



Commonwealth Edison  
1400 Opus Place  
Downers Grove, Illinois 60515

June 2, 1994

Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Attention: Document Control Desk

Subject: LaSalle County Nuclear Power Station Units 1 and 2  
Supplemental Response to NRC Bulletin 93-02, "Debris  
Plugging of Emergency Core Cooling Suction Strainers"  
NRC Dockets 50-373 and 50-374

- References:
- 1) D. J. Chrzanowski letter to Document Control Desk dated June 9, 1993
  - 2) NRC Bulletin 93-02: "Debris Plugging of Emergency Core Cooling Suction Strainers"
  - 3) M. J. Vonk letter to Document Control Desk dated December 17, 1993
  - 4) NRC Bulletin 93-02 Supplement 1: "Debris Plugging of Emergency Core Cooling Suction Strainers"

The purpose of this letter is to provide supplemental information to our response (Ref. (1)) to NRC Bulletin 93-02 (Ref. (2)). This documents in Attachment 1 the evaluation committed to in Reference (3) for long term actions pertaining to these filters.

To the best of my knowledge and belief, the statements contained in this document are true and correct. In some respects these statements are not based on my personal knowledge, but on information furnished by other CECO employees, contractor employees, and/or consultants. Such information has been reviewed in accordance with company practice, and I believe it to be reliable.

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*JEH*

June 2, 1994

If there are any questions or comments, please contact me at (708) 663-7292.

Sincerely,



*Nadine M. Espisito*

A handwritten signature in cursive script, appearing to read "Martin J. Vonk".

Martin J. Vonk  
Generic Issues Administrator  
Nuclear Regulatory Services

Attachment: LaSalle Evaluation Results

cc: J. Martin, Regional Administrator, NRC Region III  
J. Dyer, Director of Directorate III-2, NRR  
A. Gody, Jr., LaSalle Project Manager, NRR  
D. Hills, LaSalle Senior Resident Inspector

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### LASALLE STATION RESPONSE TO NRC BULLETIN NO. 93-02

LaSalle Station has reviewed NRC Bulletin No. 93-02, Debris Plugging of Emergency Core Cooling Suction Strainers, for applicability to the station. Based on this review, LaSalle Station has performed an evaluation to determine what actions are required to fully comply with the NRC Requested Actions per Bulletin No. 93-02.

Per NRC Bulletin 93-02, the NRC is requesting that all holders of operating licenses for nuclear power reactors identify fibrous air filters or temporary sources of fibrous material, not designed to withstand a LOCA, which are installed or stored in the primary containment. The NRC also requests that the station take prompt action to remove any such material from the primary containment to assure the functional capability of the ECCS. The NRC also states that because of the low probability of a LOCA event, the staff considers removal of this material at the next shutdown, or within 120 days, whichever comes first, to be sufficiently prompt.

LaSalle Station has previously responded to NRC Generic Letter 85-22 and NRC Information Notice 88-28, Potential for Loss of Post-LoCa Recirculation Capability Due to Insulation Debris Blocking. LaSalle Station's response to these NRC documents included an evaluation of all insulating material inside the drywell. A walkdown was performed on all insulated piping within the Drywell of both units to verify the type, condition, and extent of insulating material used. Engineering personnel had evaluated the use of the insulation types during that time and determined that if a LOCA occurred, there would be insufficient transport of insulation into the wet well to cause the ECCS or RCIC suction strainers to become blocked. Engineering personnel also evaluated the use of Microtherm insulation for application to the RVLIS and Main Steam High-Flow Instrument piping and also found it to be acceptable.

NRC Information Notice 92-71, Partial Plugging of Suppression Pool Strainers at a Foreign BWR, addressed an event where a reactor vessel safety valve was opened to the drywell causing the dislodging of mineral wool type insulating material. This wool material was eventually washed into the suppression pool causing suction strainer partial blockage. Our evaluation of the Information Notice concluded that mineral wool insulation is not utilized in the LaSalle Station drywells. Additionally, it was concluded that because the SRVs do not discharge directly into the drywell, an inadvertent SRV opening could not cause a similar problem.

The primary focus of NRC Bulletin 93-02 is an incident which occurred at a United States BWR Power Plant involving clogging of ECCS pump suction strainers due to deposition of filter fibers on Residual Heat Removal Strainers. It was determined that the debris consisted of glass fibers from temporary drywell cooling filters that had been inadvertently dropped into the suppression pool. The plant used the fibrous material as a filter in three cooling air return ducts located in the drywell.

