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RECIP.NAME RECIPIENT AFFILIATION
MARTIN,J.B. Region 3 (Post 820201)

See Report

SUBJECT: Requests that NRC reconsider reduction in scope for SWS Operational Performance Insp (SWSOPI) to be performed at plant during Feb & Mar 1994.Basis for request,Rev 3 to SSFI plan & document entitled, "SSFI of...SWS 02 (SW)" encl.

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WISCONSIN PUBLIC SERVICE CORPORATION
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October 13, 1993

Mr. John B. Martin
Regional Administrator
US NRC Region III
799 Roosevelt Road
Glen Ellyn, IL 60137-5927

Dear Mr. Martin:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
SWSOPI Scope Reduction

Reference: 1) Letter from W. L. Forney (NRC) to C. A. Schrock (WPSC) dated September 29, 1993

As stated in the above reference, a Service Water System Operational Performance Inspection (SWSOPI) is scheduled to be performed at the Kewaunee Nuclear Power Plant (KNPP) during February and March, 1994. In light of the recently released NRC Inspection Procedure 40501 and the extensive amount of work Wisconsin Public Service Corporation has performed associated with the KNPP service water system, including performing a six week safety system functional inspection (SSFI), WPSC initiated discussions with the Senior Resident Inspector at the KNPP concerning the potential of a reduced scope SWSOPI. On September 1, 1993, members of my staff met with Mr. Geoffrey Wright of your staff to discuss this topic. It was agreed that WPSC would formally submit a request to the Region providing details of the WPSC service water system SSFI and other activities performed associated with the service water system.

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This letter is our formal request for the NRC to consider a reduction in scope for the SWSOPI to be performed at the KNPP. The attachment to this letter contains the basis for this request. If you have any questions, please contact a member of my staff.

Sincerely,

C. A. Schrock

C. A. Schrock
Manager - Nuclear Engineering

PMF/cjt

Attach.

cc - US NRC Document Control Desk
US NRC Region III (w/o Enclosures)
US NRC Senior Resident Inspector (w/o Enclosures)

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ATTACHMENT 1

Letter from C. A. Schrock (WPSC)

To

Mr. John B. Martin (NRC)

Dated

October 13, 1993

I. INTRODUCTION

NRC Inspection Procedure 40501 provides guidelines on what is necessary in order to credit a licensee self assessment in lieu of a full NRC inspection. The Inspection Procedure listed the following four areas which the NRC will assess to determine whether the licensee self assessment warrants a reduced NRC inspection.

1. The capability of the licensee's organization to manage the self assessment.

2. The credentials and experience of the licensee's assessment team.

3. The scope and depth of the self assessment are equivalent to the temporary instruction (TI) for the area-of-emphasis inspection.

4. The timing of the licensee's self assessment.

In January, 1990, Wisconsin Public Service Corporation (WPSC) initiated a six week Safety System Functional Inspection (SSFI) of the service water (SW) system as part of the on-going SSFI program at the KNPP. (Note: A six week SSFI was also performed on the component cooling water (CCW) system in September/October 1990 as part of our Generic Letter (GL) 89-13 actions.) Currently, nine SSFIs have been performed covering twelve systems as part of the SSFI program at the KNPP. Although the SSFI was performed prior to the existence of the NRC Temporary Instruction for performing SWSOPIs (TI 2515/118), it correlated well with the inspection requirements of the TI as will be shown later in this attachment.

II. QUALIFICATIONS OF ORGANIZATION AND ASSESSMENT TEAM

In the two most recent SALP reports for the KNPP, including the SALP period in which the SW SSFI was performed, the NRC has termed the WPSC SSFI program as "highly effective," and executed by well-qualified personnel. The SW SSFI inspection was performed by a twelve-member team, including four WPSC personnel, seven contractors, and one representative from the Institute for Nuclear Power Operations. The makeup of the inspection team included members with experience in mechanical design, electrical design, fluid mechanics, operations, maintenance, surveillance, quality assurance, field verification, and Generic Letter 89-13 issues.

