2.0 LIMITING CONDITIONS FOR OPERATION

2.1 Reactor Coolant System (Continued)

2.1.4 Reactor Coolant System Leakage Limits

Applicability

Applies to the leakage rates of the reactor coolant system whenever the reactor coolant temperature (T_{cold}) is greater than 210 °F.

Objective

To specify limiting conditions of the reactor coolant system leakage rates.

Specifications

To assure safe reactor operation, the following limiting conditions of tne reactor coolant system leakage rates must be met:

(1) If the reactor coolant system leakage exceeds 1 gpm and the source of leakage is not identified within 12 hours, the reactor shall be placed in the hot shutdown condition. If the source leakage exceeds 1 gpm and is not identified within 24 hours, the reactor shall be placed in the cold shutdown condition.

(2) If leakage exceeds 10 gpm, the reactor shall be placed in the hot shutdown condition within 12 hours. If the leakage exceeds 10 gpm for 24 hours, the reactor shall be placed in the cold shutdown condition.

(3) Primary-to-secondary leakage through the steam generator tubes shall be limited to 1 gpm total for both steam generators. When primary-to-secondary leakage has been determined to be in excess of the limit, the leakage rate shall be reduced to within limits in 4 hours or the reactor shall be placed in the cold shutdown condition within the next 36 hours.

(4) ~~To determine leakage to the containment, one of the following must be operable at all times:~~

~~a. Containment Dew Point Instrument~~
~~b. Containment Radiation Monitor~~
~~c. Containment Sump Level Instrument~~
~~d. CVCS Volume Control Tank Inventory Instrument~~

To determine leakage to the containment, a containment atmosphere radiation monitor (gaseous or particulate) or dew point instrument, and a containment sump level instrument must be operable.

a. With no containment sump level instrument operable, verify that a containment atmosphere radiation monitor is operable, and restore the containment sump level instrument to operable status within 30 days.

b. With no containment atmosphere radiation monitor and no dewpoint instrument operable, restore either a radiation monitor or dewpoint instrument to operable status within 30 days.

c. With only the dewpoint instrument operable, or with no operable instruments, enter Specification 2.0.1 immediately.

(5) To determine leakage to the secondary system one of the following must be operable ~~at all times~~:

a. Steam Generator Blow Down Radiation Sample Instrument
b. Condenser Off Gas Radiation Monitor
c. Periodic Secondary Samples Analyzed for Activity

Basis

Leakage directly into the containment indicates the possibility of a breach in the reactor coolant envelope. The limit is held low to minimize the chance of a crack progressing to an unsafe condition without detection and proper evaluation.

When the source of leakage can be identified, the situation shall be evaluated to determine if operation can safely continue. This evaluation will be reviewed by the Plant Review Committee and will be documented in writing and approved by the Plant Manager. Under these conditions, a maximum allowable reactor coolant leakage rate of 10 gpm has been established. This does not include the reactor coolant pump seal leak off that is piped to the volume control tank, which is not considered "leakage" from the reactor coolant system. A reactor coolant leakage to the containment atmosphere greater than 10 gpm would be indicative of seal and packing failures of sufficient magnitude to warrant shutdown for repair.

The maximum reactor coolant leakage rate of 10 gpm is within the 40 gpm capacity of one charging pump which would be available even under a loss-of-off-site power condition. Leakage from the reactor coolant system can be detected by monitoring one or a combination of reactor coolant system inventory, containment building radiation level, condenser offgas, steam generator blowdown water, containment ~~humidity~~dewpoint, and containment sump level (LT-99 or LT-600).[1,2] The containment atmosphere gaseous and particulate monitors are capable of detecting a one gpm leak from the reactor coolant system to containment within four hours of leak initiation following Regulatory Guide 1.45 criteria. The capability to detect a one gpm RCS leak within 4 hours is required in order to credit leak-before-break methodology. If reactor coolant leakage is to another closed system, it can be detected by the plant radiation monitors or by inventory control.

Placing the reactor in hot shutdown within 12 hours provides adequate time to arrange for an orderly reduction of power on the plant. The hot shutdown condition allows personnel to enter the containment and to inspect the pressure boundary for leaks. The 24 hours allowed prior to going to a cold shutdown condition allows reasonable time to correct small deficiencies. If major repairs are needed, a cold shutdown condition would be in order.

