Commonwealth Edison
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Downers Grove, Illinois 60515

August 16, 1990

Dr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555
Attn: Document Control Desk

Subject: Byron Station Units 1 and 2
Application for Amendment to Facility
Operating Licenses NPF-37 and NPF-66
Appendix A, Technical Specifications
NRC Docket Nos. 50-454 and 50-455

Dear Dr. Murley:

Pursuant to 10 CFR 50.90, Commonwealth Edison proposes to amend Appendix A, Technical Specifications of Facility Operating Licenses NPF-37 and NPF-66. The proposed amendment requests changes to Specification 3.7.4 and 3.7.5 regarding the Essential Service Water cooling system.

The description and bases of the proposed changes are contained in Attachment A. The revised Technical Specification pages are contained in Attachment B. The proposed changes have been reviewed and approved by both on-site and off-site review in accordance with Commonwealth Edison procedures. Attachment C describes Edison's evaluation performed in accordance with 10 CFR 50.92(c), which has determined that no significant hazards consideration exists. An Environmental Assessment has been performed and is included as Attachment D.

Since some of the changes made to this amendment indicate a more conservative mode of operation which is more consistent with the analyses performed to date, Commonwealth Edison requests a review of this amendment be completed by February 15, 1991.

Commonwealth Edison is notifying the State of Illinois of application for this amendment by transmitting a copy of this letter and its attachments to the designated State Official.

Please direct any questions you may have regarding this submittal to this office.

Respectfully,

Terence K. Schuster
T.K. Schuster
Nuclear Licensing Administrator

Attachments: A) Description and Bases of the proposed changes
B) Proposed Technical Specification Changes
C) Evaluation of Significant Hazards Consideration
D) Environmental Assessment

cc: Resident Inspector-Byron
T. Boyce-NRR
Regional Administrator-RIII
Office of Nuclear Facility-IDNS

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ATTACHMENT A

DESCRIPTION & BASES OF THE PROPOSED CHANGES

The Ultimate Heat Sink (UHS) consists of two redundant essential service water towers and their associated makeup systems. The towers and the essential service water pumps are designed such that tower OA provides suction and cooling for the A trains on Units 1 and 2, and tower OB provides the same for the B trains. (fig. A1) The maximum heat rejection to the UHS is from the safe shutdown of both units as a result of one unit undergoing a loss of coolant accident (LOCA), the other unit undergoing a complete loss of off-site power (LOOP), and then the UHS sustaining the worst case credible single active failure which is a loss of two fans due to the failure of a Diesel Generator to start on the LOOP unit.

Several changes are proposed to Technical Specification 3.7.4, Essential Service Water System and 3.7.5, Ultimate Heat Sink and the associated Bases Sections. The majority of changes were initiated based on the results of the Essential Service Water (ESW) cooling tower performance test performed in 1987 and documented in a preliminary report to the NRC dated September 1987 and in a final report entitled "Byron Station Essential Service Water Cooling Tower Performance Test Program" transmitted by letter to the NRC on February 1, 1988. Following is a discussion of the proposed changes.

Specification 3.7.4 and Bases 3/4.7.4

The reference to the cooling tower in Specification 3.7.4 and it's associated surveillance have been relocated to Specification 3.7.5 for the Ultimate Heat Sink (UHS). The cooling tower is really part of the UHS with the ESW pumps taking suction from their respective UHS cooling tower basin, supplying the required loads and returning the water to the tower for the heat to be rejected by the UHS. Therefore, instead of Specification 3.7.4 referring to two independent ESW systems, each of which includes a loop and a cooling tower, the proposed change just references two independent ESW loops. Also, changes were made in Bases Section 3/4.7.4 to clarify that the capacity of the ESW system is consistent with the assumptions used in the "safety analyses" rather than the "accident conditions within acceptable limits" while providing additional justification for the availability of the other units ESW pump and crosstie capability.

