



Illinois Power Company
Clinton Power Station
P.O. Box 678
Clinton, IL 61727
Tel 217 935-5623
Fax 217 935-4632

John G. Cook
Vice President

U-602515
L30-95(11-15)LP
8G.120

JGC-479-95
November 15, 1995

Docket No. 50-461

Document Control Desk
Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Subject: Illinois Power's (IP's) Response to NRC Bulletin 95-02,
"Unexpected Clogging of a Residual Heat Removal (RHR)
Pump Strainer While Operating in Suppression Pool Cooling Mode"

Dear Sir:

The Nuclear Regulatory Commission (NRC) issued NRC Bulletin 95-02 on October 17, 1995, to alert boiling water reactor (BWR) operating licensees to complications experienced during a recent event in which a licensee initiated suppression pool cooling in response to a stuck-open safety relief valve and subsequently experienced clogging of one RHR pump suction strainer. Bulletin 95-02 requested BWR license holders to:

- (1) Review the operability of their emergency core cooling system (ECCS) and other pumps which draw suction from the suppression pool while performing their safety function. This evaluation should be based on suppression pool cleanliness, and the effectiveness of foreign material exclusion (FME) practices. In addition, addressees were requested to implement appropriate procedural modifications and other actions, as necessary, to minimize foreign material in the suppression pool, drywell and containment. The operability evaluation should be verified through appropriate testing and inspection.
- (2) Report to the NRC whether, and to what extent, the licensee intends to comply with the requested action in the bulletin. The report should provide a detailed description of actions taken, evaluations performed, corrective actions taken, and a description of any planned test(s) or inspection(s) for confirming the operability evaluation. In addition, the report should include a schedule for pool cleaning, the basis for the cleaning schedule, and a summary of any additional measures taken to detect and prevent clogging of the ECCS strainers.

210044

9511210107 951115
PDR ADCK 05000461
Q PDR

JEH

IP intends to comply with the requested actions contained within the bulletin. Attachment 2 of this letter contains the response to the requested actions to ensure that an unacceptable buildup of debris that could clog strainers does not occur.

Clinton Power Station (CPS) utilizes a suppression pool cleanup (SF) system to maintain the suppression pool in a clean and clear condition. The suppression pool was last manually cleaned in April, 1994. The SF system operates continuously and the SF pump suction strainers will capture suspended material and other debris. Based on visual observation, the present overall cleanliness condition of the suppression pool is very good. The suppression pool water is clear to the extent that the floor of the pool is readily visible. The bottom of the suppression pool has a clean, metallic appearance indicating a very minimal amount of material has settled out since the last cleaning.

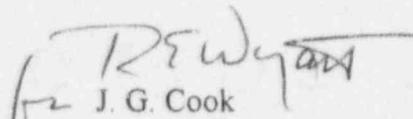
The frequency of operation of the ECCS's and other pumps which draw suction from the suppression pool were reviewed. This review concluded that the reactor core isolation cooling (RCIC) system and the high pressure core spray (HPCS) system suppression pool strainers are infrequently used and as such would not have the opportunity to develop a significant buildup of material matting on their surfaces. The low pressure core spray (LPCS) and RHR C pumps draw suction from the suppression pool during their quarterly operability tests. The short duration of these tests should not give the opportunity to develop and retain a significant amount of material layer.

Of all the pumps which draw suction from the suppression pool, the RHR A and B loops operate most frequently, due to suppression pool cooling operation, and as such they should be the most susceptible to the phenomenon identified in Bulletin 95-02. An examination of the pump suction pressure test data for these two pumps does not indicate that any buildup of material is occurring.

For additional assurance that CPS is not affected by an unacceptable buildup of debris that could clog pump strainers, a visual examination of the surface condition of the ECCS and RCIC system suction strainers will be performed within 120 days of the date of the bulletin. Also, a suppression pool inspection will be completed prior to the next refueling outage (RF-6), scheduled for Fall, 1996. All other additional reports described in this bulletin will be forwarded within the time requested by the bulletin.

