APPENDIX B
(RECORDS ALREADY PUBLICLY AVAILABLE)

NO.	DATE	ACCESSION NUMBER	DESCRIPTION/(PAGE COUNT)
1.	5/6/96	9605020119	NRC Bulletin 96-03: Potential Plugging of Emergency Core Cooling Suction Strainers by Debris in Boiling-Water Reactors (10 pages)

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NRCB

96-03

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555

May 6, 1996

NRC BULLETIN 96-03: POTENTIAL PLUGGING OF EMERGENCY CORE COOLING SUCTION STRAINERS BY DEBRIS IN BOILING-WATER REACTORS

Addressees

All holders of operating licenses or construction permits for boiling-water reactors (BWRs), except Big Rock Point and holders of possession-only licenses.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this bulletin to:

(1) request addressees to implement appropriate procedural measures and plant modifications to minimize the potential for clogging of emergency core cooling system (ECCS) suppression pool suction strainers by debris generated during a loss-of-coolant accident (LOCA), and

(2) require that addressees report to the NRC whether and to what extent the requested actions will be taken and to notify the NRC when actions associated with this bulletin are complete.

Background

On July 28, 1992, an event occurred at Barsebäck Unit 2, a Swedish BWR, which involved the plugging of two containment vessel spray system (CVSS) suction strainers. The strainers were plugged by mineral wool insulation that had been dislodged by steam from a pilot-operated relief valve that spuriously opened while the reactor was at 3,100 kPa [435 psig]. Two of the three strainers on the suction side of the CVSS pumps were in service and became partially plugged with mineral wool. Following an indication of high differential pressure across both suction strainers 70 minutes into the event, the operators shut down the CVSS pumps and backflushed the strainers. The Barseb ck event demonstrated that the potential exists for a pipe break to generate insulation debris and transport a sufficient amount of the debris to the suppression pool to clog the ECCS strainers.

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On January 16 and April 14, 1993, two events involving the clogging of ECCS strainers also occurred at the Perry Nuclear Power Plant, a domestic BWR. The first Perry event involved clogging of the suction strainers for the residual heat removal (RHR) pumps by debris in the suppression pool. The second Perry event involved the deposition of filter fibers on these strainers. The debris consisted of glass fibers from temporary drywell cooling unit filters that had been inadvertently dropped into the suppression pool, and corrosion products that had been filtered from the pool by the glass fibers which accumulated on the surface of the strainer. The Perry events demonstrated the deleterious effects on strainer pressure drop caused by the filtering of suppression pool particulates (corrosion products or "sludge") by fibrous glass materials entrained on the ECCS strainer surfaces. These corrosion products are typically present in varying quantities in domestic BWRs. The sludge is generated during normal operation, and the amount of sludge present in the pool depends on the frequency of pool cleanings/desludging conducted by the licensee. Separate test programs have been conducted by the Boiling Water Reactor Owners Group (BWROG) and the staff to quantify this filtering effect.

Based on these events, the NRC issued Bulletin 93-02, "Debris Plugging of Emergency Core Cooling Suction Strainers," on May 11, 1993. The bulletin requested licensees to remove fibrous air filters and other temporary sources of fibrous material, not designed to withstand a LOCA, from the containment. In addition, licensees were requested to take any immediate compensatory measures necessary to ensure the functional capability of the ECCS.

Following these events, the staff performed calculations to assess the vulnerability of each domestic BWR. The results of these calculations showed that the potential existed for the ECCS pumps to lose net positive suction head (NPSH) margin due to clogging of the suction strainers by LOCA-generated debris. The staff then conducted a detailed study of a reference BWR 4 plant with a Mark I containment. The preliminary results of the staff study are contained in a draft report, "Parametric Study of the Potential for BWR ECCS Strainer Blockage Due to LOCA Generated Debris," which was published in August 1994. The preliminary study results confirmed the results of the earlier staff calculations. The final version of this report was published as NUREG/CR-6224 in October 1995.

