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SUBJECT: Requests temporary waiver of compliance from TS 3.6.3 (c) to perform reactor coolant makeup pump surveillance testing.

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DUKE POWER

October 9, 1990

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

Subject: Oconee Nuclear Station, Unit 3
Docket No. 50-287
Reactor Coolant Makeup Pump Surveillance Testing
Request for Regional Waiver of Compliance

Gentleman:

In a series of letters last updated 8/21/90, Duke Power Company (Duke) has proposed amendments to the Oconee Nuclear Station (ONS) Facility Operating Licenses, and revisions to the ONS Technical Specifications (TS), providing requirements relating to the ONS Standby Shutdown Facility (SSF). In part, the proposed SSF TS require quarterly surveillance testing of each unit's SSF Reactor Coolant Makeup Pump (RCMU pump). Though the proposed amendment has not been approved, quarterly testing has been performed since the SSF became operational. After the last performance of this test on Unit 3, a valve in the suction line to the pump, 3SSF-SF-82, failed to display a closed indication when operated from it's SSF Control Room switch. Because the valve opens normally, this does not affect operability of the RCMU pump. However, the valve is considered to be inoperable in regard to its function as a containment isolation valve.

In accordance with Technical Specification 3.6.3 (c), valve 3SSF-SF-97, which is immediately upstream of 3SSF-SF-82 in the RCMU pump suction line, was closed, and it's electric operator's power supply deactivated and tagged, within four hours. This does not affect RCMU pump operability, since 3SSF-SF-97 is normally deactivated, and would be reopened as necessary in an SSF-related event (non-LOCA). However, this application of TS 3.6.3(c) prevents performance of further surveillance testing on the RCMU pump. The grace period for the next quarterly test extends to 11/02/90. The test would be performed one additional time during the current cycle of operation.

Establishing operability of 3SSF-SF-82, through a combination of analysis and compensatory measures, has been considered and rejected. Similarly, alternative means to meet the isolation requirement of TS 3.6.3 (c) during the RCMU test could not be identified.

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Given this situation, several options have been evaluated by my staff.

The first option was repair of 3SSF-SF-82 at power. Investigation results indicate that the problem must be corrected at the valve itself. Both 3SSF-SF-82 and 3SSF-SF-97 are located in the reactor building basement. This is a hot environment during power operation, and has potentially high levels of direct radiation and radioactive contamination. Workers could spend considerable time in the reactor building basement performing repairs, and would have to work in the same location during subsequent valve stroke testing and local leak rate testing. The RCMU pump would be rendered inoperable during work on the valve or valve operator, and during subsequent testing.

The second option was to postpone the testing, beyond the surveillance interval, until a unit outage presented an opportunity to repair 3SSF-SF-82. The proposed SSF TS provides a special 45 day inoperablity period which would allow operation to continue until 12/17/90. In addition, since the TS amendment requiring the testing has not been approved, Duke could have contacted the NRC to request that the amendment not be approved until this matter is resolved. Administratively, this may have been the simplest option. However, surveillance testing of the RCMU pumps has proved valuable in assuring operability. I do not wish to postpone testing beyond the requirements of the proposed SSF TS.

The third option was shutdown of the unit in order to repair the valve. It can be shown that there is no actual risk associated with performing the RCMU pump test on-line. Subjecting the plant to a shutdown / startup transient in order to perform the RCMU pump test would not be in the best interest of public health and safety, though it would be required by the combined effect of TS 3.6.3 (c) and the proposed SSF TS.

The final option - the option I have chosen through consultation with my staff and with NRC representatives from Region II and the Office of Nuclear Reactor Regulation - is to request a NRC Regional Waiver of Compliance in regard to TS 3.6.3 (c). This waiver would allow opening of 3SSF-SF-97 for the short period of time necessary to perform the RCMU pump test (about two hours). This would occur once prior to 11/02/90, and once in early 1991. The second occurrence might be avoided, should an unplanned outage of sufficient duration provide an opportunity to repair the valve.

As described in the attachments, opening 3SSF-SF-97 for these two short intervals of testing would involve no increased risk to the public because:

1) Compensatory measures would be in place to close both containment isolation valves, 3SSF-SF-82 & 97, in the event of a LOCA.

