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Docket Nos. 50-348
50-364

June 14, 1985

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

Attention: Mr. S. A. Varga

Joseph M. Farley Nuclear Plant - Units 1 and 2
Staff Recommended Actions Stemming from NRC Integrated
Program for the Resolution of Unresolved Safety Issues
Regarding Steam Generator Tube Integrity (Generic Letter 85-02)

Gentlemen:

By letter dated April 17, 1985, the NRC requested Alabama Power Company to provide information regarding Generic Letter 85-02. Enclosed for NRC review are the Alabama Power Company responses to this request. The enclosure numbers correspond to the enclosures of the Generic Letter.

If there are any questions, please advise.

Yours truly,

R. P. McDonald

RPM/RSF:drs/D-355
Enclosures
cc/Enc: Mr. L. B. Long
Dr. J. N. Grace
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ENCLOSURE 1

STAFF RECOMMENDED ACTIONS AND REVIEW GUIDELINES

STEMMING FROM NRC INTEGRATED PROGRAM

FOR THE RESOLUTION OF UNRESOLVED SAFETY ISSUES

REGARDING STEAM GENERATOR TUBE INTEGRITY

1.a PREVENTION AND DETECTION OF LOOSE PARTS (INSPECTIONS)

Staff Recommended Action

Visual inspections should be performed on the steam generator secondary side in the vicinity of the tubesheet, both along the entire periphery of the tube bundle and along the tube lane, for purposes of identifying loose parts or foreign objects on the tubesheet, and external damage to peripheral tubes just above the tubesheet. An appropriate optical device should be used (e.g., mini-TV camera, fiber optics). Loose parts or foreign objects which are found should be removed from the steam generators. Tubes observed to have visual damage should be eddy current inspected and plugged if found to be defective.

These visual inspections should be performed: (1) for all steam generators at each plant at the next planned outage for eddy current testing, (2) after any secondary side modifications, or repairs, to steam generator internals, and (3) where eddy current indications are found in the free span portion of peripheral tubes, unless it has been established that the indication did not result from damage by a loose part or foreign object.

For PWR OL applicants, such inspections should be part of the preservice inspection.

For steam generator models where certain segments of the peripheral region can be shown not to be accessible to an appropriate optical device, licensees and applicants should implement alternative actions to address these inaccessible areas, as appropriate.

Licensees should take appropriate precautions to minimize the potential for corrosion while the tube bundle is exposed to air. The presence of chemical species such as sulfur may aggravate this potential, and may make exposure to the atmosphere inadvisable until appropriate remedial measures are taken.

Response

After sludge lancing the secondary side of each steam generator, visual inspections are conducted in the area between the periphery tubes and the shell, 360° around each steam generator and under the blowdown line in both sides of the tube lane. The purpose of this effort is to identify any loose parts or foreign objects on the tubesheet or any external damage to peripheral tubes above the tubesheet. A fiberscope is used for the inspection and photographs are taken which document the inspection. After the location of a loose part or foreign object is documented, retrieval efforts begin. If tube damage is detected visually which had not been previously recorded, an eddy current inspection is performed and the tube is plugged if found to be defective.

Visual inspections are performed (1) for steam generators at the planned outage for eddy current testing, (2) after any secondary side modifications, or repairs, to steam generator internals, and (3) where eddy current indications are found in the free span portion of peripheral tubes, unless the indications did not result from damage by a loose part or foreign object. Should eddy current inspection results indicate the presence of a foreign object or loose part, a special search and retrieval effort is conducted. Additionally, Alabama Power Company has modified its Metal Impact Monitor System (MIMS) to detect objects in both the primary and secondary sides of each steam generator.

The time that the tube bundle is exposed to air is minimized by performing foreign object search and retrieval (FOSAR) upon completion of sludge lancing. The generators are then placed in a chemistry controlled wet layup condition as soon as other evolutions permit filling.

## 1.b PREVENTION AND DETECTION OF LOOSE PARTS (QUALITY ASSURANCE)

### Staff Recommended Action

Quality assurance/quality control procedures for steam generators should be reviewed and revised as necessary to ensure that an effective system exists to preclude introduction of foreign objects into either the primary or secondary side of the steam generator whenever it is opened (e.g., for maintenance, sludge lancing, repairs, inspection operations, modifications). As a minimum, such procedures should include: (1) detailed accountability procedures for all tools and equipment used during an operation, (2) appropriate controls on foreign objects such as eye glasses and film badges, (3) cleanliness requirements, and (4) accountability procedures for components and parts removed from the internals of major components (e.g., reassembly of cut and removed components).

