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600 North 18th Street
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F. L. CLAYTON, JR.
Senior Vice President

Alabama Power
the southern electric system

June 27, 1980

Docket No. 50-364

Director of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. A. Schwencer

Joseph M. Farley Nuclear Plant - Unit 2
Steam Generator Tube Integrity

Gentlemen:

Per NRC request, attached is additional information on the above subject.

Yours very truly,

F. L. Clayton, Jr.

CLB/rt

Attachments

cc: Mr. R. A. Thomas
Mr. G. F. Trowbridge
Mr. W. Bradford

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STEAM GENERATOR TUBE INTEGRITY

1. NRC Requirement: The license will be conditioned to require repairing or plugging of main condenser tubes within 96 hours of the time condenser leakage is confirmed.

Response: See Appendix attached.

2. NRC Requirement: Inspection ports are required to be installed in each steam generator prior to startup after the first refueling.

Response: Alabama Power Company will install one (1) inspection port above the upper tube support plate level in each steam generator prior to startup after first refueling. The size of the port is undetermined at this time.

*3. NRC Requirement: Row 1 tubes of each steam generator must be plugged prior to initial startup.

Response: At this time Alabama Power Company does not believe that plugging the row 1 tubes prior to initial startup is necessary.

*Note: It is our understanding from meeting with Mr. Eisenhut of NRC on June 24, 1980, that this is no longer a NRC requirement.

APPENDIX

STEAM GENERATOR TUBE INTEGRITY

NRC POSITION

1. The license will be conditioned to require repairing or plugging of main condenser tubes within 96 hours of the time condenser leakage is confirmed.

APCO RESPONSE

1. Alabama Power has a comprehensive analytical program in effect for the secondary system of Farley Unit No. 1. This same program will also be implemented for Farley Unit No. 2 when it becomes operational. This program requires sampling and analysis of the condenser condensate, the steam generator feedwater, the steam generator blowdown and steam for parameters, which are indicative of condenser leakage. The details of this program was submitted to the NRC in a letter to Mr. John F. Stolz, dated September 17, 1979. (Copy attached)
2. As part of the abnormal operating procedures presently employed for Farley, operational limits are established based upon steam generator blowdown (SGBD) cation conductivity. Essentially these limits with action levels are as follows:
   a. For intermediate range condenser tube leaks which are indicated by the SGBD cation conductivity being out of specification for steady state operation, power is reduced in an orderly manner for plugging the leak(s). Chemistry data is used to determine the affected half of the condenser, the appropriate water box is then opened to locate the leak(s) and repairs are made. A time limit is placed upon this action which is less than that proposed by the staff.

b. For large condenser tube leaks which are indicated by a prompt jump in the SGBD cation conductivity to values significantly above specifications, the unit is placed in hot standby at the maximum safe rate. The leak is then located and repaired as described above.

3. For suspected small, weeping-type leaks indicated by an unexplained perturbation in SGBD cation conductivity, an investigation is required. If a condenser leak is located appropriate repairs are made.

Alabama Power Company is of the opinion that a commitment to find and repair leaks, which do not result in contaminant levels in the steam generators in excess of the secondary system chemistry specifications within 96 hours is unrealistic. Because of the high sensitivity of the available analytical tools leaks of the order of 0.01 to 0.1 gpm can be detected. However, locating the source which may be from several tiny "weeps" may be impossible even if the time period could be extended without limit. We feel that maintaining the feedwater quality in the steam generators, as reflected by the SGBD cation conductivity, is much more important than the arbitrary application of a time limit for locating and repairing condenser leaks.

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F. L. CLAYTON, JR.
Senior Vice President

Alabama Power
the southern electric system

September 17, 1979

Docket No. 50-364

Director of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555
Attn: Mr. John F. Stolz

Dear Mr. Stolz:

RE: Secondary Water Chemistry Control
J. M. Farley Nuclear Plant Unit 2

Alabama Power Company's response to your letter dated August 2, 1979 on this subject is attached. Detailed procedures will be available at Farley Nuclear Plant for review.

If you have questions please advise.