2) A fully-closed indication for valve 3SSF-SF-82 is achieved when this valve is operated from its motor control center breaker, as would be the case for the compensatory measure described above.

3) The containment penetration in question connects to the fuel transfer tube. The potential release path would be through the fuel transfer tube and into the Unit 3 Spent Fuel Pool (SFP), where the fuel transfer tube enters near the bottom of the SFP. The static head of water from the SFP reduces the potential leakage through this penetration. The water in the connecting lines and SFP would strip much of the radioactive iodine and other soluble radioactive material, in a manner similar to that described in the Oconee FSAR Fuel Handling Accident.

4) As a further compensatory measure, in the event of a LOCA, the Unit 3 Spent Fuel Filtered Exhaust System would be started to further reduce any potential release through this pathway.

5) The RCMU pump piping is not open inside containment, and the RCMU pump suction piping is isolated from the Reactor Coolant System during both normal operation and RCMU pump testing.

6) The probability of a LOCA, concurrent with a single failure of 3SSF-SF-97, during the two hour period in which the RCMU pump test is to be performed, is very low. Further, it is unlikely that the subject containment isolation valve would actually be challenged during a LOCA. Should this unlikely set of events occur, the consequences (offsite dose) of a core damaging MHA would not be increased above the limits of 10 CFR 100. The possibility of any new type of accident would not be created.

7) Because of the low probability and acceptable consequences of an accident during the RCMU pump test, no irreversible environmental consequences would be involved.

The above conclusions have been reviewed and verified by Duke Design Engineering. The planned compensatory measures will be incorporated into the procedure associated with the RCMU pump test. The changes to the procedure, including the attached safety analysis, have been reviewed and approved, pending NRC approval of this request for a waiver.

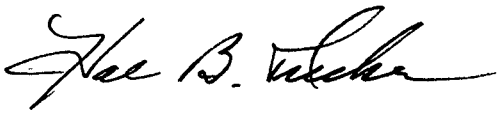
A waiver of the requirements of TS 3.6.3 (c), regarding isolation of inoperable containment isolation valve 3SSF-SF-82, would provide the safest option for assuring continued operability of the SSF RCMU pump. Application of the waiver would be limited to operation of 3SSF-SF-97 during two planned instances of RCMU pump testing on Unit 3. No permanent change to the Technical Specifications is needed.

The situation leading to this request for a waiver could not be foreseen, because previous surveillance testing, preventive maintenance, and operation of 3SSF-SF-82 had not indicated problem with the valve.

I request that NRC Region II grant this temporary Waiver of Compliance in regard to Technical Specification 3.6.3 (c), and that this waiver be granted in sufficient time to perform the quarterly surveillance test of the Unit 3 SSF RCMU pump by 11/02/90. I further request that the waiver also apply to the one other scheduled performance of this test in early 1991, unless an opportunity to repair 3SSF-SF-82 occurs during an unplanned outage.

I declare that the statements set forth herein are true and correct to the best of my knowledge.

Very truly yours,



Hal B. Tucker

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ATTACHMENTS

I. Description of Condition

II. Compensatory Measures

III. Safety Analysis / No Significant Hazards Considerations Evaluation

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Attachment I

Description of Condition

PT/3/A/0400/07 (SSF RCMU PUMP PERFORMANCE TEST) was successfully performed on Oconee Unit 3 on 6/20/90. This test involves pumping water from the SFP, through valve 3SF-1, fuel transfer tube # 1, valves 3SSF-SF-97&82, the RCMU pump, valves 3SSF-HP-417&428, fuel transfer tube # 2, valve 3SF-2, and back into the SFP (see drawing on next page). Except for 3SF-1&2, all the valves mentioned above are normally closed with their electric operators deenergized. 3SSF-SF-97&82, which are electrically operated valves located in the reactor building basement, are the containment isolation valves for the RCMU pump suction line. They are remotely operated from the SSF Control room, but are not actuated by the Engineered Safeguards System. Following testing, all valves are returned to their normal condition.