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In addition, there were six similar air filters in the containment. It had been common practice at the plant to replace the filter material at the end of each outage and to leave the material stored in the drywell and containment during operation of the plant at power.

The subject reactor containment is a Mark III design where the reactor is located in the drywell structure and a free standing steel primary containment is constructed around the drywell. The suppression pool is located in the containment extending into the drywell weir area through horizontal vents/openings in the drywell wall. The suppression pool is open to the containment and drywell weir area. Only grating partially covers the suppression pool open area. In the event that any material located directly over the suppression pool was dislodged, loosened, or dropped, the material would fall directly into the suppression pool without any restriction during any plant condition. The ECCS suction lines/strainers are all located on the primary containment side of the suppression pool.

The LaSalle reactor containment is a Mark II design where the reactor is located in the drywell which also acts as the primary containment. The suppression pool is located directly under the drywell in an enclosed chamber. The ECCS suction lines/strainers are all located in the enclosed suppression pool chamber. A concrete floor separates the suppression chamber from the drywell. The only openings to the suppression pool consist of two personnel access hatches located on the suppression chamber side of the primary containment which are normally maintained closed/sealed, drywell floor to suppression pool instrumentation penetrations which are blind flanged, and ninety eight drywell to suppression pool downcomers for LOCA pressure suppression.

The drywell to suppression pool downcomers are constructed of 23.5" inner diameter stainless steel piping extending approximately six inches above the drywell floor and penetrating into the suppression pool approximately 12' below the normal suppression pool water level (elevation 699'). The downcomer openings on the drywell floor are covered by steel plates mounted approximately 4" above the downcomer opening and extending approximately 4" beyond the downcomer opening. In the event that any foreign material was dislodged, loosened, or dropped in the containment, it would fall to the drywell floor or on top of the downcomer covering plate.

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The suction strainers at the subject Nuclear Power Plant were conical shaped devices made of 18 gauge stainless steel perforated plate with 0.18 cm (0.07 inch) diameter holes at 0.287 cm (0.113 inch) centers with internal cruciform shaped stiffener plates for support. The design of the LaSalle ECCS suction strainers is a 34 inch diameter by 19 $\frac{3}{4}$  inch long cylinder with support rods and 0.06 inch wide, horizontal intake slots for a design flow rate of 8400 gpm with 50% of the strainer surface area plugged. The RCIC suction strainer design is a 8 $\frac{5}{8}$  inch nominal diameter by 12 inch long cylinder with support rods and 0.05 inch wide, horizontal intake slots for a design flow rate of 600 gpm with 50% of the strainer surface area plugged.

The Suppression pool water volume is used during Refuel outages to supply Reactor grade water for flood up and refueling activities, in addition to being the source of water for ECCS pumps during other operating modes. In order to obtain this quality of water, the Suppression Pool Cleanup system is operated during the refuel outage to clean up and maintain the water quality.

The Suppression Pool is visually inspected by System Engineering during the Integrated Leak Rate Test (ILRT) per LTS 600-3 Primary Containment Inspection. The inspection is to look for signs of damage and foreign materials in the Suppression Pool. This was performed on Unit 1 and Unit 2 prior to their restarts from the Refuel outages during which ILRTs were performed.

In the Unit 1 third refuel outage, L1R03, (on or about January 1990) while Suppression Pool level was about 10 feet below normal level, foreign material was found. A dive was attempted after the ILRT with normal pool level, but was ineffective due to limited mobility and poor water clarity, reducing visibility. Water level was again lowered about 10 feet and the surface of the pool and steel bracing above the surface were examined from a boat. Four polyethylene (poly) bags, a small piece of plastic sheet, and two polyflow tubes were removed from the pool. Evaluation of the results of the inspections was made and reviewed prior to startup from L1R03.

Based on the findings in L1R03, actions were initiated to establish foreign material exclusion controls and schedule pool inspections during the Unit 2 third refuel, L2R03, and Unit 1 fourth refuel, L1R04.

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In L2R03, on April 30, 1990, the Unit 2 Suppression Pool was inspected during a dive with about 15 feet of visibility. The RCIC and all ECCS suction strainers, as well as the entire pool area were inspected. No objects were found on the strainers and four items were found in the general pool areas, 15' of heavy gauge wire, one 15' to 20' length of 3/8" polyflow tubing with brass compression fittings, one small rad bag, and one 10' length of 3/4" scaffolding bracing with 2 beam clamps attached. The items were removed.

