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AUTH.NAME AUTHOR AFFILIATION
VAN BRUNT,E.E. Arizona Public Service Co.
RECIP.NAME RECIPIENT AFFILIATION
KERRIGAN,J. NRC - No Detailed Affiliation Given

SUBJECT: Provides addl marked-up clarifications to NRC questions originally responded to in FSAR Amend 4,per 810702 telcon.

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August 18, 1981
ANPP-18691 - JMA/WFQ

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U.S. NUCLEAR REGULATORY COMMISSION

Ms. Janis Kerrigan
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 Janis:

As a result of a July 2, 1981 telecon with Mr. B. Giardina of the NRC/NRR staff, we had agreed to provide additional clarifications to specific NRC questions originally responded to in the PVNGS FSAR Amendment 4.

Our clarifications are enclosed as revisions to existing FSAR pages. Enclosure 1 provides a cross reference list for convenience. The revisions as shown will be included in a future FSAR amendment.

If your staff has any questions with regard to these responses, we believe such questions should be raised promptly so that such subjects can be closed out completely.

Very truly yours,

E. E. Van Brunt

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

EEVBJr/WFQ/av
Enclosures
cc: B. Giardina (NRC) (w/a)
P. Hourihan (w/a)
A. C. Gehr (w/a)

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A PDR

Ms. Janis Kerrigan
August 18, 1981
ANPP-18691 - JMA/WFQ
Page 2

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 17th day of AUGUST, 1981.

Connie Lou Armstrong

My Commission expires:

June 24, 1983

ENCLOSURE 1

Original NRC Question for Which Clarification Was Requested	FSAR Question	APS Response
430.2 (Section 8.3)		Enclosure 2
430.8 (Section 9.5.4)		Enclosure 3
430.10 (Section 9.5.4)		Enclosure 11
430.15 (Section 9.5.4)		Enclosure 4
430.12 (Section 9.5.4)		Enclosure 10
430.21 (Section 9.5.5)		Enclosure 5
430.34 (Section 9.5.8)		Enclosure 6
430.35 (Section 9.5.8)		Enclosure 7
430.45 (Section 10.3)		Enclosure 8
430.55 (Section 10.4.4)		Enclosure 9

generator, or auxiliaries. The manufacturer requires 15 to 30 minutes of run at 75% to 100% full load after every six hours of ~~idling~~ No Load Operation. ← INSERT A

2. Periodic surveillance testing of the emergency diesel generators will be conducted in accordance with the recommendations of Regulatory Guide 1.108 as interpreted by section 1.8, and with the recommendations of the engine manufacturer. The engine manufacturer's recommendations for periodic testing do not conflict with Regulatory Guide 1.108 as interpreted.

3. Maintenance procedures for the emergency diesel generators will require investigation and correction of causes of malfunctions and will require preventive maintenance procedures tailored to monitor performance of components discovered to have highest failure rates.

4 4. Maintenance and surveillance procedures will include post maintenance or surveillance restoration to operability, and in the case of the emergency diesel generators shall specify a final equipment check and when actions have been accomplished that could affect engine operability a load test prior to declaring a generator operational.

Emergency diesel generator operating, maintenance and surveillance procedures will be available on site for NRC review 60 days prior to Unit One fuel load.

<u>QUESTION 8A.3</u> (NRC Question 430.3) (8.3)

The availability on demand of an emergency diesel generator is dependent upon, among other things, the proper functioning of its controls and monitoring instrumentation. This equipment is generally panel mounted and in some instances the panels are mounted directly on the diesel generator skid. Major diesel engine damage has occurred at some operating plants

Insert A - This requirement will be stipulated in an appropriate procedure. Furthermore, section 8.3.1.1.4.7 references Chapter 16 for the testing requirements for the diesel generator. The monthly surveillance requirement will require the diesel generator to be loaded to greater than 25% for 1 hour.

Enclosure 3

9.5.4.2 System Description

4 The DGFOS is shown schematically in figures 9.5-7 and 9.5-7A.

Two fully redundant DGFOS are provided for each unit. Each DGFOS consists of one diesel fuel oil storage tank, one diesel fuel oil transfer pump, and one diesel fuel oil day tank per diesel generator along with the associated piping, valves, and instrumentation. Indications, alarms, and sensors are listed in Table 9.5-6. Components are described in subsequent sections. Table 9.5-7 lists the major components in the DGFOS and their design specifications. The DGFOS is designed in accordance with the codes and standards specified in table 3.2-1. The DGFOS is designed to comply with Position C.2 of Regulatory Guide 1.137 as discussed in section 1.8.

Insert A

9.5.4.2.1 Diesel Generator Fuel Oil Storage Tanks

Each diesel generator fuel oil storage tank is buried underground and has a capacity of 84,000 gallons. The fuel oil storage tanks are protected from corrosion in accordance with Recommended Practice, Control of External Corrosion on Underground or Submerged Metallic Piping Systems, RP-01-69, as published by the National Association of Corrosion engineers.

4 The external surface of the diesel fuel oil storage tank was cleaned in accordance with Steel Structures Painting Council (SSPC)-SP10-63. A 30 mil coat (dry film thickness) of Koppers bituplastic 33 was applied in accordance with the manufacturer's directions. No internal coating is provided.