Yours truly,

F. L. Clayton, Jr.

FLCJr/TNE:bhj

Attachment

cc: Mr. A. R. Barton (w/Attachment)
Mr. J. T. Young (w/Attachment)
Mr. H. O. Thrash (w/Attachment)
Mr. W. G. Hairston (w/Attachment)
Mr. K. W. McCracken (w/Attachment)
Mr. Ozen Batum (w/Attachment)
Mr. B. J. George (w/Attachment)
Mr. T. N. Epps (w/Attachment)

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JOSEPH M. FARLEY NUCLEAR PLANT

UNIT NO. 2

SECONDARY WATER CHEMISTRY MONITORING PROGRAM

Procedures have been written to implement a secondary water chemistry monitoring program for Unit No. 2 at the Joseph M. Farley Nuclear Plant. A major objective of this program is to inhibit steam generator tube degradation. This program described in FNP-0-CCP-103, "Secondary Water Chemistry Monitoring Program" includes

A. Sampling schedule for the critical secondary water chemistry parameters. (Attachment 1).
Sampling will be performed in accordance with the schedule specified in FNP-0-CCP-101, "Schedule, Chemistry and Water Treatment Plant Activities," Table 12.

B. Control specifications (points) for the critical secondary water chemistry parameters. (Attachment 2).
Results from analyses will be compared to the control point specifications listed in FNP-0-CCP-102, "Water Chemistry Specifications," Table 12 to determine if corrective action is required.

C. Procedures for measuring critical parameters.
Control point parameters specified in FNP-0-CCP-102 will be analyzed in accordance with the following analysis procedures:

FNP-0-CCP-2	Determination of the pH of an Aqueous Solution
FNP-0-CCP-3	The Determination of Chloride Ion in Water
FNP-0-CCP-5	The Determination of Dissolved Oxygen in Aqueous Solutions
FNP-0-CCP-10	Determination of Hydrazine
FNP-0-CCP-20	Determination of Free Hydroxide
FNP-0-CCP-66	Calibration and Operation of the Hays Dissolved Oxygen Analyzer
FNP-0-CCP-67	Operation and Calibration of the Cambridge Mark IV Hydrazine Analyzer
FNP-0-CCP-70	Operation of the Larson-Lane Condensate Analyzers

D. Process Sampling Points
(Attachment 3)
The process sampling points which will be monitored are:
1. Steam generator blowdown
2. Steam generator upper tap
3. Main steam
4. Steam generator outlet
5. Condenser hotwells
6. Condensate pump discharge
7. Steam generator feedpump inlet
8. Feedwater

E. Recording and Management of Data (Attachment 4)
Analytical data will be managed in accordance with FNP-0-AP-17, "Chemistry & Health Physics Conduct of Operations", section 8.0.

F. Corrective Actions for Off-Control Point Chemistry Conditions (Attachments 5 & 6).
The procedures which will be used for corrective action are:

FNP-0-CCP-25	Chemical Addition/Control of the Secondary System, Section 5.2.
FNP-2-AOP-25.0	Unit 2 Condenser Leakage (In preparation-Expected to parallel the approved Unit 1 procedure FNP-1-AOP-25)

G. Program Administration
1. Interpretation of Data
The Chemistry & Health Physics Supervisor is responsible for supervision of the Secondary Water Chemistry Monitoring Program. The Chemistry Foreman is responsible for review and trending of chemistry data.

2. Initiation of Corrective Action
a. The chemistry technician on shift is responsible for reporting out of specification conditions to C&HP supervision and to the Unit Operator as soon as practical following discovery.
b. Corrective action for out of specification conditions will be taken in accordance with section 3.5, FNP-0-CCP-103, "Procedures Defining Corrective Action" (See Section F above).

