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February 18, 1988

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Subject: Catawba Nuclear Station
Docket Nos. 50-413 and 50-414

Dear Sir:

Dr. K. N. Jabbour's letter of January 22, 1988 transmitted a Request for Additional Information concerning proposed changes to the Technical Specifications and Final Safety Analysis Report (FSAR) description for Catawba's Nuclear Service Water (RN) System which were submitted on October 16, 1987. Attached are responses to the questions along with marked-up FSAR pages related to the question responses.

As a part of the October 16, 1987 submittal, revised FSAR pages were submitted which reflected changes to the RN system including a proposed change in the design bases. This change would delete the previous assumption of a simultaneous LOCA and seismic event. As a result the Staff concluded that the proposed Technical Specification change would involve an increase in the probability or consequences of previously evaluated accidents.

First of all, the Staff is mixing the proposed change in the design bases of the RN system with the proposed Technical Specification change, which is a separate matter. The changes to the Technical Specification added clarifying statements to more accurately reflect the shared nature of Catawba's RN system. These changes would not change the way the RN system is currently operated.

Secondly, Duke does not agree that changing the design bases of the RN system to no longer consider LOCA and seismic as simultaneous events would increase the probability or consequences of any previously evaluated accident since this change will not result in any changes in the design or operation of the system. Duke has already deleted the swapover from Lake Wylie to the standby nuclear service water pond on a LOCA (Sp) signal and plans to add additional pit level instrumentation. Both changes are discussed in the Staff's SER dated September 30, 1987. No other changes are contemplated as a result of separating seismic and LOCA events.

The change in the design bases was requested in order to revise an over-commitment in the FSAR. A simultaneous LOCA and seismic event was not considered credible by the NRC in the recent GDC-4 rulemaking and the combination of these independent events is not required by the Standard Review Plan or applicable General Design Criteria.

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Therefore, it is again requested that the NRC Staff approve the Technical Specification changes and the proposed change in the design bases for the Nuclear Service Water System. Since this submittal supplements Duke's letter of October 16, 1987, no additional Part 170 fees are included.

Very truly yours,

Hal B. Tucker

Hal B. Tucker

ROS/1403/sbn

Attachment

xc: Dr. J. Nelson Grace, Regional Administration
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Mr. P. K. Van Doorn
NRC Resident Inspector
Catawba Nuclear Station

Duke Power Company
Catawba Nuclear Station
Response to NRC RAI - January 22, 1988

(1) In Technical Specification Tables 3.3-3, and 4.3-2, Item 14.g, the Applicable Mode is identified as Modes 1, 2, 3, 4. This should be revised to identify that it applies when either unit is in Modes 1, 2, 3, 4 because even for single unit operation, both pump pits must be operable.

Response:

The manner in which the proposed revision to Table 3.3-3 and 4.3-2 item 14.g is presented is consistent with the specifications associated with other shared systems (denoted "Unit 1 and 2"). Specification 3.0.5 requires that in this case "the ACTION requirements will apply to both units simultaneously". The specification appears proper as proposed.

(2) The proposed revision to the Bases B3/4.7.4 identifies that one RN pump has sufficient capacity to maintain a unit indefinitely in COLD SHUTDOWN (commencing 36 hours following a trip from full power) while supplying the post-LOCA loads on the other unit. However, the proposed Specification 3/4.7.4 for the RN system does not consider the 36 hour time period. For example, Specification 3.7.4 discusses "both units in MODE 1, 2, 3 or 4". It should discuss either both units in MODE 1, 2, 3 or 4 or one unit in MODE 1, 2, 3 or 4 plus the other unit in MODE 5 or 6 for less than 36 hours. Revise your proposed specification to reflect this 36 hour period.

Response:

Two Nuclear Service Water loops are required by specification 3.7.4 to assure the performance of the safety function in the event of a single failure coincident with a LOCA (or other accident). As with many specifications, the ACTION allows continued operation without single failure protection for 72 hours, with a subsequent requirement to be in COLD SHUTDOWN within the following 36 hours. The proposed revision to the Bases B3/4.7.4 is consistent with these ACTION requirements.