After the 6/20/90 test, when 3SSF-SF-82 was to be closed by operating the switch in the SSF Control Room, a closed indication light could not be obtained. 3SSF-SF-82 was declared inoperable as a containment isolation valve. Investigation included cycling the valve several times. It continued to open normally, so that RCMU pump operability was not affected. The valve's motor operator torque switch was was found to be activating after about one second of travel in the close direction (normal stroke time is about 9 - 10 seconds). By operating the valve from the valve breaker at SSF motor control center (MCC) 3XSF, temporarily overriding the torque limit switch, the closed indication light was obtained after a normal stroke time. However, the valve remained inoperable in its containment isolation function, because the it had not been operated in its normal manner (ref. ASME Section XI).

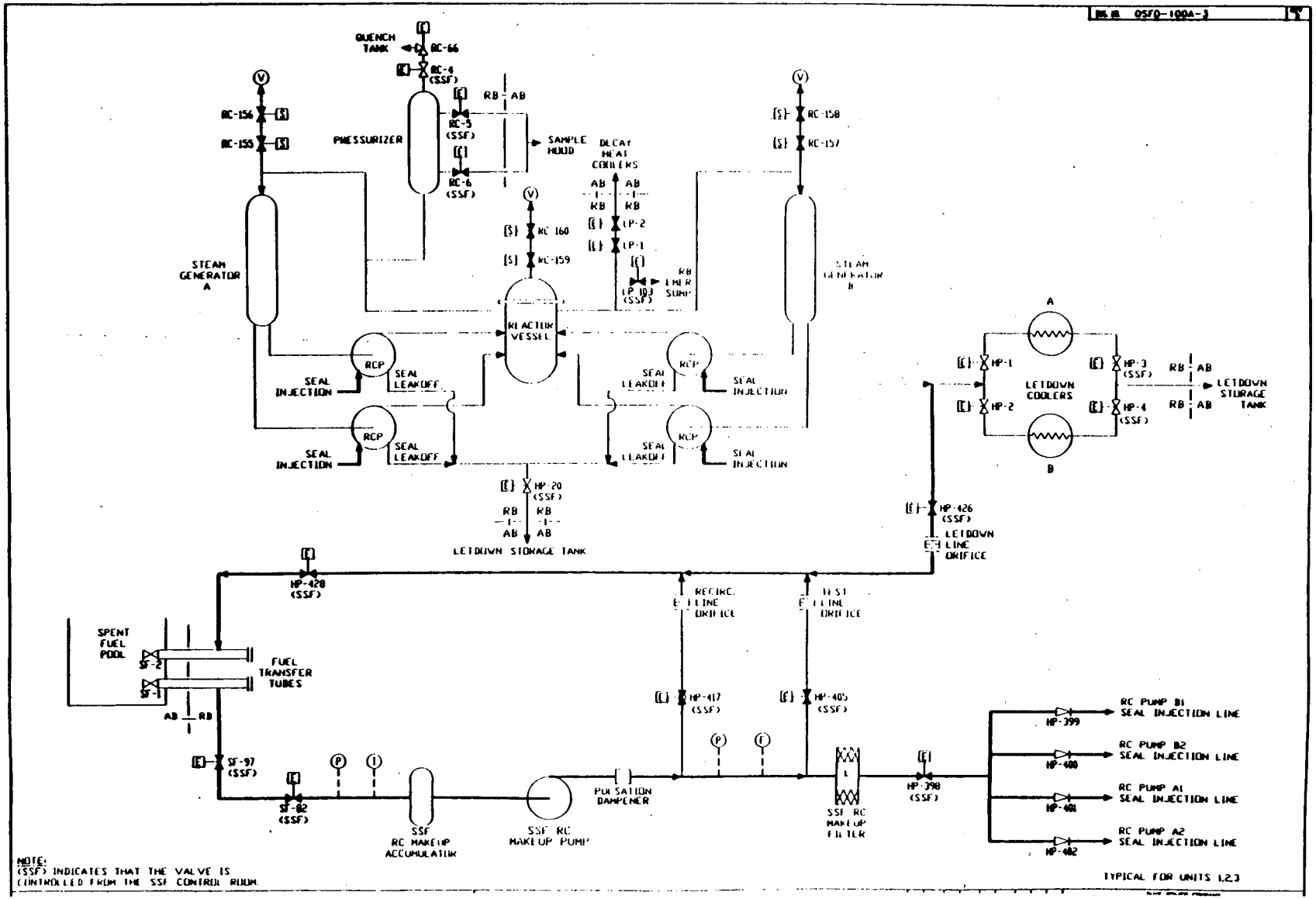
In order to isolate 3SSF-SF-82 as required by TS 3.6.3 (c), 3SSF-SF-97 was closed, and its power supply deenergized and tagged, within 4 hours. This did not affect RCMU pump operability, since 3SSF-SF-97 is normally deactivated, and would be reopened as necessary in an SSF-related event (non-LOCA). 3SSF-SF-82 was left in the open position to further assure RCMU pump operability.