Specification 3.7.4.1

Specification 3.7.4.1 was revised to add a statement that the provisions of Specification 3.0.4 are not applicable. Specification 3.7.4.1 is required to enhance the reliability of the ESW system by requiring an ESW pump on a unit in Modes 5 or 6 to be available to support the other unit operating in Modes 1, 2, 3 or 4. Specification 3.7.4 already requires two ESW pumps to be operable on a unit in Modes 1, 2, 3 or 4 and if an ESW loop is not operable, because an ESW pump is not operable, the associated Action is applicable. Since Specification 3.0.4 is applicable to Specification 3.7.4, a mode change could not be made when in the Action statement. This seems appropriate, not permitting a Mode change when one of the two normal ESW pumps is not operable. However, it is overly restrictive to not permit a mode change when both of the operating unit's ESW pumps are operable but the opposite unit's ESW pump is unavailable. With the addition of the note to Specification 3.7.4.1 that Specification 3.0.4 is not applicable, the required Actions would be followed for an inoperable ESW pump on a Unit in Modes 1-4, but mode changes on a Unit would be permitted when the opposite unit's pump was not available. This Action would permit plant operation with 2 of the 3 required ESW pumps operable recognizing the fact that each pump can supply 100% of ESW system cooling requirements for a Unit.

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Also, Surveillance Requirement 4.7.4.1b was revised to add the words "at least" before "15 minutes". This was a clarification to indicate that the available ESW pump shall be run for at least 15 minutes rather than exactly 15 minutes.

LCO 3.7.5b, Action b and Bases 3/4.7.5

LCO 3.7.5b was revised based on the results of the cooling tower performance test. It was determined that with the UHS cooling tower basin temperature less than or equal to 70°F, two cooling tower fans operating in high speed can remove the heat load from a design basis LOCA in one unit and a LOOP with normal shutdown in the other unit without exceeding an ESW pump discharge temperature of approximately 98°F. This ensures the maximum acceptable ESW pump discharge temperature limit of 100°F is not exceeded. Therefore, requiring four fans operable, ensures that an active failure that may make one or two fans inoperable does not affect the availability of the two fans required to dissipate the heat load. For the case with the UHS cooling tower basin temperature greater than 70°F, four cooling tower fans operating in high speed are required to remove the heat load from the design basis accident. Therefore, requiring six fans operable per the LCO ensures that with any credible single active failure, four fans will be available. LCO 3.7.5b was revised to require a total of 6 fans operable in the high speed mode with each fan capable of being powered from an operable emergency power source. The references to specific units, fans and operating modes have been removed because the Ultimate Heat Sink is common to both Units. The requirement for a fan to be capable of being powered from an operable emergency power source was added because with one unit operating in Modes 1, 2, 3, or 4 and the other unit operating in Modes 5 or 6, Specification 3.8.1.2 only requires one diesel generator to be operable in Modes 5 and 6 so it is necessary to select the required fans with consideration for which diesel generators are operable. However, if a diesel generator is inoperable that is associated with one of the six required fans, it is acceptable to have the same train diesel generator from the other unit operable and capable of being crosstied to the fan's unit bus to declare a fan operable. This is conservative given that the unit undergoing the LOCA does not lose it's offsite power. Therefore, the LOOP unit's fans can be powered (crosstied) from the LOCA unit's SATs.

As previously discussed, with the UHS basin temperature less than or equal to 70°F, requiring four fans operable ensures that two fans will be available to mitigate the heat load assuming a credible failure which makes two of the four fans inoperable. Considering this case, the revised LCO 3.7.5b appears overly restrictive. However to facilitate operator implementation and maintain a simple LCO, the case of basin temperature less than or equal to 70°F is addressed in revised Action b. With one or two less than the 6 fans required operable, Action b is entered. In accordance with Action b, within 1 hour and every 12 hours thereafter, the basin temperature must be verified less than or equal to 70°F and that there are at least four fans operable. With these conditions met, operation can continue indefinitely since the assumptions in the accident analysis are satisfied. The note that the provisions of Specification 3.0.4 are not applicable was added to allow mode changes while in this portion the Action Statement. Changing modes while in this action is acceptable since the assumptions of available equipment and starting conditions for the accident analysis are met. This action merely increases the frequency to verify that the required basin temperature and fan configuration are satisfied so an operator is readily made aware if additional actions such as b.2 or b.3 must be initiated for a basin temperature greater than 70°F or not having four fans. If the basin temperature is greater than 70°F, 6 fans must be restored to operable status in 72 hours or a unit shutdown is required in accordance with Action b.2. With the basin temperature less than or equal to 70°F only two fans are required to mitigate the

consequences of an accident. Therefore by requiring four fans, if an emergency power source fails making two fans inoperable the two remaining fans will be able to remove the heat load. Action b.3 requires four fans be restored in 72 hours or a unit shutdown is required.