(3) The proposed surveillance requirements for the standby nuclear service water pond (SNSWP) under technical Specification 3/4.7.5 added a requirement to measure the RN temperature in the discharge path of an operating RN pump during the months of July, August and September while the RN system is aligned to Lake Wylie. While this may be a necessary operation, it does not appear to affect the operability of the SNSWP as implied by the location of the requirement. Revise the proposed specifications to identify why this measurement is necessary and place it in the proper location.

Response:

As described in the proposed revision to Bases B3/4.7.5, Nuclear Service Water temperatures is an input to the containment pressure analysis. The SNSWP is the assured source of RN and as such is appropriately controlled by LCO 3/4.7.5. Operator actions following a LOCA require a knowledge of Lake Wylie temperature in order to determine if a manual realignment to the SNSWP is needed. The proposed addition of specification 4.7.5.d assures that this temperature is monitored and recorded daily. This assures that SNSWP will be properly utilized in the event of an accident and thus is associated with SNSWP OPERABILITY. The safety analysis is unaffected by Lake Wylie temperature, therefore, a specification limiting temperature is not appropriate.

(4) In the proposed FSAR amendment the RN flows to the containment spray (CS) heat exchanger and component cooling water (CCW) heat exchanger have been decreased from 4500 gpm to 3800 gpm and 6500 gpm to 5200 gpm, respectively. Consequently the design heat transfer capability has been correspondingly decreased. Provide the following related information:

(a) Explain the reason for this decrease in RN flows and discuss why no other RN cooled components are affected, i.e., is there a corresponding flow reduction to other components cooled by the RN system?

(b) Why is there no corresponding change in the post - LOCA containment pressure/temperature profiles? If there is a change then the FSAR should be revised accordingly.

Response:

Westinghouse has reanalyzed the accident heat loads which has resulted in a reduced required flow rate to heat exchangers cooled by nuclear service water (RN). Credit for these reduced flows has been taken in order to support one RN pump operation. This analysis reduced flow only to the major essential header components (Component Cooling and Containment Spray Heat Exchangers), since the nonessential header is isolated in an accident. The Westinghouse analysis is referenced in the one RN pump calculations which were submitted by H. B. Tucker's letter of January 4, 1988.

The Westinghouse analysis (see Attachment 12 of January 4, 1988 submittal), using approved WCAP-10325, revised the mass and energy releases for the LOCA analysis. These changes would have resulted in lower post-LOCA pressure/temperature profiles. Instead, assumptions for heat exchanger flow and heat transfer were revised to take advantage of the increased margin. The post-LOCA peak pressure and temperature were held essentially constant and are bounded by the current Technical Specification and EQ envelope. The post-LOCA temperature/pressure profiles did change and will be included in an update to the FSAR.

(5) Because the revised design results in a situation where following an accident, the RN system might very well continue to draw from Lake Wylie instead of the SNSWP, the maximum temperature of Lake Wylie should also fall within the Technical Specification. Revise your Technical specifications accordingly (Refer to Question 3 above).

Response:

See response to question 3.

(6) Do crossover valves between SW trains still receive close signals on a safety injection signal (SIS) or containment isolation signal? It was the staff's understanding that only the switchover from Lake Wylie to the SNSWP would be eliminated following an SIS. Specifically identify those valves

whose operation on an SIS or containment isolation signal will be different following the proposed changes. The staff's concern is that all possible scenarios are considered, especially if the proposed changes involve more than the switchover between Lake Wylie and the SNSWP. In your response specifically identify whether you still have automatic isolation between trains and discuss when such isolation would occur.

Response:

Crossover valves between service water trains still close on a containment isolation (Sp) signal on the affected unit. Important RN valves that change position or used to change position upon ESF signals are:

Group I -- Isolate RN from Lake Wylie

1RN1A	1RN843B
1RN2B	1RN847A
1RN5A	2RN847A
1RN6B	1RN849B
1RN52A	2RN849B

Group II -- Isolate RN from the SNSWP

1RN3A	2RN846A
1RN4B	1RN848B
1RN846A	2RN848B

Group III -- RN Supply Header Crossover Isolation Valves

1RN47A	1RN48B
2RN47A	2RN48B

Group IV -- RN Return Header Crossover Isolation Valves

1RN53B	1RN54A

Valves from Group I used to close upon Ss or upon emergency low RN pump pit level signal. Now, they automatically close only on an emergency low RN pump pit level signal.