Limiting primary to secondary leakage is important to ensure steam generator tube integrity. The plant is expected to be operated in a manner such that the secondary coolant will be maintained within those chemistry limits found to result in negligible corrosion of the steam generator tubes. If the secondary coolant chemistry is not maintained within these limits, localized corrosion may likely result in stress corrosion cracking. The extent of cracking during plant operation would be limited by the limitation of steam generator tube leakage between the primary coolant system and the secondary coolant system (primary-to-secondary leakage = 1 gallon per minute, total). Cracks having a primary-to-secondary leakage less than this limit during operation will have an adequate margin of safety to withstand the loads imposed during

normal operation and by postulated accidents. Operating plants have demonstrated that primary-to-secondary leakage of 1 gallon per minute can readily be detected by radiation monitors. Leakage in excess of this limit will require

plant shutdown and an unscheduled inspection, during which the leaking tubes will be located and plugged.

References

(1) ~~FSAR~~ USAR, Section 11.2.3

(2) ~~FSAR~~ USAR, Page G.16-1~~, 2~~

ATTACHMENT B

DISCUSSION, JUSTIFICATION AND NO SIGNIFICANT HAZARDS ANALYSIS

DISCUSSION AND JUSTIFICATION OF AMENDMENT REQUEST:

Omaha Public Power District is proposing to revise the Fort Calhoun Station Unit No. 1 Technical Specification 2.1.4, "Reactor Coolant System Leakage Limits," to implement the Reactor Coolant System (RCS) Leak Before Break (LBB) methodology detection criteria. The Technical Specification is being modified to incorporate leak detection instruments of diverse monitoring principles in accordance with recommendations listed in Generic Letter 84-04.

The proposed revision to Technical Specification 2.1.4 is a result of OPPD's commitment to close Unresolved Safety Issue (USI) A-2, Asymmetric Blowdown Loads on Reactor Primary Coolant Systems, through application of LBB methodology. The NRC concluded in Generic Letter 84-04 that an acceptable technical basis was provided so that USI A-2 issues need not be considered as part of the design basis for the Fort Calhoun Station since Fort Calhoun was included as part of the Westinghouse Owner's Group Analysis. The NRC indicated that an acceptable basis for eliminating asymmetrical loads from the design basis was to ensure leak detection systems were capable of detecting a one gpm leak within four hours of leak initiation.

OPPD informed the NRC in a letter dated August 13, 1990 (LIC-90-0591) that containment radiation monitors RM-050 and RM-051 were the primary means of detecting RCS leakage to containment within four hours of leak initiation. Each monitor is sensitive enough to detect a one gpm leak within four hours in accordance with the modified criteria of Regulatory Guide (RG) 1.45 specified in Generic Letter 84-04. The modified criteria state that the airborne particulate radiation monitor need not be seismically qualified. The proposed revisions reflect taking credit for containment atmosphere radiation monitors for RCS leak detection.

Regulatory Guide 1.45 indicates that RCS leakage to the containment atmosphere could also be indirectly monitored by changes in containment humidity, pressure, temperature and sump level. OPPD reported to the NRC in letter LIC-90-0591 that a backup leak detection system is provided through monitoring both containment sump level and dew point monitors. This letter stated that the backup system could meet the criteria to detect a one gpm leak within four hours, but had no means of differentiating water sources. Subsequent calculations indicate that in some scenarios the narrow range containment sump level by itself or the containment dew point monitor by itself, are not sensitive enough to detect with certainty, a one gpm RCS leak within four hours of initiation. Timely detection could be accomplished in specific conditions, but not under all conditions. However, the proposed changes require more than one leak detection system be operable, or corrective actions be taken to restore the inoperable instrumentation within the allowed outage time. This ensures that leak detection instruments of diverse monitoring principles are operable to detect leakage.

