NORTHEAST UTILITIES

THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

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April 19, 1984

Docket No. 50-423

B11135

Director of Nuclear Reactor Regulation
Mr. B. J. Youngblood, Chief
Licensing Branch No. 1
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

References: (1) B. J. Youngblood letter to W. G. Counsil, Request for Additional Information, dated May 3, 1983.

(2) B. J. Youngblood letter to W. G. Counsil, Draft SER, dated December 20, 1983.

(3) W. G. Counsil letter to B. J. Youngblood, Response to Request for Additional Information, Question 281.9, dated August 1, 1983.

Gentlemen:

Millstone Nuclear Power Station, Unit No. 3
Response to Chemical Engineering Branch DSER Open Items

In Reference (1) and (2), Northeast Nuclear Energy Company (NNECO) was requested to provide information concerning the secondary water chemistry monitoring and control program. NNECO stated in Reference (3) that the secondary water chemistry program would be available for submittal after January 1, 1984.

Attached is NNECO's response to the Chemical Engineering Branch DSER open item CMEB 02(112) 281.9 addressing the secondary water chemistry monitoring and control program. We expect this response will fully resolve the Staff's concerns regarding this open item.

B001 1/1

If you have any questions, please contact our licensing representative.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY, ET AL

By Northeast Nuclear Energy Company, Their Agent

W. G. Counsil
Senior Vice President

STATE OF CONNECTICUT)
) ss. Berlin
COUNTY OF HARTFORD)

Then personally appeared before me W. G. Counsil, who being duly sworn, did state that he is Senior Vice President of Northeast Nuclear Energy Company, an Applicant herein, that he is authorized to execute and file the foregoing information in the name and on behalf of the Applicants herein and that the statements contained in said information are true and correct to the best of his knowledge and belief.

Notary Public

My Commission Expires March 31, 1988

Millstone Nuclear Power Station, Unit No. 3
Open Item
Question No. Q281.9 (Section 10.3.5) and Draft SER 10.3.5

The information that you have provided is insufficient for us to evaluate the secondary water chemistry control program. Provide a summary of operative procedures to be used for the steam generator secondary water chemistry control and monitoring program, addressing the following:

1. Identify the sampling schedule for the critical chemical and other parameters and the control points or limits for these parameters for each operating mode of the plant, i.e., dry lay-up, cold shutdown, hot standby/shutdown, and power operation.

Response

Detailed parameters for dry lay-up are not defined. Whenever possible the secondary system will be maintained under wet lay-up conditions. If parts of the system are open for maintenance then an atmosphere of dry N_2 gas will be held in the system whenever practical. The chemistry limits specified are based on operating with the Full Flow Condensate Polishing System.

Cold Shutdown Chemistry

Steam Generator Wet Lay-up System

Parameter	Frequency (1)	Normal Value	Initiate Action	Value Prior to Heatup
pH	3/week	9.6-10.5	9.6-10.5	8.5-9.2
Hydrazine, ppm	3/week	75-200	75, 200	--
Sodium, ppb	3/week	1000	1000	100
Cation Conductivity, umho/cm(2)	3/week	10.0	10.0	2.0
Chloride, ppb	3/week	500	500	200

(1) 3/week until stable, then weekly
(2) Chloride analysis may be used in lieu of cation conductivity.

Start up, Hot Standby and Hot Shutdown (3)

Steam generator Blowdown Sample, each generator.

Parameter	Frequency	Normal Value (4)	Initiate Action	Value Prior to Power Escalation
pH	continuous	8.5-9.2	<8.5 >9.2	
Cation Conductivity, umho/cm	continuous	<2.0	>2.0	<2.0
Sodium, ppb	continuous	<100	>100	<100
Chloride, ppb	daily	<100	>100	<100

(3) if practical, continuous blowdown is maintained in these modes.
(4) Power is held at 30 percent until these values are met during startup.

Power Operation

Parameter	Frequency	Normal Value	Action Level 1	2	3
Steam Generator Blowdown					
pH	continuous (8)	8.5-9.2	<8.5 >9.2 (5)		
Cation Conductivity, umho/cm	continuous (8)	<0.8	>0.8	>2	>7
Sodium, ppb	continuous (8)	<20	>20	>100	>500
Chloride, ppb	5/week	<20	>20	>100	
Silica, ppb	3/week	<300	>300		
Feedwater					
pH (ferrous/copper system)	continuous (8)	8.8-9.2	<8.8 >9.2 (5)		
Cation Conductivity umho/cm	continuous (8)	<0.2	>0.2		
Dissolved O_2, ppb	continuous (8)	<3	>3		
Hydrazine, ppb	5/week	<3 x (O_2) (6)	<3 x (O_2) (6)		
pH control additive	5/week	(7)	(7)		
Total Fe, ppb	1/week	≤20	>20		
Total Cu, ppb	1/week	≤2	>2		

(5) Action required only if experience shows increased copper transport at pH 9.2
(6) Based on oxygen value measured in the condensate sample
(7) To be consistent with pH
(8) In line instrumentation

Condensate

Parameter	Frequency	Normal Value	Action Level 1	2	3
Dissolved O_2, ppb	continuous	<10	>10	>30	
Cation Conductivity	continuous	<1.0			
Sodium, ppb	continuous	<1.0			
pH @25°F	continuous	8.5-9.2			

2. Identify the procedures used to measure the values of the critical parameters, i.e., standard identifiable procedures and/or instruments.