The tanks are installed in accordance with Occupational Safety and Health Administration OSHA 29CFR1910, Subpart H, Hazardous Materials Section 1910.106. Appropriate instrument connections are installed. Tank vents are equipped with flame arrestors Other fittings permit fuel oil replenishment by truck and water removal from the tank as required.

A vault built above each diesel fuel oil storage tank houses the transfer pump and associated valving and provides for

Insert A to page 9.5-56

In addition, cross connection is provided between the fuel storage tanks which allows the diesel either engines to be supplied with fuel from tank. Therefore, during refulling operations which may stir up sediments, the other tank may be used to supply fuel while the sediment settles in the recently filled tank.

TABLE 9.5-7

DIESEL GENERATOR FUEL OIL STORAGE AND TRANSFER SYSTEM DESIGN SPECIFICATIONS

Equipment or Parameter[(a)]	Quantity Per Station Generating Unit	Type or Capacity
Fuel oil storage tank	2 (one per diesel)	84,000 gal
Fuel oil storage transfer pump	2 (one per diesel)	15 gal/min
Fuel oil day tank	2 (one per diesel)	1,100 gal

a. All equipment Safety Class 3 and Seismic Category I.

protection and accessibility to the connections on the tank. The foundation of the vault is independent of the tank to avoid any load transfer to the tank shell. The vault is of waterproof design.

The walls of the vault extend above the maximum probable flood level and have a structural cover to protect equipment inside the vault from tornados and missiles. The vent lines are routed inside the vault and project through the top slab. The vent line has a flange connection inside the vault. This vent line can easily be replaced at the flange connection should the projection of this line become damaged by a tornado generated missile. The DGFOS storage tanks are located underground about 35 feet from the diesel generator building. (Insert A) 4

A cathodic protection system is provided for the fuel oil storage tanks and piping. The plant cathodic protection system consists of a number of rectifiers and deep bed anodes producing a direct current flow through the ground to the metallic objects buried in the soil which require corrosion protection.

The cathodic protection rectifiers are distributed throughout the site with power supplied from Non-Class IE 480V power motor

Insert A 9.5.4.2.1

In the unlikely event that either or both the truck fill line and the tank vent are damaged and cannot be removed at the tank flange connections, there are three unused flanged connections. These connections are located inside the vault on the tank as shown in figure 9.5-7. These connections could be used as temporary vent or fill connections.

Where cetane number by test D613 is not available, calculated cetane index may be used as an approximation. However, where there is disagreement, method D613 will be used.

Fuel oil will meet the requirements of Position C.2 of Regulatory Guide 1.137 as discussed in section 1.8.

Day tank and storage tank samples will be taken every 92 days. The storage tank will be sampled in accordance with ASTM-D270-65. Condensate will be removed on a quarterly basis. Should the day tank oil be found unacceptable, it is drained into drums for non-safety related uses, such as the auxiliary boilers. Should the storage tank oil be found unacceptable, all oil, including the day tank oil is removed and replaced with fresh oil. Fuel oil level in the tanks is continuously monitored, and visually checked every 31 days.

4 Newly delivered oil will be sampled per Regulatory Guide 1.137 before the oil is placed in the storage tank.

QUESTION 9A.12 (NRC Question 430.15) (9.5.4)

Provide additional justification to support your statement in section 9.5.4.4 that sufficient additional fuel can be delivered to the plant site by truck, rail or helicopter. In your discussion include sources where diesel quality fuel oil is available and distances travelled from the source to the plant. Also discuss how fuel oil will be delivered onsite under extremely unfavorable environmental conditions, including probable maximum flood conditions.

Insert A

RESPONSE: Diesel fuel oil will normally be supplied from Phoenix, Arizona, 34 miles to the east. An Interstate Highway runs east and west between Phoenix and Blythe, California approximately 110 miles west of the site, where fuel is also available. The highway is approximately 6 miles north of the site over an all weather road.

As discussed in sections 2.4 and 2.4.1.1, the plant site is above maximum probable flood level. Therefore, as a minimum, access to the site by helicopter is not affected by flooding in the highly unlikely event that an accident occurs concurrent with flooding throughout the Arizona desert such that all rail and roads are unusable for 14 days or more.

QUESTION 9A.13 (NRC Question 430.16) (9.5.4)

You state in section 9.5.4.2 that the diesel generator fuel oil storage tank is provided with an individual fill and vent line. Indicate where these lines are located (indoor or outdoor) and the height these lines are terminated above finished ground grade. If these lines are located outdoors discuss the provisions made in your design to prevent entrance of water into the storage tank during adverse environmental conditions. 4

RESPONSE: The fuel oil storage tank fill lines are located outdoors, and terminate approximately 2-3/4 feet above ground level and 2 feet above a concrete surface. The fill line has a threaded cap. The vent has a turned down opening. Both openings are above the flood level discussed in section 2.4.