### Response

Procedures exist that require materials taken into both the primary and secondary sides of the steam generators to be logged at the time of entry and accounted for at the time of exit.

However, these procedures address materials in general and will be revised to be more specific to ensure eye glasses and dosimetry packs are logged. These procedures also provide for inspections to be conducted upon completion of work for cleanliness and loose parts.

These procedures will also be revised to address the reassembly of cut and removed components.

## 2.a. INSERVICE INSPECTION PROGRAM (FULL LENGTH TUBE INSPECTION)

### Staff Recommended Action

The Standard Technical Specifications (STS) and Regulatory Guide 1.83, Part C.2.f, currently define a U-tube inspection as meaning an inspection of the steam generator tube from the point of entry on the hot-leg side completely around the U-bend to the top support of the cold-leg side. The staff recommends that tube inspections should include an inspection of the entire length of the tube (tube end to tube end) including the hot leg side, U-bend, and cold leg side.

This recommended action does not mean that the hot leg inspection sample and the cold leg inspection sample should necessarily involve the same tubes. That is, it does not preclude making separate entries from the hot and cold leg sides and selecting different tubes on the hot and cold leg sides to meet the minimum sampling requirements for inspection.

Consistent with the current STS requirement, supplemental sample inspections (after the initial 3% sample) under this staff recommended action may be limited to a partial length inspection provided the inspection includes those portions of the tube length where degradation was found during initial sampling.

### Response

Alabama Power Company's eddy current inspection program for steam generator tubes is an expansion of the Technical Specification requirements to closely monitor tube conditions. For the past few outages this program has included, in addition to the Technical Specification requirements, all peripheral tubes plus a selected sampling of the remaining tubes based on Farley specific and industry related concerns. The expanded program, depending on areas of concern, has included both partial and full length tube examinations. Degraded tubes found during past examinations have been included in the program. Alabama Power Company plans to continue an eddy current inspection program in excess of Technical Specification requirements that is appropriate for monitoring the areas of concern until a level of confidence can be established that the degradation mechanisms identified at other plants are not occurring at Farley Nuclear Plant.

## 2.b INSERVICE INSPECTION PROGRAM (INSPECTION INTERVAL)

### Staff Recommended Action

The maximum allowable time between eddy current inspections of an individual steam generator should be limited in a manner consistent with Section 4.4.5.3 of the Standard Technical Specifications, and in addition should not extend beyond 72 months.

### Response

During pre-operational testing for each unit, all tubes were inspected by eddy current testing (September 1976 for Unit 1 and December 1978 for Unit 2). Since that time (102 months for Unit 1 and 76 months for Unit 2), essentially all Unit 1 and two-thirds of the Unit 2 steam generator tubes have been eddy current inspected at least once. However, the actual period for total repeat inspections is not rigidly fixed. As stated in the response to 2.a, the expanded program for Farley Nuclear Plant is based on monitoring areas of concern. In the future, the period is expected to be within 72 months.

3.a. SECONDARY WATER CHEMISTRY PROGRAM

Staff Recommended Action

Licensees and applicants should have a secondary water chemistry program (SWCP) to minimize steam generator tube degradation.

The specific plant program should incorporate the secondary water chemistry guidelines in SGOG Special Report EPRI-NP-2704, "PWR Secondary Water Chemistry Guidelines," October 1982, and should address measures taken to minimize steam generator corrosion, including materials selection, chemistry limits, and control methods. In addition, the specific plant procedures should include progressively more stringent corrective actions for out-of-specification water chemistry conditions. These corrective actions should include power reductions and shutdowns, as appropriate, when excessively corrosive conditions exist. Specific functional individuals should be identified as having the responsibility/authority to interpret plant water chemistry information and initiate appropriate plant actions to adjust chemistry, as necessary.

The referenced SGOG guidelines above were prepared by the Steam Generator Owners Group Water Chemistry Guidelines Committee and represent a consensus opinion of a significant portion of the industry for state-of-the-art secondary water chemistry control.