TABLE 12

STEAM GENERATORS/FEEDWATER/CONDENSATE/MAIN STEAM/STEAM GENERATOR OUTLET

		Frequency								
		Weekly							Monthly	
		M	Tu	W	Th	F	Sa	Su	First Week	Third Week
MODES 1 & 2	FEEDWATER									
	pH (inline & grab	X	X	X	X	X	X	X		
	[1] Specific Conductivity	X	X	X	X	X	X	X		
	[2] Silica	X	X	X	X	X	X	X		
	Ammonia	X		X		X				
	Hydrazine (inline&grab)	X	X	X	X	X	X	X		
	Oxygen (inline&grab)	X	X	X	X	X	X	X		
	Iron					X				
	Copper					X				
	[1] Cation Conductivity	X	X	X	X	X	X	X		
MODE 1	MAIN STEAM									
	Sodium.								X	
	pH	X		X		X				
	[1] Specific Conductivity	X	X	X	X	X	X	X		
	[1] Cation Conductivity	X	X	X	X	X	X	X		
	Silica								X	

[1] Inline instrument re ding
[2] Inline instrument r ading daily, grab sample on Thursday only

TABLE 12 (Continued)

	Frequency								
	Weekly							Monthly	
	M	Tu	W	Th	F	Sa	Su	First Week	Third Week
MODES 1,2,3,4 — STEAM GENERATORS									
pH	X	X	X	X	X	X	X		
Cation Conductivity	X	X	X	X	X	X	X		
Sodium				X					
*Chloride	X	X	X	X	X	X	X		
Fluoride				X					
Oxygen		X		X		X			
Hydrazine	X	X	X	X	X	X	X		
Suspended Solids		X		X					
[1]Gross β,γ degassed	X	X	X	X	X	X	X		
** Tritium								X	
Free Hydroxide	X	X	X	X	X	X	X		
Spec. Cond.	X	X	X	X	X	X	X		
[2]Dose Equivalent I^{131}								once/31 days if gross activity >0.01 μCi/gm; once/6 months if gross activity ≤ 0.01μCi/gm	
Ammonia	X	X	X	X	X	X	X		
Silica	X	X	X	X	X	X	X		
[3]Flow								Once/month	
[3]Oil & Grease								Once/month	
[3]Suspended Solids								Once/month	
[3]Copper								Once/month	
[3]Iron								Once/month	

[1]LCO-Modes 1, 2, 3 and 4 (72 hr)
[2]LCO-Modes 1, 2, 3 and 4 (6 mo/31 da)
[3]NPDES parameter if discharge through plant dilution line (1/month)
*Not required on weekend if cation conductivity is operational.
**After primary to secondary leaks are detected.

TABLE 12 (Continued

	Frequency								
	Weekly							Monthly	
	M	Tu	W	Th	F	Sa	Su	First Week	Third Week
MODES 1,2	CONDENSATE								
Oxygen(inline & grab)	X	X	X	X	X	X	X		
Ammonia			X						
Iron					X				
Copper					X				
Silica	Not scheduled								
[2]Sodium	X	X	X	X	X	X	X		
pH(inline & grab	X	X	X	X	X	X	X		
Specific con.	X	X	X	X	X	X	X		
Cond. A C.C.	X	X	X	X	X	X	X		
Cond. B C.C.	X	X	X	X	X	X	X		
MODE 1	STEAM GENERATOR OUTLET								
Spec. Cond.	X	X	X	X	X	X	X		
Cation Cond.	X	X	X	X	X	X	X		
[3]Silica	X	X	X	X	X	X	X		
MODES 5 and 6	STEAM GENERATORS[1]								
pH					X				
Chloride					X				
Hydrazine					X				
Dissolved Oxygen					X				

[1]NPDES parameters listed under MODES 1, 2, 3, and 4 must also be monitored if a discharge is made through the plant diluation line.

[2]Inline reading; grab sample Thursdays only.

[3]Inline instrument rea'ings; grab sample on Thursdays only.