QUESTION 9A.14 (NRC Question 430.17) (9.5.5)

Section 9.5.5 indicates that the function of the diesel generator cooling water system is to dissipate the heat transferred through the: 1) engine water jacket, 2) combustion air (intake) cooler, and 3) engine turbo charger. Provide information on the individual component heat removal rates (BTU/hr),

INSERT A FOR PAGE 9A-10

Many major and independent oil companies have sufficient supply facilities in West Phoenix at the Southern Pacific Pipe Lines Terminal (tank farm). Companies such as Union Oil Company, Shell Oil Company, Chevron, and ARCO, among others, operate out of this Phoenix terminal. The Southern Pacific pipe line pumps fuel to the Phoenix terminal from Los Angeles, California or El Paso, Texas. An additional storage terminal is located in Tucson, Arizona approximately 100 miles from Phoenix. Both Chevron and Texaco Oil Companies have storage at the Tucson terminal.

for extended periods without degradation of engine performance or reliability. Expand your PSAR/FSAR to include and explicitly define the capability of your design with regard to this requirement. (SRP 9.5.5, Part III, Item 7).

RESPONSE: The response is given in amended section 9.5.5.2.3. Insert E

QUESTION 9A.19 (NRC Question 430.22) (9.5.5)

You state in section 9.5.5.2 each diesel engine cooling water system is provided with a surge tank to provide for system expansion and for venting air from the system. In addition to the items mentioned, the surge tank is to provide for minor system leaks at pump shafts seals, valve stems and other components, and to maintain required NPSH on the system circulating pump. Provide the size of the expansion tank and location. Demonstrate by analysis that the expansion tank size will be adequate to maintain required pump NPSH and make up water for seven days continuous operation of the diesel engine at full rated load without makeup, or provide a seismic Category I, safety Class 3 make up water supply to the expansion tank.

RESPONSE: The cooling water system expansion tank is located on the auxiliary skid shown in figure 9.5-8. The expansion tank holds approximately 250 gallons. Makeup is provided from the Seismic Category I, Safety Class 3 water supply from the condensate storage tank as shown on figures 9.5-9 and 9.5-10.

QUESTION 9A.20 (NRC Question 430.23) (9.5.5)

Provide the source of power for the diesel engine motor driven recirculation jacket water pump and electric jacket water heater. Provide the motor and electric heater characteristics, i.e., motor hp., operating voltage, phase(s), frequency and kw

Insert E 9A.18

The response is given in amended section 9.5.5.2.3 and in the response to question 8A.2.

Enclosure 5

directed to the jacket water heat exchanger. In this manner, the cooling water is maintained at the proper temperature for maximum engine efficiency.

During emergency operation, operator action is required to prevent engine damage in event of overheating. Alarm response procedures described in section 13.5.2.1.E are prepared for alarms associated with this system, incorporate information from the troubleshooting guide, and provide operator guidance in alarm response. 4

The DGCWS is a closed system and is independent of any other plant cooling water system.

9.5.5.2.3 Unloaded Operation

The design specification requires that the diesel engine be capable of running unloaded for 1 hour without adverse effects. The manufacturer's approved test procedure requires six hours of no load operation. Following six hours of no load operation at rated speed, the engines are subjected to a 75% load test for one hour, followed by a 50% load test for one hour. The manufacturer recommends that for each six hours of no load operation the diesel should be run at least one hour at 50% load or greater. The diesel engine can be manually sychronized in the isochronous mode with the offsite power. 4

Insert A

9.5.5.3 <u>Safety Evaluation</u>

A. Safety Evaluation One

The DGCWS is sized to cool the diesel generator while operating at design load when the ESPS water is at a maximum temperature.

B. Safety Evaluation Two

Refer to table 9.5-9 for a single failure analysis of the DGCWS.

Insert A 9.5.5.2.3

During periodic testing,

127,300 ft^3/min ventilation exhaust discharge is an upward direction from the diesel generator building roof through a rectangular chimney. The exhaust is carried in an exhaust pipe inside the chimney. The exhaust is directed vertically upward. The top of the exhaust pipe and the chimney exit are approximately 90 feet above grade and about 50 feet above the air intake. These design features will preclude the recirculation of exhaust gases into the air intake.

Therefore, the engine exhaust, which is approximately 30% of the total exhaust flow, would be sufficiently mixed prior to reaching the combustion air intake, in the unlikely event that this would occur, such that engine performance will not be degraded. Additionally, the diesel generator building is equipped with a parapet around the top perimeter to further direct engine exhaust upward and away from the combustion air intake.

The cooler section of the combustion air cooler/heater is fabricated from corrosion-resistant titanium tubing; the heater section which caries treated jacket water is made from cupro-nickel tubing. These corrosion-resistant materials minimize the possibility of tube leaks.

4 The diesel generator buildings are not equipped with gaseous fire protection systems, nor are they located near the gas storage facilities. The carbon dioxide storage tank is located at a distance of 220 feet, the hydrogen storage facility is 600 feet away, and the nitrogen storage system is 500 feet away. These distances are adequate to ensure that accidental releases of these gases will not degrade diesel performance.

Insert F

Enclosure 6

Insert F 9.5.8.3A

The meteorological data presented in sections 2.3.1.1.5 and 2.3.1.2.5 indicate that snow, hail or freezing rain are extremely rare and very light. It is not probable that either the intake or exhaust could be plugged by snow or ice. The intake and air filter are sized to adequately provide combustion air during dust storm conditions.