The following are summaries of each of the inspector's qualifications. Copies of the inspector resumes are kept on file at the KNPP and are available for your review.

Team Leader (WPSC)

The Team Leader's work history includes 1 year employment with the Trane Company, where he was involved in the construction and testing of heat exchangers. At the time of the Service Water SSFI, he had 10 years experience in the Wisconsin Public Service Corporation (WPSC) Nuclear Licensing and Systems Department. He was involved in numerous projects for WPSC including NRC Bulletins 79-02 and 79-14, post-TMI auxiliary feedwater qualification, Regulatory Guide 1.97, and performance of a technical review of radiation counting techniques at Kewaunee. He also was the lead engineer for development of a regulatory commitment tracking system and development of a program to detect and trend erosion/corrosion in secondary plant piping systems. He acted as the WPSC technical representative to the Westinghouse Owners Group (WOG) and was on the MERITS Subcommittee for technical specification improvements.

Assistant Team Leader (United Energy Services Corp. [UESC])

Prior to his employment at UESC, the Assistant Team Leader was employed by the U.S. Nuclear Regulatory Commission where he conducted performance based Emergency Operating Procedure inspections at the Crystal River, Oconee, Arkansas Nuclear One and D.C. Cook plants. He also participated in the SSFI Program at Kewaunee for the Instrument Air and Emergency DC Systems as well as the SW System. In addition, he participated in the SSFI on Emergency Power Systems at the H.B. Robinson Plant, an Operational Readiness Review at the Vogtle Electric Generating Plant, and was a member of an Augmented Inspection Team assigned to the Surry Plant to investigate the refueling cavity floor seal failure and subsequent root cause determination. While employed by General Electric Company, he completed the BWR-6 Senior Reactor Operator Certification Program at the Perry Power Plant. He also directed the efforts of engineering and craft personnel during startup and test of the onsite emergency power systems at the Shoreham Nuclear Power Plant while employed by Primetech Associates, Inc.

Mechanical Design (UESC)

While employed by Gilbert/Commonwealth, this team member worked on mechanical engineering projects for several nuclear power plants including: dynamic incidents analysis and supervising steam erosion hazards analysis at the Perry Nuclear Plant; supervision of the design basis documentation project, resolution of questions from SSFI and Independent Safety Evaluation Group reviews, and revision of pipe rupture design basis data records and drawings at V.C. Sumner Nuclear Station; performing as a

Systems Engineer during the cleanup and recovery operation at TMI Unit 2; and implementation of TMI-2 lessons learned, 10 CFR 50 Appendix R compliance and critical path resolution of audit questions for the restart of TMI Unit 1.

Electrical Design (UESC)

Prior to participating in Kewaunee's Service Water System SSFI, this team member had participated in over a dozen SSFIs. His work history included participating in SSFIs at the Rancho Seco Nuclear Plant, performing ealculations, analyses, walkdowns and procedure development to determine the plant electrical equipment as-built configuration at the Browns Ferry Nuclear Plant, and performing as a nuclear construction electrical engineer at the Perry Nuclear Plant. While employed by Gilbert/Commonwealth, Inc., he was assigned as a certified Level III Electrical Startup Engineer and served as a Design Representative to the site nuclear design engineering section.

Fluid Hydraulics (UESC)

As an employee of Gilbert/Commonwealth for 16 years, this team member had extensive experience performing fluid systems analyses, thermodynamic cycle analyses, heat transfer analyses and dynamic simulations at several nuclear and non-nuclear power plants.