Action b was written such that Action is required with "one or two" of the above required fans inoperable rather than with "one less than" or with "two less than" the required fans because a worst case failure could make two fans inoperable at one time. However, if the failure only made one fan inoperable, Action should still be initiated so the redundancy of available equipment would be restored. Typically, additional failures of equipment while in an Action is not assumed, so as discussed previously, with two of the required fans inoperable there remains sufficient fans to mitigate the consequences of the accident. Bases Section B 3/4.7.5 has been revised to discuss these changes.

In addition, the fans are required to be operable in the high speed mode to satisfy an assumption of the UHS capability to mitigate the accident. However, the fans do not have to be operating in the high speed mode to satisfy the operability requirement.

Action 3.7.5c

Administrative changes were made to the words "status" and "mode".

LCO 3.7.5d

LCO 3.7.5d was revised to incorporate the results of the cooling tower performance test. Limiting the UHS cooling tower basin temperature to less than or equal to 88°F ensures that the accident heat load can be removed without exceeding an ESW pump discharge temperature of approximately 98°F. This ensures the maximum acceptable ESW pump discharge temperature limit of 100°F is not exceeded. The asterisk on LCO 3.7.5d and the associated note at the bottom of the page are deleted because they are no longer applicable. Testing using this exemption has been completed.

Action 3.7.5 d

The change to Action d is a clarification. Instead of stating "the discharge water temperature not meeting the above requirement", the specific temperature limit requirement of 88°F is being included. Also it is the temperature of the UHS cooling tower basin that is being verified rather than the ESW pump discharge temperature to be consistent with the change to the LCO.

LCO 3.7.5.e and Action e

With the current Action c wording, when a basin level switch fails, the automatic start signal to the essential service water makeup pump is not operable and therefore the makeup pump is considered inoperable. This is very conservative because the makeup pump is still functional if started manually and an independent basin level indication is available in the control room.

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A calculation was performed to determine an increased basin level requirement such that the level will not fall below the Technical Specification requirement within a specified surveillance interval. This calculation was provided in an application for amendment to Facility Operating Licenses NPF-37 and NPF-66 transmitted in a letter from R.A. Chrzanowski to Dr. T.E. Murley dated May 24, 1989. This Amendment (No. 32) was approved by the NRC as documented in the Safety Evaluation transmitted by a letter from L.N. Olshan to T.J. Kovach dated August 15, 1989. These amendments modified Technical Specification 3.7.5 to utilize the seismic qualification of the deep well pumps to be used in several instances instead of the essential service water make-up pumps to satisfy the design bases of the ultimate heat sink. Since the deep well pumps do not have an automatic start feature on low essential service water basin level, a calculation was performed to determine an increased level such that level would not fall below the required Technical Specification limit within a specified surveillance interval.

The calculation took into consideration basin inventory losses from evaporation, blowdown and drift for a "Worst 30 day" period and a "Worst Day" period and a heat load on the tower that corresponds to power operation on one unit and normal shutdown on the other unit. Normal makeup is assumed to be lost. This calculation determined that if the basin level was raised to 82% and verified every two hours, a sufficient inventory of water would be available in the basin at the start of an accident which relies on cooling tower basin inventory for mitigation. The results of the analyses are provided in the following table:

CONDITION	EVAPORATE (gpm)	BLOWDOWN (gpm)	MAKEUP (gpm)	ELEVATION (ft MSL)	IND (%)
Worst Day	435.40	245.72	691.52	875.35	80.12
Worst 30 Day	395.33	222.18	627.96	875.24	78.02

This calculation was conservative because a continuous peak heat load which occurs 4 hours after shutdown when RHR is placed in service was assumed for the normal shutdown load. If a time dependent heat load was considered, the makeup requirements would be less making the 2 hour surveillance verification time conservative. Also, using the required level on the "Worst 30 Day Period" and "Worst Day" makeup requirements is conservative because the frequency of occurrence of "Worst" case conditions is very limited. Considering the probability of an accident occurring during these worst case conditions is even more remote. An additional conservatism in the calculation was that losses due to evaporation, blowdown and drift would not cause the level to fall below the essential service water automatic makeup setpoint which is 3% above the minimum Technical Specification requirement. Furthermore, the calculation assumes that normal makeup, i.e. circulating water makeup, is not available.

