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U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Update to Illinois Power's (IP's) Response to Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment"

Dear Madam or Sir:

As a result of deficiencies identified during the Integrated Safety Assessment (ISA) and the System Design and Functional Validation (SDFV) effort at Clinton Power Station (CPS), IP has re-evaluated it's implementation of the CPS Generic Letter (GL) 89-13 program.

In IP letter U-602926 dated February 20, 1998, IP committed to notify the NRC before startup of the actions which will be taken to ensure that the Shutdown Service Water system does not have an adverse affect on safety-related equipment operability. This letter and attachment completes this action and provides an update to the NRC of the recent CPS actions taken to implement GL 89-13 requirements.

Provided below are IP's revised commitments regarding the Generic Letter 89-13 Program at CPS. The attachment to this letter provides details regarding these commitments.

1) The Shutdown Service Water (SX) system will be chemically treated within the limitations of the National Pollutant Discharge Elimination System (NPDES) permit.

2) The intake structures at CPS will be inspected on a frequency not to exceed two years between inspections.

3) Residual Heat Removal (RHR) Heat Exchangers (HXs) will be tested or inspected on a frequency not to exceed two years between tests and/or inspections.

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4). Periodic performance testing or inspection of GL 89-13 related heat exchangers, which are cooled by the Shutdown Service Water system and needed to perform a safety-related function, will be conducted to verify heat exchanger heat transfer capability.

Sincerely yours,

John P. McElwain
Chief Nuclear Officer

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Attachments

cc: NRC Clinton Licensing Project Manager
NRC Resident Office, V-690
Regional Administrator, Region III, USNRC
Illinois Department of Nuclear Safety

I. Introduction

As a result of deficiencies identified during the Integrated Safety Assessment (ISA) and the System Design and Functional Validation (SDFV) effort at Clinton Power Station (CPS), IP has re-evaluated it's implementation of the CPS Generic Letter (GL) 89-13 program. The purpose of this attachment is to provide an update of the recent CPS actions being taken to implement Generic Letter 89-13 commitments, and to ensure that the Shutdown Service Water System (SX) does not impact the operability of safety-related equipment.

Summary of Recently Identified GL 89-13 Program Deficiencies:

From September 1997 through May 1998, audits and assessments were performed at CPS by the Integrated Safety Assessment Team (ISA), MPR Associates, and the System Design and Functional Validation (SDFV) Team. These audits and assessments led to the discovery of significant deficiencies in the implementation of the CPS GL 89-13 program. Additionally, Shutdown Service Water System operation and testing resulted in the discovery of other issues related to the CPS GL 89-13 program. These issues are summarized as follows:

1. The CPS implementation of a raw water treatment program has been fragmented and inconsistent.

2. Screenhouse silting levels were not adequately monitored or maintained.

3. Safety-related heat exchanger performance trending provided inconclusive results.

4. SX system flow balance verification was not performed for all design bases operating modes.

5. The material condition (i.e., SX system boundary valve leakage) was not addressed to assess impact on SX system operation.

CPS Corrective Actions

The corrective actions described in section II will correct the identified issues and deficiencies of the ISA and SDFV assessments. Several of these items are also plant restart items that are included in the NRC 0350 restart package for issue NRC IV.10C titled "Perform Inspections, Tests, and Evaluations to Resolve Service Water Heat Exchangers GL 89-13 Issues." The restart corrective actions are focused on demonstrating that the SX system and the associated safety-related heat exchangers are in an acceptable condition to perform their required design basis function(s).

II. Specific GL 89-13 Commitment Discussion:

A. GL 89-13 Commitment 1:

The Shutdown Service Water (SX) system will be chemically treated within the limitations of the National Pollutant Discharge Elimination System (NPDES) permit.

CPS Actions to Meet Commitment 1:

In June of 1996, CPS completed the installation and released for operation raw water treatment modification CL-007, a permanent chemical treatment system for the station's raw water systems. The CL-007 modification installed provisions for injecting sodium hypochlorite into the Plant Service Water (WS) and Circulating Water (CW) Systems. Chemical treatment of the safety-related Shutdown Service Water System piping and serviced loads can occur when the WS to SX System cross-tie isolation valves are open during normal WS System chemical treatment operations. This treatment occurs within the compliance limitations set by the CPS National Pollution Discharge Elimination System (NPDES) Permit, and when there is no conflicting plant operations/maintenance or chemical injection equipment maintenance.