Maintenance (UESC)

While employed by UESC, this team member was the maintenance inspector during an SSFI inspection at the Trojan Nuclear Plant. Prior to employment with UESC, he was employed by the U.S. Nuclear Regulatory Commission for 10 years and was the onsite resident inspector assigned to the Kewaunee Plant. During that time, he participated in a number of individual and team inspections at several nuclear facilities. He was the lead operations inspector assigned to a fact finding team for the Ginna steam generator tube rupture event. He received the Resident Inspector of the Year Award in 1987. During previous employment at the Wisconsin Electric Power Company, he obtained his Senior Reactor Operator license and held the position of Operations Shift Supervisor at the Point Beach Nuclear Plant. He was involved in the construction, pre-operational testing, and startup of Point Beach Units 1 and 2.

Mechanical Design (INPO)

This team member's qualifications include developing technical guidance for INPO on

the conduct of Service Water system performance reviews, participating as an evaluator on several system performance reviews, and managing projects in INPO's Operational Data Analysis Section. He also worked as a project engineer for Sargent & Lundy and was responsible for preparation and review of probablistic risk assessment (PRA) analyses and performing computer analyses and technical reports in the areas of thermodynamics, fluid mechanics and heat transfer.

Mechanical Design/Generic Letter 89-13 (WPSC)

This team member's work history includes employment with Westinghouse Electric Corporation where he was primarily involved in operator training. He held the position of Nuclear Engineer in the Nuclear Licensing and Systems Department of WPSC at the time of the Service Water SSFI. At that time, he was the responsible engineer for response to NRC's Generic Letter 89-13 and also was a certified Shift Technical Advisor for the Kewaunee Plant.

Operations (WPSC)

As an employee of WPSC, this team member was employed in the Operations Department for seven years where he held several positions and obtained his Reactor Operator and Senior Reactor Operator licenses. He also had two years experience in the WPSC Quality Assurance Department where he performed as a certified Lead Auditor. He conducted audits on the subjects of maintenance activities, surveillance procedures, design changes, technical specification compliance, Integrated Plant Emergency Operating Procedures (IPEOP), and NRC Bulletin 79-14. He was the Operations Inspector for the Kewaunee DC and Emergency AC Distribution System SSFI.

Quality Assurance (UESC)

While employed by Florida Power & Light for 3 years, this team member was a principal auditor in the areas of operations, maintenance, testing and training. He used vertical audit techniques and NRC SSFI and Safety System Outage Modification Inspection (SSOMI) techniques in the audit of an ISI program and several plant safety systems. While employed by Bechtel Construction Inc. for 3 years, he performed as a mechanical field engineer at the Palo Verde Nuclear Generating Station, responsible for equipment placement, alignment, lubrication and troubleshooting/rework prior to turnover to the owner. He also was certified as a Bechtel Level I Quality Control Inspector responsible for inspection of nuclear piping, fittings, valves and welds at the Limerick Nuclear Plant, and was certified to ANSI Level II for inspection of nuclear mechanical components and systems at the Palo Verde Plant.

Testing (UESC)

As an employee of UESC, this team member provided engineering services in support of Safety System Functional Inspections, Safety System Outage Modification Inspections, Configuration Management assessments, Operational Performance Assessments, event investigations and root cause analysis activities. While employed with System Energy Resources, Inc. at the Grand Gulf Nuclear Station, he performed reviews of design changes for technical accuracy and compliance with standards and regulatory requirements, performed post-modification testing on design changes, and he participated in the SSFI of the Standby Liquid Control System, providing testing and engineering expertise to the SSFI team. He also was certified at the Senior Reactor Operator level while employed with General Electric Company.

Walkdown (WPSC)

This team member's employment history included 15 years of experience in the nuclear industry as an engineering consultant, preoperational test administrator and construction test assistant. He had worked at a number of reactor sites on various projects including Final Safety Analysis Report (FSAR) updates, Nuclear Plant Reliability Data System (NPRDS) reporting, audits of NPRDS reporting, responding to NRC Bulletins and Information Notices and design change implementation and control. He was a construction test assistant and preoperational test administrator at the Kewaunee site during the construction and startup phases of the Kewaunee unit.

