FNP Program: Water Chemistry Control Program	Document Type: NUREG-1801 Program Exception Comparison
Version: 1	

FNP Closed Cooling Water Chemistry Control Program Exception Comparison

FNP Program	Water Chemistry Control Program; *LRA Section B.3.2*
NUREG-1801 Reference	XI.M21, Closed-Cycle Cooling Water System
Precedent Program	**St. Lucie** Chemistry Control Program; Closed-Cycle Cooling Water System Chemistry Subprogram; *LRA Appendix B, Section 3.2.5.2.*
Precedent Program SER Reference	**St. Lucie SER**, ML031890095 (dated July 2003); *Section 3.0.5.6.*

1. OBJECTIVE

This document supports application for renewal of the FNP Units 1 and 2 operating licenses.

This document compares the FNP Water Chemistry Program exception to NUREG-1801 to a previously submitted program credited by another applicant. The objective is to identify areas where similar exceptions to NUREG-1801 have been previously accepted by the NRC staff in an SER.

The FNP Water Chemistry Control Program is consistent with NUREG-1801, Sections XI.M2 and XI.M21 with exception. This comparison document focuses solely on the FNP exception to NUREG-1801 identified in the FNP LRA, Appendix B.3.2. Other program attributes have been determined to be consistent with NUREG-1801 and need not be addressed.

FNP Program: Water Chemistry Control Program	Document Type: NUREG-1801 Program Exception Comparison
Version: 1	

2. PROGRAM EXCEPTION COMPARISON:

2.1 FNP Water Chemistry Program Exception

The FNP Water Chemistry Control Program LRA documentation identifies the following exception to NUREG-1801 Section XI.M21:

(From the FNP LRA, Section B.3.2.3)

> *"The Closed Cycle Cooling Water program described in NUREG-1801, section XI.M21 places emphasis on thermal-hydraulic performance testing for pumps and heat exchangers. The FNP program deals with performance monitoring as outlined in Section 5 of EPRI TR-107396, "Closed Cooling Water Chemistry Guideline" regarding chemistry monitoring."*

2.2 Precedent LRA Reference (St. Lucie)

(From the St. Lucie LRA, Appendix B, Section 3.2.5.2

> *"The Closed-Cycle Cooling Water System Chemistry Subprogram is consistent with the ten attributes of the Aging Management Program XI.M21, 'Closed-Cycle Cooling Water System,' in the GALL Report,* ***except that this subprogram does not address surveillance testing and inspection****. This subprogram was developed in accordance with the guidance in EPRI TR-107396, "Closed Cooling Water Chemistry Guideline" [Reference B-14]. The Intake Cooling Water Inspection Program implements the applicable surveillance testing and inspection aspects of the GALL program."*

2.3 Precedent SER Reference (St. Lucie)

The St. Lucie SER, Section 3.0.5.6 provides the staff's assessment of the St. Lucie Closed-Cycle Cooling Water Chemistry subprogram:

> *"The applicant credits the St. Lucie Water Chemistry Control Program—Closed-Cycle Cooling Water System Subprogram for managing loss of material due to general, pitting, and crevice corrosion in the cooling water system components exposed to treated water. These components are made of carbon steel, stainless steel, cast iron, and aluminum bronze.* ***The applicant states that the Closed-Cycle Cooling Water System Chemistry Subprogram is consistent with the 10 attributes of AMP X1.M21, "Closed-Cycle Cooling Water System," in the GALL Report, with the exception that this subprogram does not address surveillance testing and inspection.*** *The applicant further states that the St. Lucie Intake Cooling Water System Inspection Program implements the applicable surveillance testing and inspection aspects of the GALL program. However, the Intake Cooling Water System Inspection Program includes inspection of only those closed cooling water (CCW) system components that are exposed to raw water, and not to treated water, which include the CCW heat exchanger tubes, tubesheets, channels, and doors. The GALL Report*

recommends inspecting these components and other CCW system components that are exposed to treated water and are susceptible to loss of material. By letter dated July 18, 2002, the staff requested, in RAI B.3.2.5-2, the applicant to provide justification for not including inspection in the aging management of the CCW components exposed to treated water.

In its response dated September 26, 2002, the applicant stated that a review of St. Lucie plant specific operating experience was performed as part of the AMR process for the CCW System to identify any age-related material failures/degradations associated with corrosion due to inadequate chemistry controls. The results of the review identified no instances of material failures or degradation, which supports evidence of an effective Chemistry Control Program. The applicant noted that many CCW components have been inspected in the past as part of corrective maintenance or the Periodic Surveillance and Preventive Maintenance Program (e.g., periodic pump overhauls). The applicant further stated that during the past 12 months, more than 30 maintenance work orders were generated for Units 1 and 2 CCW that required disassembly or removal of components. These work orders included repairs on instrumentation and other isolation valves, flow control valves, and check valve and relief valve internal inspections throughout the system. A majority of these components (e.g., relief and isolation valves) entailed system locations where stagnant flow conditions exist. These locations are the likely candidates for pitting corrosion. The internal condition of the components has provided additional confidence that the Closed-Cycle Cooling Water System Chemistry Subprogram is effective.

The applicant stated that the St. Lucie maintenance procedures typically specify inspection criteria or reference plant quality instructions that specify internal cleanliness requirements. As an example, the maintenance procedure for relief valve removal and testing includes a visual inspection of valve and piping mating surfaces for corrosion and pitting. Additionally, the applicant referred to the response to RAI 3.3.2-1 for additional information regarding maintenance inspection requirements. The response to RAI 3.3.2-1 stated that the maintenance procedures specify Class C cleanliness requirements for CCW. Class C permits a tightly adhered oxide film or red oxide coating, as well as small areas of light rust, but pitting is not acceptable. The applicant further stated that any significant degradation identified during these inspections would have been documented under the plant's Corrective Action Program. Therefore, the applicant concluded that the Closed-Cycle Cooling Water System Chemistry Subprogram is an effective program, and additional inspections of other CCW components specifically to confirm program effectiveness are unnecessary.

On the basis of its review, the staff finds that the applicant's response to RAI B.3.2.5-2 clarifies and satisfactorily resolves the item because (1) some of the CCW component locations with stagnant flow conditions that might be susceptible to pitting corrosion were included in the past maintenance activities, (2) the connections between metals and nonmetals (e.g., flange connections associated with valves and pumps) that might be susceptible to crevice corrosion were also included in the maintenance activities, and

(3) no loss of material (corrosion damage) has been detected during activities to verify the effectiveness of the Closed-Cycle Cooling Water System Chemistry Subprogram."

2.4 Discussion

It is noted that the St. Lucie approach uses documented operating experience to justify not crediting any component inspection. The FNP approach credits a focused one-time inspection (via the One-Time Inspection Program) to validate the effectiveness of CCW chemistry controls in lieu of surveillance testing, maintenance history reviews, or ongoing maintenance inspections.

Reviews of FNP operating history performed to support development of the FNP LRA indicate that the FNP CCW systems have not experienced any significant age related failures. A one-time inspection will be utilized to verify the adequacy of existing chemistry controls. This approach is conservative when compared to the St. Lucie approach. A similar approach (CCW chemistry control, coupled with a one time inspection) was evaluated and approved by the NRC staff for renewal of the Plant Hatch operating licenses. See the Plant Hatch License Renewal SER, NUREG-1803.

3. CONCLUSION

The FNP LRA notes an exception to NUREG-1801, XI.M21 regarding credit for surveillance testing of closed-cycle cooling water systems. As documented in the St. Lucie LRA and License Renewal SER, a similar exception taken by St. Lucie was approved by the staff.