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During the period when the basin level switches are inoperable, there may be evolutions that affect level beyond the evaporation, drift, blowdown and heat load requirements previously discussed (e.g. starting or stopping an essential service water pump, changing riser valve positions, back washing strainers etc.) Of these other evolutions, back washing the strainers has the greatest impact on the UHS Cooling Tower Basin Level. To account for basin level changes during strainer back washing, an additional margin of 2% was added to the required Technical Specification basin level when the level switches are inoperable. Therefore basin level will be raised to $\geq$ 82%. Typically, normal operations is at a level several percent higher than 82%. Both basins are interconnected as 82% is above the overflow for the basins and the essential service water makeup pumps can be started as required.

Therefore, the change proposed to Action e states that with one basin level switch inoperable, operation may continue for 72 hours before additional actions are required. If the level switch is not restored within 72 hours then within the next hour the basin level is increased to greater than or equal to 82% and subsequently verified every two hours. The Action required for two inoperable basin level switches is the same as with one level switch inoperable except the time requirement is reduced to one hour. Increasing the basin level to greater than or equal to 82% and verifying it every two hours will ensure that the water level will remain greater than or equal to 50%, the Technical Specification minimum requirement, without automatic makeup. Therefore,in the event an accident occurs, adequate water inventory will be available and the makeup pumps can be manually started. Actions e.1 and e.2 also state that the provisions of Specification 3.0.4 are not applicable. This allows mode changes while in the Action statement for the inoperable basin level switches. The basin level is maintained at a conservatively high level since automatic makeup is not available and both essential service water makeup pumps can be manually started. Previously provided calculations demonstrated there was sufficient time to manually initiate deep well makeup to the UHS. The same reasoning applies to the essential service water makeup pumps. Considering that the essential service water makeup pumps have a greater capacity than the deep well pumps, level would recover more rapidly. Since there is still redundant manual makeup capability to the basins and sufficient time before manual action is required, we believe it is acceptable that the provision of Specification 3.0.4 is not applicable.

Surveillance Requirement 4.7.5b

A change was made to Surveillance Requirement 4.7.5b to require daily verification that the UHS cooling tower basin temperature is less than or equal to 88°F rather than the ESW pump discharge water temperature is within its limit. The accident analysis requirement for the initial water temperature to be less than or equal to 88°F ensures that the heat load from a design basis LOCA on one unit and a LOOP with normal shutdown on the other unit can be dissipated without exceeding the ESW pump discharge temperature of approximately 98° F. Monitoring of the basin temperature ensures the assumptions of the accident analysis are maintained. Since there is no installed basin temperature indications there are several methods which may be utilizied to verify basin temperatures, including the monitoring of an operating ESW pump discharge temperature. Normal plant operations provide for overflow between both UHS basins with an operating pump taking suction from one basin and discharging to the other basin. This overflow permits

communications between the two basins resulting in the operating pump discharge temperature being representative of the discharge temperature of both basin. Also, this indication is expected to be several degrees higher due to pump heat and is therefore a conservative indication of basin temperature. In the event plant operations would require a basin to be isolated with no overflow communication and no operating ESW pump taking suction from it, direct basin temperature verification would be performed to meet the surveillance requirement. Also, use of this wording is consistent with that used in the LCO and Action Statement.

In addition, a change was made to Surveillance Requirement 4.7.5b to add a requirement for daily verification that the 6 required fans are operable.

Surveillance Requirement 4.7.5d

The revision to Surveillance Requirement 4.7.5d clarifies that fan operability must be verified in the high speed mode. Fan operation in the high speed mode was an assumption in the UHS ability to mitigate the consequences of a design basis accident where a LOCA occurs in one unit with the other unit proceeding to a normal shutdown. Verifying high speed mode operation, is also consistent with the LCO requirement to maintain the required fans in the high speed mode.

Surveillance Requirement 4.7.5e

Changes to Surveillance Requirements 4.7.5e.2) and 4.7.5e.4) to add the words "at least" before "30 minutes" and "15 minutes" is a clarification. The diesel powered ESW makeup pump shall be operated for at least 30 minutes and the deep well pumps shall be operated for at least 15 minutes; not operated for exactly 30 minutes or 15 minutes, respectively.

Surveillance Requirement 4.7.5j

Surveillance Requirement 4.7.5j was added to replace part of the surveillance deleted by Surveillance Requirement 4.7.4c. The additional requirements of Surveillance Requirement 4.7.4c are already included in existing Surveillance Requirement 4.7.5d.

Bases 3/4.7.5

Bases Section 3/4.7.5 has also been revised to incorporate some of the preceding changes that have been discussed.

