Omaha Public Power District
444 South 16th Street Mall
Omaha NE 68102-2247

April 3, 1996
LIC-96-0017

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Main Station PI-137
Washington, D.C. 20555

Reference: Docket No. 50-285

SUBJECT: Alternate Methods for Determining Integrity of Applicable Waste Disposal System Components/Piping at Fort Calhoun Station (FCS)

The Omaha Public Power District (OPPD) is notifying the NRC of implementation of alternate methods for determining the integrity of the Waste Disposal Systems (WDS) components/piping, including Solid Waste Disposal, Liquid Waste Disposal and Gaseous Waste Disposal.

NUREG-0578, Section 2.1.6.a, *Integrity of Systems Outside Containment Likely to Contain Radioactive Materials (Engineered Safety Systems and Auxiliary Systems)*, recommended that the licensee:

> "Perform leakage rate tests on systems outside containment that process primary coolant and could contain high level radioactive materials. Develop and implement a periodic testing program and preventive maintenance programs."

In response to NUREG-0578, by letter dated October 25, 1979 (LIC-79-0131), OPPD made the following commitment:

> "OPPD will implement a series of surveillance tests to inspect auxiliary systems for leakage, quantify and evaluate any leaks that are found to the extent possible, and initiate appropriate corrective actions... This surveillance program will generally be applied to... Portions of the waste disposal system including containment sump piping, spent regenerative tanks and piping, neutralization tank and piping, SI and CVCS valve leakoff piping, auxiliary building sump tank and piping, monitor tanks inlet piping,

A001
1/1

waste filters, gas stripper, waste evaporator and piping, monitor tanks and recirculation piping, waste evaporator to drumming piping, concentrate tanks, waste holdup tanks, spent resin storage and associated piping and pumps, and the gaseous waste disposal system."

The WDS components/piping were classified as American Society of Mechanical Engineers (ASME) Safety Class 2 or 3, and were required to be tested in accordance with ASME Section XI, Article IWA-5000. Therefore, once-per-cycle tests were incorporated into the FCS Inservice Inspection (ISI) Program Plan using the ISI (3000 Series) surveillance tests. Subsequently, the FCS Updated Safety Analysis Report was revised which reclassified the WDS components/piping as Non-Nuclear Safety Class (Class 4). Because the ASME Section XI testing requirements no longer apply to these WDS components, alternate methods of determining WDS integrity will be used in lieu of the above stated commitment. In addition, several WDS components have been or will be "abandoned in place"; therefore, these portions of the WDS no longer have the potential to contain highly radioactive material.

Use of the alternate methods of determining WDS integrity will result in lower total radiation exposures to plant personnel, thus maintaining personnel exposure as low as reasonably achievable (ALARA), and will reduce costs of operation and maintenance without any significant reduction in the level of quality or safety.

Attached please find OPPD's discussion and justification for the alternate methods of determining and monitoring Waste Disposal System integrity. The alternate methods will be fully implemented prior to the 17th Operating Cycle which is scheduled to commence on November 2, 1996.

If you should have any questions, please contact me.

Sincerely,

T. L. Patterson
Division Manager
Nuclear Operations Division

TLP/dll

Attachment

c: Winston and Strawn
L. J. Callan, NRC Regional Administrator, Region IV
L. R. Wharton, NRC Project Manager
W. C. Walker, NRC Senior Resident Inspector

OMAHA PUBLIC POWER DISTRICT
FORT CALHOUN STATION (FCS) UNIT 1

Alternate Method for Determining/Monitoring Waste Disposal System Integrity - NUREG-0578

The Omaha Public Power District (OPPD) is notifying the NRC of implementation of alternate methods for determining the integrity of the Waste Disposal systems, components and piping, including Solid Waste Disposal, Liquid Waste Disposal and Gaseous Waste Disposal.

I. **SYSTEMS/COMPONENTS/PIPING FOR WHICH ALTERNATE METHODS ARE PROPOSED:**

Waste Disposal System (WDS) - including containment sump piping, spent regenerative tanks and piping, neutralization tank and piping, Safety Injection (SI) and Chemical Volume Control System (CVCS) valve leakoff piping, auxiliary building sump tank and piping, monitor tanks and inlet piping, waste filters, gas stripper, waste evaporator and piping, waste demineralizer, monitor tanks and recirculation piping, waste evaporator to drumming piping, concentrate tanks, hotel waste tanks, waste holdup tanks, spent resin storage tanks, pumps and associated piping, and the gaseous waste disposal system including the waste gas analyzer.