The above application of TS 3.6.3(c) prevents performance of further surveillance testing on the RCMU pump. The grace period for the next quarterly test extends to 11/02/90. The test is also scheduled to be performed one additional time during the current cycle of operation.

Establishing operability of 3SSF-SF-82, through a combination of analysis and compensatory measures, was considered and rejected. The potential compensatory measure was to station an I&E technician at MCC 3XSF-1, ready to close 3SSF-SF-82 by overriding the torque switch. However, even though a closed indication could be obtained by operating the valve in this manner, analysis could not resolve the apparent change in the operating characteristics of the valve. This would cast doubt on the applicability of the last leak rate test on the penetration, and would not be in accordance with requirements of ASME Section XI. Similarly, alternative

Attachment I

Description of Condition



Attachment I

Description of Condition
(continued)

means to meet the isolation requirement of T.S. 3.6.3 (c) during the RCMU test could not be identified. Isolation with 3SF-1, the fuel transfer tube isolation valve in the SFP, was not viable because the RCMU pump takes suction on the fuel transfer tube.

On-line repair of 3SSF-SF-82 was considered. Because of the operating characteristics noted above, the problem is thought to be located in the valve or its motor operator, and is not expected to be a simple limit switch positioning problem. With work in progress on the valve or valve operator, and during subsequent penetration leak rate testing, the RCMU pump would be rendered inoperable. Potential duration of the repairs is not known, but Oconee experience with similar situations on other valves tends toward long jobs with repeated efforts to identify and correct the problem.

The reactor building basement is a hot environment during power operation, with potentially high levels of direct radiation and radioactive contamination. Required local leak rate testing following repairs would involve further worker exposure to heat, radiation, etc. Overall, it was decided that on-line repair was not a useful alternative.

Also considered was postponing the RCMU pump testing until a unit outage presented an opportunity to repair 3SSF-SF-82. The proposed SSF TS provides a special 45 day inoperablity period which, in combination of with the 45 day grace period associated with the proposed surveillance testing requirement, would allow operation to continue until 12/17/90. Since the amendment requiring the testing has not been approved, Duke could have contacted the NRC to request that the amendment not be approved until this matter is resolved. However, surveillance testing of the RCMU pumps has proved valuable in assuring operability. Therefore, it was decided that the testing should not be postponed.

Shutdown of the unit in order to repair the valve was considered. In this case, because it can be shown that there is no actual risk associated with performing the RCMU pump test on-line, shutting down the unit in order to do the test would not appear to be in the best interests of the public. Continued operation with 3SSF-SF-82 inoperable poses no increased risk, because the closed and deactivated isolation valve, 3SSF-SF-97, assures containment isolation with a properly tested component.

Without surveillance testing, the Unit 3 RCMU pump would be declared inoperable on 11/02/90. As required by the proposed SSF TS, Unit 3 shutdown would be necessary on 11/9/90, or on 12/17/90 if the 45 day special inoperablity period were invoked.

Attachment II

Compensatory Measures

Due to the problems with 3SSF-SF-82 described in Attachment I, and as a condition of the requested waiver, the following compensatory measures will be in place when opening 3SSF-SF-82 and 3SSF-SF-97 for performance of the RCMU pump surveillance test:

1) Direct, continuous communications will be established between the Unit 3 Control Room, an operator at the SSF Control Room, and an I&E technician at SSF Motor Control Center MCC 3XSF-1.

