

PACIFIC GAS AND ELECTRIC COMPANY
COAST VALLEYS DIVISION
DIABLO CANYON POWER PLANT UNIT NOS. 1 AND 2
CHEMICAL ANALYSIS PROCEDURE NO. A-2

TS Proc.

TITLE: SECONDARY CYCLE SAMPLING SCHEDULE

SCOPE

This procedure covers the sampling and analysis schedule for the secondary cycle system and auxiliary systems which include the following:

1. Steam Generator blowdown
2. Steam Generator blowdown cleanup demineralizer system
3. Main Steam
4. Condensate
5. Feedwater
6. Service cooling water
7. Condensate storage tank
8. Stator cooling water
9. Transfer tank
10. Auxiliary boiler blowdown
11. Reservoir
12. Diesel fuel oil
13. Diesel engine jacket cooling water
14. Turbine E-H fluid
15. Turbine lube oil
16. Diesel lube oil
17. Auxiliary steam drain receiver

FOR INFORMATION
ONLY

DISCUSSION

The sampling and analysis schedule for the various systems is shown in Tables 1 and 2. Chemical parameters identified with an asterisk (*) are those which are critical chemical control parameters which have importance in inhibiting steam generator tube degradation. These critical chemical control parameters are derived from Operating Procedure No. F-5, Tables 7 and 18A, and maximum effort should be made to adhere to the sampling and analysis schedule for these particular parameters. The chemical analysis procedures appropriate for the analysis for these critical control parameters are shown in Table 3.

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REVISION 2

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SUMMARY SAMPLING SCHEDULE - TABLE 1

SYSTEM	FREQUENCY					MONTHLY	OTHER
	WEEKLY						
	M	T	W	T	F		
1. Steam Generator Blowdown (each SG)	X	X	X	X	X		
2. SG Blowdown Cleanup Demin Eff.			X				
3. Main Steam (each SG)	X	X	X	X	X		
4. Condensate	X	X	X	X	X		
5. Feedwater	X	X	X	X	X		
6. Service Cooling Water		X					
7. Condensate Storage Tanks		X			X		
8. Stator Cooling Water				X			
9. Transfer Tank	X						
10. Auxiliary Boiler Blowdown			X				
11. Reservoir					X		
12. Diesel Fuel Oil							Quarter
13. Diesel Engine Jacket Cooling Water						X	
14. Turbine E-II Fluid							Semi-Annual
15. Turbine Lube Oil							Annual
16. Diesel Lube oil							Semi-Annual
17. Auxiliary Steam Drain Receiver			X				

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DETAILED SAMPLING AND ANALYSIS SCHEDULE - TABLE 2

SYSTEM	FREQUENCY					MONTHLY	OTHER
	WEEKLY						
	M	T	W	T	F		
1. Steam Generator Blowdown							
a. Normal Operation							
*1) pH	X	X	X	X	X		
*2) Free Hydroxide	X	X	X	X	X		
*3) Cation Conductivity	X	X	X	X	X		
4) Sodium	X	X	X	X	X		
5) Potassium	X	X	X	X	X		
6) Chloride	X	X	X	X	X		
7) Ammonia	X	X	X	X	X		
8) Dissolved Oxygen	X	X	X	X	X		
9) Silica	X	X	X	X	X		
10) Suspended Solids		X					
11) Calcium		X					
12) Magnesium		X					
13) Iron						X	
14) Copper						X	
15) Degassed Gross β - γ	X	X	X	X	X		
16) Tritium	X	X	X	X	X		
17) I-131			X				
18) Lithium		X					
19) Zinc		X					
b. Cold Wet Layup							
*1) pH		X					
*2) Chloride		X					
3) Ammonia		X					
*4) Hydrazine		X					
*5) Dissolved Oxygen		X					
*6) Sodium		X					
*7) Potassium		X					
8) Calcium						X	
9) Magnesium						X	
10) Iron						X	
2. SG Blowdown Cleanup Demin Eff							
a. Cation Conductivity			X				
b. Sodium			X				
c. pH			X				
d. Chloride			X				
3. Main Steam							
a. Normal Operation							
1) Cation Conductivity	X	X	X	X	X		
2) Dissolved Oxygen	X	X	X	X	X		

DETAILED SAMPLING AND ANALYSIS SCHEDULE - TABLE 2

SYSTEM		FREQUENCY					MONTHLY	OTHER
		WEEKLY						
		M	T	W	T	F		
3)	Sodium	X	X	X	X	X		
4)	Chloride	X	X	X	X	X		
5)	Silica	X	X	X	X	X		
6)	Copper				X			
7)	Iron				X			
8)	Sulfites and Sulfates				X			
b.	Cold Wet Layup							
1)	Nitrogen				X			
4.	Condensate							
a.	Normal Operation							
1)	pH	X	X	X	X	X		
2)	Cation Conductivity	X	X	X	X	X		
3)	Ammonia	X		X		X		
4)	Dissolved Oxygen	X	X	X	X	X		
5)	Iron				X			
6)	Copper				X			
7)	Zinc				X			
b.	Wet Layup							
1)	pH				X			
2)	Hydrazine				X			
3)	Copper				X			
4)	Iron				X			
5)	Zinc				X			
5.	Feedwater							
a.	Normal Operation							
1)	pH	X	X	X	X	X		
2)	Cation Conductivity	X	X	X	X	X		
3)	Ammonia	X		X		X		
*4)	Dissolved Oxygen	X	X	X	X	X		
*5)	Hydrazine		X			X		
6)	Copper				X			
7)	Iron				X			
8)	Zinc				X			
b.	Wet Layup							
1)	pH				X			
2)	Hydrazine				X			
3)	Copper				X			
4)	Iron				X			
5)	Zinc				X			
c.	Heater Drains							
1)	pH						X	