In L1R04, on April 13, 1991, the Unit 1 Suppression Pool was inspected during a dive with about 2 feet of visibility. All ECCS suction strainers were inspected, and no foreign material was found on or near the strainers. General area inspection was limited due to poor visibility. There was a buildup of crud or rust particles on the bottom of the pool near the suction strainers. An evaluation of the findings was made prior to startup from L1R04. In L1R06, a sample of this particulate material buildup was obtained and analyzed. The results verified that the material is corrosion products and is more than 99% iron oxide with no organic compounds present.

LaSalle County Station has recently completed two dives into the Unit 1 Suppression Pool, with about 3 to 5 feet of visibility, and has removed the following items:

A) April 26, 1994 Dive:

- 1 - Hardhat,
- 1 - Anti-C Coverall (wedged inside penetration sleeve annulus),
- 1 - 50' section of 1/2" Tygon tubing,
- 3 - small threaded nuts,
- 1 - 15' length of black duct tape - installed (during construction) around RCIC strainer mating flange.

B) May 11, 1994 Dive:

- 2 - 50' sections of sleeved 3/4" red hose with Chicago fittings,
- 1 - 150' section of 3/4" white hose with Chicago fittings,
- 1 - 25' section of 3/4" white hose with Chicago fittings,
- 1 - 50' section of 1/2" clear Tygon tubing,
- 2 - 20' sections of 1/2" clear Tygon tubing, and
- 1 - 12" length of 2" X 4" wood (block),
- 1 - yellow flashlight.

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During the dive of 4/26/94, an inspection of the ECCS and RCIC suction strainers revealed no damage or deformation of the strainer faces. The strainers were manually cleaned of debris covering less than 3% of the strainer surface, characterized as dissolved portions (a few scattered small pieces) of the recovered coveralls. Also, the suction penetration sleeve annuluses were flushed with a hydrolaze wand to reduce radiation dose outside the containment. The Anti-C coverall was dislodged during the hydrolazing of the A RHR suction line penetration sleeve annulus. This set of coveralls was stuck back into the penetration, and "protected" from free movement. As such, it was not likely to have become dislodged and capable of significant strainer blockage. The second dive thoroughly searched the Unit 1 suppression pool floor as well as the surface and intermediate levels in the pool to provide assurance that foreign materials have been removed.

Also, during L1R06, in order to limit the amount of material available to plate out on suction strainers during a LOCA, the Drywell floor is being cleaned to remove debris with additional focus to remove paint that is not tightly adhered to the drywell floor in accessible areas.

An evaluation of the U-2 suppression pool has been performance based on the results of the latest U-1 dive. There are no immediate operability concerns resulting to suppression pool cleanliness for U-2. Long term actions will be documented in the stations final response to bulletin 93-02 supplement 1.

LaSalle Station has monitored the suction pressure and pump dp for the Unit 1 and Unit 2 ECCS pumps since initial startup. The pumps and pressures are surveilled on a quarterly basis and the trends obtained indicate that there is no plugging or obstruction of the suction strainers and no negative effect on the pump performance.

In addition to the primary containment design differences, LaSalle Station is taking measures in preventing the accumulation of any foreign material in the primary containment and/or intrusion of foreign material into the suppression pool. These measures are as follows:

1. Storage of any type of foreign materials in the drywell is not allowed at LaSalle Station. Prior to unit startup after an outage, LaSalle Station performs Operating Surveillance LOP-DW-01, Drywell Closeout (After Outage). This surveillance requires that the drywell be inspected for foreign materials and/or debris as well as proper installation of insulation. This surveillance has been revised to include a step to verify removal of the Primary Containment Ventilation (VP) system polyester air filters on the 2 main coolers and 6 area coolers. All discrepancies must be resolved prior to surveillance sign-off and drywell closeout.

In addition, the Station is also required to perform LOP-DW-02, Drywell Entry and inspection (Shutdown, Startup, and Operation) which also requires inspections for accumulated debris when LOP-DW-01 is not used.