III. COMPARISON OF TI 2515/118 REQUIREMENTS AND WPSC ACTIONS

1. Status of planned or completed actions in response to Generic Letter 89-13.

References:

1. Letter from C.R. Steinhardt (WPSC) to NRC Document Control Desk dated January 29, 1990.

2. Letter from C.R. Steinhardt (WPSC) to NRC Document Control Desk dated October 21, 1991.

A. NRC Recommended Action 1:

For open-cycle service water systems, implement and maintain an ongoing

program of surveillance and control techniques to significantly reduce the incidence of flow blockage problems as a result of biofouling.

WPSC Actions:

1. WPSC annually inspects the external framework and gridwork of the intake structure in Lake Michigan using Preventative Maintenance Procedure (PMP) 4-1, "Circulating Water (CW) System Inlet Structure Inspection." The CW system forebay and CW pump discharge piping are inspected using PMF 4-14, "Circulating Water System Circulating Water Pump Suction Vault and Discharge Piping Zebra Mussel and Organic Macrofouling Inspection," for macroscopic biofouling.

2. WPSC has two independent chlorination systems, one system to inject into the forebay and the condenser inlet waterboxes, and one system to inject into the SW pump discharge piping. Both systems inject sodium hypochlorite intermittently and are also capable of continuous injection when necessary. Radiochemistry Procedure (RC-C) RC-C-46, "Circulating Water Chlorine Injection Procedure," provides direction for injecting into the forebay and the waterboxes. Procedure RC-C-46G, "Service Water Chemical Injection Procedure," provides direction for injecting into the SW pump discharge piping.

3. A method has been developed to allow the main fire protection system water header to be flushed and placed into wet layup with a non-oxidizing biocide. Normal Operating Procedure N-FP-08B, "Fire Protection Chemical Treatment," provides procedural direction for this evolution. Flushing of the main fire header in accordance with this procedure has recently been implemented.

4. Procedure RC-C-46K, "Service Water Dead Leg Chemical Treatment," provides direction for biocide injection into identified portions of the SW system that have intermittent or stagnant flow. Current plans are to perform this procedure before the end of this year.

5. Beginning in 1990, WPSC implemented a program to sample water and substrate to determine if any form of macroscopic biofouling organisms have populated Lake Michigan using procedure RC-C-48, "Zebra Mussel Veliger Sampling." In addition, bioboxes were installed to aid in the early detection of zebra mussels in both the SW and CW systems. Because zebra mussels have been found in the CW system, the bioboxes have been removed; the bioboxes are still installed in the SW system to monitor the effectiveness of the chlorination system. Also, monitoring of the SW and CW systems for veligers has been performed.

TI Inspection Requirements addressed: 03.01.e, 03.03.d, 03.03.i, and 03.04.k.

B. NRC Recommended Action II:

Conduct a test program to verify the heat transfer capability of all safety-related heat exchangers cooled by open-cycle service water.

WPSC Actions:

1. Design Change Request (DCR) 2396 was implemented to install flow and temperature instrumentation on all safety-related heat exchangers cooled by service water with the exception of the safety injection pump lube oil coolers and one of the residual heat removal pump pit area fan coil units. In addition, temperature monitors were not installed on the process fluid in the control room air conditioning condensers and the diesel generators jacket water coolers. The bases for these decisions are provided in reference 2. Fan coil unit/ heat exchanger performance monitoring is performed in accordance with General Maintenance Procedure (GMP) 136, "Fan Coil Unit Performance Monitoring," and PMP 10-6, "Diesel Generator Mechanical Cooling System." Due to the small temperature changes across many fan coil units and heat exchangers, trending of data is needed to help determine performance. Therefore, WPSC is developing a program for performing trending and evaluation of the testing results.

2. Analyses performed in parallel with the development of the heat exchanger performance monitoring program determined the heat removal capabilities and requirements for the safety-related heat exchangers and fan coil units. Included in these analyses were the use of 80° F maximum service water temperature versus the design temperature of 66° F.

