5-8-75

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Docket No. 50-331

Iowa Electric Light and Power Company
ATTN: Mr. Duane Arnold, President
Security Building
P. O. Box 351
Cedar Rapids, Iowa 52406

Gentlemen:

As a result of our review of Amendment No. 15 to the Duane Arnold Final Safety Analysis Report, we have identified additional information that is required in order for us to continue our review of your proposed main steam line isolation valve leakage control system (MSIV-LCS). The additional information required is listed in the enclosure.

In order for us to maintain our schedule for the review of the proposed MSIV-LCS, we will need your response to the enclosure by June 25, 1975. If you cannot meet this date, please inform us within seven days after receipt of this letter so that we may appropriately revise our scheduling.

Sincerely,

George Lear, Chief
Operating Reactors Branch #3
Division of Reactor Licensing

Enclosure:
Request for Additional
Information

cc: See next page

Disposition 5-8-75

| OFFICE | ORB#3 | ORB#3 | | | | |
|---|---|---|---|---|---|---|
| SURNAME | WPaulson/dg | GLear | | | | |
| DATE | 5/ 7/ 75 | 5/ 7/ 75 | | | | |

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Iowa Electric Light & Power Company

cc: w/enclosure

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ENCLOSURE
Request for Additional Information
Duane Arnold Energy Center
Docket No. 50-331

020.1 (5.8-8) Provide the design basis for establishing the capability of the leak control system in terms of what main steam isolation valve (MSIV) leakage it can accommodate. Include information for selecting blower rating and dilution air flow.

020.2 (5.8-8) Review and revise the system specific design criteria as necessary to ensure that they conform to the guidelines of Attachment 020-2 and Appendix A to the extent practical for the main steam isolation valve leakage control system (MSIVLCS).

020.3 (5.8-8) Provide the design criteria and bases for the air damper and describe its flow characteristics to show that steam will not flow thru in the reverse direction if the leak control system manifold is at a positive pressure during initial depressurization. In the event of momentary reverse flow, state where the discharge is processed by the standby gas treatment system.

020.4 (5.8-9) Provide additional design criteria and basis for the condensate drain on the low pressure manifold. Will transient positive pressure in the manifold during initial depressurization leak steam through this drain. In the event of momentary outflow, provide assurance that discharged steam is processed by the standby gas treatment system.

020.5 (5.8-9) Provide information on interconnections between MSIVLCS piping and other plant systems. Figure 13-5.8-1 indicates that MSIVLCS piping shares a 6-inch condensate blowdown manifold and miscellaneous 1-1/2 inch lines with installed plant systems. Describe the effects that these interconnections could have on the intended functions of the MSIVLCS and provide assurance that these interconnections do not provide a release path for MSIV steam leakage that is not processed by SGTS following a LOCA.

020.6 (5.8-11) Include a discussion of how the MSIVLCS controls MSIV stem packing leakage.

310.1 Justify the use of a SGTS iodine removal efficiency of 99% in estimating the radiological consequences of releases through the MSLIV-LCS following a postulated loss of coolant accident. (See Regulatory Guide 1.52 for requirements for high efficiency filter systems.)

310.2 Explain your translation of the base MSLIV leak rate of 11.5 scfh to a fractional release rate of 0.059%/day.

310.3 Provide the earliest time after the postulated LOCA that the MSLIV-LCS might be actuated.

DESIGN OF MAIN STEAM ISOLATION VALVE LEAKAGE CONTROL SYSTEMS

FOR DIRECT CYCLE BOILING WATER REACTOR NUCLEAR POWER PLANTS

1. The main steam isolation valve leakage control system (MSIVLCS) and any necessary subsystems should be designed in accordance with seismic Category I and Quality Group B requirements, including the source of any sealing fluid, if a fluid seal type of system is used except for the following: Any portion of LCS piping that connects to steam system piping between inner and outer containment isolation valves of the main steam system for either single or dual barrier containment structures up to and including the first isolation valve in the LCS piping should be designed in accordance with seismic Category I and Quality Group A and the provisions given in Appendix A of this guide.