II. **CODE/TECHNICAL SPECIFICATION REQUIREMENT:**

The FCS Technical Specification (TS) Section 5.14 requires that "a program to reduce leakage from systems outside Containment that would or could contain highly radioactive fluids during a serious transient or accident to as low as practical levels shall be implemented. This program shall include the following:

1. Provisions establishing preventive maintenance and periodic visual inspection requirements, and

2. Integrated leak test requirements for each system at a frequency not to exceed refueling cycle intervals."

As stated in Reference 3, OPPD incorporated the periodic visual inspection and integrated leak test requirements into several surveillance tests performed under normal system operating pressure once-per-cycle. The acceptance criterion was that of the American Society of Mechanical Engineers (ASME), Section XI, Paragraph IWA-5250, *Corrective Measures*. ASME Section XI, Paragraph IWA-5250 states that the source of leakages detected during the conduct of a system pressure test shall be located and evaluated by the owner for corrective measures and repairs or replacement of components/piping shall be performed in accordance with the rules of IWA-4000/IWA-7000. OPPD's position for implementation of these requirements was approved by the NRC in References 7 and 11.

III. **DISCUSSION:**

As a result of the incident at Three Mile Island (TMI) Unit No. 2, the NRC issued NUREG-0578 (Reference 1). NUREG-0578 required licensees to implement a program to reduce leakage from systems outside containment that would or could contain highly radioactive fluids. In a letter from Mr. D. G. Eisenhut (Reference 2), the NRC required followup actions which included the immediate leak reduction program and preventive maintenance program for the integrity of systems outside containment likely to contain high radioactivity.

In Reference 3, OPPD committed to perform the surveillance tests under normal operating pressure once-per-cycle. The basic acceptance criterion was that of the Summer 1975 Addenda of ASME Section XI, Paragraph IWA-5250. This surveillance program applied to the WDS, as previously described in Section I. In Reference 10, OPPD optionally classified the WDS as Class 3 and committed to continue to treat the WDS as a critical quality element (CQE) system for the purposes of repair, modification and replacement.

The surveillance tests which are used to incorporate the requirements of TS 5.14 have been performed once-per-cycle since the early 1980's. In 1990, the WDS piping and components were classified as either ASME Class 2 or 3. Thus, the WDS piping and components were required to be tested under the FCS Inservice Inspection (ISI) Program Plan in accordance with the requirements of ASME Section XI, Article IWA-5000. Therefore, in 1990, the integrity tests for the systems identified in NUREG-0578 and Reference 3 were incorporated into the FCS ISI Program Plan using ISI (3000 Series) surveillance tests. The once-per-cycle tests satisfied the requirements of the FCS ISI Program Plan (40-month test frequency of system pressure tests) and TS 5.14.

Since the WDS was classified as Class 2 or 3, OPPD did not consider a relief request to minimize or totally eliminate the system pressure test requirements to be prudent. However, the fact that no through-wall leaks on the WDS, other than mechanical gaskets and seals, have been detected during the performance of the previous surveillance tests, contributes to the conclusion that these tests are not pertinent to safe plant operation.

In July 1992, OPPD revised the FCS Updated Safety Analysis Report (USAR), Appendix N, *Reclassification of Systems*. The purpose of Appendix N was to classify the FCS mechanical systems based upon regulatory and industry guidance, Regulatory Guide (RG) 1.26 and ANSI/ANS 51.1 (References 9 and 13); and to establish the corresponding piping and component construction codes (B31.7 Nuclear Piping Code).

The original licensing basis for FCS did not categorize systems based on their safety functions which current industry standards and NRC guidance documents have promulgated. The FCS safety-related systems are designated as CQE and the non-nuclear safety-related systems are designated as either Limited-CQE or Non-CQE, depending on the system's importance on plant safety (see Reference 14, Table N-2).

Current industry standards, RG 1.26 and ANSI/ANS 51.1, correlate system safety classes to ASME Section III code classes. Because of the similarity between ASME Section III and B31.7 code classes, Appendix N of the USAR correlates the safety classes with the B31.7 code classes. Appendix N of the FCS USAR, Section N.5-2, Table N-1, classifies the balance of the WDS, excluding the Containment penetrations and the interfaces with the Safety Injection Refueling Water Tank (SIRWT), as Non-Nuclear Safety (NNS) Class 1 (CL-1) and NNS Class 2 (CL-2).

