Entergy

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June 29, 2000

2CAN060003

U. S. Nuclear Regulatory Commission
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Washington, DC 20555

Subject: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
Technical Specification Change Request For ANO-2 Containment Cooling System

Gentlemen:

Attached is the proposed change for ANO-2 Technical Specification 3.6.2.3, the associated surveillance requirements, and the Technical Specification bases. This change is required as a result of the increase in the containment building design pressure from 54 psig to 59 psig and the corresponding post design bases accident (DBA) environmental conditions which were identified in a November, 1999 submittal to the NRC (2CAN119903). A plant modification will be completed during the next refueling outage to adjust the containment cooler fan blade pitch. This fan blade pitch change will reduce the airflow through each unit and limit the post DBA fan motor horsepower. This will reduce the airflow rate through each unit and correspondingly reduce the heat removal capacity of each containment cooler. With this reduction in heat removal capacity, both units in each group will be required to meet post DBA containment heat removal requirements.

The proposed change has been evaluated in accordance with 10CFR50.91(a)(1) using criteria in 10CFR50.92(c) and it has been determined that this change involves no significant hazards considerations. The bases for these determinations are included in the attached submittal.

Entergy Operations requests that the effective date for this change be in conjunction with the completion of the ANO-2R14 Refueling Outage. Therefore, we request NRC approval of this license amendment by October 30, 2000. Although this request is neither exigent nor emergency, your prompt review is requested.

A001

Very truly yours,

CGA/dm
Attachments

To the best of my knowledge and belief, the statements contained in this submittal are true.

SUBSCRIBED AND SWORN TO before me, a Notary Public in and for Pope **County and the State of Arkansas, this** 29 **day of** June**, 2000.**

Notary Public
My Commission Expires 12/15/2007

"OFFICIAL SEAL"
Andrea Pierce
Notary Public, State of Arkansas
County of Pope
My Commission Exp. 12/15/2007

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ATTACHMENT

TO

2CAN060003

PROPOSED TECHNICAL SPECIFICATION

AND

RESPECTIVE SAFETY ANALYSES

IN THE MATTER OF AMENDING

LICENSE NO. NPF-6

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT TWO

DOCKET NO. 50-368

DESCRIPTION OF PROPOSED CHANGES

Technical Specification

The current Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specification (TS) 3.6.2.3 states: "Two independent containment cooling groups shall be operable with at least one operational cooling unit in each group." The proposed change will modify this wording as follows: "Two independent containment cooling groups shall be operable with two operational cooling units in each group."

Surveillance Requirements

The surveillance requirements contained in TS 4.6.2.3.a.1 allow a containment cooler group with a minimum service water flow rate of 1250 gpm to be declared operable if one of the two cooling units and associated fan is operable. As a result of this proposed change, the surveillance requirements will be modified to require both cooling units per group to be operable for the containment cooler group to be operable.

Technical Specification Bases

The bases for TS 3/4.6.2.3 states: "The containment cooling system and the containment spray system are redundant to each other in providing post accident cooling of the containment atmosphere." The bases for TS 3/4.6.2.1, Containment Spray System, was worded similar to the bases for TS 3/4.6.2.3. These bases statements were originally identified via the condition report process (CR-ANO-2-1999-0662) as being inaccurate in relationship to the current analysis. The containment spray pumps are redundant to the containment cooling units, however, the containment cooling units are not redundant to the containment spray pumps. If the containment spray pumps become inoperable the allowable outage time is 72 hours. If the containment coolers become inoperable the allowable outage time is 7 days. Since the coolers are not redundant to the spray pumps, the allowable outage time for the coolers can remain the same. For consistency the Technical Specification bases for both of these systems will be modified to correct the inaccuracy discussed above.

BACKGROUND

The Containment Cooling System is designed to reduce the post Design Basis Accident (DBA) containment building pressure and temperature and to control the normal containment temperature. ANO-2 utilizes two electrically independent and redundant containment cooling groups with two cooling units in each group. Therefore, the loss of a single group will result in the loss of both cooling units in that group. The system is designed with non-safety related chilled water cooling coils that are in service during normal operation and service water coiling coils for post accident conditions. The service water piping configuration allows one of the two cooling units per group to be blanked off. Originally, the group was considered operable if only one operable cooling unit could be supplied with a minimum of 1250 gpm of service water.

