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August 12, 1980

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Virgil C. Summer Nuclear Station
Docket No. 50/395
Secondary Water Chemistry Control Program

Dear Mr. Denton:

On July 14, 1980 South Carolina Electric and Gas Company, acting for itself and as agent for South Carolina Public Service Authority, filed five (5) copies of the response to questions transmitted in Mr. Schwencer's letter of June 30, 1980 regarding the secondary water chemistry control program for the Virgil C. Summer Nuclear Station. NRC review of this material and follow-up discussions between Mr. Phil Mathews of the NRC and SCE&G resulted in several changes to the water chemistry program. Five (5) copies of these changes are herewith filed documenting the agreements made. The new procedure pages should be substituted for the old pages submitted in our previous letter. If additional information is required, please let us know.

Very truly yours,

T. C. Nichols, Jr.

RBC:TCN:rh

cc: H. T. Babb
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A

Reference (a): "Steam Side Water Chemistry Control Specifications". January 1975, Westinghouse.

1. Provided as Enclosure 1 is a revised copy of ATTACHMENT II to CHP-613, "Steam Generator Chemistry Control". Note that the conductivity specification has been eliminated. Note also that we have changed the definition of plant conditions to match those in the Technical Specifications and reference (a).

2. The limit of 1.5 ppm for free OH^- is a typographical error. The correct limit is .15 ppm. This error will be corrected in this and future submittals.

3. Provided is a revised page 2, Enclosure 2, which is ATTACHMENT II to CHP-615, "Condensate and Feedwater Chemistry Control". Note under the ammonia analysis in the operating condition, that the frequency is increased to 5 days/week and a specification of $\leq$ .5 ppm has been added; so that the ammonia requirements now match those of reference (a).

4. To meet the requirements for condenser leaks, the previously mentioned CHP-615 contains the following provisions:

    a. The condensate pump discharge sample point, along with continuous cation conductivity monitoring will be used as the control point for confirming the existence of a condenser leak and for initiating corrective action to locate and repair the leak.

    b. In the event of a confirmed condenser tube leak, the limits of ATTACHMENT V apply to feedwater chemistry and must be adhered to.

    A copy of ATTACHMENT V is provided as page 2 of Enclosure 5.

    The steam generator procedure, CHP-613, contains the following provision:

    a. Whenever a confirmed condenser leak, as indicated at the condensate pump discharge sample point, exists, the limits for pH and cation conductivity given in ATTACHMENT III will be adhered to.

    A revised ATTACHMENT III is provided as page 1 of Enclosure 5.

5. To be in agreement with the manufacturer's recommendations, silica analysis will be increased to 5 days/week. Sodium analysis will be increased to 5 days/week as long as instrumented measurement is functioning and withing specification. The answer to 9 below is applicable in this situation.

6. The requirement for ammonia has been changed to three times/week (Monday, Wednesday and Friday).

7. The only amine used is the already referenced ammonia.

8. A revised Enclosure 6 is provided. Note that the frequency for pH monitor

calibration has been reduced to weekly. Note also the changes made for oxygen and hydrazine.

9. This is to confirm that the conditions listed as (a), (b) and (c) in the NRC transmittal will be implemented per Westinghouse's recommendations to allow omission of weekend analysis.

10. Attached as Enclosure 7 are information drawings and a listing of all requested sample points.

Concluding Comment: Response to these NRC concerns necessitated a considerable procedure change and new procedure generation effort. Therefore, many of these procedures could not be available within the time constraint desired for response. All committments are as stated in this response. Information copies of the applicable procedures will be provided if desired when they are issued.

STEAM GENERATOR CHEMISTRY SPECIFICATIONS

Condition	Power Operation		Hot Shutdown/ Hot Standby		Wet Layup (10)(11)	
Analysis	Specification	Frequency	Specification	Frequency	Specification	Frequency
* pH	8.5 - 9.0 (2)	5 Days/week	8.8 - 9.2	M.W.F.	10.0 - 10.5 (5)	Weekly
* Cation Conductivity	2.0 mhos/cm @ 75°C (2)	Continuous Reading Instr	----		-----	
Chloride	<0.15 ppm	5 Days/week	<0.15 ppm	M.W.F.	<0.15 ppm	
Total Suspended Solids	<1.0 ppm	5 Days/week	<1.0 ppm	M.W.F.	<1.0 ppm	
Dissolved Oxygen	N/A	5 Days/week	<5 ppb	M.W.F.	<100 ppb (11)	
Free Hydroxide	0.15 ppm as $CaCO_3$ (2)	5 Days/week	0.15 ppm as $CaCO_3$	(4)	0.15 ppm as $CaCO_3$	(9)
* Hydrazine	10 - 125 ppb	5 Days/week	<2.0 ppm	M.W.F.	75 - 150 ppm (7)	
Ammonia	---	5 Days/week				
Silica	<1.0 ppm	5 Days/week	<1.0 ppm	M.W.F.	<1.0 ppm	
Iron		M.W.F.				
Copper		M.W.F.				
* Sodium	<100 ppb	5 Days/week	<100 ppb	(4)	<100 ppb	(9)

* Denotes Continuous Monitors.

NOTES: 1) N/A

2) See Attachment III for Steam Generator blowdown (Drum) operational limits.

3) pH must be $\leq$ 9.4 prior to Power Operation (defined in Section 3.1.1). Steam may be bled to a condenser to reduce pH.

4) Analysis only required for first 2 days in hot standby condition and after each addition of m/u water > 500 gal.