Members of the NRC staff also attended an Organisation for Economic Co-operation and Development/Nuclear Energy Agency (OECD/NEA) workshop on the Barsebäck incident held in Stockholm, Sweden, on January 26 and 27, 1994. Representatives from other countries at this conference discussed actions taken or planned which would prevent or mitigate the consequences of BWR strainer blockage. Based on the preliminary results of the staff's study, as reinforced by information learned at the OECD/NEA workshop, the staff issued NRC Bulletin 93-02, Supplement 1, "Debris Plugging of Emergency Core Cooling Suction Strainers," on February 18, 1994. The purpose of the bulletin supplement was to request that BWR licensees take the appropriate interim actions to ensure reliability of the ECCS so that the staff and industry would have sufficient time to develop a permanent resolution. In addition, the bulletin supplement informed licensees of pressurized-water reactors (PWRs) and BWRs of new information on the vulnerability of ECCS suction strainers in BWRs and containment sumps in PWRs to clogging during the recirculation phase of a LOCA.

On September 11, 1995, Limerick Unit 1 was being operated at 100-percent power when control room personnel observed alarms and other indications that one safety relief valve (SRV) was open. Emergency procedures were implemented. Attempts to close the valve were unsuccessful, and a manual reactor scram was initiated. Prior to the opening of the SRV, the licensee had been running the "A" loop of suppression pool cooling to remove heat being released into the pool by leaking SRVs. Shortly after the manual scram, and with the SRV still open, the "B" loop of suppression pool cooling was started. Operators continued working to close the SRV and reduce the cooldown rate of the reactor vessel. Approximately 30 minutes later, fluctuating motor current and flow were observed on the "A" loop. Cavitation was believed to be the cause, and the loop was secured. After it was checked, the "A" pump was successfully restarted and no further problems were observed.

After the cooldown following the blowdown event, a diver was sent into the suppression pool at Unit 1 to inspect the condition of the strainers and the general cleanliness of the pool. Both suction strainers in the "A" loop of suppression pool cooling were found to be almost entirely covered with a thin "mat" of material, consisting mostly of fibers and sludge. The "B" loop suction strainers had a similar covering, but less of it. Analysis showed that the sludge was primarily iron oxides and the fibers were polymeric in nature. The source of the fibers was not positively identified, but the licensee has determined that the fibers did not originate within the suppression pool, and that no trace of either fiberglass or asbestos was in the fibers.

The Limerick event demonstrated the need to ensure adequate suppression pool cleanliness. In addition, it re-emphasized that materials other than fibrous insulation could also clog strainers (Perry's strainers were clogged by fibrous filter media). In response to this event, the staff issued NRC Bulletin 95-02, "Unexpected Clogging of Residual Heat Removal (RHR) Pump Strainer While Operating in Suppression Pool Cooling Mode," on October 17, 1995. The bulletin requested that licensees (1) assess the operability of their ECCS based on the cleanliness of their suppression pool and ECCS strainers, (2) verify the operability of the ECCS through an appropriate pump test and strainer inspection within 120 days from the date of the bulletin, (3) establish a pool cleaning program, (4) review their foreign material exclusion practices and correct any identified weaknesses, and (5) implement any appropriate additional measures for ensuring the availability of their ECCS. The staff is still reviewing the responses to NRC Bulletin 95-02, but results of the review of requested action (1) have shown that almost all plants have cleaned their pools during the last 4 years with most having done so during their last refueling outage.

Licensee responses to NRC Bulletin 93-02 and its supplement have demonstrated that appropriate interim measures have been implemented by licensees to ensure adequate protection of public health and safety, and to allow continued operation until the final actions requested in this bulletin are implemented. In responding to these bulletins, licensees ensured that (1) alternate water sources (both safety and nonsafety-related sources) to mitigate a strainer clogging event were available, (2) emergency operating procedures (EOPs) provided adequate guidance on mitigating a strainer clogging event, (3) operators were adequately trained to mitigate a strainer clogging event, and (4) loose and temporary fibrous materials stored in containment were removed. Licensee responses to NRC Bulletin 95-02 have shown that most suppression pools have been cleaned recently, and that those licensees who have not
cleaned their suppression pools recently are scheduled to do so during their upcoming refueling outage. In addition, a generic safety assessment conducted by the BWROG concluded that operators would have adequate time to make use of alternate water sources (25-35 minutes). The staff also notes that the probability of the initiating event is low. The actions requested in this bulletin will ensure that the ECCS can perform its safety function and minimize the need for operator action to mitigate a LOCA.

