured during in-place filter testing using local flow rate measuring devices. Any bypass leakage or abnormal flow conditions are corrected at this time. Since the blower motors are single speed devices, the flowrate through the filter is precisely the measured flowrate as determined during in-place testing.

c) According to FSAR Table 9A-1, PVNGS will comply with Regulatory Guide 1.140, Rev. 1, Item C.5.c in total and Item C.3.m as clarified.

Q.460.10 Hydrogen and oxygen gas analyzers

a) Applicant has been informed that at least one continuous gas analyzer should be located between the compressor and the decay tank as stated in the acceptance criteria of Standard Review Plan 11.3, Rev. 1.

b) Applicant has been informed that the control feature should include the provision for automatic injection of the appropriate diluent into the system to reduce concentrations below the specified limit on automatic initiation of the "high-high" alarm.

c) Applicant has been informed that the lack of the above features will be identified as open items in the SER.

RESPONSE

a) PVNGS design currently samples the surge tank continuously and the on-line decay tank sequentially at a timed cycle internal ranging between 45 seconds and 10 minutes. However, the Gaseous Radwaste System (GRS) is a positive pressure system. Any leakage would be out of, not into, the system. There are no connections to a pressurized source of oxygen. GRS piping is constructed to minimize the potential for leakage, either in or out. In addition, experience at operating PWR plants utilizing a GRS design similar to that at PVNGS has shown that inleakage rates leading to potentially explosive hydrogen and oxygen mixtures with the GRS are not experienced.

Even if there were a passive failure in the compressor suction piping, there would be no potential for an explosive mixture. Flow would be out of the system until a point where piping pressures are equal to atmospheric. As the compressor isolates at pressures below + 0.5 psig, no inleakage can occur. Therefore continuous sampling of the GRS compressor is unnecessary.

b) The high-high oxygen or low surge tank pressure trips the compressors. Therefore, even if there were a passive failure in the compressor suction piping, there would be no potential for an explosive mixture. A passive failure of one of the surge tank input streams could potentially lead to an explosive mixture in the surge tank if an alarmed condition went unchecked. Therefore, Bechtel recommends that the addition of automatic nitrogen diluent into the GRS surge tank on high-high oxygen alarm will be provided. This is discussed on revised page 11.3-8, Attachment G.