Attachment 1 provides an affidavit supporting the facts set forth in this letter.

Sincerely yours,


J. G. Cook
Vice President

JLP/csm

Attachments

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

NRC Bulletin 95-02 Requested Actions:

To ensure that unacceptable buildup of debris that could clog strainers does not occur during normal operation the NRC requested the following actions be taken:

- 1) Verify the operability of all pumps which draw suction from the suppression pool when performing their safety functions, based on an evaluation of suppression pool and suction strainer cleanliness conditions. This evaluation should be based on the pool and strainer conditions during the last inspection or cleaning and an assessment of the potential for the introduction of debris or other materials that could clog the strainers since the pool was last cleaned.
- 2) The operability evaluation in requested action (1) above should be confirmed through appropriate test(s) and strainer inspection(s) within 120 days of the date of this bulletin.
- 3) Schedule a suppression pool cleaning. The schedule for cleaning the pool should be consistent with the operability evaluation in requested action (1) above. In addition, a program for periodic cleaning of the suppression pool should be established, including procedures for cleaning of the pool, criteria for determining the appropriate cleaning frequency, and criteria for evaluating the adequacy of the pool cleanliness.
- 4) Review foreign material exclusion (FME) procedures and their implementation to determine whether adequate control of materials in the drywell, suppression pool, and systems that interface with the suppression pool exists. This review should determine if comprehensive FME controls have been established to prevent materials that could potentially impact ECCS operation from being introduced into the suppression pool, and whether workers are sufficiently aware of their responsibilities regarding FME. Any identified weaknesses should be corrected. In addition, the effectiveness of the FME controls since the last time the suppression pool was cleaned and the ECCS strainers inspected, and the impact that any weaknesses noted may have on the operability of the ECCS should be assessed.
- 5) Consider additional measures such as suppression pool water sampling and trending of pump suction pressure to detect clogging of the emergency core cooling system (ECCS) suction strainers.

IP Response to Requested Action #1:

An evaluation was performed to determine the overall operability of all pumps which draw suction from the suppression pool at Clinton Power Station (CPS). This evaluation consisted of reviewing the history of cleaning operations, reviewing the design of the suppression pool cleanup (SF) system, and reviewing the design of the emergency core cooling systems and the reactor core isolation cooling (RCIC) system.

History of cleaning operations:

Clinton Power Station's (CPS's) suppression pool was last cleaned in April, 1994. This cleaning was done by vacuuming the bottom of the suppression pool. Prior to that, the last mechanical cleaning of the suppression pool was performed by divers in January 1992.

Review of suppression pool cleanup system design:

In addition to the last pool cleaning, CPS has a suppression pool cleanup (SF) system. The purpose of the SF system is to remove suspended and dissolved solids in the suppression pool. This system operates continuously. Based on the normal operation of the system (approximately 1000 gpm with one pump in operation), the suppression pool water volume is processed through the system about once every seventeen hours. The SF pumps are equipped with in-line suction strainers. There is no strainer in the suppression pool. The pump suction strainers are cone-shaped with 1/8-inch diameter holes. Historically, there has not been excessive fouling of these strainers, and there have been only seven cleanings in nine years of operation.

The SF pump suction strainers serve to collect material that may be present thereby minimizing the potential of other strainers from collecting fibers which draw suction from the suppression pool. The suppression pool water is then processed through filter/demineralizers, which will remove fibrous material and sediment, before returning to the suppression pool. The suction line is approximately 8 feet above the pool bottom, and is representative of the ECCS and reactor core isolation cooling (RCIC) system strainers since they are installed at approximately the same elevation. The SF return line is approximately 180 degrees from the suction line. This configuration provides a good circulation pattern of the suppression pool water.