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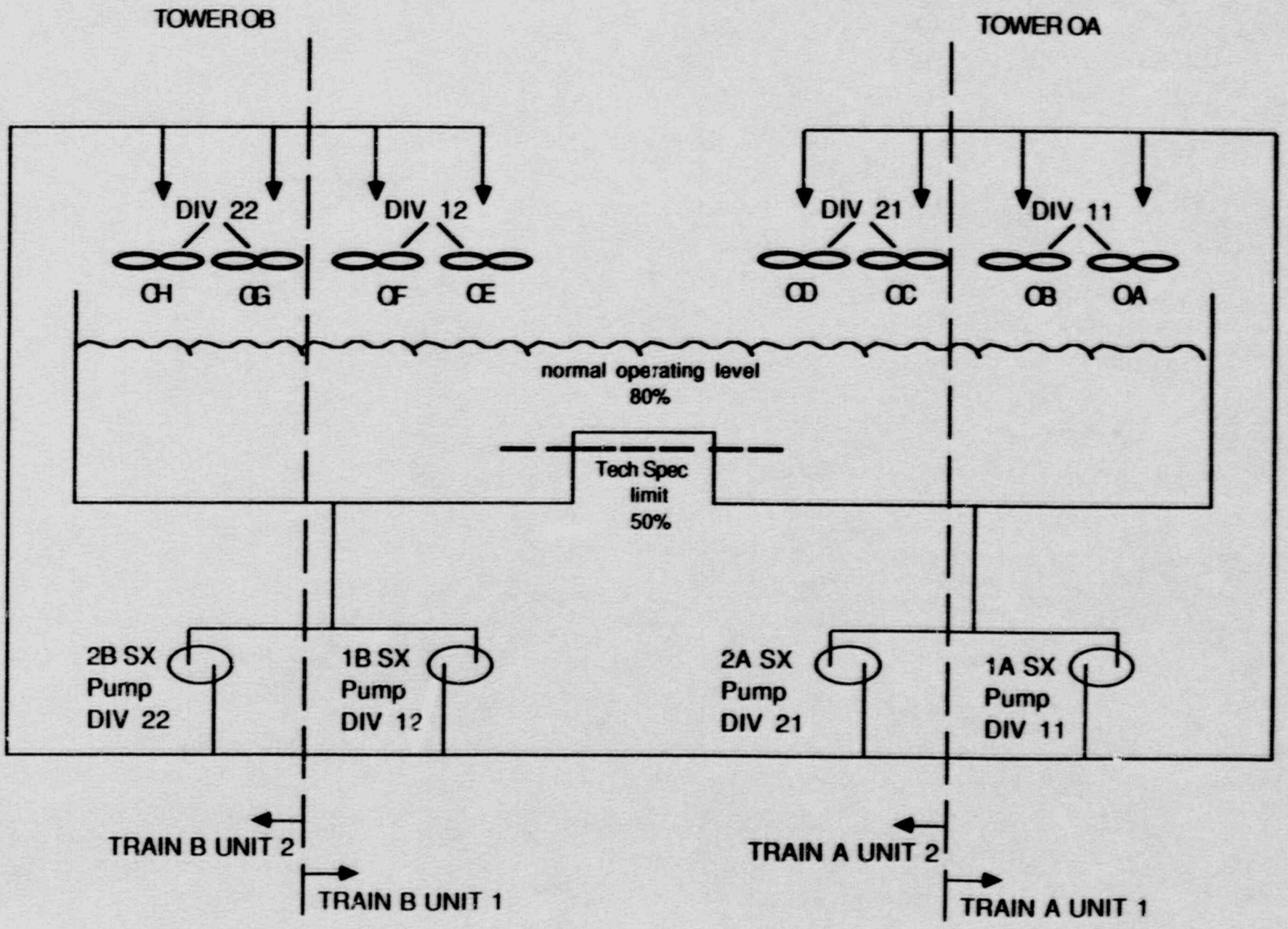
Figure A1


TOWER OB
TOWER OA
DIV 22
DIV 12
DIV 21
DIV 11
OH
OG
OF
OE
OD
OC
OB
OA
normal operating level
80%
Tech Spec
limit
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2B SX
Pump
DIV 22
1B SX
Pump
DIV 12
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DIV 21
1A SX
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DIV 11
TRAIN B UNIT 2
TRAIN B UNIT 1
TRAIN A UNIT 2
TRAIN A UNIT 1