TABLE 12 1

STEAM GENERATORS/FEEDWATER

MODE 1 - NORMAL

Feedwater:

Hydrazine - 5 ppb greater than dissolved oxygen concentration (Minimum)

Dissolved Oxygen - $\leq$ 5 ppb

Blowdown:

pH @ 25°C - 8.5 - 9.0

Free Hydroxide $\leq$0.15 ppm as $CaCO_3$

Cation Conductivity $\leq$2.0 μmhos/cm

[1]Gross β,γ (degassed) - Compare to D.E. I-131 limit 1

[1]D.E. I-131 - $\leq$0.10 uCi/gram

MODE 1 - LIMITING AVT SPECIFICATIONS

Blowdown:

	Two Weeks	24 hours	Immediate
pH @ 25°C	8.5-9.2	N/A	<8.5 or >9.4
Cation Conductivity μmhos/cm @25°C	>2.0 but $\leq$7	N/A	>7
Free Hydroxide ppm as $CaCO_3$	N/A	>0.15 but <1.0	$\geq$1.0

MODE 2

Feedwater

Hydrazine - 5 ppb greater than dissolved oxygen concentration (Minimum)

Dissolved Oxygen - <100 ppb

Blowdown:

pH @ 25°C - 8.5 - 10.0

Free Hydroxide - 0.15 ppm as $CaCO_3$ (max.)

Cation Conductivity - 7 μmhos/cm (max.)

[1]Gross β,γ (degassed) - Compare to D.E. I-131 limit 1
[1]D.E. I-131 - ≤0.10 uCi/gram

MODE 3, 4, and HOT FUNCTIONAL

Blowdown:

pH	8.8 to 9.2 @ 25°C
Free Hydroxide	0.15 ppm as $CaCO_3$ (max.)
Cation conductivity	2.0 μmhos/cm at 25°C (max.)
[1]Gross β,γ (degassed) [1]D.E. I-131	Compare to D. E. I-131 limit 1 ≤ 0.10 uCi/gram

MODE 5, and 6

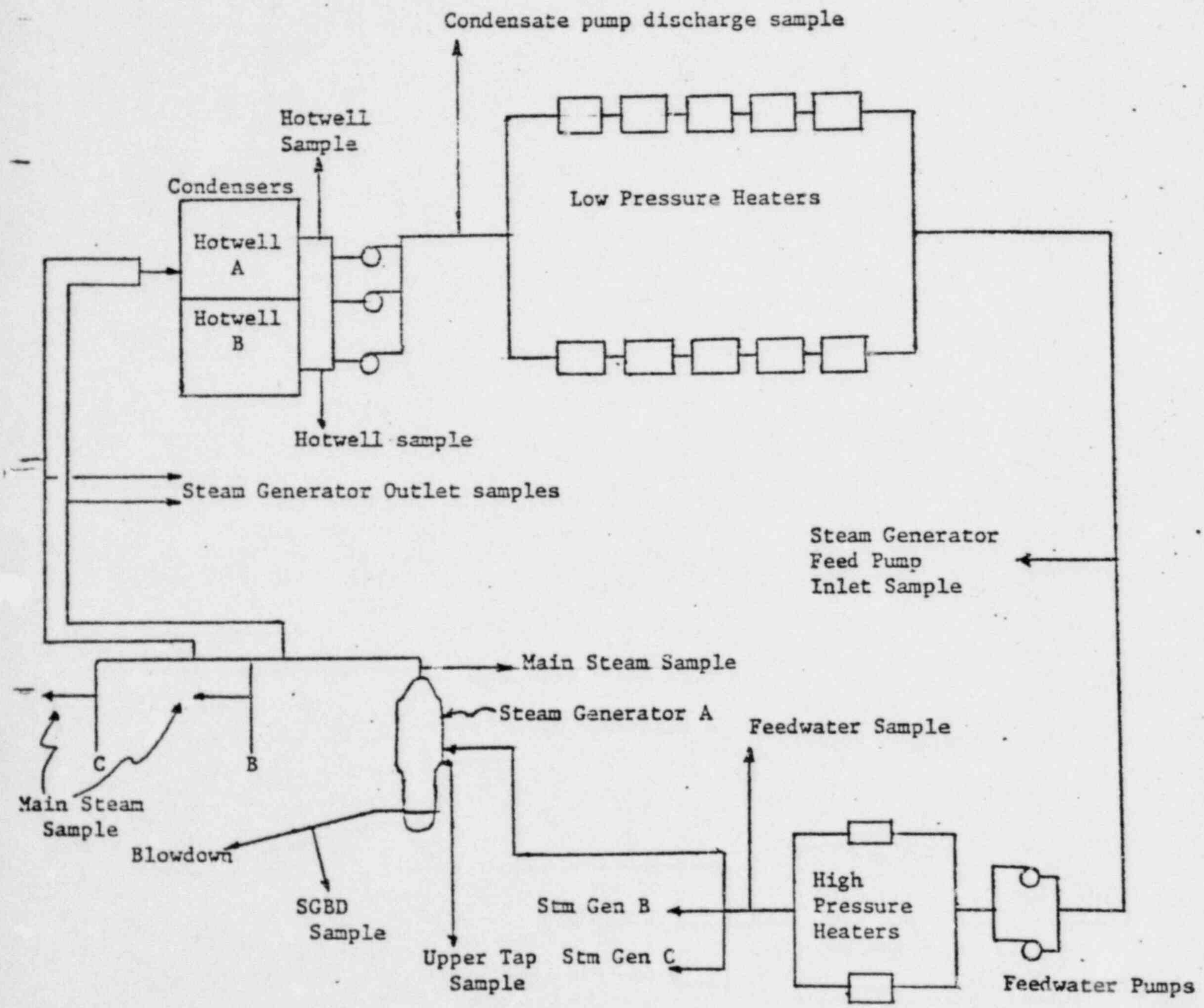
Blowdown:

pH	10.0 to 10.5 @ 25°C
Free Hydroxide	Non-detectable 1
Chloride	0.5 ppm (max.)
Hydrazine	75 to 150 ppm
Dissolved Oxygen	100 ppb (max.)

[1]LCO-Modes 1, 2, ., and 4

With the specific activity of the secondary coolant system >0.10 uCi/gram DOSE EQUIVALENT I-131, be in at least HOT STANDBY within 6 hours and in COLD-SHUTDOWN within the following 30 hours. 1

Attachment 3



Secondary Systems
Sample Points

8.0 Records and Reports

8.1 Operating Records

The Chemistry and Health Physics Group will utilize one or more of five types of operating records.

(1) Log-A legal notebook with number pages. The results of tests and surveys may be logged directly or transferred from the work sheet.

(2) CHP Forms-Loose leaf forms which have preprinted headings for pertinent data. Loose leaf forms may be single sheets or multiple sheets, when duplicate copies are required. 1

(3) Charts-Taken from automatic or semi-automatic recorders.

(4) Worksheets-These are informal preprinted or hand printed sheets used to record pertinent data during the conduct of tests and surveys. The information collected on worksheets will be subsequently transferred to a log or looseleaf form. Worksheets will be filed after the sheet is completed and the data has been transferred to the appropriate log or form.

(5) Computer Printout-The results of computer analysis or data logging on hard copy form. Information stored in the memory of onsite computers will constitute an operational data bank but will not be considered as a record or file for plant history purposes. Computers may be utilized to prepare reports, from memory bank data, that will become part of the plant files.

Periodically, copies of operating logs, FNP Forms, Charts and Computer Printouts will be sent to document control for inclusion in the plant files. Table 1 contains a list of record and the frequency for sending the data to document control.

8.2 Record Review

8.2.1 The C&HP Technician provides the first line of review for data which he/she generates. The Technician will determine if applicable limits 1 have been met.

8.2.2 The C&HP Foreman or Power Plant Specialist is the second line of review. The Foreman or Specialist will review data to confirm that limits have been met and to determine if there are any trends which need attention. For Surveillance Test Procedures the Foreman or Specialist will ensure that: (1) the procedure has been completed by a qualified person, (2) the time timit for performance of the test has been met, (3) the acceptance criterial has been met, (4) the completion of STP's has been reported to the Control Room. 1

8.2.3 All data forwarded to Document Control or the Tech. Group will go through the C&HP Supervisor. He will scan most data and randomly pick some data for a detailed review to determine if the requirements for collecting and evaluating data are being met.