Response

The Farley Nuclear Plant secondary water chemistry program has incorporated the "PWR Secondary Water Chemistry Guidelines" (EPRI-NP-2704, October 1982) with exceptions. These exceptions do not affect the program's intent to minimize steam generator tube degradation and are intended to parallel the EPRI Guidelines. Modifications are in progress or are planned to reduce exceptions to a minimum (i.e., replacing feedwater heaters, retubing MSRs and upgrading instrumentation).

Plant procedures include progressively more stringent corrective actions for out-of-specification water chemistry conditions and include power reductions and shutdowns as appropriate and require chemistry hold points on startups. Specific individuals are assigned functional responsibility/authority to interpret plant water chemistry information and initiate appropriate plant actions to adjust chemistry, as necessary.

Additionally, the plant program and procedures are being reviewed and revised to incorporate Revision 1 to the "PWR Secondary Water Chemistry Guidelines" dated June 1984. At present, FNP is in verbatim compliance with 282 of 344 identified guidelines. Upon implementation

of pending design changes and additional programmatic actions, 326 of the 344 identified guidelines will have been implemented. Exceptions and current status are as noted in Attachment 1. Future updates and revisions to FNP's program are anticipated as state-of-the-art equipment developments, advances from research findings and industry experience become available.

## 3.b. CONDENSER INSERVICE INSPECTION PROGRAM

Staff Recommended Action

Licensees should implement a condenser inservice inspection program. The program should be defined in plant specific safety-related procedures and include:

1. Procedures to implement a condenser inservice inspection program that will be initiated if condenser leakage is of such a magnitude that a power reduction corrective action is required more than once per three month period; and

2. Identification and location of leakage source(s), either water or air;

3. Methods of repair of leakage;

4. Methodology for determining the cause(s) of leakage;

5. A preventive maintenance program.

Response

No condenser tube leakage has occurred at Farley Nuclear Plant (Unit 1 and Unit 2) since October of 1982.

Condenser tube leakage is monitored by continuous on-line instrumentation that detects increases in cation conductivity. Procedures are in place that require a reduction in power or unit shutdown, depending on the severity of the leak. Procedures are also in place that provide the methodology to identify and plug leaking tube(s). At each refueling outage, a condenser inspection (visual) is conducted for damaged tubes, loose parts, etc.

Alabama Power Company also pursues an aggressive program to identify and eliminate sources of air inleakage. Procedures are in place that use helium and freon to locate sources of air inleakage.

Since immediate actions are taken to plug leaking tubes, a condenser inservice inspection program will not necessarily have an affect on increasing the life of steam generator tubes. Based on not having any leaking condenser tubes since 1982, an inservice inspection program will probably not be implemented in the near future. Alabama Power Company does not intend to designate procedures associated with condenser leakage as safety related.

4. PRIMARY TO SECONDARY LEAKAGE LIMIT

Staff Recommended Action

All PWRs that have Technical Specifications limits for primary to secondary leakage rates which are less restrictive than the Standard Technical Specifications (STS) limits should implement the STS limits.

Response

The Technical Specifications for Farley Nuclear Plant implement the STS (Draft Revision 5) limits.

5. COOLANT IODINE ACTIVITY LIMIT

Staff Recommended Action

PWRs that have Technical Specifications limits and surveillance for coolant iodine activity that are less restrictive than the Standard Technical Specification (STS) should implement the STS limits. Those plants identified above that also have low head high pressure safety injection pumps should either: (1) implement iodine limits which are 20% of the STS values, or (2) implement reactor coolant pump trip criteria which will ensure that if offsite power is retained, no loss of forced reactor coolant system flow will occur for steam generator tube rupture events up to and including the design basis double-ended break of a single steam generator tube, and implement iodine limits consistent with the STS.

Response

The Technical Specifications for Farley Nuclear Plant implement the STS (Draft Revision 5) limits.

6. SAFETY INJECTION SIGNAL RESET

Staff Recommended Action

The control logic associated with the safety injection pump suction flow path should be reviewed and modified as necessary, by licensees, to minimize the loss of safety function associated with safety injection reset during an SGTR event. Automatic switchover of safety injection pump suction from the boric acid storage tanks (BAST) to the refueling water storage tanks should be evaluated with respect to whether the switchover should be made on the basis of low BAST level alone without consideration of the condition of the SI signal.

