**Omaha Public Power District**
1623 Harney Omaha, Nebraska 68102
402/536-4000

March 1, 1985
LIC-85-091

Mr. James R. Miller, Chief
Office of Nuclear Reactor Regulation
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, DC 20555

References: (1) Docket No. 50-285
(2) Letter from OPPD (R. L. Andrews) to NRC (R. D. Martin) dated February 2, 1985 (LIC-85-040)

Dear Mr. Miller:

Mid-Cycle Inspection of the
Fort Calhoun Station Steam Generators

The Omaha Public Power District submitted Reference (2) as justification that a mid-cycle inspection of the Fort Calhoun Steam Generators is not warranted. Discussions between the District and your staff resulted in NRC questions which were answered by the District on an informal basis.

Pursuant to a request from the District's NRC Project Manager that these questions be formally answered, please find attached the District's responses.

Sincerely,

R. L. Andrews
Division Manager
Nuclear Production

RLA/CWN/dao

Attachment

cc: Mr. Robert D. Martin
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV

LeBoeuf, Lamb, Leiby & MacRae
1333 New Hampshire Avenue, N.W.
Washington, DC 20036



Mr. E. G. Tourigny, NRC Project Manager
Mr. L. A. Yandell, NRC Senior Resident Inspector

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NRC QUESTIONS RELATING TO
STEAM GENERATOR MID-CYCLE SHUTDOWN WAIVER

Question 1

What is the primary to secondary leakage rate?

Response

Zero

Question 2

What is the strain/denting criteria for preventive plugging in the future?

Response

Together with Combustion Engineering, the District responds in the following manner:

The criterion to date for correlating denting with the advisability of plugging is the ability to pass a 0.540" ET probe through the 0.654" ID tube. Any tube showing sufficient denting to obstruct this passage has been plugged. We believe this criterion is consistent with industry standards and is conservative. Therefore, we plan to contin use. We do not believe that current quantitative evaluations of denting are sufficiently precise to be used as final criteria for tube plugging.

Question 3

How do the new secondary chemistry limits for Fort Calhoun Station compare to EPRI limits?

Response

The EPRI/OPPD Fort Calhoun Station secondary chemistry limit comparison is presented in the following table.

EPRI/OPPD
SECONDARY SIDE CHEMISTRY PROGRAM COMPARISON

Blowdown

| Parameter | **Action Level and Limit 1) EPRI | 2) | 3) | *Action Level and Limit 1) OPPD | 2) | 3) |
|---|---|---|---|---|---|---|
| pH | 8.5 - 9.0 | None | None | 8.5 - 9.2 | None | None |

Comment: The District has adopted the CE limits as shown in Action Level 1).

*See Response to Question 4 for OPPD "Secondary System Corrective Action" from Chemistry Manual. Definitions of 1, 2, and 3 are II.A.1, II.A.2, and II.A.3 for all parameters.

**See EPRI/SGOG PWR Secondary Water Chemistry Guidelines, Revision 1, June 1984 for EPRI Action Level Definitions of 1, 2, and 3.

| Parameter | **Action Level and Limit 1) EPRI | 2) | 3) | *Action Level and Limit 1) OPPD | 2) | 3) |
|---|---|---|---|---|---|---|
| Cation Conductivity umho/cm | <0.8 | >2 | >7 | None | None | None |

Comment: OPPD is installing on-line analyzers on blowdown for cation conductivity. OPPD presently does not have a cation conductivity limit in place but covers the makeup problems and condenser inleakage that cation conductivity covers in the water plant by taking samples of water plant effluent every 25,000 gallons (approximately every 8-10 hours). On-line sodium analyzers cover condenser inleakage and sodium problems from the water plant continuously. The District will back up the sodium analyzers and cation analyzers with appropriate grab samples. After the on-line analyzers on blowdown for cation conductivity are installed, the District will accumulate data from them and establish a cation conductivity limit and associated action levels.