3. In addition to performance testing, periodic cleaning and inspection of heat exchangers are performed as part of our preventive maintenance program using procedure GMP 137, "Brush Cleaning Heat Exchanger Tubes and Inspection."

4. Eddy current testing is performed on the component cooling heat exchangers and the diesel generator coolers periodically to ensure tube integrity.

5. Numerous modifications were made to the SW system in order to improve heat exchanger performance and ensure that the required SW flowrates were being delivered to safety-related components. These modifications include:

   - DCR 2486 - Replacement of diesel generator lube oil and water jacket coolers.

   - DCR 2467 - Installation of orifices in containment fancoil unit service water return lines.

   - DCR 2479 - Coating of service water tube sheet channel heads and end caps of the component cooling water heat exchangers.

   - DCR 2468 - Relocation of SW control valves from the inlets to the outlets of the component cooling water heat exchangers.

   - DCR 2459 - Modified SW piping to the control room air conditioning system and the control rod drive mechanism fan coil units to ensure adequate SW flow.

   - DCR 2317 and 2634 - Replacement of the battery room fan coil unit coils.

- DCR 2460 - Modified SW supply to the auxiliary building mezzanine fan coil units and RHR pump pit fan coil units to ensure adequate flow.

- DCR 2461 - Replacement of the containment fan coil unit coils.

6. Service Water flow testing was performed during the 1990, 1991 and 1992 refueling outages to support SW system modifications which ensured proper SW system flow distribution. In addition, a detailed flow model was developed and benchmarked using the flow test results. The purpose of the flow model is for use as a tool in design, testing, and inspection decisions related to the SW system.

TI Inspection Requirements addressed: 03.01.e, 03.01.j, 03.04.h, and 03.04.1.

C. NRC Recommended Action III:

Ensure by establishing a routine inspection and maintenance program for open-cycle service water system piping and components that corrosion, erosion, silting and biofouling cannot degrade the performance of the safety-related systems supplied by service water.

WPSC Actions:

1. WPSC led the industry by developing a tangential radiographic technique for performing pipe inspections. This technique is capable of detecting silt buildup, macrofouling, corrosion product buildup, pitting, erosion, etc. The SW radiography program is an ongoing program with inspections performed in accordance with Engineering Control Procedure 8.2, "Service Water Inspection Program Coordination" during each operating cycle.

2. Several plant improvements have been made as a result of or in conjunction with the radiography program, these include:

   - A study was performed to determine which areas in the SW system were most susceptible to corrosion product and silt buildup. DCR 2416 was initiated to install piping and

connections to facilitate chemical cleaning of these areas. WPSC analyzed sections of SW piping to determine the makeup of the corrosion product buildup in order to determine the best chemical cleaning agent and application technique, and during the 1990 refueling outage WPSC chemically cleaned those areas of concern. Radiography was performed on these sections of piping prior to and following chemical cleaning, and the post-cleaning inspection verified that the cleaning was effective. We have continued to periodically inspect these areas to identify if there would be any adverse effects of chemical cleaning, there have been none to date.

- Radiographic inspections identified silt buildup in the SW backup supply piping to the auxiliary feedwater pumps. As a result, DCR 2475 installed branch piping to collect the silt. Flush connections were also installed and are used to periodically flush the silt buildup. In addition, the piping taps off the SW train header were relocated to the top of the header.

- Radiographic inspections identified a similar problem in the SW backup supply to the spent fuel pool. DCR 2457 installed an additional valve near the main header and a flushing connection to prevent silt buildup.

- Pipe replacements have been performed due to pitting identified using radiography.

3. In addition, GMP 137 (discussed above) is also used for inspecting the SW system piping and heat exchangers. These inspections are typically coordinated with maintenance activities.

TI Inspection Requirements addressed: 03.01.e, 03.01.j, 03.03.d, 03.03.i, and 03.04.k.

D. NRC Recommended Actions IV and V:

Confirm that the service water system will perform its intended function in accordance with the licensing basis of the plant.

