

Jim McKnight
OP-37

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555

June 20, 1994

NRC INFORMATION NOTICE 94-46: NONCONSERVATIVE REACTOR COOLANT SYSTEM LEAKAGE CALCULATION

Addressees

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to the potential for water from sources other than the reactor to be routed to closed system tanks inside the containment and thus cause a nonconservative evaluation of unidentified reactor coolant system leakage. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

McGuire Nuclear Station. On December 7, 1993, during review of the leakage inputs into the reactor coolant drain tank, the licensee, Duke Power Company, determined that several valve stem leakoff lines other than those associated with the reactor coolant system or the chemical and volume control system were connected to the tank. In particular, leakoff water from the cold leg accumulators and the refueling water storage tank was collected in the reactor coolant drain tank. The connected cold leg accumulator leakoff lines included the four nominal 10 in. discharge isolation valves, four nominal 1 in. fill isolation valves, and seventeen nominal $\frac{3}{4}$ in. or 1 in. isolation valves associated with the test header for cold leg accumulator and safety injection check valves. In addition, a discharge line from a relief valve on a flush line to the regenerative heat exchanger was connected to the reactor coolant drain tank. Leakoff from these sources incorrectly increased the value of identified RCS leakage, resulting in a nonconservative value of unidentified leakage from the reactor coolant system (Licensee Event Report (LER) 50-369/94-01).

Upon discovery, the licensee conservatively labeled the measured total reactor coolant system leakage as unidentified. At that time, total leakage was calculated to be less than 3.8 l/min [1 gal/min]; therefore, the technical specification limit of 3.8 l/min [1 gal/min] for unidentified leakage was not exceeded. At each unit, the licensee redirected these leakoff lines to the containment sump and reevaluated unidentified leakage for the current

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updated on 6/22/94

operating cycle. The licensee found the unidentified leakage to be no greater than 4.9 l/min [1.3 gal/min] greater than previously evaluated. The licensee concluded that some leakoff from the non-reactor sources had drained into the reactor coolant drain tank at each unit and that the technical specification limit for unidentified leakage had been exceeded several times during the current operating cycle for Unit 2.

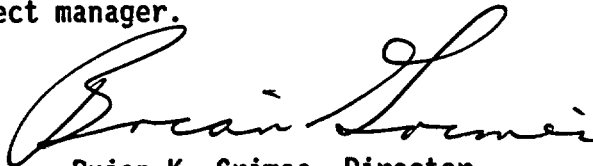
Catawba Nuclear Station. In a similar review, the licensee, also Duke Power Company, determined that the leakoff lines from the four nominal 10-in. cold leg accumulator discharge isolation valves were connected to the reactor coolant drain tank. The licensee redirected these lines to the containment sump, reevaluated operability, and determined that the technical specification unidentified leakage limit had not been exceeded during the current operating cycle.

Discussion

In a pressurized water reactor (PWR), reactor coolant system leakage inside containment is typically classified as "identified" or "unidentified." Identified leakage includes the coolant leakage directed into closed system tanks, such as the leakoff systems for the reactor coolant pumps or valves routed to the reactor coolant drain tank and the leakoff systems for pressurizer safety and relief valves routed to the pressurizer relief tank. All other leakage is labeled "unidentified."

The licensee assigned the cause of the McGuire event to failure in the original design of the computer program for calculating reactor coolant system leakage to recognize inputs of water from other systems to the reactor coolant drain tank. Most PWR leakage detection calculations use measurements of changes in the reactor coolant system inventory over a specified time period. The total leakage is obtained from the sum of subsidiary inventory changes, such as changes in the inventories of the volume control tank and of the pressurizer. The identified leakage component is determined from changes in the closed system inventory, and the unidentified component is then determined by subtracting the identified leakage from the total leakage. Typical technical specifications for PWRs, as is the case here, set the limiting condition for operation for unidentified leakage at 3.8 l/min [1 gal/min] and stipulate periodic determinations of this leakage.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate Office of Nuclear Reactor Regulation project manager.



Brian K. Grimes, Director
Division of Operating Reactor Support
Office of Nuclear Reactor Regulation

Technical contacts: George F. Maxwell, RII
(704) 875-1681

John Zeiler, RII
(803) 831-2963

Garry A. Harris, RII
(704) 875-1682

Attachment:
List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
94-45	Potential Common-Mode Failure Mechanism for Large Vertical Pumps	06/17/94	All holders of OLs or CPs for nuclear power reactors.
94-44	Main Steam Isolation Valve Failure to Close on Demand because of Inadequate Maintenance and Testing	06/16/94	All holders of OLs or CPs for nuclear power reactors.
94-43	Determination of Primary-to-Secondary Steam Generator Leak Rate	06/10/94	All holders of OLs or CPs for pressurized water reactors.
94-42	Cracking in the Lower Region of the Core Shroud in Boiling-Water Reactors	06/07/94	All holders of OLs or CPs for boiling-water reactors (BWRs).
94-41	Problems with General Electric Type CR124 Overload Relay Ambient Compensation	06/07/94	All holders of OLs or CPs for nuclear power reactors.
94-40	Failure of a Rod Control Cluster Assembly to Fully Insert Following a Reactor Trip at Braidwood Unit 2	05/26/94	All holders of OLs or CPs for pressurized-water reactors (PWRs).
94-39	Identified Problems in Gamma Stereotactic Radiosurgery	05/31/94	All U.S. Nuclear Regulatory Commission Teletherapy Medical Licensees.
94-38	Results of a Special NRC Inspection at Dresden Nuclear Power Station Unit 1 Following a Rupture of Service Water Inside Containment	05/27/94	All holders of OLs or CPs for NPRs and all fuel cycle and materials licensees authorized to possess spent fuel.

OL = Operating License
CP = Construction Permit

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NAME	CVHodge	MMejac	GMaxwell	JZeiler	GAHarris
DATE	03/07/94	03/07/94	04/25/94	03/10/94	04/25/94
*AD:DRP/REGION II	*AD:DSSA/NRR	*AC:OGCB/NRR	D:DOBS/NRR		
JJohnson	MJVirgilio	RJKiesel	BKGGrimes		
05/04/94	05/27/94	06/01/94	06/15/94		

DOCUMENT NAME: 94-46.IN

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JJohnson	MJVirgilio	RJKiessel	BKGrimes <i>gll</i>
05/04/94	05/27/94	06/01/94	06/ /94

DOCUMENT NAME: NCRCSLKG.INF

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