| Parameter | **Action Level and Limit 1) EPRI | 2) | 3) | *Action Level and Limit 1) OPPD | 2) | 3) |
|---|---|---|---|---|---|---|
| Sodium ppb | <20 | >100 | >500 | <20, 20-50*** | ≤100 | 500 |

Comment: The OPPD limits are the same as, or more conservative than, the EPRI limits. On-line analyzers are installed, and operating on blowdown. Appropriate grab samples can be run, and will be run more frequently if all sodium and cation conductivity on-line analyzers are out of service. Action levels for sodium have been adopted to cover increased blowdown, power reduction and immediate shutdown.

| Parameter | **Action Level and Limit 1) EPRI | 2) | 3) | *Action Level and Limit 1) OPPD | 2) | 3) |
|---|---|---|---|---|---|---|
| Chloride ppb | <20 | 100 | None | <100 | ≤200 | None |

Comment: Until January 1985, the District had only the mercuric nitrate method for determination of chloride and therefore set the chloride limit consistent with the lower limit of detectability (LLD) of that method. Recently, development of the ion specific electrode method (LLD of 10 ppb) has been completed and the District has adopted 20 ppb as a limit for steady state power operations and adopted the 100 ppb action level (effective February 28, 1985).

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***Increase blowdown if 20 <[sodium ppb] <50. If >50, initiate II.A of Response to Question 4..

| Parameter | **Action Level and Limit 1) EPRI | 2) | 3) | *Action Level and Limit 1) OPPD | 2) | 3) |
|---|---|---|---|---|---|---|
| Sulfate ppb | <20 | None | None | <100 | <200 | None |

Comment: An ion chromatograph has been purchased by the District and is being pre-operationally tested. Procedures and technique are under development. The District will develop a baseline for normal operation, startup, and shutdown before adopting lower limits and action levels. The District will implement the ion chromatograph procedures and analysis by March 15, 1985.

| Parameter | **Action Level and Limit 1) EPRI | 2) | 3) | *Action Level and Limit 1) OPPD | 2) | 3) |
|---|---|---|---|---|---|---|
| Silica ppb | <300 | None | None | <300 | None | None |

Comment: The OPPD limits are the same as the EPRI limits.

## Feedwater

| Parameter | **Action Level and Limit 1) EPRI | 2) | 3) | *Action Level and Limit 1) OPPD | 2) | 3) |
|---|---|---|---|---|---|---|
| pH | 8.8 - 9.2 | None | None | 8.8 - 9.2 | None | None |

Comment: The OPPD limits are the same as the EPRI limits.

| Parameter | **Action Level and Limit 1) EPRI | 2) | 3) | *Action Level and Limit 1) OPPD | 2) | 3) |
|---|---|---|---|---|---|---|
| Oxygen, ppb | <5 | None | None | <5 | <20 | None |

Comment: The OPPD limits are the same as, or more conservative than, the EPRI limits.

| Parameter | **Action Level and Limit 1) EPRI | 2) | 3) | *Action Level and Limit 1) OPPD | 2) | 3) |
|---|---|---|---|---|---|---|
| Iron, ppb | <20 | None | None | <20 | None | None |

Comment: The OPPD limits are the same as the EPRI limits.

| Parameter | **Action Level and Limit 1) EPRI | 2) | 3) | *Action Level and Limit 1) OPPD | 2) | 3) |
|---|---|---|---|---|---|---|
| Copper, ppb | <2 | None | None | <2 | None | None |

Comment: The OPPD limits are the same as the EPRI limits.

| Parameter | **Action Level and Limit 1) EPRI | 2) | 3) | *Action Level and Limit 1) OPPD | 2) | 3) |
|---|---|---|---|---|---|---|
| Hydrazine, ppb | >20 | None | None | 10 - 50 | 50 - 100 | None |

Comment: The District has adopted these limits to allow for adjustment of the hydrazine based on our operational experience, so that oxygen and pH can be controlled seasonally. The District has adopted the Combustion Engineering limit.