Response

The following is a summary of the methods to determine critical parameters. The procedures for performance of these measurements were derived from either Standard Methods, ASTM, or Westinghouse supplied procedures.

Parameter	Method
pH	By on-line analyses and grab samples
Sodium	Specific ion electrodes for on-line and grab samples
Chloride	Specific ion electrodes for on-line and grab samples (9)
Hydrazine	By p-dimethylaminobenzaldehyde method
Ammonia	By gas-sensing electrode or colorimetric
Silica	By the ammonia molybdate method
Dissolved O_2	By on-line analyzers and by grab sample indigo carmine methods
Cation Conductivity	On line cation conductivity columns

(9) Specific ion electrodes or mercuric nitrate titration.

3. Identify the sampling points, considering as a minimum the steam generator blowdown, the hot well discharge, the feedwater, and the demineralizer effluent. While some of this material can be gleaned from Figures 10.3.2 and 10.3.3, the Applicant should provide it, as well as the remaining information, in a more concise manner. We recommend a process flow chart similar to that in EPRI N-2074-SR "PWR Secondary Water Chemistry Guidelines".

Response

See attached figure.

4a. State the procedures for recording and management of data, defining corrective actions for various out-of-specification parameters. The procedures should define the allowable time for correction of out-of-specification parameters. We recommend multiple levels of time allowable for providing correction based upon the amount of out-of-specification of the variable. (See EPRI NP-2704-SR above).

Response

Recording and management of data is accomplished as follows:

a) All analytical results and in-line instrumentation data are recorded onto the applicable log sheets by the technician. Out of specification conditions or undesirable trends are reported to Chemistry Supervision immediately.

b) Chemistry Supervision reviews the results daily and is notified immediately if any parameters are out of specification.

c) Data are accumulated, categorized and stored in Nuclear Records on a calendar-year basis, following review by Chemistry Supervision for completeness.

d) Data are additionally reviewed by the corporate chemistry group for long-term trend analysis.

Definition of corrective actions are as follows:

For Cold Shutdown

pH

1) Cross check with NH_3/N_2H_4/conductivity values for consistency (Chemistry Supervision responsibility).

2) If low pH, add ammonium hydroxide as prescribed by Chemistry Supervision.

3) If high, feed and bleed.

N_2H_4

1) If low, add as prescribed by Chemistry Supervision.

2) If high, feed and bleed.

Na

1) Check makeup water purity.

2) Feed and bleed as prescribed by Chemistry Supervision.

For Hot Standby

pH

1) If pH is low, adjust ammonium hydroxide feed as prescribed by Chemistry Supervision.

2) If pH is high, feed and bleed as prescribed by Chemistry Supervision.

Cation Conductivity

1) Increase blowdown as prescribed by Chemistry Supervision.

Sodium/Chloride

1) Feed and bleed.

2) Check makeup water purity.

For Power Operation 30 percent

pH

1) Check feedrate of hydrazine and ammonium hydroxide.

2) Check water makeup quality.

3) Increase blowdown if appropriate as prescribed by Chemistry.

Conductivity, Na, Silica, Cl^-

1) Increase blowdown.

2) Check water makeup quality.

3) Check for condenser in-leakage.

For power operation 30 percent, corrective action is based on three progressive action levels as follows:

Action Level 1

a) Increase steam generator blowdown to maximum.

b) Compare laboratory analyses and readings from all continuous monitors; check for internal consistency.

c) Increase grab sample analysis and instrument readout frequency and begin short-term trending of critical chemistry parameters.

d) Identify source of problem.

e) Correct problem within 1 week or go to Action Level 2.

Action Level 2

a) Increase steam generator blowdown to maximum.

b) Compare laboratory analysis and reading from all continuous monitors; check for internal consistency.

c) Perform verification analyses.

d) Increase grab sample, analysis and instrument readout frequency and begin short-term trending of critical chemistry parameters.

e) Correct problem or evaluate the need for power reduction to 30 percent or less within eight hours.

f) Return parameter to normal value within 100 hours or evaluate the need to go to Action Level 3 for those parameters having action Level 3 values.

Action Level 3

a) Perform verification analyses.

b) Identify and correct problem.

c) Correct problem or evaluate the need for shutdown within eight hours, and clean up by drain, refill, feed and bleed until normal values are reached.

4b. Because of the significance of condenser in-leakage the chemistry program should include a corrective action provision such that a condenser inservice inspection program will be initiated if condenser leakage is of such a magnitude that power reduction is required (action level 2 of the EPRI/SGOG guidelines) more than once per 3 month period.