Enclosure 1

QUESTION 9A.31 (NRC Question 430.34) (9.5.8)

Discuss the provisions made in your design of the diesel engine combustion air intake and exhaust system to prevent possible clogging, during standby and in operation, from abnormal climatic conditions (heavy rain, freezing rain, dust storms, ice and snow) that could prevent operation of the diesel generator on demand. (SRP 9.5.8, Part III, item 5).

RESPONSE: The response is given in amended section 9.5.8.3A. Also refer to figure 9.5-8. Insert F

QUESTION 9A.32 (NRC Question 430.35) (9.5.8)

4 Show by analysis that a potential fire in the diesel generator building together with a single failure of the fire protection system will not degrade the quality of the diesel combustion air so that the remaining diesel will be able to provide full rated power.

RESPONSE: Refer to section 9.5.8.3A and figure 9.5-8. Each engine utilizes separate air intakes, and is enclosed within a compartment with walls with a three hour fire resistance. Assuming a fire in one engine during operation of both engines, the combustion smoke would be discharged out the exhaust vent. The same design features discharge the hot gases vertically, while the air intake is located 50 feet below the exhaust point so as to preclude recirculation and degradation of combustion air.

Insert G

QUESTION 9A.33 (NRC Question 430.36) (9.5.8)

Experience at some operating plants has shown that diesel engines have failed to start due to accumulation of dust and other deleterious material on electrical equipment associated

Enclosure 7

4362...

Insert G 9.A.32

Figure 9.5-8 shows that each engine has a separate intake and exhaust. Each intake occurs on the side of the building that its diesel is on. Each engine is enclosed in a three hour resistant fire wall. Assuming a fire in one engine during operation of both engines, the combustion smoke would be discharged out the exhaust vent. Section 9.5.8.3.A states that this exhaust mixture could be directly sucked into the intake and not degrade engine performance. To prevent suction of exhaust gases the exhaust is directed vertically upward and releasesd fifty feet above the intake. Furthermore, a parapet has been placed around the perimeter of the building to help direct exhaust upward and away from the intake.

QUESTION 10A.9 (NRC QUESTION 430.45) (10.3)

As explained in issue No. 1 of NUREG 0138, credit is taken for all valves downstream of the Main Steam Isolation Valve (MSIV) to limit blowdown of a second steam generator in the event of a steam line break upstream of the MSIV. In order to confirm satisfactory performance following such a steam line break provide a tabulation and descriptive text (as appropriate) in the FSAR of all flow paths that branch off the main steam lines between the MSIV's and the turbine stop valves. For each flow path originating at the main steam lines, provide the following information:

a) System identification

b) Maximum steam flow in pounds per hour

c) Type of shut-off valve(s)

d) Size of valve(s)

4 e) Quality of the valve(s)

f) Design code of the valve(s)

g) Closure time of the valve(s)

h) Actuation mechanism of the valve(s) (i.e., Solenoid operated, motor operated, air operated diaphragm valve, etc.)

i) Motive or power source for the valve actuating mechanism

In the event of the postulated accident, termination of steam flow from all systems identified above, except those that can be used for mitigation of the accident, is required to bring the reactor to a safe cold shutdown. For these systems describe what design features have been incorporated to assure closure of the steam shut-off valve(s). Describe what operator actions (if any) are required.

If the systems that can be used for mitigation of the accident are not available or decision is made to use other means to shut down the reactor describe how these systems are secured to assure positive steam shut-off. Describe what operator actions (if any) are required.

If any of the requested information is presently included in the FSAR text, provide only the references where the information may be found.

RESPONSE: NUREG-0138 page 1-9 states that the probability of occurrence of the above scenario is quite low. Page 1-10 states that the scenario is not analyzed by the staff and need not be considered as a design basis accident. This scenario should therefore not be a design basis accident for Palo Verde Units 1, 2 & 3.

Refer to the following P&ID's:

- 13-M-SGP-001 (figure 10.3-1)
- 13-M-SGP-002 (figure 10.3-1)
- 13-M-FTP-001 (figure 10.3-3)
- 13-M-CDP-001 (figure 10.4-9)
- 13-M-MTP-001 (figure 10.2-1)
- 13-M-MTP-002 (figure 10.2-1)
- 13-M-ASP-001 (figure 10.3-2)
- 13-M-GSP-001 (figure 10.4-2)

~~Refer to table 10A.1 for additional information requested.~~

INSERT A

QUESTION 10A.10 (NRC QUESTION 430.46) (10.4.1)

Provide a tabulation in your FSAR showing the physical characteristics and performance requirements of the main condensers. In your tabulation include such items as: 1) the number of condenser tubes, material and total heat transfer surface, 2) overall dimensions of the condenser, 3) number of passes, 4) hot well 4

 4

Q 440.72

Insert A to page 10A-7

Table 10A-1 lists the information requested. The table shows valve position following MSIV isolation. For those valves which remain open, the total steam flow through these valves is 253,955 lb/hr. Each auxiliary feedwater pump has a capacity of 484,000 lb/hr. Therefore, even for the extreme situation postulated, any single auxiliary feedwater pump can prevent the second steam generator from boiling dry.