USAR Appendix N states that Non-Nuclear Safety Class 1 (NNS CL-1) shall apply to equipment that is not included in Safety Class (SC) SC-1, -2 or -3, and that is designed and relied upon to accomplish one or more selected, but limited, requirements specified to ensure acceptable performance of specific NNS functions. The selected requirements are established on a case-by-case basis commensurate with the specific NNS function performed. The functions performed by the NNS CL-1 equipment are:

a. Process, extract, encase or store radioactive waste.

b. Provide clean-up of radioactive material from the reactor coolant system or fuel storage cooling system for normal operations.

c. Extract radioactive waste from, store, or transport for reuse irradiated neutron absorbing materials (e.g., boron compounds).

d. Resist failure that could prevent any SC-1, -2 or -3 equipment from performing its nuclear safety function.

e. Structurally load-bear or protect NNS equipment providing any of the functions listed.

f. Provide permanent shielding for protection of SC-1, -2 or -3 equipment or of onsite personnel.

g. Provide operational, maintenance or post-accident recovery functions involving radioactive materials without undue risk to the health and safety of the public.

h. Following a control room evacuation, provide an acceptable environment for SC-1, -2 or -3 equipment required to achieve or maintain a safe shutdown condition.

i. Handle spent fuel, the failure of which could result in fuel damage such that significant quantities of radioactive material could be released from the fuel.

j. Ensure reactivity control of stored fuel.

k. Protect SC-2 or -3 equipment necessary to attain or maintain safe shutdown following a fire.

USAR Appendix N states that Non-Nuclear Safety Class 2 (NNS CL-2) shall apply to equipment that is not included in SC-1, -2, -3 or NNS CL-1. This equipment is not relied upon to perform a nuclear safety function.

The original intent of NUREG-0578, Section 2.1.6.a was to ensure that systems/components outside of Containment that would or could contain "highly" radioactive fluids during a serious transient or accident were able to have radioactivity levels maintained as low as reasonably achievable (ALARA). The WDS outside of Containment is extremely unlikely to contain highly radioactive levels during a transient or accident. As a result, USAR Appendix N has reclassified the balance of the WDS non-nuclear safety-related. As a result of the balance of the FCS WDS being NNS class, thereby not being under the jurisdiction of the ASME Code, the applicable components/ piping are no longer required by ASME Section XI to be periodically pressure tested. ASME Code requires only Code Class 1, 2 and 3 component/piping/systems to fall under the requirements of Section XI regarding leakage/pressure testing in order to determine the integrity for components/piping that:

1. Perform a function in shutting down the plant to a safe shutdown condition.

2. Perform a function in maintaining the safe shutdown.

3. Mitigate the consequences of an accident which could cause the limits of 10 CFR 100 criteria to be exceeded.

As discussed above, since the WDS is classified as NNS CL-1 or NNS CL-2, the WDS is considered unlikely to contain highly radioactive contaminants either before or during a transient which could cause radiation levels to exceed 10 CFR 100 limits. Therefore, the WDS system does not fall under the requirements of the ASME Code or TS 5.14.

IV. **ALTERNATE TESTING/EXAMINATIONS:**

Although no alternate testing is planned to be performed on the WDS, during routine operations there are methods currently in place at FCS for "monitoring" leakage from the WDS:

1. During routine Operations personnel tours/rounds of areas in the Auxiliary Building, the WDS components/piping are visually examined and leakage (e.g., packing leaks, water on floor, moisture, discoloration of insulation, etc.) is identified and maintenance work documents are generated to correct the condition.

2. Various tank levels (e.g., spent regenerative, waste holdup, etc.) are monitored and logged. Abnormal changes in tank level/pressure are noted and monitored, and appropriate corrective action is taken, if required.

3. Area radiation monitors throughout the Auxiliary Building would alarm if radiation levels in the area exceeded setpoints due to excessive external WDS leakage from packing, pin-hole leaks, through-wall defects, etc.

V. **JUSTIFICATION FOR ALTERNATE METHODOLOGY:**

OPPD considers the proposed alternate methods for identifying and monitoring leakage from the WDS justified for the following reasons:

1. Less than 15% of the applicable WDS piping/components is subject to the ASME Code, therefore, under the ASME Committee rules the balance of the WDS is considered non-nuclear safety-related.

2. The WDS has been monitored for approximately the last 15 years using ASME Code type surveillance tests. No through-wall leakage has been identified.

3. The WDS is a low energy system, where flow/temperature conditions would not give rise to erosion/corrosion with ensuing rupture. It is likely that any unsatisfactory piping/component conditions in the WDS would be manifested as a pipe leak, well before any catastrophic pipe failure. It is common practice at FCS for the responsible Operations personnel to perform numerous walkdowns/tours of the plant each shift. Any leakage into or out of WDS components/piping could be detected during the shift rounds/tours.