Review of safety systems which take suction from the suppression pool:

The ECCS's include the high pressure core spray (HPCS) system, the low pressure core spray (LPCS) system, and the Residual Heat Removal (RHR) A, B and C systems. The ECCS's and reactor core isolation cooling (RCIC) system each have suction strainers in the suppression pool. Each of these systems have operability tests performed on a quarterly basis. Only the LPCS, RHR A, RHR B, and RHR C systems draw suction from

the suppression pool for these tests. The HPCS and RCIC systems have the capability to take suction from either the suppression pool or the RCIC storage tank. However, the normal pump suction path for the HPCS and RCIC systems operability tests is from the RCIC storage tank.

ECCS's and the RCIC system pump suction pressures are recorded for each pump run as required for the inservice inspection (ISI) program. Clogging of the strainers is a function of pump run time while drawing suction from the suppression pool. The RHR A and B systems are operated more frequently than the other ECCS pumps since these two pumps provide suppression pool cooling. Therefore, a chronic clogging problem due to the long-term buildup of material on the strainer surface should be most evident on either of these two strainers. A review of the suction pressure data for these two pumps has not indicated any clogging taking place. There have also been no abnormal suction pressures identified by the ISI program for any of the other ECCS or RCIC pumps.

Review of plant procedures:

In addition to recording the pump suction pressures, as required by the ISI program, the operating procedures for each of the ECCS and RCIC systems have the following precaution:

"Closely monitor ECCS system flows, pressures, amps, valve positions, Hx ΔT 's, circulation noises, etc., to detect possible strainer blockage.

Blockage mitigation/prevention actions should include:

Minimizing ECCS flow not needed to maintain EOP parameters

Alternating ECCS divisions being used for EOP actions.

Timely use of Alternate Injection Systems per the EOP's."

The above precaution was added to the operating procedures as a result of earlier industry issues related to the potential clogging of ECCS and other safety system strainers.

CPS has several programs in place to minimize the potential introduction of materials into the suppression pool. The details of these programs are provided in the response to Requested Action #4.

Conclusions:

The ECCS and RCIC system pumps have been determined to be in an operable condition. This is based on the cleanliness of the suppression pool, continuous cleaning of the suppression pool water by the SF system, an absence of abnormal trends in ECCS and RCIC system pump suction pressures, and an established foreign material control program.

IP Response to Requested Action #2:

A review of the current testing procedures was performed to confirm the operability of the safety system pumps which take suction from the suppression pool.

The RHR A, B, C, and LPCS pumps have operability tests performed quarterly taking suction from the suppression pool. Since an examination of the pump suction pressure history for these pumps has shown no adverse trends, no additional pump flow testing is necessary. IP has determined that the last quarterly surveillance tests for these systems satisfy the testing requirements of this bulletin.

The HPCS pump was last tested using its suppression pool suction strainer on December 21, 1994. The normal quarterly tests are performed while taking suction from the RCIC storage tank. The RCIC pump was last tested using its suppression pool suction strainer during startup testing. Like the HPCS pump, it also uses the RCIC storage tank during quarterly tests. Since HPCS and RCIC do not normally pass water through their suppression pool suction strainers they would not be expected to have a fibrous buildup.

All ECCS and RCIC system suction strainers will receive a visual inspection within the requested 120-day period. Once completed, the results of these inspections will be reported within 10 days as required by this bulletin. Also, the results of this inspection will be evaluated to determine further actions as appropriate.

IP Response to Requested Action #3:

IP reviewed the request for performing a cleaning of the suppression pool to determine when a cleaning should be scheduled. As stated in the response to Requested Action #1 above, the suppression pool was last cleaned in April, 1994. Continuous pool filtering and demineralizing occur at CPS through the use of the SF system. As an added assurance of pool cleanliness, and in response to this requested action, CPS will establish suppression pool inspection criteria, develop an inspection frequency, and conduct a special suppression pool inspection. The suppression pool inspection will be completed prior to the sixth refueling outage, RF-6, scheduled for Fall, 1996. Once completed, the results of this inspection will be reported within 10 days as required by this bulletin. Also, the results of this inspection will be evaluated to determine further actions as appropriate.