Response

This is not an appropriate concern for Farley Nuclear Plant as the safety injection pumps, during the injection phase, take suction from the refueling water storage tanks. Suction is not taken from the boric acid storage tanks.

ENCLOSURE 2

REQUEST FOR INFORMATION CONCERNING CATEGORY C-2

STEAM GENERATOR TUBE INSPECTIONS

## Information Requested

The enclosed draft NUREG-0844 Section 2.2.1.2 describes certain limitations which the staff believes to be inherent in the present Technical Specification steam generator ISI requirements pertaining to Category C-2 inspection results. Licensees and applicants are requested to provide a description of their current policy and actions relative to this issue and any recommendations they have concerning how existing Technical Specification steam generator ISI requirements pertaining to Category C-2 inspection results could be improved to better ensure that adequate inspections will be performed. This description should include a response to the following questions:

1. What factors do, or would, the licensee or applicant consider in determining (a) whether additional tubes should be inspected beyond what is required by the Technical Specifications, (b) whether all steam generators should be included in the inspection program, and (c) when the steam generators should be reinspected.

2. To what extent do these factors include consideration of the degradation mechanism itself and its potential for causing a tube to be vulnerable to rupture during severe transients or postulated accident before rupture or leakage of that tube occurs during normal operation.

## Response

Alabama Power Company attempts to remain as current and informed as possible regarding degradation mechanisms occurring in the industry. This is accomplished through active membership in the Steam Generator Owners Group and through a network of contacts at other utilities, EPRI and eddy current vendors.

The present steam generator inspection program is performed at each refueling outage and at a minimum includes 740 tubes (22%) in each steam generator. Any tube in rows 3 and above within the selected sample is inspected throughout the full length.

Any row 2 tube is inspected from the hot leg tubesheet through the U-bend through the top support plate on the cold leg side. The tightness of the row 2 U-bend radius requires the use of a .680 inch diameter probe in the bend area and prevents probe travel beyond the top support plate. Therefore, full length inspection of row 2 tubes cannot be performed without opening both hot and cold leg channel heads. A .720 inch diameter probe is normally used in the straight leg portions of the row 2 tubes and all row 3 and above tubes. All row 1 tubes are plugged. The pattern selected in each steam generator is a representative sample of all areas of concern currently identified for model 51 steam generators. A typical pattern used during a previous refueling outage included the following:

1. Previous non-plugged indications
2. Outer two rows of entire periphery
3. 100% of tubes in rows 2 and 3
4. Approximately 15% of the kidney region
5. Approximately 15% of the AVB region

This pattern may be modified to inspect areas of particular interest. For example, during the third refueling outage of Unit 2, the 740 pattern was implemented in two of the three steam generators. The third steam generator received a 100% hot leg tubesheet area inspecton using an 8 x 1 probe. The steam generators in Unit 2 have tubes which were expanded along the full length of the tubesheet using a mechanical rolling process. Roll transition cracking is an industry issue and this examination allowed Alabama Power Company to establish a degree of confidence that cracking was not occurring at Farley Nuclear Plant.

The intent of this program is to inspect steam generators at refueling outages until confidence can be established that the industry identified damage mechanisms are not operative in the Farley steam generators. This program exceeds the requirements of the Technical Specifications, which require inspection of only 9% of the tubes in one steam generator (approximately 305 tubes).

If three steam generators are inspected during a refueling outage, the Technical Specifications require that 3% of the tubes in each generator be inspected. This equates to 102 tubes in each Farley steam generator; however, as described above, 740 are usually inspected. If the results of the inspection of the 740 tubes fall into Category C-2, 204 additional tubes are inspected. Credit is not taken for the 740 initially inspected. The 204 tubes represent 2S, where S is 102, as required by the Technical Specifications. These tubes are selected from the areas where defective or degraded tubes were found.

Alabama Power Company is monitoring the current industry program under development for eliminating the Row 1 U-bend cracking problem. When this process has become feasible for plant implementation, Alabama Power Company will consider unplugging all non-degraded Row 1 tubes.