Valves in Group II used to open upon Ss or upon emergency low RN pump pit level signal. Now, they automatically open only on an emergency low RN pump pit level signal.

Valves in Group III used to have the following interlocks:

(a) 1RN47A and 1RN48B close upon Sp from Unit 1.

(b) 2RN47A and 2RN48B close upon Sp from Unit 2.

(c) 1RN47A close upon Sp from Unit 2 with emergency low level signal from RN pump pit B.

(d) 1RN48B close upon Sp from Unit 2 with emergency low level signal from RN pump pit A.

(e) 2RN47A close upon Sp from Unit 1 with emergency low level signal from RN pump pit B.

(f) 2RN48B close upon Sp from Unit 1 with emergency low level signal from RN pump pit A.

Now, valves in Group III have the following interlocks:

(a) 1RN47A and 1RN48B close upon Sp from Unit 1.

(b) 2RN47A and 2RN48B close upon Sp from Unit 2.

(c) 1RN47A and 2RN47A close upon emergency low level in pump pit B.

(d) 1RN48B and 2RN48B close upon emergency low level in pump pit A.

Valves in Group IV used to close upon Sp or upon emergency low RN pump pit level. Now, they automatically close only on an emergency low RN pump pit level signal.

The changes in Group III and IV valves were intended to correct a weakness detected in the previous logic and to minimize the consequences of postulated active valve failures.

Regarding Group III, under the old logic, if there was a loss of Lake Wylie and a single failure removed an RN loop from service, the RN system would not automatically separate into independent loops unless there was an Sp signal on one of the units. Under the new logic, loss of Lake Wylie would be detected by the RN pump pit level instrumentation, and trains would separate upon emergency low level without regard to ESF signals. ESF logic is not degraded by this change, and the RN System loops will separate to insure continued operation in a non-ESF failure scenario.

The comments on Group III valves also apply to Group IV valves, but more comments are needed on Group IV valves. There are two main crossovers on the RN supply header, one for Unit 1 and one for Unit 2. There is only one return header crossover, isolated by 1RN53B and 1RN54A. Each loop has an independent return path to the SNSWP, but the single RN return path to Lake Wylie originates from RN loop A. Since RN will be aligned to Lake Wylie during all modes of operation, including ESF events in which a RN pump pit emergency low level signal is not given, the Sp interlocks had to be removed from the return header crossover isolation valves to provide a discharge path from loop B to Lake Wylie.

In addition to the above, there is no change in the Sp interlocks to 1RN58B and 1RN63A, which isolate main RN discharge to the SNSWP. These vales open upon an Sp from either unit to assure a discharge path for the RN System in case 1RN53B, 1RN57A or 1RN843B transfer closed during an ESF event.

The result of the forgoing changes is to make RN loop separation totally dependent upon RN pump pit level. The partial loop separation on Sp on the affected unit serves only to isolate nonessential flow rates during ESF events.

(7) If automatic crossover isolation or isolation of nonessential loads does not occur until loss of Lake Wylie, then you should reevaluate various scenarios other than LOCA during different modes of operation to ensure that the proposed Technical Specifications are acceptable. For example, evaluate a diversion of RN flow through a faulted nonessential portion of the system under different possible accident scenarios.

Response:

The nonessential headers can be isolated by redundant isolation valves in series. The nonessential header isolation valves are in addition to the crossover isolation valves between loops. The branch connections for the nonessential headers are located between the crossover isolation valves on each unit. If a diesel generator is declared inoperable, station procedures call for the RN crossover valve between the nonessential header and the loop with the inoperable D/G to be closed. This action would help the operator recover if there was an accident and a subsequent single RN failure.

Deletion of the Sp switchover on the RN header crossover valves does not change the systems ability to respond to other than LOCA accidents.

(8) The safety injection pumps' and CCW pumps' heat exchanger inlet valves were previously identified as interlocked to open when their respective pump started. The proposed amendment deletes this from the FSAR. Explain why this change was made and justify deletion of this interlock.