2) Upon occurrence of an Engineered Safeguards Channel 1 or 2 actuation signal, the Unit 3 Control Room would direct the following actions:

   a) SSF Control Room operator

      o trip the Unit 3 RCMU pump
      o close 3SSF-SF-97

   b) I&E technician at MCC 3XSF

      o close 3SSF-SF-82, overriding the torque switch as necessary for a closed indication light to be obtained

   c) Dispatch an operator to the hallway outside the Unit 3 SFP to start the Spent Fuel Filtered Exhaust Fans

Instructions for the above compensatory measures are to be included in the procedure used to perform the RCMU pump test.

Should a LOCA result in unacceptable leakage, despite the above compensatory measures and considerations of the Safety Analysis (Attachment III), a longer term mitigating measure would be available. This measure would be to manually close the fuel transfer tube isolation valve, 3SF-1, in the Unit 3 SFP.

Attachment III

Safety Analysis and No Significant Hazards Considerations Evaluation

Overview:

The justification for promptly performing the SSF RCMU pump surveillance test during operation, despite apparent problems in achieving a fully closed position on 3SSF-SF-82, is that this is the course of action which minimizes risks to the health and safety of the public and to Duke's workers. Specifically:

1) Operability of the SSF RCMU system would be maintained and assured. This system is currently operable. The quarterly RCMU pump surveillance test assures continued operability. Repair and testing of 3SSF-SF-82, while in progress, would render the RCMU system inoperable.

2) Neither the risks nor potential consequences of any accidents would be significantly increased, and no margin of safety would be significantly reduced. (see Safety Analysis below). In addition to the low probability of an accident, the low probability of actual failure of the penetration isolation function during an accident, and the inherently limiting characteristics of the the potential leakage pathway involved, compensatory measures (Attachment II) would be taken for added assurance of containment integrity in the event of an accident.

3) Risks associated with an unnecessary shutdown / startup of the unit would avoided.

4) Unnecessary radiation exposure and potential risk to Duke's workers would be avoided.

Safety Analysis:

Valves 3SSF-SF-82 and 3SSF-SF-97 perform a containment isolation function. Valve 3SSF-SF-82 currently can not be assured to be fully closed because the closed indication light cannot be obtained when the valve is operated by its normal means. In accordance with TS 3.6.3 (c), 3SSF-SF-97 has been closed, and it's electric operator's power supply deactivated and tagged, to isolate 3SSF-SF-82.

This analysis constitutes a No Significant Hazards Consideration Evaluation for a requested NRC Regional Waiver of Compliance, which would allow opening of 3SSF-SF-97 for performance of a surveillance test on the Unit 3 RCMU pump. During this test, which would last approximately two hours, compensatory measures (Attachment II) would be in place.

Regarding the change from previously approved operating conditions which would be allowed by the requested waiver, would the change: (next page)

Attachment III

Safety Analysis and No Significant Hazards Considerations Evaluation
(continued)

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated?

Increase in probability:

The accident in question is a LOCA requiring containment isolation. The RCMU pump surveillance test has no impact upon the probability of a LOCA inside containment. The RCMU system remains isolated from the reactor coolant system during testing, so that the probability of an interfacing system LOCA through RCMU suction piping is not increased.

Given the conditions associated with the requested waiver, the accident sequence with increased consequences is a core-damaging LOCA, concurrent with failure of the operable containment isolation valve (3SSF-SF-97), and a rupture of the SSF RCMU pump suction piping. Rupture of the piping would be necessary to create a challenge to the penetration isolation valves. It would also be necessary for containment pressure to exceed 24 psig, which is equivalent to the 55.5 ft. head of the SFP at the subject containment isolation valves.

The estimated frequency of a LOCA requiring containment isolation is 6E-03/yr (6.8E-07/hr). This includes random LOCAs as well as transient induced reactor coolant pump seal LOCAs, and does not take credit for mitigation which may prevent core damage. The failure probability of 3SSF-SF-97 is estimated to be 1E-02/demand. The combined probability, during a two hour test, will be

2 hr X 6.8 E-07/hr X 1E-02 = ~ 1E-08.