ATTACHMENT 1

FARLEY NUCLEAR PLANT SECONDARY WATER CHEMISTRY PROGRAM
COMPARISON TO "PWR SECONDARY WATER CHEMISTRY GUIDELINES"
REVISION 1, JUNE 1984

(The FNP program parallels the Guidelines (Rev. 1) with the following exceptions:)

| "PWR Secondary Water Chemistry Guidelines," Rev. 1, June 1984 Recommendations (Section) | Present FNP Status | Planned Actions |
|---|---|---|
| 1. Written implementation policy (1.2.1) | Corporate and plant management fully support the policy elements which are implemented through various policy and procedural documents. | None |
| 2. Corporate technical staff management of chemistry program (1.3.2.2) | Corporate technical staff provides support. FNP staff manages program. | None |
| 3. Power reductions to be $\leq$30% (2.1.2) | $\leq$35% power | None - 35% is optimum at FNP for operational stability. |
| 4. Representative AFW sample point (2.1.4) | Not required | None - AFW sample point does not exist. Sampling the CST and SGs is adequate. |
| 5. Maintain $N_2$ overpressure during filling, draining, and cold shutdown of SG (2.2.1) | Capability exists; typically not implemented due to constraints from MSIV maintenance requirements. Procedural guidance needs improvement. | Improve procedural guidance to ensure adequate $N_2$ inventory and to plan use of $N_2$ unless precluded by maintenance activities. |
| 6. Adequate sample line flush times during WLU (2.2.1) | General guidance provided | Specific requirements to be added to procedures. |

| "PWR Secondary Water Chemistry Guidelines," Rev. 1, June 1984 Recommendations (Section) | Present FNP Status | Planned Actions |
|---|---|---|
| 7. Sample frequency during wet layup (WLU) 3/week until stable, then weekly. (Table 2-1a) | 1/week | Change sampling frequency in appropriate procedures. Typically multiple samples are taken; however, no specific procedural guidance exists other than for weekly sampling. |
| 8. SGBD WLU $SO_4$ Sampling required (Table 2-1a) | Not required | Implement sampling. |
| 9. Feedwater DO sample during filling; 3/day (Table 2-1b) | 1/week | None - CST weekly monitoring is adequate. |
| 10. SGBD WLU $N_2H_4$ corrective action if $N_2H_4$ is high: drain & refill (2.2.4) | Not required | None - Available information indicates that >200 ppm $N_2H_4$ is not detrimental. Ensuring the SG pH is within range prior to opening MSIVs negates the need for the recommended correction action. |
| 11. Allocate S/U time for draining and refilling SG (2.3.1) | No critical path time is allocated. | None - During past two outages time was available off critical path. If SG chemistry for heatup becomes critical path, management will make a case by case evaluation. |

| "PWR Secondary Water Chemistry Guidelines," Rev. 1, June 1984 Recommendations (Section) | Present FNP Status | Planned Actions |
|---|---|---|
| 12. Monitor HDT discharge during power escalation (2.3.1) | Not required | None - Applies only to plants with condensate polishers. |
| 13. SGBD (Hot standby) pH corrective action established for exceeding lower limit (2.3.4) | None | Establish lower limit corrective actions. |
| 14. AFW D.O. (Hot standby) Sample 1/day (Table 2-2a) | 1/week | None - CST weekly monitoring is adequate. |
| 15. SGBD (Hot standby) Control parameter: pH (Table 2-2b) | Control parameter: Specific Conductivity (SC) | None - Specific Conductivity is more accurate than pH<br>- pH is monitored as a diagnostic parameter |
| 16. SGBD (Hot standby) pH continuous monitoring (Table 2-2b) | Grab samples: 1/4 hr | Present pH system is not reliable and will be replaced by design change. |
| 17. SGBD (Hot standby) Sodium (Na) - Continuous monitor (Table 2-2b) | Grab sample: 1/4 hr | Continuous monitoring capability to be installed by design change. |
| 18. SGBD (Hot standby) $SO_4$ Sample: 1/day (Table 2-2b) | Not required - periodic samples taken | Implement sampling. |