Response:

To minimize fouling and degradation problems in small diameter cooling water pipe, several small heat loads (pump motor coolers and oil coolers) formally cooled by RN are now cooled by KC (CCW). The safety injection pump motor coolers and component cooling water pump motor coolers are among the pump auxiliaries now cooled by KC. When these pump motor coolers were cooled by RN, condensation on the tubes during cold weather was a concern. To minimize the condensation, the inlet isolation valve was fitted with an operator interlocked to open when the pump was started, close when the pump was stopped. When the pump motor cooler was moved to KC, condensation was not a big concern, and the inlet isolation valve was not fitted with an operator. Valves are left open so flow can be supplied to the safety injection and component cooling pump motor coolers during any mode.

The change by which small heat loads were moved to KC was done during the construction phase of Catawba. This FSAR change was made to reflect the transfer of these loads to KC.

(9) On page 9.2-1 of the FSAR, it was previously stated that "should Lake Wylie be lost due to a seismic event... the SNSWP contains sufficient water to bring the station safely to a cold shutdown condition following a single loss of coolant accident". Your proposed FSAR amendment deletes "following a single loss of coolant accident". Even though your proposed change is to delete a simultaneous LOCA and seismic event as a design basis, the SNSWP still must be capable of handling a LOCA upon loss of Lake Wylie. You should revise the subject FSAR statement to state that the SNSWP contains sufficient water to bring the station safely to a cold shutdown condition under all normal, transient and accident conditions. The automatic switchover on low pump pit level should assure this function.

Response:

The reason for deleting the reference of a LOCA from Section 9.2.1.2.1 was due to the separation of the seismic and LOCA events. It was not intended to portray the RN system as not being capable of handling a LOCA with a later (not simultaneous) loss of Lake Wylie. The SNSWP does contain sufficient water to bring the station safely to a cold shutdown condition for all cases (normal, transient and accident). The automatic switchover function assures this should Lake Wylie be lost for any reason, not just LOCA. The FSAR statement will be revised as requested. (see Attachment)

(10) On page 8.2-9 of the FSAR, you deleted the statement that "the operation of any two pumps on either or both supply lines is sufficient to supply all cooling water requirements for the two unit plant for post-accident operation". Your revision does not include "post-accident operation". Does this deletion/revision mean that two pumps cannot handle all accident situations, or are you implying that one pump is sufficient under all accident conditions? The reason for this change should be made clear. Also, if you are saying one pump is sufficient, then supporting analysis should be provided such that the staff can make its own independent evaluation.

Response:

Reference should be to page 9.2-2 (sixth paragraph). Two pumps are sufficient to supply all cooling water requirements for unit startup, cooldown, refueling and post-accident operation of two units. However one pump has sufficient capacity to supply all cooling water requirements during normal power operation of both units or during post accident conditions if the unaffected unit is already in cold shutdown. One RN pump calculations were submitted by H. B. Tucker's letter of January 4, 1988. The FSAR will be revised to clarify this. (see Attachment)

(11) In a similar vein, on revised FSAR page 9.2-5 it is stated that "bearing lube oil injection flow is maintained to all RN pumps at all times, even though only one pump is required to meet all the normal and accident flow requirements of both units". Previously, this was considered to be applicable only under normal conditions. You should clarify what the design bases for the RN system is, one pump or two pumps. From the Technical Specification bases it appears that one pump is sufficient for accident situations only after one unit has been shutdown for greater than 36 hours.

Response:

As discussed in FSAR Section 9.2.1 and the proposed Bases to Specification 3/4.7.4, two RN pumps are needed to supply post-LOCA loads on one unit and shutdown and cooldown loads on the other unit. However, with one unit in cold shutdown, only one RN pump and its associated emergency diesel generator are needed. The cited FSAR paragraph will be revised to eliminate the current confusion over design bases. (see Attachment)

(12) On page 9.2-7 of your proposed FSAR revision, you have deleted the fact that the RN system is designed to handle a LOCA in one unit with a simultaneous shutdown of the other unit plus the loss of Lake Wylie. This is unacceptable. The staff requires that this remain a design basis for the RN system and the ultimate heat sink, the standby nuclear service water pond. Although simultaneous LOCA and seismic loads do not have to be considered, reliance on Lake Wylie which is not designed to seismic Category I requirements is not acceptable under LOCA conditions i.e., General Design Criterion 2 and 10 CFR Part 100.