Response

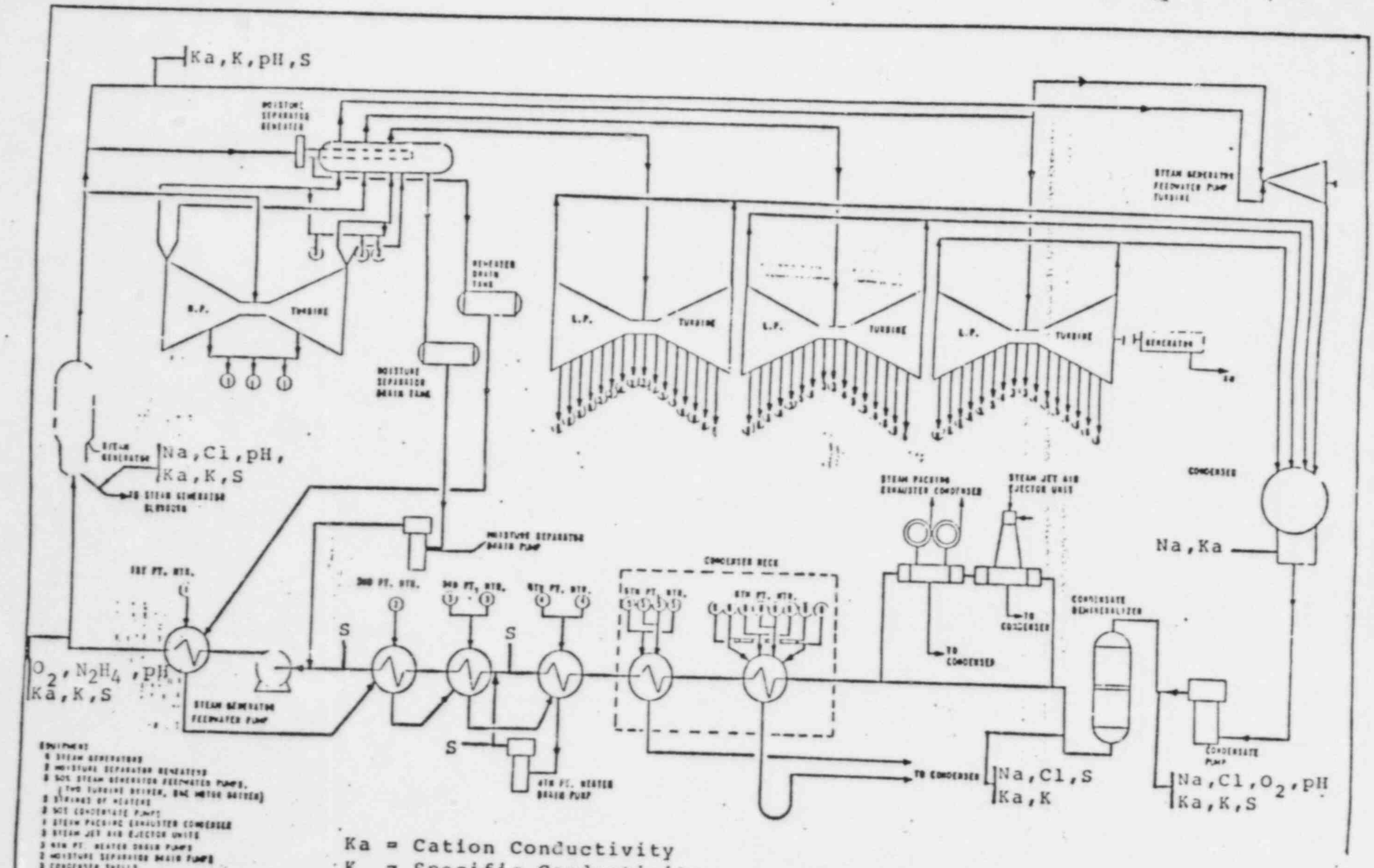
Millstone 3 is equipped with titanium condenser tubing, cathodic protection for tubesheet and waterboxes, on line tubesheet leak detection, and full flow deep bed condensate polishers. Because of these precautions the significance and/or consequence of condenser in-leakage is considered to be minimal. The need for a condenser in-service inspection program will be based on experience relative to the reliability of this equipment.

5. Identify (a) the authority responsible for interpreting the data and initiating action (b) the sequence and timing of administrative events required to initiate corrective action.

Response

As noted in response to question 4A, data are reviewed daily by Chemistry Supervision. Any out-of-specification data noted by a chemistry technician is reported immediately. Chemistry Supervision is responsible for interpreting the data and initiating corrective action.

In resonse to an out-of-specification condition, Chemistry Supervision will evaluate applicable Action Levels. Chemistry Supervision then makes any recommendations for corrective action and/or change in action level to the shift supervisor. Recommendations are also made to the station superintendent for any actions that envolve power recession within the given time frame.



SAMPLE POINTS
Millstone Nuclear Power Station Unit 3
Final Safety Analysis Report