Confirm that maintenance practices, operating and emergency procedures, and training that involves the service water system are adequate to ensure that safety-related equipment cooled by the service water system will function as intended and that operators of this equipment will perform effectively.

WPSC Actions:

As discussed previously, WPSC has performed SSFIs on both the SW and CCW systems. In conjunction with the SW system SSFI, a SW reliability centered maintenance analysis was also performed. Details of the SW SSFI are described below. A complete summary of the SSFI findings and resolutions is enclosed.

2. TI Inspection Requirement 3.01, Mechanical System Review

The major components of the SW system were reviewed to ensure consistency with the design bases. The SW system components reviewed were the SW pumps and strainers, the forebay and intake structures, the emergency SW supply piping, the CCW and spent fuel pool cooling heat exchangers and area fan coil units and associated piping. This review evaluated the critical performance parameters (levels, temperature, pressure, flow, heat transfer capacity), code requirements, seismic design, safety classifications, equipment environmental conditions and required operating modes. In addition to this review, a fluid mechanics review was performed which included an in-depth review of SW system hydraulic calculations, preoperational SW system test data, a recent SW flow test and a review of selected test and surveillance procedures which could affect system flow capabilities.

The following significant questions and concerns were identified as part of the mechanical design and fluid mechanics review:

- The adequacy of the QA designation of SW branch lines which are manually isolable.

- Because of the screenhouse HVAC configuration, the ambient temperature may be lower than that specified in the EQ Plan.

- The SW pump net positive suction head and forebay level setpoints were questioned.

- The procedural controls and adequacy with the post-modification testing procedures that established the area fan coil unit SW valve positions were questioned.

- Inconsistencies and potential nonconservative assumptions in the SW system flow calculations were identified.

- The adequacy of single SW pump operation was questioned.

- The team identified a lack of detailed flow analysis and information to support system modifications and operating decisions.

- No calculation could be found to support the design of the alternate circulating water intake.

- Inconsistencies and potential invalid assumptions were identified in the calculation for sizing the CCW and spent fuel pool cooling heat exchangers.

- The design bases and assumptions surrounding the modifications to install new area fan coil units were questioned.

TI Inspection Requirements addressed: 03.01.a, 03.01.b, 03.01.c, 03.01.d, 03.01.e, 03.01.f, 03.01.g, 03.01.h, 03.01.i, 03.01.j, and 03.01.k.

3. TI Inspection Requirement 3.02, Operations Review

The Operations inspection consisted of a review of normal, abnormal and emergency operating procedures; system related reference material; system walkdowns; and interviews with plant personnel. The inspection was performed to determine if the SW system is being operated within its design limitations and if operational activities are being conducted in accordance with adequate procedural guidance. The following significant concerns and questions were identified as part of the operations portion of the WPSC SW SSFI:

- The removal from service of the annunciator for the SW to containment leakage monitoring alarm.

- A lack of procedural guidance regarding radiological discharges using SW (not circulating water) as dilution flow.

TI Inspection Requirements addressed: 03.02.a, 03.02.b, 03.02.c, 03.02.d, 03.02.e, 03.02.f, 03.02.g, and 03.02.h.

4. TI Inspection Requirement 3.03, Maintenance Review

The scope of the maintenance review of the SW System included procedures and directives related to preventative, corrective, and general maintenance; machinery history; vendor technical manuals; Technical Specifications; visual observation of system equipment; and discussions with the plant Maintenance Group staff.

The review of procedures was performed to determine if the vendor technical manual recommendations regarding maintenance were appropriately addressed, and if the procedure was adequate for the designated task. Questions and concerns that were identified as significant were:

- Inconsistent information and references were noted in the different SW pump Tech Manuals.

- The basis for various lubrication intervals was questioned.

- The adequacy of the area fan coil SW flush was questioned.

- Concerns were identified with the leak testing procedure for the CCW heat exchanger tubes.

- Several maintenance activities were identified where authorization of work beyond that described on the maintenance work request could not be located.