| "PWR Secondary Water Chemistry Guidelines," Rev. 1, June 1984 Recommendations (Section) | Present FNP Status | Planned Actions |
|---|---|---|
| 19. SGBD (Hot standby) pH Lower limit established (Table 2-2b) | No lower pH limit (as monitored by SC) has been established. | Establish lower limit. |
| 20. Feedwater (FW) - Power Ops Control parameter - pH (Table 2-3a) | Control parameter: SC | None - Specific Conductivity is more accurate than pH<br>- pH is monitored as a diagnostic parameter |
| 21. FW - Power Ops CC: ≤0.2 (Table 2-3a) | ≤0.4 | Limit will be reduced to ≤ 0.2 when ingress of organics is fully under control. |
| 22. FW - Power Ops Na - continuous monitor Limit - ≤3 ppb (Table 2-3a) (Table 4-3) | Capability exists; however, monitoring is on condensate due to increased sensitivity by eliminating dilution from pumped forward drains; limit is on condensate at ≤1 ppb; if 3 ppb FW limit were exceeded from an internal source, excursion would be detected by daily SGBD grab sample and by monitoring FW during investigative actions. | None |
| 23. FW - Power Ops Total Iron (Fe) Sample: Integrated 1/week (Table 2-3a) (Table 4-3) | Not required | Conduct integrated sampling study assisted by vendor. Evaluate need for integrated sampling based on study results. All reasonable actions are being taken to minimize iron transport, therefore weekly sampling is unjustified. |

| "PWR Secondary Water Chemistry Guidelines," Rev. 1, June 1984 Recommendations (Section) | Present FNP Status | Planned Actions |
|---|---|---|
| 24. FW - Power Ops<br>Total Copper (Cu)<br>Sample: Integrated 1/week<br>(Table 2-3a)<br>(Table 4-3) | Not required | Conduct integrated sampling study assisted by vendor. Evaluate need for integrated sampling based on study results. All reasonable actions are being taken to minimize copper transport, therefore weekly sampling is unjustified. |
| 25. FW - Power Ops<br>Total Cu<br>Limit: ≤2 ppb<br>(Table 2-3a) | ≤10 ppb; goal: ≤2 ppb | None - Air inleakage and DO are being controlled to minimum levels. Cu feedtrain components are being replaced. (Unit 1 is complete). |
| 26. SGBD - Power Ops<br>Control parameter: pH<br>(Table 2-3b)<br>(Table 4-1) | Control parameter: SC | None - Specific Conductivity is more accurate than pH<br>- pH is monitored as a diagnostic parameter |
| 27. SGBD - Power Ops<br>Na - Continuous monitor<br>(Table 2-3b)<br>(Table 4-1) | Grab sample: 1/day | Continuous monitoring capability to be installed by design change. |
| 28. SGBD - Power Ops<br>Compare theoretical CC with total anions<br>(Table 2-3b) | No procedural guidance | Establish procedural guidance. |

| "PWR Secondary Water Chemistry Guidelines," Rev. 1, June 1984 Recommendations (Section) | Present FNP Status | Planned Actions |
|---|---|---|
| 29. SGBD - Power Ops<br>$SO_4$: Sample 1/day<br>Analyze 2/week<br>(Table 2-3b)<br>(Table 4-3) | Not required | Establish sampling and analysis |
| 30. Capability for monitoring carbonate and organics (2.4.3) | Present instrument has inadequate sensitivity | Acquire new instrument |
| 31. All ferrous system chemistry limits (Chapter 2) | Modified limits used for Unit 1 to account for use of boric acid and presence of copper in condenser tubesheet | Upon reduction of residual copper in system, boric acid treatment will be discontinued. Provisions for copper in tubesheet will remain. |
| 32. Power operation corrective action guidelines (2.4.4) | Some corrective actions listed in guideline are not included in FNP procedures. | Revise procedures to include appropriate actions. |
| 33. Cond. Pump Discharge (CPD) CC-continuous monitor (Table 4-1) | Unit 1 does not have monitor<br>Unit 2 does have monitor | CPD CC monitor is redundant to Hotwell (HW) monitors. CPD CC is considered unnecessary. U2 CC monitor will be removed by design change. |
| 34. HW Na | Monitor at CPD. Capability exists to valve HW to monitor. | Planned design changes will provide Na monitors for each hotwell. |