Condensate

| Parameter | **Action Level and Limit 1) EPRI | 2) | 3) | *Action Level and Limit 1) OPPD | 2) | 3) |
|---|---|---|---|---|---|---|
| Oxygen, ppb | <10 | >30 | None | <10 | ≤30 | None |

Comment: The OPPD limits are the same as, or more conservative than, the EPRI limits.

Question 4

What are the corrective actions when secondary chemistry limits are exceeded?

Response

AUTHORITY OF OPERATING MANUAL

The Operating Manual prescribes the policies, procedures, and instructions to safely operate the Fort Calhoun Station Unit No. 1. Adherence to the Operating Manual is mandatory per Fort Calhoun Station Standing Order G-7. The Chemistry Manual is part of the station Operating Manual. The following is extracted from the Operating Manual Procedure CMP-5, Rev. 1, currently in effect and governing operations.

I. PRINCIPLES OF CORRECTIVE ACTION

Certain steps are mandatory in the resolution of any chemical system abnormality or out-of-specification result. They are:

A. Resample and reanalyze. Correct sampling procedures must be followed as described in OPPD Chemistry Manual, Section CMP-2. Correct analytical procedures must be followed as described in OPPD Chemistry Manual, Section CMP-3.

B. Verification of analytical instrument accuracy. The instrument(s) used must be checked for proper calibration and function. Any chemical reagents used must be verified to be of the proper type, strength, standardization and be known to be free of contamination.

C. Identification of system anomalies. The plant operations and maintenance staffs must be contacted to determine if those groups have taken any action or caused any situation that may have caused the problem being investigated.

I. PRINCIPLES OF CORRECTIVE ACTION

D. Notify the Plant Chemist or Supervisor - C/RP immediately, except as noted below. Immediate notification is considered to be within two hours of completion of the analysis. These steps (A through C) may be deleted or modified only with the approval of the Plant Chemist or Supervisor - C/RP. The resolution of any "out-of-spec" chemical condition or other unusual variation in chemical control may be achieved by, but not be limited to, adjustment to chemical feed rates, use or disuse of demineralizer systems, adjustment by plant operation of system flow rates, temperatures, and pressures, maintenance repair of systems, OPPD modification of systems.

II. SECONDARY SYSTEM CORRECTIVE ACTION (Condensate, Feedwater and Steam Generator Blowdown)

A. For All Parameters

1. When the normal range is exceeded, initiate immediate investigation of the problem, increase the sample frequency to once per eight-hour shift, and increase blowdown to approximately 1% of the main steaming rate as appropriate. The problem must be corrected and the parameter(s) returned to the normal range within one week. If this cannot be done, and the parameter has a listed abnormal range, power should be reduced to 25% as if the abnormal range had been exceeded.

2. When the abnormal range is exceeded, reduce power to 25%. Continued plant operation is then possible while corrective action is taken. Power reduction should be initiated within four hours of exceeding the abnormal range. The problem must be corrected and the parameter(s) returned to the normal range within one hundred (100 hours). If this cannot be done, the unit must be shut down as if an immediate shutdown limit had been exceeded.

3. When an immediate shutdown limit is exceeded, the unit must be shut down within four hours to prevent rapid steam generator corrosion.

B. Additional Corrective Action for pH and Conductivity

1. Verify that at least 12 hours have elapsed since any previous secondary system chemical feed alteration (or at least one hour if reactor power is being changed). Review reactor power and secondary system chemical feed history for the previous 48 hours.

2. Write a chemical instruction to alter, as appropriate, alkameen pump stroke. If alkameen feed is not in service then alter, as appropriate, hydrazine pump stroke. (If this is likely to cause hydrazine to go out of specification, notify the Plant Chemist.)