TI Inspection Requirements addressed: 03.03.a, 03.03.b, 03.03.c, 03.03.e, 03.03.f, and 03.03.g.

5. TI Inspection Requirement 3.04, Surveillance and Testing Review

References:

1. "Independent Technical Review of the Kewaunee Nuclear Power Plant In-Service Testing Program," TR-91-03, March 13, 1992

2. Letter from M. A. Ring (NRC) to C. A. Schrock (WPSC) dated October 7, 1992

The scope of the testing evaluation of the SW System included a review of surveillance test procedures, preoperational tests, construction tests, post-modification testing, post-maintenance testing, and calibration/testing of system instrumentation. The evaluation of SW surveillance procedures included a review of test adequacy in satisfying plant Technical Specifications and ASME Section XI Code requirements. Significant questions and concerns identified were:

- Concerns arose regarding the SW Pump IST through the mini-flow recirculation piping.

- Following SW pump maintenance, no requirement was found to ensure Section XI baseline values are incorporated into the procedures.

- No trending of pump and valve IST results was observed.

- Discrepancies in the Appendix J leak testing program.

- An error was identified in the test method that determines the SW pumps total developed head.

In addition, WPSC performed an independent technical review of the KNPP In-Service Testing (IST) program from July 16, 1991 to November 21, 1991 (Reference 1). The IST inspection included three engineers from the WPSC nuclear department, one of whom was a former Senior Reactor Operator at the KNPP. Also, the NRC performed an IST inspection at the KNPP from August 17, 1992 to September 22, 1992 (Reference 2).

TI Inspection Requirements addressed: 03.04.a, 03.04.b, 03.04.c, 03.04.d, 03.04.e, 03.04.f, 03.04.g, 03.04.i, 03.04.j and 03.04.l.

6. TI Inspection Requirement 3.05, Quality Assurance (QA) and Corrective Actions Review

Quality aspects of various corporate and plant programs were reviewed. Major areas reviewed were design control, document control, procurement, QA oversight, maintenance, and procedure reviews. With respect to procurement, maintenance, and procedure reviews, SW components or those cooled by the system were selected and their appropriate records were reviewed. The selected components were the SW pumps, SW pump discharge check valves, CCW heat exchangers, Control Room chiller condenser and the spent fuel pool heat exchanger. Design and document controls were examined for generic concerns.

Procurement controls were evaluated by review of purchase orders (POs) for various SW pump spare parts. Quality requirements included in the POs, along with documented manufacturer's site surveillance and inspection activities, and QA audits provide adequate assurance that quality products are being specified and procured.

Maintenance activities were reviewed to verify controls are in place to assure the quality levels of parts and components are sustained throughout their service life.

During the course of the quality reviews, the following issues were identified;

- Calculations are not being adequately controlled with respect to identification, indexing and retrievability; interface with other organizations; format; and methodology.

- Temporary Change controls were felt to be insufficient to prevent temporary changes from being left in place for long periods of time.

- Document control is not fully proceduralized. Procedures only existed for drawing control and receipt and revision of vendor technical manuals.

- An issue was identified regarding welding controls during welding of a SW pump component.

TI Inspection Requirements addressed: 03.05.b and 03.05.e.

7. Electrical Design Review:

The major subjects reviewed in the Electrical Design area included identification of installed equipment; intereonnecting wiring design; application of protection devices such as fuses, motor heaters, and molded-case circuit breakers; delivery of adequate current and voltage to electrical devices; sizing of electrical drives to satisfy the mechanical requirements; application of test results information; and review of changes from original design to present installations. The following are the significant concerns that were identified as part of this review:

- For single service water pump operation, pump motor operating limitations were identified.

- Other concerns identified documentation and configuration control issues associated with the electrical distribution system information.

8. Field Walkdown Verification:

A specific area of inspection performed as part of the SW System SSFI was a field walkdown/verification. The walkdown of the SW System verified the configuration of readily accessible system equipment. A set of system flow diagrams were yellow-lined and Documentation Sheets completed describing the system material conditions. Several minor discrepancies were identified.