This Technical Specification (TS) change will require both cooling units in a given group to be operable for the group to be operable. During normal power operation it is expected that three of the four units will be required to maintain the building pressure and temperature within the region of acceptable operations as specified by Technical Specifications. During accident conditions when containment pressure exceeds the containment pressure high setpoint a containment cooling actuation signal is generated that sends a start signal to all four of the Containment Cooling Units. The current containment analyses shows that only one of the containment cooling units in conjunction with one containment spray loop is sufficient to maintain the containment atmosphere pressure below design following a Loss of Coolant Accident (LOCA) or a Main Steam Line Break (MSLB).

In preparation for the next ANO-2 refueling outage (2R14), in which the steam generators will be replaced, a new LOCA and MSLB analysis was performed. This resulted in a change to the containment pressure from the current 54 psig to 58 psig. The containment design pressure is 59 psig. One of the assumptions in the analyses was that one containment cooling unit in conjunction with the containment spray system would provide adequate heat removal capability. Under these new Design Bases Accident (DBA) conditions in order to limit the containment cooler fan motor horsepower to its existing design capacity, a plant modification is required during 2R14 to adjust the containment cooler fan blade pitch. The increased design conditions and the change in blade pitch will reduce the design heat removal capacity of a given cooling unit by about 35% below its original design requirements. As a result, the new fan pitch will require two fans per group to be operable to ensure that the heat removal assumptions in the analysis are bounded. Having two cooling units per group operable will ensure more than adequate margin for design basis heat removal capacity.

To ensure heat removal capability of the containment coolers, an additional analysis based on the higher peak containment pressure was performed to evaluate the effects of flashing in the service water coils. The GOTHIC code was used to perform the analysis. Eighteen cases were performed to investigate the effect of upstream service water pressure, fan airflow, downstream service water pressure, coil fouling, coil flow resistance, and cooler configuration upon flashing within the service water coils. It was observed that upstream service water pressure has the most significant impact upon acceptable cooler heat removal capability. The analysis shows that acceptable cooler performance can be obtained whenever two coolers in a group are in service as long as service water supply pressure is greater than or equal to 70 psia. Current ANO-2 emergency operating procedures specify to maintain service water pressure greater than 85 psig (100 psia) and provide contingencies to realign components as necessary to ensure this pressure is maintained. Therefore, the minimum service water supply pressure needed to ensure heat removal capability of two coolers per group is assured by existing procedural guidance.

BASIS FOR PROPOSED CHANGE

With the replacement of the ANO-2 Steam Generators during 2R14, peak containment pressure will increase from 54 psig to 58 psig as a result of the new LOCA and MSLB analyses. The conclusions of these analyses as submitted to the NRC on November 3, 1999

(2CAN119903) indicate that one Containment Cooling unit in conjunction with the Containment Spray system can provide adequate heat removal capability during operating Cycle 15 and beyond. While continuing the review of the containment building parameters and Containment Coolers, it was determined that a plant modification was needed to upgrade the containment coolers. The modification will ensure that the containment cooler motor design limits are maintained under Design Basis Accident (DBA) conditions. This modification will adjust the containment cooler fan blade pitch to the capacity of the existing 75 hp motors, replace the non–safety related chilled water cooling coils with coils that have greater heat transfer capacity, install additional emergency drain capacity, and replace or repair corroded sections of the existing housing, structural members and normal drains. The new blade position will result in a reduction in airflow during both normal and post DBA conditions. Therefore, to bound the assumed heat removal capability in the current analysis, two units will be required and the option to blank off the service water cooling coils to one of the units within a group will be prohibited.

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

Entergy Operations, Inc. is proposing that the Arkansas Nuclear One Unit 2 (ANO-2) Operating License be amended to require two operational Containment Cooling units in each Containment Cooling Group.

The containment cooling system (CCS) is comprised of two electrically independent and redundant cooling groups with each group containing two cooling units. The system is designed with chilled water cooling coils that are in service during normal operation and service water coiling coils for post accident conditions. The service water piping configuration allows one of the two cooling units per group to be blanked off. Originally, the group was considered operable if only one operable fan could be supplied with a minimum of 1250 gpm of service water. The proposed TS change will require two containment cooling units in each group to be operable with a service water flow rate of 1250 gpm to the group. And therefore, the allowance to install a blank flange in the service water piping to a single cooler will be removed with this proposed change.