Discussion

The results of the staff study, documented in NUREG/CR-6224, demonstrate that for the reference plant, there is a high probability that the available NPSH margin for the ECCS pumps will be inadequate following dislodging of insula- tion and other debris caused by a LOCA and transport of the debris to the suction strainers. In addition, the study calculated that the loss of NPSH could occur quickly (less than 10 minutes into the event). The study also demonstrated that determining the adequacy of NPSH margin for an ECCS system is highly plant-specific because of the large variations in such plant characteristics as containment type, ECCS flow rates, insulation types, plant layout, plant cleanliness, and available NPSH margin.

The Barsebäck event demonstrated that a pipe break can generate and transport sufficient quantities of insulation and other debris to the suppression pool where they can be potentially deposited onto strainer surfaces and cause the ECCS to lose NPSH. The Perry events further demonstrated that fibrous debris combined with corrosion products present in the suppression pool (sludge) can exacerbate the problem. This phenomenon was confirmed in the staff study which showed that the calculated loss of NPSH could occur soon (less than 10 minutes) after ECCS initiation. The effect of filtering sludge from the suppression pool water by fibrous debris deposited on the strainer surface was further confirmed in NRC-sponsored testing conducted at the Alden Research Laboratory which demonstrated that the pressure drop across the strainer was greatly increased by this filtering effect. Additional testing sponsored by the NRC at Alden Research Laboratory demonstrated that the energy conveyed to the suppression pool during the "chugging" phase of a LOCA is sufficient to ensure that the fibrous debris and sludge are well mixed and evenly distributed in the suppression pool, and can remain suspended for a sufficiently long period to allow large quantities to be deposited onto the strainer surfaces. The staff has concluded that this problem is applicable to all domestic BWRs. The basis for the staff's conclusion is as follows: (1) there do not appear to be any features specific to a particular plant, class of plants, or containment type that would mitigate or prevent the generation, the transport to the suppression pool, or the deposition on the ECCS strainers of sufficient material to clog the strainers, and (2) parametric analyses performed in support of the NUREG/CR-6224 study, using parameter ranges which bound most domestic BWRs, failed to find parameter ranges that would prevent BWRs with other containment types from being susceptible to this problem. In addition, the staff study was conducted on a Mark I; Barsebäck had a strainer clogging event and is similar in design to a Mark II; and Perry, a Mark III, also had a strainer clogging event.

Section 50.46 of Title 10 of the Code of Federal Regulations (10 CFR 50.46) requires that licensees design their ECCS systems to meet five criteria, one of which is to provide long-term cooling capability of sufficient duration following a successful system initiation so that the core temperature shall be maintained at an acceptably low value and decay heat shall be removed for
the extended period of time required by the long-lived radioactivity remaining in the core. The ECCS is designed to meet this criterion, assuming the worst single failure. Experience gained from operating events and detailed analysis, as previously discussed, demonstrate that excessive buildup of debris from thermal insulation, corrosion products, and other particulates on ECCS pump strainers is highly likely to occur, creating the potential for a common-cause failure of the ECCS, which could prevent the ECCS from providing long-term cooling following a LOCA. The staff concludes therefore, that this issue must be resolved by licensees in order to ensure compliance with the regulations. Regulatory Guide 1.82, Revision 2 (RG 1.82, Revision 2), "Water Sources for Long-Term Recirculation Cooling Following a Loss-of-Coolant Accident," provides an acceptable method of ensuring compliance with 10 CFR 50.46.

Plant-specific analyses to resolve this issue are difficult to perform because a substantial number of uncertainties are involved. Examples of these uncertainties include the amount of debris that would be generated by a pipe break for various insulation types; the amount of debris that would be transported to the suppression pool; the characteristics of debris reaching the suppression pool (e.g., size and shape); and head-loss correlations for various insulation types combined with suppression pool corrosion products, paint chips, dirt, and other particulates. Many of these uncertainties would be plant-specific because of the differences in plant characteristics such as plant layout, insulation types, ECCS flow rates, containment types, plant cleanliness, and NPSH margin. Testing may be required to quantify these uncertainties for licensees to demonstrate compliance with 10 CFR 50.46.