IP Response to Requested Action #4:

IP's review of station procedures indicated that the current FME controls are adequate. These procedures and controls are as follows:

CPS Procedure 1019.04, "Foreign Material Exclusion Areas (FMEA) in the Containment/Drywell or Near Open Pools," provides direction concerning the control of tools, equipment, and materials used in performing work in the containment or drywell or near open pools, such as the suppression pool. Workers are instructed to tape personal dosimetry, provide lanyards where appropriate, and to lay out drop cloth material to preclude small items from dropping through gratings or into open systems or pools. Also included are some specific restrictions on the use of flexible materials. Particular attention is paid when taking colored plastic sheeting or bags into containment to prevent them from potentially clogging suppression pool suction strainers. Clear plastic sheeting or bags are not permitted in FMEAs (except for marked viewing aids). If an item is dropped into a pool and cannot be found or retrieved, or if a dropped item is thought to have caused damage to any materials in the pool, a condition report is written in accordance with CPS 1016.01, "CPS Condition Reports," and the condition receives an engineering evaluation.

CPS Procedure 1019.05, "Control of Transient Equipment/Materials," provides direction on the control of non-permanent equipment in the plant. Proper use and storage of equipment will minimize the risks placed on plant components during normal operation and other events. All levels of containment and drywell are restricted areas. Storage of items in these areas is not allowed without first contacting engineering and requesting a safety evaluation be performed.

CPS Procedure 1019.01, "Housekeeping," identifies the housekeeping practices and surveillance for the control of activities, conditions, and environments that can affect the quality of structures, systems, and components which are important to safety. The housekeeping program at CPS encompasses all activities related to the control of cleanliness of facilities, materials, and equipment; disposal of material and debris; and control of access to areas and protection of equipment. Supervisors are responsible for monthly tours of their designated areas for housekeeping and material condition.

CPS Procedure 8170.10, "Control of Cleanliness During a System Breach," controls access to a system or component in which tools or materials can potentially get into a system, undetected, presenting a possible component failure.

CPS Procedure 3800.02, "Area Operator Logs," specifies daily rounds to be performed by plant operators outside the Main Control Room. This procedure identifies the inspections to be made in area watchstations. A visual suppression pool cleanliness check is performed to minimize the potential for the ECCS suction strainers becoming plugged. These inspections are performed by certified personnel (watchstanders) for that area. The watchstander conducts at least one complete tour of the watchstation per eight hour shift. If a tour cannot be completed within the shift, the Shift Supervisor or Assistant Shift Supervisor shall be notified and that notification documented on the rounds sheet. The tour consists of general area inspections and equipment inspections.

A review of condition reports was completed. No adverse trend in the area of FME for the suppression pool has been identified and is indicative of program implementation adequacy and general worker knowledge. No further action is warranted in this area.

IP Response to Requested Action #5:

IP reviewed the current suppression pool water sampling and trending practices. Suppression pool sampling is currently implemented in CPS No. 6001.01, "Sampling and Analysis Requirements."

The parameters measured, at least monthly, are conductivity, chloride, sulfate, pH, suspended solids, total organic content, and gross gamma. If a parameter falls into an abnormal range, actions are prescribed to restore the parameter to its normal range.

This sampling program is adequate. Enhancements to this program may be made based on the results of the visual inspection of the strainer surfaces which will be performed as described in the response to Requested Action #3.

During the quarterly ECCS and RCIC system operability tests, the pump suction pressure is recorded as required by the ISI program. Pump suction pressures are recorded and are used in the computation of pump differential pressure which is trended by the ISI program. The trending of pump differential pressures will detect any gross strainer clogging. No further actions regarding pump suction pressure trending are necessary.