An Information System verification was performed prior to the SSFI which corrected the nameplate information for mechanical components and was available for the SW system SSFI. The verification had been conducted on an area by area basis and actual system configuration was not confirmed until this inspection.

This walkdown inspection was closely coordinated with the other discipline inspectors, significant findings identified as a part of the field walkdown activities were documented as part of the concerns developed by the individual inspectors.

9. Reliability Centered Maintenance Assessment of the SW System

In conjunction with the SW SSFI, a reliability centered maintenance (RCM) analysis was performed on the SW system. The purpose of the SW system RCM was to enhance maintenance methods to increase system reliability and plant availability, and to lower operating costs. A summary of the basic methodology used is provided below:

A. Define system boundaries and functions using drawings, procedures, licensing documents, and system walkdowns.

B. Develop a functional block diagram.

C. Define subsystem partitions and functions.

D. Perform system and subsystem functional failure analysis identifying all potential failure modes.

E. Identify actual functional failures using work requests, surveillance procedure results, preventative maintenance history, design changes, and interviews.

F. Summarize existing preventative maintenance program.

G. Identify functionally significant items (critical components).

H. Develop system matrix with Failure Modes Effects Analysis.

I. Identify Functional Failures/Functionally significant items requiring logic tree analysis.

J. Perform logic tree analysis including the following considerations:

- mandatory or discretionary
- evident or hidden failure
- identify preventative maintenance task and frequency
- cost-benefit evaluation
- compare to current preventative maintenance program.

K. Develop recommended actions.

L. Implement changes.

TI Inspection Requirements addressed: 03.03.e, 03.03.f, 03.03.g, 03.04.b, and 03.04.i.

IV. SUMMARY OF COMPARISON OF TI 2515/118 REQUIREMENTS AND WPSC ACTIONS

TI 2515/118 Inspection Requirement	WPSC Actions		
	GL 89-13	SW SSFI	SW RCM
03.01.a		X	
03.01.b		X	
03.01.c		X	
03.01.d		X	
03.01.e	X	X	
03.01.f		X	
03.01.g		X	
03.01.h		X	
03.01.i		X	
03.01.j	X	X	
03.01.k		X	
03.02.a		X	
03.02.b		X	
03.02.c		X	
03.02.d		X	
03.02.e		X	
03.02.f		X	
03.02.g		X	
03.02.h		X	

TI 2515/118 Inspection Requirement	WPSC Actions		
	GL 89-13	SW SSFI	SW RCM
03.03.a		X	
03.03.b		X	
03.03.c		X	
03.03.d	X		
03.03.e		X	X
03.03.f		X	X
03.03.g		X	X
03.03.h			
03.03.i	X		
03.04.a		X	
03.04.b		X	X
03.04.c		X	
03.04.d		X	
03.04.e		X	
03.04.f		X	
03.04.g		X	
03.04.h	X		
03.04.i		X	X
03.04.j		X	
03.04.k	X		
03.04.l	X	X	

TI 2515/118 Inspection Requirement	WPSC Actions		
	GL 89-13	SW SSFI	SW RCM
03.05.a			
03.05.b		X	
03.05.c			
03.05.d			
03.05.e		X	

V. ENCLOSURES

1. SSFI Methodology and Plan

2. SW SSFI Inspection Report Summary

3. Status of SW SSFI RI Resolution

   Enclosure 3 provides a status of the resolution effort associated with the SW SSFI concerns. The summaries provided in Enclosure 3 were written based on either the formal Request for Information (RI) response or the RI engineering evaluation. Please note that for each identified RI, a detailed engineering evaluation is performed. This evaluation is used as the basis when preparing a formal RI response. Refer to Enclosure 1, the SSFI Methodology and Plan, for further details regarding the RI implementation process. Copies of formal RI responses and/or the supporting engineering evaluations will be provided at your request.