The unquantified probabilities; (a) that mitigation efforts would not prevent core damage, (b) that the seismically designed RCMU suction piping would fail, (c) that the technically inoperable 3SSF-SF-82 would not actually provide effective isolation, and, (d) that containment pressure would exceed 24 psig; combine to reduce this value by several orders of magnitude.

It is concluded that there be no increase in the probability of an accident, and an extremely small increase in the probability of an accident sequence with increased consequences.

Increase in consequences:

Given the scenario above, the increase in consequences is the increase in offsite dose resulting from increased leakage through the penetration. As described below, the increase is not significant relative to the acceptance criteria of 10CFR100.

Attachment III

Safety Analysis and No Significant Hazards Considerations Evaluation
(continued)

a) Taking no credit for operable valve 3SSF-SF-97, leakage through 3SSF-SF-82 is estimated.

3SSF-SF-82 is a Borg-Warner 4 inch gate valve. When operated from the breaker at the motor control center (as in the planned compensatory measures), 3SSF-SF-82 displays a closed indication light after a normal stroke time. This provides confidence that, while the valve disc may not be sealed on the seating surface, "disc overlap" of the valve disc over the seating surface opening has been obtained. Differential pressure across the valve is the time-dependant containment accident pressure minus the 24 psi head of water from the SFP.

Neglecting pressure drops through piping, average flow rates through the valve in a "disc-overlap" condition are calculated to be:

4.1 gpm (liquid), or 9 cubic ft./min (gas).

b) Given this increased leakage, the effects upon offsite dose are estimated.

Depending upon the scenario, the RCMU piping may or may not be inundated. An inundated (liquid) release would be limiting for iodine; a non-inundated (gaseous) release would be limiting for noble gases. The leakage would pass through water in the RCMU pump penetration line, the fuel transfer tube, the SFP proper, and through the SFP Filtered Exhaust System filters, prior to release. (Starting the SFP Filtered Exhaust System fans is one of the planned compensatory measures.) The water and filters would remove nearly all of the iodine from such a release. Release of noble gases is not assumed to be reduced.

The Oconee 3 NRC SER states the calculated MHA offsite dose to be 5.5 Rem (whole body) and 235 Rem (thyroid). Using the same source term and X/Q values as the SER, along with a 99% iodine removal effectiveness for the SFP and a 90% iodine removal effectiveness for the SFP Filtered Exhaust System filters, calculated additional offsite doses for the above leak rates are:

	MHA Existing (Rem)	SF-82 Leakage Flow Rate	SF-82 Leakage Dose (Rem)	Total Dose (Rem)	10CFR100 Guidance (Rem)
Whole Body	5.5	9.0 cfm	4.5	10.0	25
Thyroid:					
Gaseous	235	9.0 cfm	1.8	236.8	300
Liquid	235	4.1 gpm	7.4	242.4	300

Attachment III

Safety Analysis and No Significant Hazards Considerations Evaluation
(continued)

The consequences conservatively estimated are less than the guidance of 10CFR100.

2. Create the possibility of a new or different kind of accident from any accident previously evaluated?

   Operation of ONS in accordance with the provisions of this proposed waiver will not create any failure modes not previously considered in previously evaluated accidents. Therefore, the possibility of a new or different kind of accident is not created.

3. Involve a significant reduction in a margin of safety?

   10 CFR 100 states the limits for offsite dose in an accident. The NRC SER for Oconee 3 states calculated offsite doses for a MHA. (1) above states the calculated offsite dose increase due to potential leakage through 3SSF-SF-82. It is concluded that there will be no significant reduction in a margin of safety.

It should also be stated that the requested waiver would not involve an increase in the probability of failure of equipment important to safety, other than the potential increased leakage through 3SSF-SF-82 described above. The RCMU pump will remain available to perform its function in an SSF-related event (fire/flood/sabotage). Though a LOCA and concurrent rupture of the RCMU piping would make the RCMU pump unavailable, this is a result of the scenario, not of the conditions associated with the requested waiver.