II. SECONDARY SYSTEM CORRECTIVE ACTION (Continued)

3. If a pump stroke change of more than 5% appears to be needed during steady state power operation, notify the Plant Chemist immediately; otherwise, immediate notification of the Plant Chemist is not required.

4. Resample after the chemical instruction is implemented, normally within four hours.

C. Additional Corrective Action for Hydrazine

1. Verify that at least 12 hours have elapsed since any previous secondary system chemical feed alteration (or at least one hour if reactor power is being changed). Review reactor power and secondary system chemical feed history for the previous 48 hours.

2. Write a chemical instruction to alter, as appropriate, hydrazine pump stroke.

3. If a pump stroke change of more than 5% appears to be needed during steady state power operation, notify the Plant Chemist immediately; otherwise immediate notification of the Plant Chemist is not required.

4. Resample after the chemical instruction is implemented, normally within four hours.

D. Additional Corrective Action for Blowdown Rate

1. For steam generator blowdown out-of-specification low but greater than 9000 pounds per hour, notify the Shift Supervisor.

Question 5

What are the differences between the old and new secondary chemistry program?

Response

A. The administrative, operational, and equipment upgrading implemented in the new program which were not in the old program are:

1. Chemistry holdpoints at startup.

2. Plant procedures require increased investigation and sampling of chemistry parameters that are not in the normal range.

3. Plant procedures require action including power reduction and shutdown for chemistry parameters that are abnormal as discussed in the Response to Questions 3 and 4 above.

4. A District commitment to upgrade the on-line analyzers on blowdown, feedwater, condensate, and makeup so that the system upsets can be detected as soon as possible and corrective action can be taken. The blowdown on-line sodium analyzing system is installed and in service.

5. The plant chemistry staff has improved the analytical capabilities of the lab. The LLD's necessary to meet the new chemistry limits for chloride and sulfate have been established by the purchase and implementation of a chloride ion specific electrode and an ion chromatograph, respectively. The District will implement the ion chromatograph by March 15, 1985; the chloride electrode is in service.

   Sodium analysis technique improvement has lowered the LLD for sodium to 3 ppb for grab samples.

B. The old secondary limits versus the new limits are as follows:

| PARAMETER | OLD* 1 | OLD* 2 | NEW 1 | NEW 2 | NEW 3 |
|---|---|---|---|---|---|
| | | | Blowdown | | |
| pH | 8.2-9.2 | 7.5-9.5 | 8.5-9.2 | None | None |
| cation cond. | None | None | None | None | None |
| sodium ppb | <1000 | None | <20,20-50** | ≤100 | 500 |
| chloride ppb | <100 | None | <100 | ≤200 | None |
| sulfate ppb | None | None | <100 | ≤200 | None |
| silica ppb | <1000 | <10,000 | <300 | None | None |
| | | | Feedwater | | |
| pH | 8.8-9.2 | 8.5-9.2 | 8.8-9.2 | None | None |
| oxygen ppb | <10 | None | <5 | <20 | None |
| iron ppb | ≤25 | ≤50 | <20 | None | None |
| copper ppb | <10 | ≤25 | <2 | None | None |
| hydrazine ppb | 10-50 | 5-10 | 10-50 | 50-100 | None |
| | | | Condensate | | |
| oxygen ppb | ≤5 | None | <10 | ≤30 | None |

*For old limits: 1 = Normal, 2 = abnormal. No shutdown limits. Power reduction not considered for abnormal.

**Increase blowdown if 20 <[sodium ppb] <50. If >50, initiate II.A of Response to Question 4.

Question 6

What was your past operational procedure/policy regarding leaks in condenser?

Response

The District's previous policy was to operate in accordance with the Chemistry Manual procedures. These procedures included the limits discussed in I.B. above and did not provide for action levels related to power reductions and/or shutdowns. Power reduction and/or shutdown decisions were made by plant management based on the magnitude of the condenser leak. This previous policy allowed for operation with condenser inleakage while the necessary investigation/search was conducted.