Response:

During the extensive review of Catawba's RN System it was recognized that the original design basis, which assumed a simultaneous LOCA and seismic event, was an unnecessary over commitment. This assumption led to the automatic swapover from the normal source of cooling water (Lake Wylie) to the standby nuclear service water pond (SNSWP) on a LOCA signal. It was recognized that Lake Wylie was a highly reliable source of cooling water, in a number of respects preferable to the SNSWP.

Therefore there was no practical reason to automatically swap from Lake Wylie to the SNSWP. This swap represented an unnecessary challenge to the RN System. In order to improve reliability of the RN System, the automatic swapover on a LOCA (Sp) signal was deleted with NRC staff concurrence (S. A. Varga letter of September 30, 1987). One additional modification is planned, the addition of RN pump sit level monitoring instrumentation from a 1 out of 2, to a 2 out of 3 system. No other hardware or operational changes are contemplated as a result of the change in the design basis. The SNSWP will still be the ultimate heat sink for the station and the RN system will automatically realign to the SNSWP on a low level in Lake Wylie or by operator action. The net effect has been an improvement in the reliability of the RN System.

In reviewing the applicable regulatory documents, it was concluded that the FSAR commitment to a simultaneous LOCA and seismic event was unnecessary:

<u>NUREG-0800</u> - Section 9.2.1 of the Standard Review Plan does not include simultaneous LOCA and seismic events as criteria for an acceptable station service water system.

<u>NUREG-0954</u> - Section 9.2.1 of the Catawba SER makes no mention of and gives no credit for a capability of mitigating seismic and LOCA events simultaneously.

GDC-4 Rulemaking - As acknowledged by the NRC in this recent rulemaking proceeding seismic and LOCA loads do not have to be considered concurrently, i.e., that LOCA and seismic are independent events.

Other FSAR's - A review of the FSAR's of other operating reactors with similarly configured station service water systems indicates that simultaneous LOCA and seismic events was not consistently assumed by other utilities.

Operation of the RN System in the current configuration, i.e., the SNSWP providing an assured backup to Lake Wylie, is consistent with the operation of other systems found acceptable by the NRC. For example, the condensate-quality water supply for the Auxiliary Feedwater System is non-safety and non-seismic. These sources are the preferred sources for any event requiring auxiliary feedwater initiation. The swapover to the assured safety grade source (RN System) is not performed on a LOCA signal (Sp). The swapover is made only if the non-safety sources become unavailable. There is no presumption of a simultaneous LOCA and seismic event.

(13) Additionally, on the revised Safety Evaluation Section of the FSAR (page 9.2-7) you state that upon complete channel separation, both units are assured of having a source of water and at least one pump. This is not as clear as in the original FSAR where it is stated that each unit will have at least one 100 percent capacity pump. Revise this proposed change to identify whether each unit is assured of having at least one pump or not. If you intend to rely on a single pump for both units then the appropriate analysis should be provided.

Response:

The Safety Evaluation correctly states that the normal configuration will provide each unit with at least one 100% capacity pump, one essential header and an assured source of water. In the case of having a diesel generator out-of-service for an extended period of time, not a normal configuration, (and its associated unit in cold shutdown) the consequences of a simultaneous LOCA on the operating unit, loss of offsite power and single failure anywhere on the system could result in having only one RN pump operable to provide cooling water to the LOCA unit and to maintain the other unit in cold shutdown. This has been demonstrated by the one RN pump analysis which was submitted on January 4, 1988.

(14) In the original FSAR, Section 9.2.1.3, you stated that any one diesel generator can be down for maintenance and the RN system can still shut the plant down safely assuming a LOCA, seismic event, blackout, and single failure. In your proposed amendment you have eliminated the seismic event. Identify the bases for this elimination as you apparently have made no design changes that contradict this design basis. At any rate, the loss of Lake Wylie should be considered as part of the design basis in conjunction with a LOCA (refer to Question 11 above).

Response:

See response to question 12 above.

