

REPORT NUMBER: A0-50-265/74-32

REPORT DATE: March 10, 1975

OCCURRENCE DATE: December 31, 1974

FACILITY:

Quad-Cities Nuclear Power Station
Cordova, Illinois 61242

IDENTIFICATION OF OCCURRENCE:

Main steam isolation valve local leak rate testing revealed excessive leakage on steam lines A, B and C.

CONDITIONS PRIOR TO OCCURRENCE:

Unit 2 was in cold shutdown for the current refueling outage.

DESCRIPTION OF OCCURRENCE:

On December 31, 1974 local leak rate testing was being performed on the Unit Two Main Steam Isolation Valves. Prior to the test, all eight MSIV's were placed in the closed position from the control room.

The leakage measurements were taken by pressurizing the volume enclosed by the inboard and outboard MSIV's through a pressure test connection to a pressure of 25 psig. Leakage through the "D" MSIV's was determined to be 6.9 scfh. Therefore, the Technical Specification leakage limit criterion of 11.5 scfh per valve was met for that particular steam line.

The "A" steam line was pressurized between the inboard and outboard MSIV's, and the leakage was measured to be 311 scfh at 25 psig test pressure. A similar test on the "B" steam line yielded a leak rate of 83.5 scfh. The "C" steam line yielded a leak rate of 38.9 scfh. All of these leakage values exceed the Technical Specification limit of 11.5 scfh for any one MSIV.

On December 28 and 29, the reactor water level was increased to flange level, and retesting of the MSIV's commenced so as to determine which valves on the "A", "B" and "C" steam lines were actually leaking excessively. Since the water head inside the inboard MSIV's was greater than 25 psig equivalent pressure, the leakage to be measured through the MSIV's with the reactor water level at the flange would be through the outboard MSIV's only. Leak test measurements yielded the following results:

<u>VALVE</u>	<u>LEAKAGE (scfh)</u>
A0 2-203-1A A0 2-203-2A	Individual leak rates for these four valves could not be determined because the enclosed volume could not be drained when the vessel level was increased.
A0 2-203-1B A0 2-203-2B	
A0 2-203-1C A0 2-203-2C	
A0 2-203-1D A0 2-203-2D	
	6.6 (by subtracting 2C leakage from previous total)
	32.3
	6.9*
	6.9*

*6.9 scfh total for the two valves

Valves 1C, 1D and 2D showed acceptable leakage values, but 2C exceeded the leakage limit. Because individual leak rates could not be determined for the valves of the "A" and "B" steam lines, work requests were initiated to repair the inboard valves of these lines and valve 2C.

DESIGNATION OF APPARENT CAUSE OF OCCURRENCE:

Upon disassembly of the main steam isolation valves which experienced excessive leakage, washing of the valve seat was observed. Uneven heating produces a small warpage which eventually leads to a slight erosion of the stellite material. It is this slight amount of warpage which resulted in an inability to drain the volume enclosed by the MSIV's on steam lines "A" and "B" following the increase of reactor vessel water level to the flange. This was also the cause of the failure of valve 2C to meet the leak rate test criterion.

ANALYSIS OF OCCURRENCE:

In the event of a steam line break outside the primary containment, the total leakage possible through the "A" and "B" steam lines would be 156 scfh and 42 scfh respectively. A "C" steam line break would likewise result in a maximum leakage of 6.6 scfh, the value limited by the 1C valve. Therefore, the total leakage through this particular steam line from the primary containment would be minimal under accident conditions.

The excessive leakage rates did not in any way render the MSIV's inoperable, nor was the ability of the valves to perform their design function affected. Upon receipt of a Group I isolation signal, these valves would have shut in the required time, and performed the isolation function.

The Main Steam Isolation Valves utilize straight line flow to provide a good flow pattern and upstream pressure to aid in valve closure at operating pressure by tilting the actuator toward the upstream side of the valve. The balancing feature of the valve makes it possible to take advantage of the upstream pressure to aid in holding the valve closed and to have the