The CCS in conjunction with the containment spray system (CSS) provide containment heat removal in the event of a Main Steam Line Break (MSLB) or a Loss of Coolant Accident (LOCA). The original MSLB and LOCA analyses indicated that one train of CSS and one containment cooling unit would provide adequate containment heat removal in the event of occurrence of either accident. Typically two cooling units in each group are aligned for service, thereby providing more heat removal capacity than assumed in the analyses. With the replacement of the ANO-2 Steam Generators during the next refueling outage a Containment Uprate analysis was performed which resulted in new MSLB and LOCA analyses. As a result of the Containment Uprate analysis, peak containment pressure will increase from 54 psig to 58 psig.

An evaluation of the proposed change has been performed in accordance with 10CFR50.91(a)(1) regarding no significant hazards considerations using the criteria in

10CFR50.92(c). A discussion of these criteria as they relate to this amendment request follows:

Criterion 1 - Does Not Involve a Significant Increase in the Probability or Consequences of an Accident Previously Evaluated.

The containment cooling units do not have the ability to cause an accident, however, they do serve to mitigate containment accident conditions. The new MSLB and LOCA analyses contain the same assumptions relating to containment heat removal as the original analyses, i.e. at least one containment building cooling unit in conjunction with one train of CSS is adequate for containment heat removal. During 2R14 the containment coolers will be modified by adjusting the fan pitch, which will reduce fan flow as well as the post DBA motor horsepower. To offset this lower containment cooler fan airflow rate, two cooling units per group will be required. The resulting heat removal capacity with two containment cooling units in service at the new blade pitch position is greater than the required heat removal assumed in the LOCA and MSLB analyses.

Therefore, this change does <u>not</u> involve a significant increase in the probability or consequences of any accident previously evaluated.

Criterion 2 - Does Not Create the Possibility of a New or Different Kind of Accident from any Previously Evaluated.

Assuming the single failure of a loss of one group of components, the remaining group with two cooling units will continue to be available. The modification to the fan blade pitch will result in a lower air flow rate through each containment cooler. However, the requirement for two units per group to be operable provides adequate heat removal capacity for containment uprate conditions. Therefore, the heat removal capacity assumed in the Containment Uprate analysis remain valid. The previous ability to credit either cooler unit provided additional design margin whereby the required redundancy is still provided by this change.

Therefore, this change does <u>not</u> create the possibility of a new or different kind of accident from any previously evaluated.

Criterion 3 - Does Not Involve a Significant Reduction in the Margin of Safety.

The Containment Cooling System ensures that 1) the containment air temperature will be maintained within limits during normal operation, and 2) adequate heat removal capacity is available when operated in conjunction with the containment spray systems during post-LOCA conditions. The modification planned during 2R14 will result in a lower air flow rate through each cooling unit and a corresponding reduction in heat transfer capability of each cooling unit. However, the safety margin

is still maintained by requiring both cooler units to be operable and thus providing adequate heat removal capacity to remain below the containment design pressure.

Therefore, this change does not involve a significant reduction in the margin of safety.

Therefore, based upon the reasoning presented above and the previous discussion of the amendment request, Entergy Operations has determined that the requested change does not involve a significant hazards consideration.

ENVIRONMENTAL IMPACT EVALUATION

Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the proposed license amendment. The basis for this determination is as follows:

1. The proposed license amendment does not involve a significant hazards consideration as described previously in the evaluation.

2. As discussed in the significant hazards evaluation, this change does not result in a significant change or significant increase in the radiological doses for any Design Basis Accident. The proposed license amendment does not result in a significant change in the types or a significant increase in the amounts of any effluents that may be released off-site.

3. The proposed license amendment does not result in a significant increase to the individual or cumulative occupational radiation exposure because this change bounds the Containment Uprate analyses associated with the containment cooling system.

PROPOSED TECHNICAL SPECIFICATION CHANGES

CONTAINMENT COOLING SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.2.3 Two independent containment cooling groups shall be OPERABLE with two operational cooling units in each group.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With one group of the above required containment cooling units inoperable and both containment spray systems OPERABLE, restore the inoperable group of cooling units to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With two groups of the above required containment cooling units inoperable and both containment spray systems OPERABLE, restore at least one group of cooling units to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. Restore both above required groups of cooling units to OPERABLE status within 7 days of initial loss or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. With one group of the above required containment cooling units inoperable and one containment spray system inoperable, restore the inoperable spray system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. Restore the inoperable group of containment cooling units to OPERABLE status within 7 days of initial loss or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.2.3 Each containment cooling group shall be demonstrated OPERABLE:

a. At least once per 14 days by:

1. Verifying that service water flow rate to the group of cooling units is ≥ 1250 gpm and that each group has two operable fans.