Table 10A-1

FLOW PATHS ORIGINATING AT MAIN STEAM LINES (Sheet 1 of 2)

PVNGS FSAR Qmil Table 10A-1 (1/2)

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)	Type of Shut-off Valves	Size of Valve	Quality of Valve	Design Code of Valve	Closure Time of Valve (Seconds)	Actuation Mechanism	Motive or Power Source	Closure Signal (Sensor)	Quality of Power Source	Quality of of Air Supply	Position Status of Valve After MSIV Isolation	Comment
	Gate (Gate)	6"	Non-Q B31.1	ANSI	15	Manual	N/A	N/A	N/A	N/A	Open	
	Gate (Gate)	6"	Non-Q	ANSI B31.1	15	Manual	N/A	N/A	N/A	N/A	Open	Aux steam supply (13-M-ASP-001) (13-M-SGP-002)
	Globe (Gate)	3"	Non-Q	ANSI B31.1	10	Manual	N/A	N/A	N/A	N/A	Open	
06	Globe	28"	Non-Q	ANSI B31.1	0.2	Hydraulic	Trip of turbine speed control system (actuated on MSIS parameters)	MSIS Actuation Signal (Low S/G) Pressure	Non-1E	N/A	Closed	
06	Globe	28"	Non-Q	ANSI B31.1	0.2	Hydraulic	Trip of turbine speed control system (actuated on MSIS parameters)	MSIS Actuation Signal (Low S/G) Pressure	Non-1E	N/A	Closed	Main steam supply to main turbine (13-M-MTP-001)
06	Globe	28"	Non-Q	ANSI B31.1	0.2	Hydraulic	Trip of turbine speed control system (actuated on MSIS parameters)	MSIS Actuation Signal (Low S/G) Pressure	Non-1E	N/A	Closed	
06	Glove	28"	Non-Q	ANSI B31.1	0.2	Hydraulic	Trip to turbine speed control system (actuated on MSIS parameters)	MSIS Actuation Signal (Low S/G) Pressure	Non-1E	N/A	Closed	
	Globe	2"	Non-Q	ANSI B31.1	10	Motor	Non-1E, 480V, 3 phase 60 cycle		Non-1E	N/A	Open	Bleed off line between MSIV's and turbine stop valves (opens on turbine (trip) (13-M-SGP-002)
	Globe	2"	Non-Q	ANSI B31.1	10	Motor			Non-1E	N/A	Open	
	Globe	2"	Non-Q	ANSI B31.1	10	Motor			Non-1E	N/A	Open	
	Globe	2"	Non-Q	ANSI B31.1	10	Motor			Non-1E	N/A	Open	

PVNGS FSAR Gml Table 10A-1 (1

System Identification	Max. Steam Flow (LB/HR)	Type of Shut-off Valves	Size of Valve	Quality of Valve	Design Code of Valve	Closure Time of Valve (Seconds)	Actuation Mechanisim	Motive or Power Source	Closure Signal (Sensor)	Quality of Power Source	Quality of Air Supply
SG-V093 (or AS-V004)	1925	Gate (Gate)	6"	Non-Q B31.1	ANSI	15	Manual	N/A	N/A	N/A	N/A
SG-V094 (or AS-V012	1925	Gate (Gate)	6"	Non-Q	ANSI B31.1	15	Manual	N/A	N/A	N/A	N/A
SG-V095 (or AS-V013)	105	Globe (Gate)	3"	Non-Q	ANSI B31.1	10	Manual	N/A	N/A	N/A	N/A
MT-UV-1004 (or UV-1005)	$4.25x10^6$	Globe	28"	Non-Q	ANSI B31.1	0.2	Hydraulic	Trip of turbine speed control system (actuated on MSIS parameters)	MSIS Actuation Signal (Low S/G) Pressure	Non-1E	N/A
MT-UV-1006 (or UV-1007)	$4.25x10^6$	Globe	28"	Non-Q	ANSI B31.1	0.2	Hydraulic	Trip of turbine speed control system (actuated on MSIS parameters)	MSIS Actuation Signal (Low S/G) Pressure	Non-1E	N/A
MT-UV-1002 (or UV-1001)	$4.25x10^6$	Globe	28"	Non-Q	ANSI B31.1	0.2	Hydraulic	Trip of turbine speed control system (actuated on MSIS parameters)	MSIS Actuation Signal (Low S/G) Pressure	Non-1E	N/A
MT-UV-1000 (or UV-1003)	$4.25x10^6$	Glove	28"	Non-Q	ANSI B31.1	0.2	Hydraulic	Trip to turbine speed control system (actuated on MSIS parameters)	MSIS Actuation Signal (Low S/G) Pressure	Non-1E	N/A
SG-UV-035	50,000	Globe	2"	Non-Q	ANSI B31.1	10	Motor			Non-1E	N/A
SG-UV-036	50,000	Globe	2"	Non-Q	ANSI B31.1	10	Motor	Non-1E, 480V, 3 phase 60 cycle		Non-1E	N/A
SG-UV-037	50,000	Globe	2"	Non-Q	ANSI B31.1	10	Motor			Non-1E	N/A
SG-UV-038	50,000	Globe	2"	Non-Q	ANSI B31.1	10	Motor			Non-1E	N/A

EDIT SECTION
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IN___ OUT___

Table 10A-1

FLOW PATHS ORIGINATING AT MAIN STEAM LINES (Sheet 2 of 2)

PVNGS FSAR Am 6 · Table 10A-1 (2 of 2)