8.3 Reporting Requirements

The C&HP Group will prepare reports as listed in Table 1.

Description of Record	Frequency to Document Control	Requirement	Record Retention
Plant Chemistry			
1) Daily Chemistry Report-Reactor Coolant and Secondary System	monthly	FSAR 16.6.5.2 13.6.2 RTS 3.4.7 AP 17	permanant
2) Monthly Chemistry Report-Reactor Coolant System	monthly	FSAR 16.6.5.2 13.6.2 RTS 3.4.7 AP 17	permanent
3) Monthly Chemistry Report-Secondary System	monthly	AP 17	permanent
4) Monthly Chemistry Report-Steam Generator	monthly	AP 17	permanent
5) Monthly Chemistry Report-Water Treatment Plant	monthly	AP 17	permanent
6) Water Analysis&Sample Rooms-Analyzer Charts	monthly	AP 17	permanent
7) Water Treatment Plant-Analyzer Charts	monthly	AP 17	permanent
8) Grade A water analysis	every two weeks	AP 17	permanent
9) Monthly Chemistry Report-CVCS and BTRS Demineralizers	monthly	AP 17	permanent
10) Monthly Chemistry Report-Storage Tanks	monthly	AP 17	permanent
11) Monthly Chemistry Report-Auxiliary Systems	monthly	AP 17	permanent
12) Records of chemical analysis instrument calibration	upon completion	AP 17	permanent
13) Chlorination Systems-Analyzer Charts	monthly	AP 17	permanent
14) Monthly Chemistry Report-Potable Water System	monthly	AP 17	permanent

Description of Record	Frequency to Document Control	Requirement	Record Retention
Plant Chemistry			
15) Monthly Chemistry Report-Service Water System	monthly	AP 17	permanent
16) Monthly Chemistry Report-Circulating Water System	monthly	AP 17	permanent
17) Weekly NPDES Report-	monthly	NPDES permit	3 years

Table 1(Cont'd)

5.2 Control of operating parameters

5.2.1 Modes 5 and 6-Cold Shutdown and Refueling

5.2.1.1 Hydrazine will be added for oxygen control and ammonia will be added for pH control. See Table 1 for calculations.

5.2.1.2 Free hydroxide and chloride concentrations will be controlled by adding makeup quality water. If these parameters approach their limits, the generators can be drained and new makeup water added.

5.2.2 Modes 3 and 4-Hot Standby and Hot Shutdown

5.2.2.1 Hydrazine will be added for oxygen control and ammonia will be added for pH control. Refer to Figure 1 and Figure 2.

5.2.2.2 Suspended solids can be removed by increasing blowdown on individual S.G.'s.

5.2.2.3 Metal contaminants, chlorides, and cation conductivity can be controlled by increasing blowdown or by diverting flow through the blowdown demineralizers and returning the blowdown to the condenser.

5.2.2.4 Radioactive contaminants can be controlled by diverting flow through the blowdown demineralizers.

5.2.3 Modes 1 and 2-Power Operation and Startup

Chemical control is the same as for modes 3 and 4 (paragraph 5.2.2).

FARLEY NUCLEAR PLANT
UNIT 1
ABNORMAL OPERATING PROCEDURE AOP-25.0

CONDENSER LEAKAGE

1.0 Purpose

To provide the symptoms, automatic actions, immediate operator actions, and subsequent operator actions for a condenser leak which allows circulating water to enter the condensate system.

2.0 Symptoms

2.1 The Shift Foreman has been notified by the Chemistry Group that a possible condenser tube leak exists.

NOTE: There are no control room parameters which can be monitored to determine if a leak exists. The Shift Foreman must refer to recorded parameters in the Water Analysis Lab (WAL) in the Turbine Building and the Sample Room (SR) in the Auxiliary Building.

3.0 Automatic Actions

None

4.0 Immediate Operator Actions

4.1 Determine if an actual condenser tube leak exists by referring to recorded parameters in the (WAL) and (SR).

4.1.1 Cation conductivity - The most rapid indication of a condenser leak. Increasing conductivity would be expected on the condensate (WAL), the feedwater (WAL) and steam generator Blowdown (SR).