2. Addition of a biocide to the service water during the surveillance in 4.6.2.3.a.1 above, whenever service water temperature is between 60°F and 80°F.

b. At least once per 31 days by:

1. Starting (unless already operating) each operational cooling unit from the control room.

2. Verifying that each operational cooling unit operates for at least 15 minutes.

c. At least once per 18 months by verifying that each cooling unit starts automatically on a CCAS test signal.

3/4.6.2 DEPRESSURIZATION, COOLING, AND pH CONTROL SYSTEMS

3/4.6.2.1 CONTAINMENT SPRAY SYSTEM

The OPERABILITY of the containment spray system ensures that containment depressurization and cooling capability will be available in the event of a LOCA. The pressure reduction and resultant lower containment leakage rate are consistent with the assumptions used in the accident analyses.

The containment spray system and the containment cooling system provide post accident cooling of the containment atmosphere; however, the containment cooling system is not redundant to the containment spray system. The containment spray system also provides a mechanism for removing iodine from the containment atmosphere and therefore the time requirements for restoring an inoperable spray system to OPERABLE status have been maintained consistent with that assigned other inoperable ESF equipment.

3/4.6.2.2 TRISODIUM PHOSPHATE (TSP)

A hydrated form of granular trisodium phosphate (TSP) is employed as a passive form of pH control for post LOCA containment spray and core cooling water to ensure that iodine, which may be dissolved in the recirculated reactor cooling water following a loss of coolant accident (LOCA), remains in solution. TSP also helps inhibit stress corrosion cracking (SCC) of austenitic stainless steel components in containment during the recirculation phase following an accident. Baskets of TSP are placed on the floor of the containment building to dissolve from released reactor coolant water and containment sprays after a LOCA. Recirculation of the water for core cooling and containment sprays then provides mixing to achieve a uniform solution pH.

Fuel that is damaged during a LOCA will release iodine in several chemical forms to the reactor coolant and to the containment atmosphere. A portion of the iodine in the containment atmosphere is washed to the sump by containment sprays. The emergency core cooling water is borated for reactivity control. This borated water causes the sump solution to be acidic. In a low pH (acidic) solution, dissolved iodine will be converted to a volatile form. The volatile iodine will evolve out of solution into the containment atmosphere, significantly increasing the levels of airborne iodine. The increased levels of airborne iodine in containment contribute to the radiological releases and increase the consequences from the accident due to containment atmosphere leakage.

After a LOCA, the components of the core cooling and containment spray systems will be exposed to high temperature borated water. Prolonged exposure to the core cooling water combined with stresses imposed on the components can cause SCC. The SCC is a function of stress, oxygen and chloride concentrations, pH, temperature, and alloy composition of the components. High temperatures and low pH, which would be present after a LOCA, tend to promote SCC. This can lead to the failure of necessary safety systems or components.

Adjusting the pH of the recirculation solution to levels above 7.0 prevents a significant fraction of the dissolved iodine from converting to a volatile form. The higher pH thus decreases the level of airborne iodine in containment and reduces the radiological consequences from containment atmosphere leakage following a LOCA. Maintaining the solution pH above 7.0 also reduces the occurrence of SCC of austenitic stainless steel components in containment. Reducing SCC reduces the probability of failure of components.

The SR 4.6.2.2.b requirement to dissolve a representative sample of TSP in a sample of borated water provides assurance that the stored TSP will dissolve in borated water at the postulated post-LOCA temperatures. Testing must be performed to ensure the solubility and buffering ability of the TSP after exposure to the containment environment. A representative sample of 3.00 ± 0.05 grams of TSP from one of the baskets in containment is submerged in 1.0 ± 0.01 liter of water at a boron concentration of 3000 ± 30 ppm and at a temperature of 120 ± 5°F. The solution is allowed to stand for 4 hours without agitation. The liquid is then decanted from the solution and mixed, the temperature adjusted to 77 ± 2°F and the pH measured. At this point, the pH must be ≥ 7.0. The representative sample weight is based on the minimum required TSP weight of 6804 kilograms, which at manufactured density corresponds to the minimum volume of 278 cubic ft, and assumed post LOCA borated water mass in the sump of approximately 5284102 lbm normalized to buffer a 1.0 liter sample. The boron concentration of the test water is representative of the maximum possible boron concentration corresponding to the maximum possible post LOCA sump volume. Agitation of the test solution is prohibited, since an adequate standard for the agitation intensity cannot be specified. The test time of 4 hours is necessary to allow time for the dissolved TSP to naturally diffuse through the sample solution. In the post LOCA containment sump, rapid mixing would occur, significantly decreasing the actual amount of time before the required pH is achieved. This would ensure compliance with the Standard Review Plan requirement of a pH ≥ 7.0 by the onset of recirculation after a LOCA.