System Identification	Max. Steam Flow (LB/HR)	Type of Shut-off Valves	Size of Valve	Quality of Valve	Design Code of Valve	Closure Time of Valve (Seconds)	Actuation Mechanisim	Motive or Power Source	Closure Signal (Sensor)	Quality of Power Source	Quality of of Air Supply	Position Status of Valve After MSIV Isolation
SG-PV-1007	1,240,000	Globe	12"	Non-Q	ANSI B31.1	15	Pneumatic		Solenoid permissive to open (Non-1E 120V dc)	Non-1E	ANSI B31.1	Closed
SG-PV-1008	1,240,000	Globe	12"	Non-Q	ANSI B31.1	15	Pneumatic		SGBD permissive signal logic (Non-1E 120V ac)	Non-1E	ANSI B31.1	Closed
SG-PV-1002	1,240,000	Globe	12"	Non-Q	ANSI B31.1	15	Pneumatic			Non-1E	ANSI B31.1	Closed
SG-PV-1001	1,240,000	Globe	12"	Non-Q	ANSI B31.1	15	Pneumatic	Instrument Air		Non-1E	ANSI B31.1	Closed
SG-PV-1003	1,240,000	Globe	12"	Non-Q	ANSI B31.1	15	Pneumatic			Non-1E	ANSI B31.1	Closed
SG-PV-1004	1,240,000	Globe	12"	Non-Q	ANSI B31.1	15	Pneumatic			Non-1E	ANSI B31.1	Closed
SG-PV-1005	1,240,000	Globe	12"	Non-Q	ANSI B31.1	15	Pneumatic			Non-1E	ANSI B31.1	Closed
SG-PV-1006	1,240,000	Globe	12"	Non-Q	ANSI B31.1	15	Pneumatic			Non-1E	ANSI B31.1	Closed
FT-HV-65	120,000	Globe	5"	Non-Q	ANSI B31.1	0.3	Hydraulic	MFW Pump Turbine Speed Control System	MFW pump trip logic (MSIS)[(a)]	N/A	N/A	Closed
(or HV-67)	120,000	Globe	5"	Non-Q	ANSI B31.1	0.3	Hydraulic			N/A	N/A	Closed
FT-HV-66	120,000	Globe	5"	Non-Q	ANSI B31.1	0.3	Hydraulic			N/A	N/A	Closed
(or HV-68)	120,000	Globe	5"	Non-Q	ANSI B31.1	0.3	Hydraulic			N/A	N/A	Closed
MT-UV-328B	262,500	Globe	10"	Non-Q	ANSI B31.1	75	Motor	Electrical (Non-1E, 480V, 3 phase 60 cycle)	Load sensing logic on main turbine, i.e.. (pressure switch PSL 512)	Non-1E	N/A	Closed
MT-UV-328A	262,500	Globe	10"	Non-Q	ANSI B31.1	75	Motor			Non-1E	N/A	Closed
MT-UV-328D	262,500	Globe	10"	Non-Q	ANSI B31.1	75	Motor			Non-1E	N/A	Closed
MT-UV-328C	262,500	Globe	10"	Non-Q	ANSI B31.1	75	Motor			Non-1E	N/A	Closed
GS-HV-005	50,000	Gate	4"	Non-Q	ANSI B31.1	10	Motor	Electric (Non-1E, 480V, 3 phase, 60 cycle)	Conttrol room handswitch	Non-1E	N/A	Open (closed plant operator)

(a) MFW pump turbine trips on high discharge pressure due to MFW isolation valves going shut on main steam isolation signal (MSIS) (low steam generator pressure).

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Type of Shut-off Valves	Size of Valve	Quality of Valve	Design Code of Valve	Closure Time of Valve (Seconds)	Actuation Mechanisim	Motive or Power Source	Closure Signal (Sensor)	Quality of Power Source	Quality of of Air Supply	Position Status of Valve After MSIV Isolation	Comment
Globe	12"	Non-Q	ANSI B31.1	15	Pneumatic		Solenoid permissive to open (Non-1E 120V dc)	Non-1E	ANSI B31.1	Closed	Main steam blowdown at atmos. vent restrictor (13-M-SGP-002)
Globe	12"	Non-Q	ANSI B31.1	15	Pneumatic		SGBD permissive signal logic (Non-1E 120V ac)	Non-1E	ANSI B31.1	Closed	
Globe	12"	Non-Q	ANSI B31.1	15	Pneumatic			Non-1E	ANSI B31.1	Closed	
Globe	12"	Non-Q	ANSI B31.1	15	Pneumatic	Instrument Air		Non-1E	ANSI B31.1	Closed	
Globe	12"	Non-Q	ANSI B31.1	15	Pneumatic			Non-1E	ANSI B31.1	Closed	Main steam blowdown to condenser (13-M-SGP-002)
Globe	12"	Non-Q	ANSI B31.1	15	Pneumatic			Non-1E	ANSI B31.1	Closed	
Globe	12"	Non-Q	ANSI B31.1	15	Pneumatic			Non-1E	ANSI B31.1	Closed	
Globe	12"	Non-Q	ANSI B31.1	15	Pneumatic			Non-1E	ANSI B31.1	Closed	
Globe	5"	Non-Q	ANSI B31.1	0.3	Hydraulic	MFW Pump Turbine Speed Control System	MFW pump trip logic (MSIS)(a)	N/A	N/A	Closed	
Globe	5"	Non-Q	ANSI B31.1	0.3	Hydraulic			N/A	N/A	Closed	Main steam supply to MFW pump turbine
Globe	5"	Non-Q	ANSI B31.1	0.3	Hydraulic			N/A	N/A	Closed	
Globe	5"	Non-Q	ANSI B31.1	0.3	Hydraulic			N/A	N/A	Closed	
Globe	10"	Non-Q	ANSI B31.1	75	Motor	Electrical (Non-1E, 480V, 3 phase 60 cycle)	Load sensing logic on main turbine, i.e.. (pressure switch PSL 512)	Non-1E	N/A	Closed	Main steam supply to moisture separator reheater
Globe	10"	Non-Q	ANSI B31.1	75	Motor			Non-1E	N/A	Closed	
Globe	10"	Non-Q	ANSI B31.1	75	Motor			Non-1E	N/A	Closed	
Globe	10"	Non-Q	ANSI B31.1	75	Motor			Non-1E	N/A	Closed	
Gate	4"	Non-Q	ANSI B31.1	10	Motor	Electric (Non-1E, 480V, 3 phase, 60 cycle)	Control room handswitch	Non-1E	N/A	Open (closed plant operator)	Main steam supply to gland seal

