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March 20, 1990

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Subject: Restoration of Shutdown Service Water (SX) System

The purpose of this letter is to inform the Nuclear Regulatory Commission (NRC) of current activities associated with the restoration of the Shutdown Service Water (SX) system to operability following cleaning of Division I heat exchangers in accordance with Generic Letter 89-13.

In response to Generic Letter 89-13, Illinois Power Company's (IP's) plan was to open, inspect, and obtain baseline data on safety related heat exchangers and develop a program to monitor the performance of the heat exchangers for the life of the plant. In November 1989, IP experienced tube leaks on the Division I and II diesel generator heat exchangers. Investigation of this problem resulted in the conclusion that the tubes were experiencing Microbiologically Induced Corrosion (MIC) attack. IP accelerated the open and inspect program for safety related heat exchangers and developed a plan to open Division I heat exchangers prior to and during PO-3 (a planned maintenance outage which began February 21, 1990, and is currently scheduled to be completed during the second week in April 1990, when the Clinton Power Station is synchronized to the grid). During the performance of the work, the field reported that 1VH07SA (SX Division I pump room cooler) could not achieve design flow. Investigation by Engineering resulted in the discovery that the differential pressure (ΔP) value utilized in the startup test was incorrect for the type of heat exchanger installed in the field. This problem was subsequently determined to affect ten heat exchangers in Division I, ten heat exchangers in Division II, and three heat exchangers in Division III. Flow to the affected heat exchangers represents five percent of total SX system flow. The affected heat exchangers were all provided by the American Air Filter (AAF) Company. Additionally, IP discovered there was minor silting throughout the system. Corrective actions for these issues to date are as follows:

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American Air Filter

- a) Conduct detailed review of the SX flow balancing data to assure valid differential pressure numbers were used in calculations.
- b) Review other selected startup test procedures (safety related) prior to startup from PO-3 to identify if they contain similar flow calculation errors.
- c) Investigate the occurrence with respect to 10CFR21 reportability.
- d) Initiate a Licensee Event Report.
- e) Determine the impact, if any, to Division II heat exchangers and ensure the required Division II equipment is receiving adequate flow for the present mode of operation. This was an immediate action in response to the discovery of the AAF discrepancy.
- f) Establish acceptable flows through all heat exchangers.

MIC

- a) The Division I diesel generator heat exchangers have been retubed and tested satisfactorily.
- b) The Division II diesel generator heat exchanger has been inspected. Retubing is not now necessary and the heat exchanger will be chemically treated in PO-3 to arrest the MIC.
- c) The Division III diesel generator heat exchanger has been inspected and some MIC was observed, which resulted in minor pitting. The Division III SX system will be chemically treated to arrest any further MIC when the required environmental permits are obtained.

During inspection of other heat exchangers, MIC attack on heat exchanger tubing has not been noted. Indication of minor MIC attack on carbon steel piping has been observed. In addition to Division III of the SX system, the remaining SX divisions will be chemically treated when required environmental permits are obtained. It is anticipated that the environmental permits will be obtained by mid-summer.

Silting

IP has now inspected the safety related heat exchangers in Division I (except the Residual Heat Removal system (RHR) heat exchanger), two heat exchangers in Division II and one heat exchanger in Division III. IP now feels that the amount of silting in the system is what should be expected for our system and does not represent a degraded system. Of the seventeen heat exchangers inspected, fifteen heat exchangers were cleaned. Of the fifteen cleaned, only four required cleaning. The remainder were cleaned to facilitate eddy current inspection and to ensure that the baseline data obtained for the Generic Letter 89-13 program was representative of a clean heat exchanger.

Current Status

Division I

Following discovery of the American Air Filter problem, flow through Division I heat exchangers was checked and adjusted. Design flow was achieved in all heat exchangers except 1VY03S (RHR A Room Cooler), 1VR09S (Combustible Gas Control System Room Cooling Coil Cabinet), and OPR13A (Standby Gas Treatment System Exhaust High Range Radioactivity Monitor Cooler). IP intends to modify existing piping to achieve acceptable flow through 1VY03S. Engineering calculations show that the flow through 1VR09S is acceptable. OPR13A will be opened, inspected and cleaned based upon higher than expected delta P. Upon completion of this work, IP will again check safety related heat exchanger flows. The system will be returned to full operability prior to startup from PO-3.

Division II

Upon completion of work in the Division I SX system, IP will gather flow and delta P data on Division II. IP expects to find reduced flow through American Air Filter coolers installed in Division II and anticipates that a piping modification will be required to cooler 1VY05S (RHR B Room Cooler) as was done for the equivalent cooler in Division I. IP intends to restore Division II SX flows to acceptable values by adjusting throttle valves.

Division III

Flow measurements have been taken on all Division III safety related heat exchangers. This as-found data shows that minor flow adjustments were necessary due to higher than required flow through the Division III diesel generator heat exchanger. The as-left data shows that the system meets design requirements. It is important to note that only one of four heat exchangers has been opened and inspected; it did not require cleaning. This data is important because it shows that flow/delta P requirements can be met without cleaning all heat exchangers.

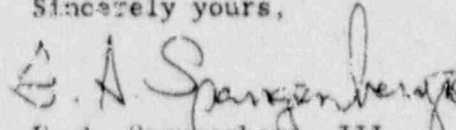
Summary

It is IP's intention to restore the entire SX system to operability by returning system flows to their design values. If that is not achievable, IP will evaluate each heat exchanger on a case by case basis as was done for Division I. Where flows are acceptable but delta P values are higher than expected, IP will evaluate the need to clean the affected heat exchanger. IP will keep the NRC Resident Inspector informed of progress and share the conclusions reached and basis for the conclusions. IP intends that the data gathered be the basis for future performance monitoring of the safety related heat exchangers and is committed to the requirements of Generic Letter 89-13.

In accordance with IP's previous commitments, IP intends to open additional heat exchangers between PO-3 and the plant's second refueling outage (RF-2) for inspection and cleaning if necessary. By the end of RF-2, IP will complete its initial inspection activities with regard to Generic Letter 89-13. Between PO-3 and RF-2, IP will identify heat exchangers for accelerated monitoring. The accelerated monitoring will provide added assurance that the system performance is not degrading. The heat exchangers selected will be chosen following the restoration of system operability.

Data obtained to date indicates that the MIC attack on heat exchanger tubes was restricted to the Division I, II, and III diesel generator heat exchangers. Chemical treatment will arrest the problem. Silting is not significant based upon observation of seventeen heat exchangers. IP considers the most significant problem with SX system flow to be improper calculations and flow adjustment to the American Air Filter heat exchangers.

Sincerely yours,


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