4. As a part of the System Engineer's responsibilities, system/piping/component walkdowns are performed on the WDS. During the System Engineer's walkdowns, leakages could be detected and corrective action taken, thereby minimizing leakages outside of the WDS.

5. Certain instrumentation both internal and external to the WDS, such as spent regenerative tank/waste holdup tank level indication, area radiation monitors and process radiation monitors, also serve to identify leakages internal and external to the WDS.

6. In addition, several major components and portions of the WDS are no longer used and have been or will be abandoned in place. Therefore, the Waste Evaporator, the Waste Evaporator components/piping, portions of the Solid Waste System including the Drumming Station, the Waste Concentration Tanks, the Gas Stripper and the Waste Demineralizers are no longer required to be tested. All mechanical interfaces will be removed (cut/capped) from between the abandoned components/piping in the WDS and the inservice components/piping.

SAFETY SIGNIFICANCE

Use of the alternate methods of determining WDS integrity will result in lower total radiation exposures to plant personnel, thus maintaining personnel exposure ALARA, and will reduce Operation and Maintenance costs without any significant reduction in the level of quality or safety at FCS. In addition, the WDS is considered unlikely to contain highly radioactive contaminants either before or after a transient such that any leakage would be well within the limits of 10 CFR 100. Therefore, the health and safety of the public will not be reduced.

CONCLUSION

In summary, OPPD has determined that the requirements of NUREG-0578, Section 2.1.6.a and TS 5.14 are not applicable to the NNS CL-1 and CL-2 portions of the WDS. Much of the WDS is either abandoned in place and physically isolated from the operating WDS, or will be abandoned/isolated in the near future. Normal plant operations, System Engineering walkdowns and other station activities (i.e., shift tours), will identify any significant leakage out of the WDS for correction in a timely manner.

VI. IMPLEMENTATION SCHEDULE:

OPPD will complete all 1995-1996 scheduled leak testing for the current cycle (Cycle 16) in accordance with Reference 3 and the FCS ISI Program Plan. OPPD will cease performing the ASME surveillance tests for leakage determination on the non-safety related WDS components/piping beginning with Cycle 17 (end of the 1996 refueling outage).

VII. REFERENCES:

1. NUREG-0578, *"TMI-2 Lessons Learned Task Force Status Report and Short-Term Recommendations,"* Section 2.1.6.a, Systems Integrity, dated July 25, 1979

2. Letter from NRC (D. G. Eisenhut), *Followup Actions Resulting from the NRC Staff Reviews Regarding the Three Mile Island Unit 2 Accident*, dated September 13, 1979

3. Letter from OPPD (W. C. Jones) to NRC (D. G. Eisenhut) dated October 25, 1979 (LIC-79-0131)

4. Letter from NRC (H. R. Denton), *Discussion of Lessons Learned Short Term Requirements*, dated October 30, 1979

5. Letter from OPPD (W. C. Jones) to NRC (H. R. Denton) dated November 27, 1979 (LIC-79-0150)

6. Letter from OPPD (W. C. Jones) to NRC (H. R. Denton) dated December 31, 1979 (LIC-79-0168)

7. Letter from NRC (R. W. Reid) to OPPD (W. C. Jones) dated April 7, 1980

8. NUREG-0737, *Post-TMI Requirements*, Section III.D.1.1, Integrity of Systems Outside Containment Likely to Contain Radioactive Material for Pressurized-Water Reactors and Boiling-Water Reactors, dated October 31, 1980

9. ANS/ANSI 51.1-1983, *"Nuclear Safety Criteria for the Design of Stationary Pressurized Water Reactors"*

10. Letter from OPPD (W. C. Jones) to NRC (R. P. Denise) dated April 2, 1984 (LIC-84-0086)

11. Letter from NRC (J. R. Miller) to OPPD (R. L. Andrews) dated November 14, 1984

12. American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section XI, 1989 Edition

13. Regulatory Guide 1.26, *"Quality Groups Classifications and Standards for Water, Steam, and Radioactive Waste Containing Components of Nuclear Power Plants"*

14. Fort Calhoun Station (FCS) Updated Safety Analysis Report (USAR) Appendix N, *"Reclassification of Systems"*

15. FCS Technical Specification 5.14, Amendment 89

16. FCS P&IDs 11405-M-6, 11405-M-7, 11405-M-8, 11405-M-9 and 11405-M-98

17. FCS Inservice Inspection Program Plan, Third Ten-Year Interval (1993-2003), Revision 3, dated September 1, 1995