on high discharge pressure due to MFW isolation valves going
lation signal (MSIS) (low steam generator pressure).

Enclosure 9

QUESTION 10A.19 (NRC QUESTION 430.55) (10.4.4)

In section 10.4.4.4 you have discussed tests and initial field inspection but not the frequency and extent of inservice testing and inspection of the turbine by-pass system. Provide this information in the FSAR. (SRP 10.4.4, Part II).

RESPONSE: Inservice testing and inspection of the turbine bypass system shall be performed in conjunction with scheduled maintenance outages, as stated in section 10.4.4.3.B.

The response is given in amended section 10.4.4.3.B

QUESTION 10A.20 (NRC Question 430.56) (10.4.4)

Section 10.4.4 of your FSAR refers to section 10.4.4 of CESSAR for additional discussion of the turbine bypass system. Your turbine bypass system differs from the one discussed in CESSAR, in that two of your bypass valves dump to atmosphere while in CESSAR they do not. Provide a discussion to show that your system meets the eleven (11) design bases stated in section 10.4.4.1 of CESSAR.

RESPONSE: The response is given in amended section 10.4.4.

QUESTION 10A.21 (NRC Question 282.2) (10.3.5)

Provide the steam generator secondary water chemistry control and monitoring program, addressing the following:

1. Sampling schedule for the critical parameters and of control points for these parameters for each mode of operation: normal operation, hot startup, cold startup, hot shutdown, cold wet layup;
2. Procedures used to measure the values of the critical parameters;
3. Process sampling points;

The turbine bypass system removes heat from the NSSS following load rejections and during startup, plant cooldowns, and hot standby. The system removes heat by modulating bypass steam flow. The modulation of the bypass steam is performed by the turbine bypass valves, which receive signals from the steam bypass control system. Refer to section 7.7 for a discussion of the steam bypass control system.

The turbine bypass system provides a maximum steam dump capacity of 55% of the rated main steam flow. This amount of bypass steam capacity in conjunction with the reactor power cutback feature of the steam bypass control system will dissipate enough energy from the NSSS to permit load rejection of any magnitude without lifting the main steam or pressurizer safety valves or tripping the reactor. The effects of postulated system piping failure on safety related equipment are given in section 3.6.

10.4.4.3 Tests and Inspections

A. Prior to initial operation, the complete turbine bypass system receives a field hydrostatic test and inspection in accordance with ANSI B31.1.

B. Periodic tests and inspections are performed in conjunction with scheduled maintenance outages.

INSERT B

10.4.4.4 Instrumentation Applications

The control system for the turbine bypass system is discussed in section 7.7.

Insert B - The turbine bypass system is tested under the requirements of the Preventative Maintenance Program on a minimum frequency of every 18 months.

Nuclear Service. The standard design of the engine package does not include ASME III items. The design specification specifically exempted the engine package from ASME Section III. Amended figures 9.5-10, 9.5-11, 9.5-12, and 9.5-13 show quality group classification changes. The design specification requires the use of ANSI B16.5 flanges and B31.1 piping. The engine package is seismically analyzed to withstand a Safe Shutdown Earthquake.

QUESTION 9A.9 (NRC Question 430.12) (9.5.4)

Section 9.5.4.2 emergency diesel engine fuel oil storage and transfer system (EDEFSS) does not specifically reference Regulatory Guide 1.137 and ANSI Standard N195 "Fuel Oil Systems for Standby Diesel Generators." Indicate if you intend to comply with this regulatory guide and standard in your design of the EDEFSS; otherwise provide justification for noncom-
4 pliance. (SRP 9.5.4, Rev. 1, Part II, item 12).

RESPONSE: The Diesel Generator Fuel Oil Storage and Transfer System is designed to comply with Position C.2 of Regulatory Guide 1.137 as stated in section 9.5.4.2.