3/4.6.2.3 CONTAINMENT COOLING SYSTEM

The OPERABILITY of the containment cooling system ensures that 1) the containment air temperature will be maintained within limits during normal operation, and 2) adequate heat removal capacity is available when operated in conjunction with the containment spray systems during post-LOCA conditions.

The containment spray system is redundant to the containment cooling system in providing post accident cooling of the containment atmosphere; however, the containment cooling system is not redundant to the containment spray system. As a result of the redundancy of the containment spray system with the containment cooling system , the allowable out-of-service time requirements for the containment cooling system have been appropriately adjusted. However, the allowable out of service time requirements for the containment spray system have been maintained consistent with that assigned other inoperable ESF equipment since the containment spray system also provides a mechanism for removing Iodine from the containment atmosphere.

The addition of a biocide to the service water system is performed during containment cooler surveillance to prevent buildup of Asian clams in the coolers when service water is pumped through the cooling coils. This is performed when service water temperature is between 60°F and 80°F since in this water temperature range Asian clams can spawn and produce larva which could pass through service water system strainers.

MARKUP OF CURRENT ANO-2 TECHNICAL SPECIFICATIONS

(FOR INFO ONLY)

CONTAINMENT COOLING SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.2.3 Two independent containment cooling groups shall be OPERABLE with ~~at least one~~ two operational cooling units in each group.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With one group of the above required containment cooling units inoperable and both containment spray systems OPERABLE, restore the inoperable group of cooling units to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With two groups of the above required containment cooling units inoperable and both containment spray systems OPERABLE, restore at least one group of cooling units to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. Restore both above required groups of cooling units to OPERABLE status within 7 days of initial loss or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. With one group of the above required containment cooling units inoperable and one containment spray system inoperable, restore the inoperable spray system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. Restore the inoperable group of containment cooling units to OPERABLE status within 7 days of initial loss or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.2.3 Each containment cooling group shall be demonstrated OPERABLE:

a. At least once per 14 days by:

1. Verifying that service water flow rate to the group of cooling units is ≥ 1250 gpm and that each ~~unit in the~~ group has ~~an~~ two operable fans~~; or that one unit in the group has a service water flow rate of ≥ 1250 gpm and an operable fan.~~

2. Addition of a biocide to the service water during the surveillance in 4.6.2.3.a.1 above, whenever service water temperature is between 60°F and 80°F.

b. At least once per 31 days by:

1. Starting (unless already operating) each operational cooling unit from the control room.

2. Verifying that each operational cooling unit operates for at least 15 minutes.

c. At least once per 18 months by verifying that each cooling unit starts automatically on a CCAS test signal.

3/4.6.2 DEPRESSURIZATION, COOLING, AND pH CONTROL SYSTEMS

3/4.6.2.1 CONTAINMENT SPRAY SYSTEM

The OPERABILITY of the containment spray system ensures that containment depressurization and cooling capability will be available in the event of a LOCA. The pressure reduction and resultant lower containment leakage rate are consistent with the assumptions used in the accident analyses.

~~The containment spray system and the containment cooling system are redundant to each other in providing post accident cooling of the containment atmosphere.~~ The containment spray system and the containment cooling system provide post accident cooling of the containment atmosphere; however, the containment cooling system is not redundant to the containment spray system. ~~However, the~~ The containment spray system also provides a mechanism for removing iodine from the containment atmosphere and therefore the time requirements for restoring an inoperable spray system to OPERABLE status have been maintained consistent with that assigned other inoperable ESF equipment.

3/4.6.2.2 TRISODIUM PHOSPHATE (TSP)

A hydrated form of granular trisodium phosphate (TSP) is employed as a passive form of pH control for post LOCA containment spray and core cooling water to ensure that iodine, which may be dissolved in the recirculated reactor cooling water following a loss of coolant accident (LOCA), remains in solution. TSP also helps inhibit stress corrosion cracking (SCC) of austenitic stainless steel components in containment during the recirculation phase following an accident. Baskets of TSP are placed on the floor of the containment building to dissolve from released reactor coolant water and containment sprays after a LOCA. Recirculation of the water for core cooling and containment sprays then provides mixing to achieve a uniform solution pH.