4.1.2 PH - (SR) will show a measurable increase if the leak is very large but this effect may not be observable on small leaks.

4.2 Request a confirming chemical analysis on steam generator blowdown chlorides.

4.2.1 This analysis should be used to confirm cation conductivity indications of a leak.

5.0 Subsequent Operator Actions

NOTE: Reduce power to the level necessary to allow actions specified in following paragraphs to be completed.

5.1 SGBD cation conductivity remains < 2 μmhos/cm.

5.1.1 Reduce power to 600MW

NOTE: Power reduction can be delayed, for a period not to exceed 24 hours, to meet load demands.

5.1.2 Determine, from the chemistry data, which half of the condenser contains the leak.

5.1.3 Select a water box in the affected condenser half, and close the circulating water inlet and outlet valves, and open the vent and drain.

5.1.4 Observe condensate cation conductivity and fluctuations in vacuum for evidence of leak being uncovered.

NOTE: When power is reduced, the cation conductivity will rise because actual concentration of contaminants will increase as a result of decreased condensate/steam flow. When the water level in the water box is drained below the leaking tube, the inflow of contaminated water will stop and the cation conductivity will go down.

5.1.5 Open water box as soon as possible during draining.

5.1.5.1 Listen for any sound changes which might indicate location of leak.

5.1.6 If leak is not found return water box and circulating water system to that condenser half to operation per SOP-26.0.

5.1.7 Repeat steps 5.1.3 to 5.1.6 until leaking tubes are found, and defective tubes are plugged.

5.1.8 When repair is completed return to desired power level. Maintain SGBD at maximum rate until chemistry indicates S/G's are clean.

5.2 SGBD cation conductivity > 2 μmhos/cm and ≤ 7 μmhos/cm

5.2.1 Commence an orderly power reduction to 600MW.

5.2.2 Isolate condensate dump to condensate storage tank.

5.2.3 If necessary to reduce Hotwell Level, open condensate drains.

5.2.4 Locate and repair leaking tubes per steps 5.1.2 through 5.1.7.

5.2.5 When repairs are completed perform one of the following:

5.2.5.1 With SGBD cation conductivity ≤ 7 μmhos/cm return to rated power. Maintain SGBD at maximum rate until chemistry indicates S/G's are clean.

5.2.5.2 With SGBD cation conductivity > 7 μmhos/cm.

a. Place unit in hot standby

b. Perform steps 5.3.5 through 5.3.10

c. Maintain SGBD at maximum rate, and condensate dump to CST isolated until notified by Chemistry Group.

5.3 SGBD cation conductivity > 7 μmhos/cm

5.3.1 Commence shutdown to hot standby at the maximum rate (Be in hot standby within 30 min.)

5.3.2 Isolate condensate dump to condensate storage tank.

5.3.3 Isolate main feedwater and transfer to auxiliary feedwater.

5.3.4 Locate and repair leaking tubes per steps 5.1.2 through 5.1.7.

5.3.5 Cooldown to Tave ≤ 540°F

5.3.6 Close MSIV's and break condenser vacuum.

5.3.7 When condensate and feedwater are < 200°F drain hotwell, condensate, and Feedwater Systems.

5.3.8 Flush condensate and Feedwater Systems per Chemistry Group instructions.

5.3.9 When condenser cation conductivity is ≤ 0.5 μmhos/cm restore systems to normal per SOP-21.0.

5.3.10 Determine from the Chemistry Group, the desired course of action, and steam generator endpoint chemistry parameters, and proceed as directed.

5.3.10.1 If steam generators are not to be drained, flushing should continue until cation conductivity is ≤ 7 μmhos/cm and chlorides are ≤ 0.5 PPM.

5.3.10.2 Proceeding to cold shutdown and rinsing steam generator tubes should be considered if the following parameters are exceeded (SGBD).

a. CL ≥ 3 PPM

b. Cation Conductivity ≥ 35 μmhos/cm