5) pH should be allowed to decrease to <9.4 and $\geq$8.8 prior to a planned heat-up and startup. If pH >9.4 but <10.0, heat-up >250°F may proceed if steam may be bled to a condenser to reduce pH to $\leq$9.4.

6) Hydrazine concentration may be increased to 300 ppm with Chemistry Supervisor concurrence.

7) Hydrazine concentration may be allowed to decrease to <5 ppm within 1 week of planned heat-up and startup provided that oxygen concentration does not exceed 100 ppb.

8) Analysis only required after placing steam generators in full wet layup or after make-up water additions of >500 gallons.

9) All analysis will be performed after initiation of full wet layup, nitrogen agitation, chemical additions and prior to complete draining for maintenance.

10) Nitrogen agitation is required following chemical additions, make-up water additions >500 gallons, prior to complete draining for maintenance and if chemical stratification is suspected.

11) If dissolved oxygen level is >1.0 ppm, perform a nitrogen agitation to reduce oxygen levels.

12) If pH exceeds 9.4 as indicated by installed instruments, analyze for free hydroxide as soon as practical to evaluate chemistry conditions.

FEED WATER CHEMISTRY SPECIFICATIONS

Analysis \ Condition	OPERATING		STARTUP		WET LAYUP	
	Specification	Frequency	Specification	Frequency	Specification	Frequency
pH *	8.8 - 9.2	5 Days/Week	8.8 - 10.0	Daily	10.0 - 10.5	Weekly(3)
Conductivity *	4.0 µmhos/cm at 25°C Max.	5 Days/Week	---	---	---	---
Cation Conductivity *	N/A	*	---	---	---	---
Chloride	---	---	---	---	≤ 0.5 ppm	Weekly(3)
Sodium (2) *	.020 ppm	5 Days/Week	---	---	---	---
Oxygen (1) *	0.005 ppm Max	5 Days/Week	0.10 ppm Max.	Daily	0.100 ppm Max	Weekly(3)
Hydrazine (1) *	.005 ppm O_2	5 Days/Week	.005 ppm O_2 Min.	Daily	75-150 ppm(4)	Weekly(3)
Ammonia	≤.5 ppm	5 Days/Week	---	---	---	---
Silica	---	---	---	---	0.20 ppm	Weekly(3)
Iron	.010 ppm	M.W.F.	0.10 ppm	Daily	---	---
Copper	.005 ppm	M.W.F.	0.050 ppm	Daily	---	---

* DENOTES CONTINUOUS MONITOR
(1) SAMPLE POINT IS AX-5 DEAERATOR INLET.
(2) SAMPLE POINT IS AX-4 CONDENSATE PUMP DISCHARGE OR CONDENSATE POLISHER OUTLET.
(3) IF CONDENSATE PUMPS ARE AVAILABLE FOR RECIRCULATION.
(4) MAY BE INCREASED TO 300 PPM AT DISCRETION OF CHEMISTRY SUPERVISOR.

STEAM GENERATOR BLOWDOWN (DRUM) OPERATIONAL LIMITS

PARAMETER	STEAM GENERATOR BLOWDOWN		
	Two Weeks	24 Hours	Immediate[3]
pH (a) 25°C	*8.5 - 9.2[1]	N/A	8.5 or >9.4[1]
Cation Conductivity mhos/cm (a) 25°C	*>2.0 but ≤ 7	N/A	>7
Free Hydroxide ppm as $CaCO_3$	N/A[2]	>0.15 but <1.0	≥1.0
Blowdown Rate gpm/SG	Maximum Available Capacity		

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* Denotes Instrumented Measurement

Comment: Operation beyond the above specifications is limited as indicated above. Corrective action including shutdown if necessary, should be implemented within the time periods as applicable.

NOTES:

(1) An increase of 0.4 pH units to the normal control pH limit of 9.0 will result from a Free Hydroxide concentration of 1.0 ppm as $CaCO_3$. However, pH is not intended to be the Free Hydroxide determinant.

(2) No relief for Free Hydroxide over and above the Normal Operating Control Limit is provided for periods in excess of 24 hours.

(3) Shutdown is recommended if these limits are exceeded for greater than 2 hours.

(4) See Section 6.3.2 for requirements in the event of a confirmed condenser leak.

FEEDWATER CHEMISTRY OPERATIONAL LIMITS (1) WITH CONFIRMED CONDENSER TUBE LEAK PRESENT

PARAMETER	FEEDWATER CHEMISTRY		
	Two Weeks	24 Hours	Immediate (2)
pH at 25°C *	8.5-9.2	N/A	<8.5 or >9.4
Cation Conductivity * umhos/cm @ 25°C	>2.0 but ≤ 7	N/A	>7

* Denotes Instrumented Measurement

(1) Plant operation is limited by the time limits indicated above whenever a condenser tube leak exists.

(2) Shutdown is required if these limits are exceeded for greater than 2 hours.

INSTALLED INSTRUMENTATION CALIBRATION REQUIREMENTS

pH	- Compare daily grab sample results to chart recorder read-out. Perform weekly calibration check using standard buffer solution.
Conductivity	- Compare daily grab sample results to chart recorder read-outs. Perform monthly calibration check using a temporary flow cell and lab meter.
Sodium	- Compare daily grab sample results to chart recorder read-out. Perform weekly calibration using standard.
Oxygen	- Calibrated weekly against internally installed calibration cell.
Hydrazine	- Compare chart recorder read-out weekly against grab sample analyzed on calibrated laboratory spectrophotometer.
Cation Conductivity	- Perform monthly calibration check using a temporary flow cell and lab meter.

NOTE: These requirements are made under the assumption that the instruments are functioning normally. If abnormalities are noted, an investigation and corrective action should be commenced.