The staff has also closely followed the work of the BWROG to resolve this issue. The BWROG has evaluated several potential solutions, and has completed testing on three new strainer designs: two passive strainer designs and one self-cleaning design. The ongoing BWROG effort is consistent with the options proposed in this bulletin for resolution of the ECCS potential strainer clogging issue. These options are discussed in the next section under Requested Actions. The BWROG is also developing a utility resolution guidance (URG) document for providing the utilities with (1) guidance on evaluation of the ECCS potential strainer clogging issue for their plant, (2) a standard industry approach to resolution of the issue that is technically sound, and (3) guidance that is consistent with the requested actions in this bulletin for demonstrating compliance with 10 CFR 50.46. The URG will include guidance on a calculational methodology for performing plant specific evaluations. This methodology is still under development by the BWROG. The staff considers the URG to be an important part of the implementation of the final resolution of this issue, and will closely monitor its development and application.

The staff has noted that much of the effort and discussion on this issue to date has focused on the threat caused by fibrous insulation. The staff recognizes that fibrous insulation represents the largest source of fibrous material in the containment; however, licensees are reminded that both the Perry and the Limerick events involved other sources of fibrous debris. In determining their resolution for this issue, licensees should focus on protecting the functional capability of the ECCS from all potential strainer clogging mechanisms.

Requested Actions

All BWR licensees are requested to implement appropriate measures to ensure the capability of the ECCS to perform its safety function following a LOCA. The staff has identified three potential resolution options; however, licensees may propose others which provide an equivalent level of assurance that the ECCS will be able to perform its safety function following a LOCA. The three options identified by the staff are as follows:

Option 1: Installation of a large capacity passive strainer design.

If this option is selected by a licensee, the strainer design used should have sufficient capacity to ensure that debris loadings equivalent to a scenario calculated in accordance with Section C.2.2 of RG 1.82, Revision 2, do not cause a loss of NPSH for the ECCS. This option has two main advantages. First, it is completely passive and, therefore, requires no operator intervention. Second, it does not require an interruption of ECCS flow. While this is the most advantageous of the options identified, the staff recognizes that it may be difficult for some licensees to implement this option owing to the difficulty in providing sufficient structural support for the strainers to handle LOCA-induced hydrodynamic loads. However, the staff notes that licensees may take appropriate measures in combination with this option to reduce the potential debris sources in containment and the suppression pool, which would, in turn, reduce the required capacity and physical size of the strainer, and therefore, assist in reducing the structural burden of the strainer installation. Licensees choosing this option for resolution should establish new or modify existing programs, as necessary, to ensure that the potential for debris to be generated and transported to the strainer surface does not at any time exceed the assumptions used in estimating the amounts of debris for sizing of the strainers in accordance with RG 1.82, Revision 2.

Option 2: Installation of a self-cleaning strainer.

This option automatically prevents strainer clogging by providing continuous cleaning of the strainer surface with a scraper blade or brush. Like Option 1, the self-cleaning strainer design would not rely on operator action or interrupt ECCS flow. However, this option does rely on an active component which is fully exposed to the LOCA effects in the suppression pool to

keep the strainer surface clean. Therefore, appropriate measures should be taken to ensure the
operability of the strainer. Installation of this type of strainer should be combined with the following measures to protect the strainer and ensure its operability: (1) implementation of reasonable measures to eliminate debris sources that could potentially damage or overload the strainer during a LOCA, including, as a minimum, removal of all debris from the suppression pool every refueling outage, and (2) implementation of surveillances to ensure adequate cleaning of the suppression pool and the operability of the strainer.

Option 3: Installation of a backflush system.

The backflush system is a reactive system that relies on operator action to remove debris from the surface of the strainer to prevent it from clogging. In order to ensure that operators can adequately deal with a strainer clogging event, installation of this type of system should be combined with the following measures: (1) reasonable measures to maximize the amount of time before clogging could occur; (2) instrumentation and alarms to indicate when strainer differential pressure increases; (3) operator training on recognition and mitigation of a strainer clogging event; and (4) implementation of surveillances to ensure the operability of the strainer instrumentation and backflush system. A supporting analysis for installation of a backflush system that is consistent with Section C.2.2 of RG 1.82 Revision 2 should be performed to demonstrate that operators have sufficient time to recognize the onset of clogging and to take appropriate action, taking into consideration their other responsibilities after a LOCA. In addition, this analysis should ensure that operators have the capability and sufficient time to cycle backflushing at the expected frequency and for the required total number of actuations anticipated in providing long-term core cooling following a LOCA. The suction strainers and backflush system should be so designed that interruption of ECCS flow due to backflushing during an accident does not contradict the guidance provided in the plant emergency operating procedures (EOPs). For instance, if the EOPs indicate that all available pumps should be running and injecting into the vessel, the system should be designed to ensure that interruption of ECCS flow for backflushing is not required during this stage of the accident. If EOPs indicate that unnecessary pumps may be secured, then use of backflush on the suction strainers
of the unnecessary pumps would be acceptable.