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DETAILED SAMPLING AND ANALYSIS SCHEDULE - TABLE 2

SYSTEM	FREQUENCY						MONTHLY	OTHER
	WEEKLY							
	M	T	W	T	F			
2) Cation Conductivity							X	
3) Ammonia							X	
4) Copper							X	
5) Iron							X	
6) Dissolved Oxygen							X	
7) Nickel							X	
6. Service Cooling Water								
a. pH		X						
b. Chromate		X						
c. Chloride		X						
7. Condensate Storage Tanks								
*a. pH		X			X			
*b. Cation Conductivity		X			X			
*c. Dissolved Oxygen		X						
d. Chloride and Fluoride		X			X			
*e. Silica		X						
*f. Suspended solids (or, turbidity)		X						
g. Total Solids		X						
*h. Free Hydroxide							X	
*i. Sodium		X						
j. Potassium		X						
k. Calcium		X						
l. Magnesium		X						
m. Aluminum		X						
n. Degassed gross β - γ							X	
8. Stator Cooling Water								
a. Conductivity					X			
b. Chloride and Fluoride					X			
c. Suspended solids (turbidity)					X			
9. Transfer Tank								
a. pH	X							
b. Conductivity	X							
c. Chloride and Fluoride	X							
d. Silica	X							
e. Sodium							X	
f. Potassium							X	
g. Calcium							X	
h. Magnesium							X	
i. Aluminum							X	

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DETAILED SAMPLING AND ANALYSIS SCHEDULE - TABLE 2

SYSTEM	FREQUENCY					MONTHLY	OTHER
	WEEKLY						
	M	T	W	T	F		
10. Auxiliary Boiler Blowdown							
a. Normal Operation							
1) pH			X				
2) Conductivity			X				
3) Dissolved Oxygen			X				
4) Hardness			X				
5) Chloride			X				
6) Hydrazine			X				
7) Ammonia			X				
8) Degassed Gross β - γ						X	
9) Iron						X	
10) Copper							
b. Cold Wet Layup							
1) pH						X	
2) Dissolved Oxygen						X	
3) Hydrazine						X	
4) Ammonia						X	
11. Reservoir							
a. pH					X		
b. Conductivity					X		
c. Hardness					X		
d. Chloride					X		
e. Calcium						X	
f. Magnesium						X	
g. Aluminum						X	
h. Degassed gross β - γ							Quar-terly
12. Diesel Fuel Oil							
a. Viscosity							Quar-terly
b. Water Content							Quar-terly
c. Sediment							Quar-terly
13. Diesel Engine Jacket Cooling Water							
a. pH						X	
b. Chromate						X	

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DETAILED SAMPLING AND ANALYSIS SCHEDULE - TABLE 2

SYSTEM	FREQUENCY					MONTHLY	OTHER
	WEEKLY						
	M	T	W	T	F		
14. Turbine E-H Fluid							Semi-Annually
15. Turbine Lube Oil							Annually
16. Diesel Lube Oil							Semi-Annually
17. Auxiliary Steam Drain Receiver							
a. pH				X			
b. Conductivity				X			
c. Ammonia				X			
d. Degassed Gross β - γ				X			

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TABLE 3
DESIGNATED CHEMICAL ANALYSIS PROCEDURES FOR GRAB SAMPLE
ANALYSIS OF SECONDARY CYCLE CRITICAL CHEMICAL PARAMETERS

CRITICAL CHEMICAL PARAMETER	CHEMICAL ANALYSIS PROCEDURE
pH	C-1
Free Hydroxide	C-46
Cation Conductivity	C-2
Dissolved Oxygen, <0.005 ppm	C-11
Dissolved Oxygen, >0.005 ppm	C-10 or C-11
Hydrazine, <1 ppm	C-23
Hydrazine, >1 ppm	C-22 or C-23
Chloride	C-13 or C-14
Sodium	C-30
Silica	C-5
Suspended Solids	C-25 or C-48

REFERENCES

1. "Steam Side Water Chemistry Control Specifications," Westinghouse Electric Corporation, Nuclear Energy Systems, Water Reactor Divisions, PWR Systems Division, July 9, 1975.
2. "Diesel Fuel Oil Analyses for Viscosity, Water and Sediment," STP No. M-10B.
3. Diesel Engine Lubricating Oil Analyses," STP No. M-10C.
4. "Chemical Control Limits," Operating Procedure No. F-5.