| "PWR Secondary Water Chemistry Guidelines," Rev. 1, June 1984 Recommendations (Section) | Present FNP Status | Planned Actions |
|---|---|---|
| 35. Specific Conductivity monitors - Check reading against lab cell - 1/week (Table 4-3) (Table 4-4) | Not required | Change procedure to require check. |
| 36. SGBD - Normal Ops - Chloride (Cl) Sample 1/day (Table 4-3) | 3/week sample and analyze by ion specific electrode | Change procedure to sample 1/day and analyze 2/week with sulfate ($SO_4$) by ion chromatography. Daily analysis would have to be performed by ion specific electrode whose sensitivity value is the same as the normal limit (i.e. 20 ppb) and consumes an inordinate amount of time. Analysis 2/week will be per ion chromatography whose sensitivity is 2 ppb. |
| 37. SGBD - Normal Ops Fe/Cu Sample: Integrated 1/week (Table 4-3) | Not required | Conduct integrated sampling study assisted by vendor. Evaluate need for integrated sampling based on study results. All reasonable action is being taken to minimize Cu and Fe transport; therefore, weekly sampling is unjustified. |

| "PWR Secondary Water Chemistry Guidelines," Rev. 1, June 1984 Recommendations (Section) | Present FNP Status | Planned Actions |
|---|---|---|
| 38. FW - Normal Ops Silica ($SiO_2$) Sample: 1/day (Table 4-3) | 1/week grab | Continuous monitoring will be reestablished upon implementation of planned design changes. Present inline instrument has been retired from service due to requiring excessive operator/ maintenance attention. |
| 39. SGBD - WLU SC required (Table 4-4) | Not required | Flow is typically insufficient to operate inline monitor. However, grab sampling for SC will be initiated even though it is recognized that results may be biased high due to absorption of $CO_2$ by the grab sample. |
| 40. SGBD - WLU Ammonia ($NH_3$) required (Table 4-4) | Not required | Analysis to be instituted. |
| 41. SGBD - WLU Silica ($SiO_2$) required (Table 4-4) | Not required | Analysis to be instituted. |
| 42. AFW when filling SG D.O. Sample 3/day (Table 4-4) | 1/week | CST weekly monitoring is adequate. |

| "PWR Secondary Water Chemistry Guidelines," Rev. 1, June 1984 Recommendations (Section) | Present FNP Status | Planned Actions |
|---|---|---|
| 43. CC flow: 5-10 $gpm/ft^2$ (4.2.2.1) | 2.42-3.16 $gpm/ft^2$ | Obtain flow meters to measure increased flow. Flow presently agrees with vendor manual. Testing shows increasing flow to higher range eliminates the CC disparity between HW halves. |
| 44. CC column min. bed depth of 2 ft (4.2.2.1) | Newest instrumentation has a bed depth of 1 ft | None - testing shows that both bed depths with 5-10 $gpm/ft^2$ flow gives same values. |
| 45. Use linear plot for Cl calibration curves (4.2.2.7) | Semi-log plot used | Change to linear plot |
| 46. Samples for ion chromatograhic analysis of anions should be obtained downstream of CC column (4.2.7.2) | Samples obtained upstream of CC column | Change appropriate sampling procedure |
| 47. Use integrated samples for Cu/Fe (4.2.12.2) | Not required | Procure service to perform integrated sampling study. Consider purchase of samplers after study has been performed. |
| 48. Carminic Acid Method for Boron is allowable in 1-10 ppm range (4.2.13.1) but cannot be recommended for use (4.2.13.2). | Carminic Acid method is used | Procedure can be used if executed with great care. FNP is considered in compliance. |

| | | |
|---|---|---|
| 49. Exclude use of HCl and $NH_3$ in lab while boron titrations are performed (4.2.13.2). | Caution only addresses $CO_2$ absorption | Add guidance to procedure |
| 50. Consider using an automatic titrator (4.2.13.2) | Do not have automatic titrator | Acquire automatic titrator |
| 51. $CO_2$ estimation from CC procedure (5.2.1) | Procedural guidance not available | Provide procedural guidance |
| 52. CC/Anion balance (5.2.2) | Procedural guidance not available | Provide procedural guidance |
| 53. Cation/Anion balance (5.2.3) | Procedural guidance not available | Provide procedural guidance |
| 54. Results consistency review (5.2.4) | Procedural guidance not available | Provide procedural guidance |
| 55. Trend Action Level 1, 2, 3 parameters (5.2.5) | Not all parameters are trended | Initiate additional trending when computer data base is developed. |
| 56. Mass Transport calculations (5.2.6) | Procedural guidance not available | Provide procedural guidance |
| 57. Histograming Data capability (5.3.2.1) | Capability exists | Histogramming of data to be implemented upon developing computer data base. |