The staff considers the instrumentation (e.g., strainer pressure differential or pump flow rate) relied upon by operators to indicate when a manual initiation of the strainer backflush system is required to be Type A instrumentation as defined in Regulatory Guide 1.97, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following An Accident," Revision 3. The instrumentation should therefore be included with other Type A instrumentation in the appropriate section of the technical specifications. In NUREG-1433, "Standard Technical Specfications, General Electric Plants, BWR/4," and NUREG-1434, "Standard Technical Specifications, General Electric Plants, BWR/6," (Volume 1, Revision 1) the applicable section is Section 3.3.3.1-1 "Post Accident Monitoring Instrumentation." The licensee should also provide appropriate corresponding bases.

Any components or systems installed to ensure that the ECCS can perform its safety function during a LOCA are considered by the staff to be a part of the ECCS. Therefore, these components or systems should be designed, fabricated, and tested to the same standards as the
ECCS. Any request to deviate from this position would require an exemption with a supporting technical analysis and must meet the specific requirements of 10 CFR 50.12. Active features such as backflush and the self-cleaning strainer must be supported by test data that demonstrate the design effectiveness for removal of debris entrained on the surface of the strainer. Strainers installed for Option 1 must be supported by test data that demonstrate their

performance characteristics and their ability to handle the worst case scenario for debris deposition on the strainer surface.

Section 50.36 of Title 10 of the Code of Federal Regulations (10 CFR 50.36) has been amended to provide the criteria for determining the content of Technical Specifications (TS) for nuclear power reactors. The amended rule was published in the Federal Register on July 19, 1995 (60 FR 36953). Paragraph (c)(2)(ii) of 10 CFR 50.36 provides four criteria for determining if a limiting condition for operation (LCO) is required in the TS. Criterion 3 states that a "structure, system or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier" should have a LCO in the TS. The staff believes that passive strainers, self-cleaning strainers, and strainer backflush systems meet Criterion 3 of the Commission's regulations and should be included in the TS because these components are necessary for the primary success path (i.e., the ECCS) to mitigate a design basis LOCA. However, since strainers and backflush systems are fundamental parts of the ECCS, the staff has concluded that the addition of new LCOs and action statements are not necessary. Rather, the effect of one of these components or systems being inoperable should be analyzed for its effect on the operability of the ECCS as a whole, and the appropriate ECCS action statement entered as a result. TS should be proposed to support surveillances for components and systems installed in response to this bulletin and should include, where appropriate, for the option selected, surveillance testing of active features (i.e., Options 2 and 3), and visual inspections where they provide reasonable assurance
that the component is operable. Where appropriate, these TS surveillances should be proposed for existing strainer components to ensure their operability if a licensee determines that no modification to their ECCS strainers is necessary in response to this bulletin. Attachment 1 to this bulletin provides sample TS surveillances that are consistent with the format for the standard TS for the BWR 4, which may be used by licensees in determining appropriate TS surveillances for the actions implemented in response to this bulletin. Success criteria for the surveil- lances should be defined by the licensee in the bases section of the TS.

Plant procedures and other actions implemented in response to NRC Bulletin 93-02 and its supplement should remain in place until the final corrective actions requested in this bulletin have been implemented.

All licensees are requested to implement these actions by the end of the first refueling outage starting after January 1, 1997. This timeframe for implementation of the final resolution is considered appropriate by the staff owing to the interim actions already taken by licensees and the low probability of the initiating event.