Recent GL 89-13 Program Deficiencies Pertaining to Commitment 1:

The ISA assessment noted potential deficiencies in the raw water treatment program. A subsequent root cause investigation concluded that CPS failed to fully establish and maintain a technically sound and consistent raw water systems chemical treatment program that addresses GL 89-13 commitment compliance, long-term economics and reliability, and line organization ownership and control of the program.

CPS Corrective Actions to Resolve These GL 89-13 Deficiencies:

A raw water treatment team has been re-established to address system fouling and corrosion control, treatment effectiveness, and recommended improvements. Currently, CPS Plant Engineering is the overall owner of the GL 89-13 program, and verifies that appropriate actions are taken to monitor and maintain the condition of the SX system and related components. The CPS Chemistry Department is responsible for the Raw Water Treatment System operation and associated sampling and analyses.

CPS has taken corrective actions to ensure a reliable safety-related heat removal system is maintained in accordance with GL 89-13. Numerous operational and equipment issues associated with raw water treatment modification (CL-007) have been resolved to establish improved operational consistency of the biocide treatment system for the SX and WS systems. An

additional intake screen wash dechlorination modification (CL-008) is underway to enhance WS/SX treatment reliability, while ensuring the NPDES permit is not violated. This modification is expected to be operational prior to plant restart.

B. GL 89-13 Commitment 2:

The intake structures at CPS will be inspected on a frequency not to exceed two years between inspections.

CPS Actions to Meet Commitment 2:

The intake screenhouse is inspected at a frequency not to exceed two years between inspections. This inspection is performed in accordance with CPS procedure 2400.01, "CPS Corbicula (asiatic clam) and Silt Control."

Recent GL 89-13 Program Deficiencies Pertaining to Commitment 2:

During ISA review of the Generic Letter 89-13 program, a concern was raised regarding the silt levels in the screenhouse. Further investigation determined that the existing inspection procedure (CPS procedure 2400.01) contained acceptance criteria for corbicula, but did not have limits for silt accumulation in the SX/Unit 1 Fire Protection bays. Also there were no limits in the design bases. The root cause for this deficiency was determined to be the lack of a detailed inspection procedure for all areas (bays) of the Raw Water Intake Screenhouse.

CPS Corrective Actions to Resolve Commitment 2 Deficiencies:

In December 1997, the raw water screenhouse was restored to a clean condition.

A revision to CPS procedure 2400.01 for corbicula control incorporated new acceptance criteria for screenhouse silt, as well as requirements to inspect and document observed findings pertinent to any degradation or fouling (e.g., concrete spalling, corrosion, aquatic growth). Additionally, CPS will trend the accumulation of silt and other acceptance criteria items during routine inspections of the Raw Water Intake Screenhouse bays.

A follow-up inspection schedule for silting of the screenhouse has been established to monitor and trend the screenhouse condition in the future. The first of these follow-up inspections was completed in October of 1998 with no significant silting being identified.

C. GL 89-13 Commitment 3:

Residual Heat Removal (RHR) Heat Exchangers (HXs) will be tested or inspected on a frequency not to exceed two years between tests and/or inspections.

CPS Actions to Meet Commitment 3:

The RHR heat exchangers are performance tested, in accordance with CPS procedure 2602.01, "Heat Exchanger Performance of Shutdown Service Water Coolers covered by NRC Generic Letter 89-13."

Formerly, IP committed to test/inspect these heat exchangers on an annual basis. The most recent performance tests of RHR heat exchangers "A" and "B" were completed on 4/24/98 and 1/30/98 respectively. Results of these tests indicated that their predicted heat removal rate under design basis conditions is well in excess of the required heat removal capability. Based upon the results of these tests, CPS has re-evaluated the periodicity of these tests using GL 89-13 test frequency guidance. IP has determined that a periodicity not to exceed two years between tests and/or inspections is justified.

D. GL 89-13 Commitment 4:

Periodic performance testing or inspection of heat exchangers, which are cooled by the Service Water system and which are needed to perform a safety function, will be conducted to verify heat exchanger heat transfer capability.

Recent GL 89-13 Program Deficiencies Pertaining to Commitment 4:

- Reviews of heat exchanger test results and performance trending identified that the heat exchanger testing program was not providing sufficient confidence that the safety-related heat exchangers were capable of performing their designed function. Performance trending results showed, in some cases, performance at a level better than baseline clean performance, which does not appear realistic. Additionally, in some instances, actual instrument and test method uncertainties were large enough to preclude determining actual component performance.

- The last Shutdown Service Water system flow balance verification tests were performed in 1990-1991. The flow test performed at this time did not test all modes of system operation. Recent testing to demonstrate system flow balance has shown that several safety-related components did not have the required flows.

