



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 10 TO FACILITY OPERATING LICENSE NO. NPF-58

CLEVELAND ELECTRIC ILLUMINATING COMPANY, ET AL

PERRY NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET NO. 50-440

1.0 INTRODUCTION

By letter dated September 11, 1987, as amended September 18, 1987, and supplemented January 8, 1988, Cleveland Electric Illuminating Company, Duquesne Light Company, Ohio Edison Company, Pennsylvania Power Company, and Toledo Edison Company (the licensees) requested an amendment to Facility Operating License No. NPF-58 for the Perry Nuclear Power Plant, Unit No. 1. The proposed amendment would extend the interval for 16 specified containment isolation or pressure isolation valve local leak rate tests (LLRTs) until the first refueling outage, currently scheduled for January 1989. The LLRTs for these valves would otherwise begin to become overdue on January 24, 1988. By a separate letter dated September 11, 1987, the licensees also requested a one-time exemption from the scheduler requirements of Section III.D.3 of Appendix J to 10 CFR Part 50 concerning LLRT testing intervals for all of the containment isolation valves (14 of these valves). The exemption would defer testing of the valves until the first refueling outage.

2.0 EVALUATION

Technical Specification 4.6.1.2.d requires LLRTs (Type C tests) on the primary containment isolation valves listed in Table 3.6.4-1 to be performed at intervals no greater than 24 months except for containment isolation valves in hydrostatically tested lines penetrating the primary containment, which shall be leak tested at least once per 18 months per Technical Specification 4.6.1.2.h. The Commission's regulations (10 CFR 50, Appendix J, Section III.D.3) require LLRTs (Type C tests) to be performed during each reactor shutdown for refueling, but in no case at intervals greater than two years. Technical Specification 4.4.3.2.2.a requires leak rate tests for Reactor Coolant System pressure isolation valves (PIVs) listed in Table 3.4.3.2-1 to be performed at least once per 18 months. An additional 25 percent may be added to the 18-month interval per Specification 4.0.2.a. The licensees have requested that the initial 18 and 24-month testing intervals for 16 valves be extended on a one-time basis until the first refueling outage presently scheduled for January 1989. These valves would otherwise become overdue for testing between January 24 and June 15, 1988.

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Testing of these valves requires one or more of the following plant conditions:

- 1) Drywell head removal.
- 2) Both Residual Heat Removal (RHR) shutdown cooling loops rendered inoperable.
- 3) Potentially reducing the number of Emergency Core Cooling System (ECCS) and/or shutdown cooling loops below the Technical Specification required systems (when taken in conjunction with other planned necessary outage work).

The licensees have currently scheduled drywell head removal to occur during the first refueling outage. To render both loops of RHR shutdown cooling inoperable, the licensees would either be required to remove the drywell and reactor heads and flood the vessel, or wait until decay heat is reduced such that ambient losses are sufficient to maintain cold shutdown. No planned outages of this duration will occur until the first refueling outage.

The requested extension became necessary as a result of delays in attaining full power operation common to initial startup activities and no planned or unplanned outages occurred during the startup test interval of sufficient duration to allow testing of these valves without significantly extending the outages for the sole purpose of conducting these tests.

The 2-year and 18-month \pm 25% testing intervals for containment isolation, and reactor coolant pressure isolation valves, respectively, are intended to be often enough to prevent significant deterioration from occurring and long enough to permit LLRTs to be performed during plant outages. This provides added assurance of Reactor Coolant System valve integrity thereby reducing the probability of gross valve failure and consequent intersystem loss of coolant accident. It also provides assurance that the overall containment leakage limits will not exceed the value assumed in the accident analysis even accounting for possible degradation of the leakage barriers between leakage tests.

A normal reactor fuel load is designed to provide an 18-month cycle with approximately 16 months of full power operations. Consequently, the primary containment/pressure isolation valves are normally exposed to 18 months of rated temperature conditions between each leak rate test. Since the initial leak rate tests at the Perry Nuclear Power Plant, these valves will have been subjected to rated temperature conditions approximately equal to one 18-month operating cycle by the first refueling outage. An extension of the isolation valve test interval to the first refueling outage would not result in exposure of these valves to temperature/pressure profiles of greater length than will be expected during subsequent refueling outage intervals.