Required Response

All addressees are required to submit the following written reports:

(1) Within 180 days of the date of this bulletin, a report indicating whether the addressee intends to comply with these requested actions, including a description of planned actions and mitigative strategies to be used, the schedule for implementation, and proposed TS, if appropriate; or, if the licensee does not intend to comply with these actions, a detailed description of the safety basis for the decision.

The report must contain a detailed description of any proposed alternative course of action, the schedule for completing this alternative course of action, the safety basis for determining the acceptability of the planned alternative course of action, and proposed TS, if appropriate, that support the proposed alternative course of action and are consistent with 10 CFR 50.36. The staff considers the 180-day response period appropriate, given the amount of engineering that licensees may wish to perform before they provide their formal response to the staff.

(2) Within 30 days of completion of all requested actions, a report confirming completion and summarizing any actions taken.

Address the required written reports to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001, under oath or affirmation under the provisions of Section 182a, the Atomic Energy Act of 1954, as amended, and 10 CFR 50.54(f). In addition, submit a copy of the reports to the appropriate regional administrator.

Related Generic Communications

NRC Bulletin 95-02, "Unexpected Clogging of Residual Heat Removal (RHR) Pump Strainer While Operating in Suppression Pool Cooling Mode," dated October 17, 1995.

NRC Bulletin 93-02, "Debris Plugging of Emergency Core Cooling Suction Strainers," dated May 11, 1993, and its supplement, dated February 18, 1994.

Backfit Discussion

The actions requested by this bulletin are considered backfits in accordance with NRC procedures and are necessary to ensure that licensees are in compliance with existing NRC rules and regulations. Specifically, 10 CFR 50.46 requires that adequate ECCS flow be provided to maintain the core temperature at an acceptably low value and to remove decay heat for the extended period of time required by the long-lived radioactivity remaining in the core following a design-basis accident. Therefore, this bulletin is being issued as a compliance backfit under the terms of 10 CFR 50.109(a)(4)(i), and a full backfit analysis was not performed. An evaluation was performed in accordance with NRC procedures, including a statement of the objectives and the reasons for the requested actions and the basis for invoking the compliance exception. A copy of this evaluation will be made available in the NRC Public Document Room.

Paperwork Reduction Act Statement

This bulletin contains information collections that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). These information collections were approved by the Office of Management and Budget, approval number 3150-0011, which expires July 31, 1997.

The public reporting burden for this collection of information is estimated to average 160 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. The U.S. Nuclear Regulatory Commission is seeking public comment on the potential impact of the collection of information contained in the bulletin and on the following issues:

(1) Is the proposed collection of information necessary for the proper performance of the functions of the NRC, including whether the information will have practical utility?

(2) Is the estimate of burden accurate?

(3) Is there a way to enhance the quality, utility, and clarity of the information to be collected?

(4) How can the burden of the collection of information be minimized, including the use of automated collection techniques?

Send comments on any aspect of this collection of information, including suggestions for reducing this burden, to the Information and Records Management Branch, T-6 F33, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0011), Office of Management and Budget, Washington, DC 20503.

The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

If you have any questions about this matter, please contact the technical contact listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

signed by

Brian K. Grimes, Acting Director
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

Technical Contact: Robert Elliott, NRR
(301) 415-1397
Internet:rbe@nrc.gov

Lead Project Manager: David Lynch, NRR
(301) 415-3023
Internet:mdl@nrc.gov

Attachments:
1. Sample Technical Specification Surveillances

Attachment 1

SAMPLE TECHNICAL SPECIFICATION SURVEILLANCES

SURVEILLANCE
FREQUENCY

SR 3.5.1.13

(a) Verify, by visual inspection, that each ECCS
[18] months
suction strainer is not restricted by debris, that the supporting structure shows no evidence of structural distress or abnormal corrosion, and there is no evidence of abnormalities which could affect the mechanical functioning of the suction strainer.

(b) Verify suppression pool is adequately clean
[18] months

[SR 3.5.1.14

(a) Verify that each [Self-Cleaning Strainer] attains at least [ ] rpm with a pressure differential of less than or equal to [ ] while the ECCS pump[s], taking suction from the strainer, is producing a flow rate of at least [ ] gpm.]
[18] months

[SR 3.5.1.15

Verify that the [Strainer Backflush System] attains flow rate of at least [ ] gpm at each ECCS strainer.]
[18] months