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BBS Ltr. #790-76

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Mr. James G. Keppler, Regional Director
Directorate of Regulatory Operations-Region III
U. S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Dear Mr. Keppler:

In accordance with section 3.6.D-Bases, of Dresden Unit 3 Technical Specifications, the following report presents an evaluation of the performance of the reactor coolant leakage system for the first five years of Unit 3 operation.

Description of System

The Dresden Unit 3 reactor coolant leakage detection system consists of direct and indirect monitoring devices for evaluating the amount and source of leakage within the drywell. Direct monitoring of drywell leakages, which must flow into either the equipment drain sump or floor drain sump, is made by flow integrators which measure the amount of water pumped from each sump. Per Tech. Specs., these sumps are pumped at least once every day. Indirect measurements are made by detecting airborne radioactivity in the drywell with particulate and charcoal filters. These systems include the drywell continuous air monitor (CAM) and the drywell manifold system. The drywell CAM continuously pulls a stream of air from the main elevation (517') of the drywell through both a particulate and charcoal filter. The drywell manifold system consists of numerous air sample lines, each line containing a particulate filter sample holder. Periodically, samples are collected and analyzed from the manifold system. This allows determination of the location as well as radioactive composition of the leak.

The Tech. Specs. state that reactor coolant system leakage shall be checked by the sump and air sampling system and recorded at least once per day. This has been accomplished with the integrators on the equipment drain and floor drain sumps, and with the continuous air monitor. However, following the 4" recirc. bypass pipe crack in Unit 2, a stepped-up program of reactor coolant leakage detection was initiated on Unit 3. This new program, begun in February of 1975, includes the following:

a) Equipment and floor drain sumps are pumped once per shift (3 times/day);

b) Both the particulate and charcoal filters of the CAM are analyzed daily,

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c) Several sample points of the drywell manifold system were rerouted to areas close to the 4" recirc. bypass lines and sampled daily;

d) The entire drywell manifold system is sampled at least once per week;

e) A report is prepared each week which reviews and summarizes the reactor coolant leakage data.

Review of Operation

Since no line has ever ruptured in the Unit 3 drywell, it is impossible to present direct evidence for the system having detected a pipe leak. However, drywell leakages from other sources have occurred and have been detected by the leakage detection system.

The most recent example of leak detection was a failure of a recirc. pump seal on Unit 3 during the summer of 1976. On about June 20, an increase was noted from the Unit 3 drywell CAM particulate filter analysis. This was followed by a 20% increase of pumpage from the equipment drain sump on June 25, and a 10-15% increase of pumpage from the floor drain sump during the first few days of July. The drywell manifold samples also indicated an increase during the first week of July. However, all of these indications remained well below reporting limits. For example, the initial indication from the floor drain sump pumpage was an increase from a normal 0.7 gpm to about 1.0 gpm. This 1.0 gpm value was still only 20% of the Tech. Spec. limit.

The Unit 3 operating engineer was informed of the indication of leakage. He stated that a seal on the "B" recirc. pump was suspected of leaking. Data from the drywell manifold system was analyzed, confirming this hypothesis, since the sample point nearest the "B" recirc. pump revealed activity significantly above the average of the other points.

The leakage detection systems continued to indicate generally upward trends during the months of July and August. In particular, the floor drain sump pumpage rose steadily from about 0.7 gpm on July 1, to about 2.1 gpm on July 22. Following a brief outage on July 24, the floor drain sump pumpage decreased, but rapidly rose back to the previous levels by the beginning of August. During August, it remained at levels of about 2 to 3 gpm until August 29, when the pumpage increased again. Results from the drywell CAM and drywell manifold systems also increased on this date. The reactor was shutdown before any Tech. Spec. Limits were exceeded and investigation revealed failure of the "B" recirc. pump seal.

As can be seen by this example, the leakage detection system detected an indication of leakage some 2 months before Tech. Spec. Limits were approached. The indication was first considered significant when the floor drain sump pumpage reached 1.0 gpm which is only 20% of the Tech. Spec. Limit and only 0.3 gpm above normal values.

Therefore, based upon past experience such as that described, the reactor coolant leakage detection system has proven capable of detecting significant leakages as soon as they occur, and is capable of detecting slowly developing leakages before they become serious. Five years of operation reveal the system to be very reliable as well as flexible enough to be easily modified to check new areas (such as the 4" recirc. line) that are suspect.

Sincerely,

B. B. Stephenson
Station Superintendent

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cc: File/NRC