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2. Whenever any work is being performed near open suppression chamber penetrations, LaSalle Station provides and describes the precautions that must be observed per the requirements set forth in LaSalle Administrative Procedure LAP-100-38, Work Near Open Suppression Chamber Penetrations. This administrative control specifically addresses the potential for ECCS suction strainer blockage due to foreign material intrusion into the suppression chamber.
3. Temporary use of materials is controlled by LAP 240-6 Temporary System Change (TSC). This procedure requires that the installation of items on a temporary basis be reviewed by Onsite Review and evaluated using 10 CFR 50.59 Safety Evaluation process. This ensures that an adequate review of the changes is conducted in order to comply with Technical Specifications and the Updated Final Safety Analysis Report.

Prior to a Reactor Startup following an outage, LaSalle General Procedure LGP 1-1 Normal Unit Startup requires a thorough review of the Temporary System Change log to determine if the active TSC's are required to be cleared prior to startup. Any TSCs that are to remain installed are reviewed for Environmental Qualification, Seismic, and Safety. The effect of a TSC on a safety related component is reviewed carefully to ensure all aspects of equipment operability are addressed.

4. LaSalle Administrative Procedure LAP 300-16. Cleanliness Control covers activities in the plant with regards to Foreign Material Exclusion. This program provides control of materials that have the potential to enter opened systems such as the Suppression Pool.

A review of the station Total Job Management (TJM) system was conducted for all work done in the Unit 1 and Unit 2 containments during 1992. This was performed to determine if any temporary fibrous materials may have been used in the containment and, if so, was it analyzed for LOCA conditions. The results of this review were satisfactory with nothing abnormal identified. This agrees with the results of the drywell walkdowns conducted on Unit 2 during the June 1993 maintenance outage.



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The LaSalle Station Containment Ventilation system (VP) design has been revised to require that the polyester air filters for the main coolers and area coolers be installed only during outages and shall be removed from the drywell prior to power operation. LaSalle Station is also pursuing the possibility of installing non-fibrous air filters such as galvanized mesh. Before any filter is installed in either unit during power operation, its use will be evaluated using the criteria provided in Regulatory Guide 1.82 and NRC Bulletin 93-02.

LaSalle Station Unit 2 performed a maintenance outage that commenced June 1, 1993. During this outage, the unit was taken to cold shutdown, the containment deenergized, and work performed inside the Drywell. LaSalle Station conducted a Drywell walkdown to inspect for any temporary fibrous material and did not find any temporary materials stored or used in the containment.

At the time of this walkdown LaSalle Station did not consider the original air filters to be applicable to the Bulletin. The Unit 1 air filter removal was completed 1/27/94 and the Unit 2 filter removal was completed 12/16/93.

Reference 1 identified one Temporary System Change that was installed using a very small quantity of fiberglass insulation. Temporary thermocouples were previously installed on Unit 1 to monitor Reactor level condensing pot temperatures and on Unit 2 to monitor Reactor level condensing pots and the associated reference legs. The purpose of this project was to gather data to allow better calibration on the Reactor Water Level indications and also provide data in regards to Information Notice 93-27 "Level Instrumentation Inaccuracies Observed during Normal Plant Depressurization".

The installed insulation on Unit 2 consisted of 25 small pads (largest 6"x6") of fiberglass enclosed in a tight meshed stainless web. Each pad was secured over the top of the temporary thermocouple to isolate the sensor response from the ambient air temperature condition. The pads were installed in various locations throughout the Drywell and, therefore, unlikely to all be affected by any single event. The total inventory of insulation was evaluated to be acceptable, even in the worst case scenario of complete transfer of the insulation pads to a single ECCS suction strainer. However, most of the insulation pads were removed during the Unit 2 Maintenance outage.

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The remaining insulation pads were removed during the Unit 2 fifth refuel outage, L2R05, which ended in January 1994. As of March 17, 1994, all fibrous insulation patches used for Unit 1 RVWLIS temperature monitoring have been removed. There is no remaining inventory of fibrous material in either LaSalle Unit 1 or Unit 2 primary containments. Any modification to the plant which would add fibrous material to the primary containment is tracked by an inventory control calculation which has been in place at LaSalle since 1987.

This letter and attachment have been reviewed and is concurred with by the following individuals.

\_\_\_\_\_/\_\_\_\_\_  
G. L. Swihart            Date  
LaSalle Licensing Coord.

\_\_\_\_\_/\_\_\_\_\_  
J. A. Miller            Date  
Station Support Engineering Supv.