2. The MSIVLCS (and any necessary subsystems) should be capable of performing its safety function, when necessary, considering the effects resulting from a LOCA, including: (a) missiles that may result from equipment failures, (b) dynamic effects associated with pipe whip and jet forces, and (c) normal operating and accident-caused local environmental conditions consistent with the design basis event. Further, any portion of the LCS which is Quality Group A and is located outside the primary containment structure should be protected from missiles, pipe whip, and jet force effects originating outside containment such that containment integrity is maintained.

3. The MSIVLCS should be capable of performing its safety function following a LOCA and an assumed single active failure (including failure of any one of the main steam isolation valves to close).

4. The MSIVLCS should be designed so that effects resulting from a single active component failure of the leakage control system will not affect the integrity or operability of the main steam lines or main steam isolation valves.

5. The MSIVLCS should be capable of performing its safety function following a loss of all offsite power coincident with a postulated design basis LOCA.

6. The MSIVLCS should be designed with sufficient capacity and capability to control leakage from the main steam lines consistent with the need for maintaining containment integrity for as long as postulated accident conditions require.

7. The MSIVLCS may be manually or automatically actuated and should be designed to permit actuation in a time period of about 20 minutes following a postulated design basis LOCA. This time period should be consistent with loading requirements of the emergency electrical buses and with reasonable times for operator action.

8. Instrumentation and circuits necessary for the functioning of the MSIVLCS should be designed in accordance with standards applicable to an engineered safety feature.

9. The MSIVLCS controls should include interlocks to prevent inadvertent operation of the MSIVLCS. In particular, interlocks should be provided to prevent damage to the LCS or possibly to the main steam system due to inadvertent opening of any LCS isolation valves whenever the pressure in the connecting main steam piping exceeds LCS design pressure. All such controls and interlocks should be activated from appropriately designed safety systems or circuits.

10. The plant should be designed to permit testing of the operability of controls and actuating devices of the MSIVLCS during power operation to the extent practical, and testing of the complete functioning of the system during plant shutdowns.

11. The MSIVLSC should be designed so that any effects resulting from use of a fluid sealing medium, such as thermal stresses, pressures associated with flashing, and thermal deformations under the loading conditions associated with the activated system, will not affect the structural integrity or operability of the main steam lines or main steam isolation valves, and that any deformation of isolation valve internals will not induce leakage of the main steam line isolation valve beyond the capacity or capability of the MSIVLCS.

12. Means should be provided, as part of the MSIVLCS or otherwise, to prevent or control valve stem packing leakage or other direct leakage from main steam line isolation valves outside containment. If such means are not part of the MSIVLCS, then they should meet the same design standards as the MSIVLCS.

## APPENDIX A

## DESIGN OF MAIN STEAM LINE ISOLATION VALVE LEAKAGE CONTROL SYSTEMS FOR DIRECT CYCLE BOILING WATER REACTOR NUCLEAR POWER PLANTS

Any portion of piping for a leakage control system that connects to steam system piping between inner and outer containment isolation valves of the main steam system for either single or dual barrier containment structures up to and including the first isolation valve in the LCS piping should be constructed to meet the requirements of the ASME Code, Section III, Subarticle NE-1120 and the following additional requirements.

1. The following design stress and fatigue limits should not be exceeded:

   (a) The maximum stress range should not exceed 2.4 Sm.

   (b) The maximum stress range between any two load sets (including the zero load set) should be calculated by Eq. (10) in Par. NB-3653, ASME Code, Section III, for upset plant conditions and an operating basis earthquake (OBE) event transient.

   If the calculated maximum stress range of Eq. (10) exceeds 2.4 Sm but is not greater than $3S_m$, the cumulative usage factor should be less than 0.1.

   If the calculated maximum stress range of Eq (10) exceeds $3S_m$, the stress ranges calculated by both Eq. (12) and Eq. (13) in par. NB-36 should not exceed 2.4 $S_m$ and the cumulative usage factor should be less than 0.1.

2. Welded attachments, for pipe supports or other purposes, to these portions of piping should be avoided.

3. The number of piping circumferential and longitudinal welds should be minimized.

4. The length of this portion of piping extending to the first shutoff valves should be reduced to the minimum length practical.

5. The design of piping restraints should not require welding directly to the outer surface of the piping.

6. The design of this portion of the leakage control system should permit the conduct of inservice examinations required by the rules of ASME Boiler and Pressure Vessel Code - Section XI, and the extent of examinations during each inspection interval should provide 100 percent volumetric examination of the piping welds within this portion of piping.