Fuel that is damaged during a LOCA will release iodine in several chemical forms to the reactor coolant and to the containment atmosphere. A portion of the iodine in the containment atmosphere is washed to the sump by containment sprays. The emergency core cooling water is borated for reactivity control. This borated water causes the sump solution to be acidic. In a low pH (acidic) solution, dissolved iodine will be converted to a volatile form. The volatile iodine will evolve out of solution into the containment atmosphere, significantly increasing the levels of airborne iodine. The increased levels of airborne iodine in containment contribute to the radiological releases and increase the consequences from the accident due to containment atmosphere leakage.

After a LOCA, the components of the core cooling and containment spray systems will be exposed to high temperature borated water. Prolonged exposure to the core cooling water combined with stresses imposed on the components can cause SCC. The SCC is a function of stress, oxygen and chloride concentrations, pH, temperature, and alloy composition of the components. High temperatures and low pH, which would be present after a LOCA, tend to promote SCC. This can lead to the failure of necessary safety systems or components.

Adjusting the pH of the recirculation solution to levels above 7.0 prevents a significant fraction of the dissolved iodine from converting to a volatile form. The higher pH thus decreases the level of airborne iodine in containment and reduces the radiological consequences from containment atmosphere leakage following a LOCA. Maintaining the solution pH above 7.0 also reduces the occurrence of SCC of austenitic stainless steel components in containment. Reducing SCC reduces the probability of failure of components.

The SR 4.6.2.2.b requirement to dissolve a representative sample of TSP in a sample of borated water provides assurance that the stored TSP will dissolve in borated water at the postulated post-LOCA temperatures. Testing must be performed to ensure the solubility and buffering ability of the TSP after exposure to the containment environment. A representative sample of 3.00 ± 0.05 grams of TSP from one of the baskets in containment is submerged in 1.0 ± 0.01 liter of water at a boron concentration of 3000 ± 30 ppm and at a temperature of 120 ± 5°F. The solution is allowed to stand for 4 hours without agitation. The liquid is then decanted from the solution and mixed, the temperature adjusted to 77 ± 2°F and the pH measured. At this point, the pH must be ≥ 7.0. The representative sample weight is based on the minimum required TSP weight of 6804 kilograms, which at manufactured density corresponds to the minimum volume of 278 cubic ft, and assumed post LOCA borated water mass in the sump of approximately 5284102 lbm normalized to buffer a 1.0 liter sample. The boron concentration of the test water is representative of the maximum possible boron concentration corresponding to the maximum possible post LOCA sump volume. Agitation of the test solution is prohibited, since an adequate standard for the agitation intensity cannot be specified. The test time of 4 hours is necessary to allow time for the dissolved TSP to naturally diffuse through the sample solution. In the post LOCA containment sump, rapid mixing would occur, significantly decreasing the actual amount of time before the required pH is achieved. This would ensure compliance with the Standard Review Plan requirement of a pH ≥ 7.0 by the onset of recirculation after a LOCA.

3/4.6.2.3 CONTAINMENT COOLING SYSTEM

The OPERABILITY of the containment cooling system ensures that 1) the containment air temperature will be maintained within limits during normal operation, and 2) adequate heat removal capacity is available when operated in conjunction with the containment spray systems during post-LOCA conditions.

~~The containment cooling system and the containment spray system are redundant to each other in providing post accident cooling of the containment atmosphere.~~ The containment spray system is redundant to the containment cooling system in providing post accident cooling of the containment atmosphere; however, the containment cooling system is not redundant to the containment spray system. As a result of ~~this~~ the redundancy of the containment spray system with the containment cooling system ~~in cooling capability~~, the allowable out-of-service time requirements for the containment cooling system have been appropriately adjusted. However, the allowable out of service time requirements for the containment spray system have been maintained consistent with that assigned other inoperable ESF equipment since the containment spray system also provides a mechanism for removing Iodine from the containment atmosphere.

The addition of a biocide to the service water system is performed during containment cooler surveillance to prevent buildup of Asian clams in the coolers when service water is pumped through the cooling coils. This is performed when service water temperature is between 60°F and 80°F since in this water temperature range Asian clams can spawn and produce larva which could pass through service water system strainers.