Regulatory Guide 1.45 indicates that another important method of obtaining indications of intersystem RCS leakage is through use of a water inventory balance, designed to provide appropriate information such as abnormal water levels in tanks and abnormal water flow rates. Fort Calhoun monitors several systems to provide indication of RCS intersystem leakage. One RCS leak monitoring method is through trending of the Volume Control Tank (VCT) level changes. VCT level alarms can be very effective in monitoring RCS leakage depending upon specific conditions. FCS effectively tracks RCS leakage through detailed inventory calculations. Currently this calculation is performed once per 24 hours, as required by Technical Specification 3.2, Table 3-5. Standard TS require that an RCS inventory be performed once per 24 hours, or grab samples of the containment atmosphere be analyzed, in response to inoperable detection

instrumentation. Since FCS is already required to perform the RCS inventory once per 24 hours these actions are not being added to the Limiting Condition for Operation (LCO). Should the control room operators receive an alarm via the radiation monitor's annunciators, they are instructed to check other indicators for RCS leakage in containment and perform an RCS leak rate calculation. If RCS leakage is confirmed, an Abnormal Operating Procedure is entered and this procedure provides direction and contingency actions to locate and isolate the leak.

An example of Fort Calhoun's response to a RCS leak is found in License Event Report 90-028 submitted January 14, 1991 (LIC-91-0003L) which provided information about an investigation of an unknown RCS leakage source in containment. Through an enhanced monitoring program the source of RCS leakage in containment was identified as the installed spare Control Element Drive Mechanism (CEDM) housing number 9. As indicated in the LER, the leak rate was verified by RCS inventory calculations. The leak rate had stabilized and was established to be approximately 0.4 gpm. Inspection of the head revealed a leak coming from the spare CEDM number 9 housing. RCS leakage from the spare CEDM housing did not cause the radiation monitors RM-050 and RM-051 to go into an alert condition. The established monitor alert setpoints (indication only) in operation at the time of the CEDM housing leakage were arbitrarily set above containment equilibrium monitor readings. The high alert setpoint was not sensitive to a 0.4 gpm RCS leak rate. Recent calculations have been performed to establish an alert setpoint sensitivity which identifies a one gpm RCS leak rate within four hours from leak initiation. Calculated alert setpoints are based upon radioisotopic inventories consistent with Regulatory Guide 1.45.

To assure safe reactor operation, the RCS leakage limit from an unidentified source will be limited to one gpm by the proposed changes to Technical Specification 2.1.4. If the unidentified leakage exceeds one gpm, the reactor must be in hot shutdown within 12 hours and cold shutdown within 24 hours. This RCS leakage limitation is consistent with leak rates identified in the Westinghouse Owner's Group analysis referenced in Generic Letter 84-04. The basis for the low leakage limits is to minimize the chance of a crack progressing to an unsafe condition without detection and proper evaluation. When the source of leakage is unknown, placing the reactor in hot shutdown within 12 hours provides adequate time for an orderly reduction of plant power level. The hot shutdown condition also allows personnel to enter the containment and inspect the pressure boundary for leaks. The 24 hours allowed prior to going to cold shutdown allows reasonable time to correct small deficiencies or to cool the primary system. If major repairs are needed, a cold shutdown condition would be in order.

It is also proposed that the applicability statement for Specification 2.1.4 be revised to clearly state when this specification is applicable. Currently the applicability statement does not state mode applicability for the specification. The proposed change would require the specification to be applicable whenever the reactor coolant temperature (T_{cold}) is above 210 °F. This is similar to CE Standard Technical Specification 3.4.15 (NUREG-1432). Specifications 2.1.4(4) and 2.1.4(5) are being revised to be consistent with the proposed change to the applicability statement. A detailed description and comparison of Specification 2.1.4 and CE Standard Technical Specification 3.4.15 was provided to the NRC in a letter dated November 15, 1991 (LIC-91-267R) and reviewed by the NRC in a letter dated December 3, 1991.

ADMINISTRATIVE CHANGES

It is proposed that the references to the FSAR (Final Safety Analysis Report) be revised to reflect the current nomenclature for this document which is the USAR (Updated Safety Analysis Report), and that page G.16-2 be deleted as this page is not presently in the USAR due to formatting changes.