- Additionally, the SDFV review of Maintenance Work Requests identified on-going problems with SX boundary valve seat leakage that did not appear to receive prompt or adequate attention. A failure to effectively eliminate the problem of inter-system leakage between the SX system and other systems, e.g., Plant Service Water and Fuel Pool Cooling, could jeopardize the flow capacity of the SX system.

CPS Actions to Meet Commitment 4 and Resolve Identified Deficiencies:

A detailed Engineering review and analysis has been performed on the completed test results, data analysis methods, and performance trending practices. Improvements have been implemented to correct deficiencies in uncertainty analysis, test performance, and performance prediction and trending.

SX supplied heat exchangers are currently being inspected and/or tested. As a minimum, each of the SX supplied safety-related heat exchangers will be inspected, tested, or evaluated, to show an acceptable heat exchanger condition exists, and will meet or exceed their design basis minimum heat removal requirements. For many of these heat exchangers, a new heat exchanger baseline condition is being established for future trending.

After plant restart, CPS will develop an on-going inspection program and schedule for all safety-related heat exchangers, large and small bore piping, and other components that are covered by the GL 89-13 program

Shutdown Service Water System flow balance verification tests are in the process of being performed to resolve past SX flow balance issues. Subsequent to the implementation of necessary hardware changes (e.g., orifice plates) flow-balance tests will be completed to demonstrate SX system capability under all designed modes of operation. This testing will be completed prior to plant restart.

Concerning SX system boundary valve leakage, acceptance criteria for the total amount of SX system boundary valve leakage allowed will be established to ensure the SX system performance will not be affected with this amount of leakage present. Additionally, acceptance criteria for the loss of SX system inventory from the Ultimate Heat Sink will be established.

At this time, maintenance and testing of the SX system boundary valves, that have been identified as critical isolation valves, is being conducted. Analysis and tracking of the leakage rate data obtained from these tests will be performed to ensure that the total SX leakage criteria is not exceeded, and to evaluate for Maintenance Rule functional failure.

III. Planned Actions for Continued Improvement of the CPS GL 89-13 Program

Some activities have been identified which, when fully implemented, will provide continued significant improvements toward re-establishing and maintaining a solid and consistent GL 89-13 program. These following items are Near Term (i.e. after plant restart).

A. The following post-restart actions are planned to improve the administration of the GL 89-13 program:

- As identified in the root cause of several condition reports, a need for an integrated GL 89-13 program document exists. The CPS GL 89-13 program procedure will address ownership, bases, requirements, control, regulatory requirements and commitments, and implementation requirements with responsibilities.

- The heat exchanger test program is being improved by documenting the bases and the uncertainty analysis for the individual heat exchanger tests. This provides a reference for understanding the effects of test equipment accuracies.

B. Improved analysis methods of the results of heat exchanger testing have also been developed to assess the effects of the test uncertainties in determining actual heat exchanger performance. These analysis methods are being formalized to provide a consistent and accurate approach to analysis of test results.

C. The condition of the heat exchangers will be periodically monitored by both tests and inspections. The tests will assure that the heat exchangers are not degrading beyond acceptable performance between the periodic inspections and cleanings. The inspection frequency will be increased if the trend from the test data projects to unacceptable performance.

D. The heat exchanger maintenance program will be improved by developing cleaning standards such that a consistent and complete cleaning can be performed to restore the heat exchanger performance to the baseline conditions. A tube plugging standard is intended to be issued to centralize the information in one document on the wall thickness criteria for plugging, the allowable number of plugged tubes, the type of plugs and installation methods. Other heat exchanger repair practices may also be included to assist maintenance in coatings and repair contingencies.

E. For the air-to-water heat exchangers, a monitoring program is being established to measure cooler air flows. These flow measurements will be used to verify design basis capacity and will be used to establish a performance monitoring trend of the air side of these heat exchangers

F. Initial and periodic training on the GL 89-13 program is planned to provide an understanding of the specific actions and responsibilities for all responsible personnel.

IV. Conclusion

The corrective actions and program enhancements described herein will resolve the GL 89-13 issues and demonstrate reliable SX system operation. The long-term effectiveness of these actions will be demonstrated after additional data points are taken to establish performance trends. However, benefits already obtained from these corrective actions serve to demonstrate the effectiveness of the actions being taken.

- The availability of the Raw Water Biocide Treatment System has significantly increased.
- Improved heat exchanger cleaning methods have been more effective in corrosion product removal.
- SX System flow testing has identified long standing system deficiencies which are being resolved to ensure system performance.
- Acceptance criteria for SX system boundary valve leakage have been established and component testing implemented.