Insert B

QUESTION 9A.10 (NRC Question 430.13) (9.5.4)

Discuss what precautions have been taken in the design of the fuel oil system in locating the fuel oil day tank and connecting fuel oil piping in the diesel generator room with regard to possible exposure to ignition sources such as open flames and hot surfaces. (SRP 9.5.4, Part III, Item 6).

RESPONSE: Refer to figure 9.5-8. The fuel oil day tank is located in a separate room from the diesel engine. Fuel oil piping is routed along the ceiling and building walls to avoid possible ignition sources. The fuel lines do not cross over the engine or pass near the exhaust piping.

Insert B, Page 9A.8

The PVNGS design complies with ANSI-N195-1976, including the following interpretations:

(1) A high level alarm is not provided on the underground storage tanks. These tanks serve only the diesel generators and are refilled only to replace fuel used during periodic testing. Safety grade level indication is provided in the main control room so that the refueling may be monitored.

(2) Direct internal corrosion protection of the storage tank is not provided. Periodic checks of fuel quality combined with the design of the fuel oil transfer system minimize corrosion related concerns. In addition, low humidity and low rainfall at the site (see Section 2.3) will preclude water accumulation and subsequent corrosion.

RESPONSE: The response is given in amended section 9.5.4.2.1.

QUESTION 9A.6 (NRC Question 430.9) (9.5.4)

Discuss the means for detecting or preventing growth of algae in the diesel fuel storage tank. If it were detected, describe the methods to be provided for cleaning the affected storage tank. (SRP 9.5.4, Part III, Item 4).

RESPONSE: The PVNGS Technical Specifications require that any accumulated water in the storage tank is removed on a quarterly basis, and each quarter the fuel is analyzed to ensure the fuel meets the requirements of ASTM D975. Periodic water removal will preclude algae growth and periodic fuel oil quality testing will preclude the use of degraded fuel.

4 In the unlikely event that a storage tank must be cleaned, the requirements of ANSI N195 will be met. The tank is emptied to the low level point using the diesel fuel oil transfer pumps. The degraded fuel is pumped to a non-safety related system. The remaining fuel is discharged to drums and discarded by a portable pump.

QUESTION 9A.7 (NRC Question 430.10) (9.5.4)

In section 9.5.4.2.1 you state that the diesel fuel oil storage tanks are protected from corrosion in accordance with recommended practice "Control or External Corrosion on Underground or Submerged Piping Systems," RP-01-69 as published by the National Association of Corrosion Engineers. This statement is incomplete; it does not discuss the buried piping or internal corrosion of the storage tanks due to water in the fuel oil. Expand the FSAR to include a more explicit description of proposed protection of underground piping.

Where corrosion protective coatings are being considered (piping and tanks) include additional industry standards which will be used in their application. Also discuss what provisions will be made in the design of the fuel oil storage and transfer system in the use of a impressed current type cathodic protection system, in addition to waterproof protective coatings, to minimize corrosion of buried piping or equipment. If cathodic protection is not being considered, provide your justification. (SRP 9.5.4, Part II, and Part III, item 4).

RESPONSE: The response is given in amended sections 9.5.4.2.1 and 9.5.4.2.4. Insert A

QUESTION 9A.8 (NRC Question 430.11)(3.2, 9.5.4 through 9.5.8) The FSAR text and table 3.2-1 states that the components and piping systems for the diesel generator auxiliaries (fuel oil system, cooling water, lubrication, air starting, and intake and combustion system) that are mounted on the auxiliary skids are designed Seismic Category I and are ASME Section III Class 3 quality. The engine mounted components and piping are designed and manufactured to DEMA standards, and are Seismic Category I. This is not in accordance with Regulatory Guide 1.26 which requires the entire diesel generator auxiliary systems be designed to ASME Section III Class 3 or Quality Group C. Provide the industry standards that were used in the design, manufacture, and inspection of the engine mounted piping and components. Also show on the appropriate P&ID's where the Quality Group Classification changes from Quality Group C. 4

RESPONSE: The engine mounted piping for auxiliary systems is designed and manufactured by the engine manufacturer. The engine and engine mounted auxiliaries (called the engine package) are designed and sold as standby units for

INSERT A FOR PG. 9A-7

The diesel fuel oil storage tank internal corrosion is minimized as follows:

1. Testing of fuel oil when delivered, per ASTM requirements, will ensure oil of the proper quality is admitted to the storage tanks.

2. Periodic testing of oil samples for water and sediment will detect potential or actual corrosion problems.

3. The fuel oil transfer pumps take suction above the tank bottom and will not pull up any water or sediment.

4. Duplex strainers, with differential pressure alarms, filter the oil before introduction into the fuel oil day tank and can be cleaned.

5. The supply pipe from the day tank to the engine is above the tank bottom and will not withdraw settlement.

6. The duplex strainers with differential pressure alarms are provided on the inlet and the discharge of the engine driven fuel oil booster pump and they can be cleaned or have elements replaced as required.

7. Low rainfall at the site (refer to Section 2.3) will preclude water accumulation and subsequent corrosion.

8. APS diesel fuel storage tanks, throughout the many years of operation of other fossil plants, have experienced no history of corrosion problems.

9. The tank interior was sandblasted to remove scale and mill slag to minimize the potential for accumulation of corrosion and sediment during the tank life.