9.2 WATER SYSTEMS

9.2.1 NUCLEAR SERVICE WATER SYSTEM

9.2.1.1 Design Bases

The Nuclear Service Water System (RN) provides essential auxiliary support functions to Engineered Safety Features of the station. The system is designed to supply cooling water to various heat loads in both the safety and non-safety portions of each unit. Provisions are made to ensure a continuous flow of cooling water to those systems and components necessary for plant safety during normal operation and under accident conditions. Sufficient redundancy of piping and components is provided to ensure that cooling is maintained to essential loads at all times. See Table 3.2.2-2 for a listing of RN System component design codes, locations, missile protection and seismic consideration.

9.2.1.2 System Description

The Nuclear Service Water System is shown diagramatically on Figures 9.2.1-1 through 9.2.1-12. The piping and components shown on Figures 9.2.1-1 through 4 are shared between units, while the piping and components shown on Figures 9.2.1-5 through 12 are duplicated for each unit unless otherwise stated in the following text. Functionally the system consists of four sections which, when put together in series, serve to assure a supply of river water to various station heat loads and return the heated effluent back to its proper heat sink.

In order of flow, these are:

a. Source and intake section
b. RN Pumphouse section
c. Station heat exchanger section
d. Main discharge section

9.2.1.2.1 Source and Intake Section

Two bodies of water serve as the ultimate heat sink for the components cooled by the RN System. Lake Wylie is the normal source of nuclear service water. A single transport line conveys water from a Class 1 seismically designed intake structure at the bottom of the lake to both the A and B pits of the Nuclear Service Water Pumphouse serving the RN pumps in operation. Isolation of each line is assured by two valves in series and fitted with electric motor operators powered from separate power supplies.

Should Lake Wylie be lost due to a seismic event in excess of the design of Wylie Dam; the Standby Nuclear Service Water Pond (SNSWP), formed by the Class 1 seismically designed SNSWP Dam, contains sufficient water to bring the station safely to a cold shutdown condition, under all normal, transient and accident conditions. The SNSWP has an intake structure designed to Class 1 seismic requirements, with two Class 1 seismic, redundant lines to transport water independently to each pit in the RN Pumphouse. Each line is secured by a single motor operated valve. Automatically upon loss of Lake Wylie (as detected by RN pit level instrumentation), Lake Wylie double isolation valves are closed and the SNSWP valves are opened to both pit A and pit B.

The Nuclear Service Water lines cross over the condenser cooling water lines. These CCW lines are low-pressure lines and could only affect the NSW lines by undermining the surrounding soil due to a possible loss of cooling water. Detection of this loss and system shutdown would occur prior to any detrimental effects to the NSW lines; further, the NSW lines are self-supporting over a considerable distance should any undermining occur.

Ultimate heat sink adequacy is discussed and analyzed in Section 9.2.5.

9.2.1.2.2 RN Pumphouse Section

The RN Pumphouse is a Class 1 seismically designed structure that contains two separate pits from which two independent and redundant channels of RN pumps take suction. Each pit can be supplied from both the normal source and also the assured source of water. Either pit is capable of passing the flow needed for a simultaneous unit LOCA and unit cooldown. Flow spreaders in front of all the intake pipe entrances prevent vortices and flow irregularities while removable lattice screens protect the RN pumps from solid objects.

Pumps 1A and 2A take suction from pit A and discharge through RN strainers 1A and 2A respectively. The outlet piping of the 1A and 2A RN strainers then join back together to form the channel A Supply line to channel A components in both units.

RN pumps 1B and 2B are physically separated from RN pumps 1A and 2A by a concrete wall, and take suction from pit B, discharging through RN strainers 1B and 2B respectively. The outlet piping of strainers 1B and 2B join together to form the channel B supply line to channel B components in both units. See Table 9.2.1-1 for a listing of RN System component design parameters.

Outside the Auxiliary Building wall, the channel A supply line splits, with 1A supply header entering on the Unit 1 side, isolated by an EMO valve powered by the 1A normal and assured power supplies, and the 2A supply header entering the building on the Unit 2 side, isolated by an EMO valve powered by the 2A normal and assured power supplies.