BASIS FOR NO SIGNIFICANT HAZARDS DETERMINATION:

The proposed change does not involve a significant hazards consideration because operation of the Fort Calhoun Station Unit No. 1 in accordance with the proposed amendment would not:

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

The proposed changes will require additional leak detection instruments be operable to close Unresolved Safety Issue A-2, "Asymmetrical Blowdown Loads on Reactor Primary Coolant System," for the Fort Calhoun Station. Requiring additional instrumerts to be operable does not increase the probability or consequences of an accident since the safety function of the instruments is not being altered.

The proposed changes require at least two different types of RCS leak detection instruments, of diverse monitoring principles, be operable or corrective actions be taken to restore the instrumentation to operable status. Currently the Technical Specifications require only one RCS leak detection instrument to be operable.

The probability of leaks occurring due to thermal or normal fatigue is not affected as indicated in the fracture mechanics analysis referenced in Generic Letter 84-04. No changes are proposed to primary RCS piping systems or supports as a result of the proposed revision. The proposed changes will ensure that a potential significant failure does not go undetected within the Regulatory Guide 1.45 criteria as noted in Generic Letter 84-04.

The Loss of Coolant Accident (LOCA) analysis will not be impacted by the proposed change. The results of the current Fort Calhoun LOCA analyses cited in Section 14.15 of the Updated Safety Analysis Report (USAR) will not be impacted as a result of these changes.

(2) Create the possibility of a new or different kind of accident from any previously analyzed.

It has been determined that a new or different kind of accident will not be created due to the proposed changes since no new or different modes of operation are created by this change. The existing operating procedures were established to support an enhanced RCS leak detection program. Operation of RCS leak detection instruments will not differ from existing conditions.

(3) Involve a significant reduction in a margin of safety.

The margin of safety as defined in the basis for the Technical Specifications is not changed or reduced by this proposed change. Defining adequate RCS LBB monitoring is required to meet recommendations provided in Generic Letter 84-04.

Therefore, based on the above considerations, it is OPPD's position that this proposed amendment does not involve a significant hazards consideration as defined in 10CFR 50.92 and the proposed changes will not result in a condition which significantly alters the impact of the station on the environment. Thus, the proposed changes meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) and pursuant to 10 CFR 51.22(b) no environmental assessment need be prepared.

FLC TRANSMITTAL
ADMINISTRATIVE CHECKLIST

FLC NO. 90-15 R2 LIC- 92-0133

REVIEW ITEM	COMMENTS	1st REVIEW	2nd REVIEW	SUPERVISOR CHECK
1. ARE ALL ASPECTS OF THE SOURCE DOCUMENT (i.e. GENERIC LETTER, LER, etc.) ADDRESSED?	N/A	BRH	MLE	
2. ARE ALL PAGES WHICH WERE REVISED BY PRC/SARC INCLUDED?	YES	BRH	MLE	
3. VERIFY SUBMITTAL AGAINST A CONTROLLED COPY OF THE TECHNICAL SPECIFICATIONS.	COMPLETE.	BRH	MLE	
4. HAS THE MOST CURRENT AMENDMENT TO THE TECHNICAL SPECIFICATIONS BEEN INCORPORATED?	YES	BRH	MLE	
5. IS THE NUMBERING OF THE TECHNICAL SPECIFICATIONS CONSISTENT WITH THE CURRENT TECHNICAL SPECIFICATIONS (i.e. parenthesis, roman numerals, etc.)?	YES	BRH	MLE	
6. ARE INDENTATIONS OF PARAGRAPHS CORRECTLY APPLIED?	YES	BRH	MLE	
7. ARE AMENDMENT NO.'S ON BOTTOM OF THE PAGE CORRECT?	YES	BRH	MLE	
8. DO ANY OF THE CHANGES REVISE /DELETE A PARAGRAPH/SUBPARAGRAPH NUMBER FROM THE TECHNICAL SPECIFICATIONS WHICH MIGHT BE REFERENCED SOMEWHERE ELSE IN THE TECHNICAL SPECIFICATIONS? (NOTE: CHECK TABLE OF CONTENTS)	NO.	BRH	MLE	
9. ARE ANY REFERENCES BEING REVISED? IF SO VERIFY REFERENCE IS CURRENT.	YES.	BRH	MLE	
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