The licensees have stated that the isolation valves which are the subject of this amendment request and the related exemption request to Appendix J of 10 CFR Part 50 were all tested successfully in early 1986. The total of the Type C leakage rates for these valves is not a significant portion (4.13%) of the allowable leakage limit (0.6 L). Reactor Coolant System PIV leakage rates are all less than 5% of their allowable leakage rates. Deterioration in the

overall integrity of non-flow modulating (either full open or full closed) isolation valves is normally expected to be a gradual process. By letter dated January 8, 1988, in response to staff requests for additional information (via telecon in December 1987 and January 1988), the licensees provided information relative to industry performance of these valves as a comparative check to the Perry Nuclear Power Plant valve performance history.

There are a total of 12 different valve groupings for which an extension was requested. The licensees' review of INPO's Nuclear Plant Reliability Data System (NPRDS) to determine how many leak rate test failures had been reported on the 12 types of valves indicated that five of the valve groups did not experience any leak rate failures. For the seven valve groups which had experienced at least one leak rate failure, the specific valve manufacturer was contacted to try to determine an approximate number of each type of valve that was being used in the nuclear industry. Based on the information from the valve manufacturers, the licensees concluded that the valves experiencing leak rate failure is a very small percentage of the total valve population (on the order of 1 to 2% failure rate). This is without considering multiple successful testing of most of these valves in the industry. It should be also noted that the valves in the NPRDS data base for the most part have been in service for significant periods whereas the valves in the Perry plant will have experienced only a part of the first fuel cycle power operation time by the date of the proposed testing. The NPRDS data do not suggest that these valves will experience excessive leakage during this time period.

The second industry review performed by the licensees was to contact three BWR plants which had been granted extensions of leak test intervals on valves to try to determine if the valves experienced a higher leak rate due to the testing extension. The three utilities reviewed a total of 49 valves with the following results:

Leak rate <u>stayed the same</u> as previous test result	-10
Leak rate <u>decreased</u> from previous test result	- 18
Leak rate <u>increased</u> from previous test result	- 21

The test interval extensions for the plants ranged from 16 days to 100 days. Several of the increased leak rates reported were very small, and a number of others were due to crud deposits found under the seating surfaces, not due to valve malfunctions. One utility with extensive testing history reported that the valves that showed an increase after the test interval extension were ones which had also shown increased leak rates in previous normal interval testing. The increased leak rates on the valves granted an extension did not result in exceeding the 10 CFR 50, Appendix J, limits at any of the plants. From the information collected, a direct relationship between test intervals and increased leak rates could not be determined. Thus, there was nothing found in the information which would indicate that the extended test intervals would have a sudden detrimental effect on the overall leak rates of the valves involved.

The licensees have further committed to performing the LLRTs for the valves which are the subject of this amendment request if an unplanned outage of sufficient duration were to occur prior to the refueling outage with the exception of three valves which require removal of the drywell head for testing. The licensees have stated that testing of these valves can only be performed during a refueling outage.

The NRC staff has determined that the licensees' request for extension of the requested Reactor Coolant System pressure isolation valve and containment isolation valve LLRTs until the first refueling outage will not present a significant safety concern and is therefore acceptable based on the following considerations:

1. The integrated temperature/pressure profiles seen by the valves which are the subject of the extension request are not significantly greater than expected for subsequent refueling cycle test intervals.
2. The favorable results of previous LLRTs performed at the Perry Nuclear Power Plant coupled with the small contribution to allowable leakage, confirmatory industry experience and expected gradual deterioration of valves of these types provide reasonable assurance that the granting of the requested extension will not result in a significant decrease in the integrity of the penetrations.
3. The 24-month interval requirement for Type B and C penetrations is intended to be often enough to prevent significant deterioration from occurring and long enough to permit the LLRTs to be performed during plant outages. Leak testing of the penetrations during plant shutdown is preferable because of the lower radiation exposures to plant personnel. Moreover, some penetrations, because of their intended functions, cannot be tested at power operation. For those penetrations that cannot be tested during power operation or those that, if tested during plant operation would cause a degradation in the plant's overall safety (e.g., the closing of a redundant line in a safety system), the increase in confidence of containment integrity following a successful test is not significant enough to justify a plant shutdown specifically to perform the LLRTs within the 24-month time period, as long as the penetrations are in compliance with Items 1 and 2 above.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. We have determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding.

Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

4.0 CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

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Dated: January 22, 1988