Likewise, the channel B supply line splits with the 1B supply header entering on the Unit 1 side of the Auxiliary Building and the 2B supply header entering on the Unit 2 side, each isolated by EMO valves powered by corresponding normal and assured power supplies.

Insert attached 9½

The supply and return headers are arranged and fitted with isolation valves such that a critical crack in either header can be isolated and will not jeopardize the safety functions of this system or flood out other safety related equipment. The operation of any two pumps on either or both supply lines is sufficient to supply all cooling water requirements for the two unit plant for unit startup, cooldown, and refueling. However additional pumps are normally started for unit startup and cooldown and refueling.

Revision to Section 9.2.1.2.2 (Page 9.2-2)

Revise the sixth paragraph as follows:

The supply and return headers are arranged and fitted with isolation valves such that a critical crack in either header can be isolated and will not jeopardize the safety functions of this system or flood out other safety related equipment. The operation of any two pumps on either or both supply lines is sufficient to supply all cooling water requirements for unit startup, cooldown, refueling and post-accident operation of two units. However, one pump has sufficient capacity to supply all cooling water requirements during normal power operation of both units or during post accident conditions if the unaffected unit is already in cold shutdown. All pumps (two per unit) are started during the hypothetical combined accident and loss of normal power. In an accident, the safety injection signal automatically starts both RN pumps on each unit, thus providing complete redundancy.

Add a paragraph between the sixth and seventh paragraphs as follows:

If a diesel generator (or an RN pump) is out-of-service for an extended period of time (then, its associated unit is in cold shutdown), one RN pump is sufficient to provide adequate cooling water requirements for the operating unit and maintain the other unit in cold shutdown in the event of a hypothetical combined accident and loss of normal power.

System flow demands outside of the RN pumphouse. Nominal Nuclear Service Water Flow System flow demands inside of the RN pumphouse are listed separately in Table 9.2.1-5.

Essential components receiving Nuclear Service Water flow are described below:

The RN pump motors are of the totally enclosed, water cooled type which have internal water-to-air heat exchangers. Cooling water is provided to the RN pump motor coolers only when the motor is in operation. This prevents the formation of condensate in the motor internals by the passage of cold water through an idle motor. The control valves for the RN pump motor coolers are manually set.

The RN pump motor upper bearing oil coolers are supplied cooling flow only when their respective RN pumps are in operation to prevent harmful condensation from forming in the oil. The RN pump motor coolers and RN pump motor upper bearing oil cooler on each pump are located downstream. A motor operated isolation valve is interlocked to open when the pump motor starts and close when the pump motor stops.

Bearing lube injection flow is maintained to all RN pumps at all times, ~~even though only one pump is required to meet all the normal and accident flow requirements of both units~~. This water is supplied through redundant self-cleaning strainers. One strainer is supplied per train. A crossover allows a single operating RN pump to supply its own bearing lube injection flow plus that of the redundant channel RN pumps. Upon Engineered Safety Features actuation, all four pumps start and the crossover valves close, allowing each channel to supply the bearing lube requirements of its corresponding channel RN pumps.

The nuclear service water strainers backflush automatically on a time cycle unless overridden by a pre-set high pressure drop. Internal water pressure is the motive force for dislodging strained particles as a backflush drive motor turns a backwash arm past the various strainer assemblies. The discharge is released to atmospheric pressure and dumps into a trash basket outside the RN Pumphouse. Entrained trash is collected and the water is returned to the Standby Nuclear Service Water Pond, which overflows to Lake Wylie.

Diesel generator engine starting air compressor aftercooler is supplied constantly as the compressor operates periodically to maintain starting air tank pressure. Flow is set by a manual throttling valve. Cooling water is supplied to the diesel generator engine jacket water cooler only when the diesel is in operation. This is accomplished by an electric motor operated valve interlocked to open when the diesel starts, close when the diesel stops. Flow is assured to all diesel generators no matter which RN pumps are in operation by the normal valve positions identified on Figure 9.2.1-2.

Those heat exchangers in which a tube leak could allow radioactive fluid to enter the cooling water are cooled indirectly through the closed loop Component Cooling System (KC). Heat is then transferred to the RN System via the component cooling heat exchanger. The heat load provided by the RN normal loads will probably provide RN pump minimum flow requirements, but should this not be