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January 5, 1984

Mr. Samuel J. Chilk
Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

In the Matter of
Metropolitan Edison Company
(Three Mile Island Nuclear Station Unit No. 1)
Docket No. 50-289 (Restart)

Dear Mr. Chilk:

On November 4 and December 19, 1983, the NRC Staff provided information to the Commission, licensing and appeal boards, and parties to the TMI-1 Restart proceeding relating to krypton-85 leakage paths between TMI Unit 1 and Unit 2. See Board Notification BN-83-177 and BN-83-190. Enclosed is a December 22, 1983 letter (5211-83-360) from H. D. Hukill, GPU Nuclear, to R. W. Starostecki, NRC, bearing on the same subject.

Respectfully submitted,

Robert Zahler

Robert E. Zahler
Counsel for Licensee

cc: Service List

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE COMMISSION

In the Matter of	)	
	)	
METROPOLITAN EDISON COMPANY	)	Docket No. 50-289
	)	(Restart)
(Three Mile Island Nuclear Station, Unit No. 1)	)	
	)	

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December 22, 1983
5211-83-360

Mr. Richard W. Starostecki, Director
Division of Project and Resident Programs
U. S. Nuclear Regulatory Commission
Region I
631 Park Avenue
King of Prussia, PA 19406

Dear Sir:

Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
Inspection Report 83-30

The subject NRC Inspection Report (Section 6) reviewed the TMI-1/TMI-2 krypton release incident of August 29, 1983, and the licensees investigation and test to identify the release path. The attached evaluation provides a detailed identification of verified and potential leak paths, as well as corrective action taken. This evaluation differs from that presented in Inspection Report 83-30. We believe the attached evaluation to be more accurate of the two reports.

Sincerely,

H. D. Hukill
Director, TMI-1

HDH:RAS:vjf

Attachment

cc: R. Conte

ATTACHMENT I

On October 20, 1983, an investigation and test was conducted to determine the actual flowpath of the released krypton gas, the nature of any deficiencies in the environmental barrier, and recommendations for corrective action. The sample and ventilation system conditions of August 29, 1983 were duplicated for the test. A tracer gas (R-12) was introduced at the same point as the krypton gas, and electronic leak detectors were used to identify the flowpath of the R-12. Attachment 3 is a sketch of the test set-up.

The R-12 injection was initiated at 1758 hrs. The first detection of R-12 vapor occurred approximately 18 minutes later at the floor drain and clean out plug under the Intermediate Closed Cooling Surge Tank (IC-T-1) on the 348' elevation in the Spent Fuel Pool Area. R-12 vapor was also detected at the floor drain just inside the entrance door to this area (both in the Unit 1/2 common air space). The next location where a flowpath was suspected was the entrance door to the Spent Fuel Pool Area and the elevator doors leading to this doorway (348' el.). R-12 vapor was detected at this location at 1830 hrs. The personnel performing this test rode the elevator down to the 281' elevation, where R-12 vapor was heavily detected at 1842 hrs. It is suspected that a drain line, that terminates after it penetrates the elevator shaft just above the elevator sump at (~276' el.), as well as the floor drain in the elevator equipment room is the cause of this leak.

Based on the test results, Plant Engineering concluded that when the krypton gas was injected into the Nuclear Sampling Room it travelled the path of least resistance into the drain system. The drain lines throughout the Auxiliary Building provided a path up to the Spent Fuel Pool Area at the floor drains directly below the Intermediate Closed Cooling Surge Tank (IC-T-1) and just inside the doorway to this area. Due to the lack of a loop seal in these floor drains, a flowpath was created for the krypton gas. In addition, the drain line at the bottom of the elevator shaft provided an additional flowpath for the krypton gas. The airflow is drawn up the elevator shaft, where it can leak out around the elevator door seals and be drawn into the Spent Fuel Pool Area through the entrance door. These three (3) flowpaths allowed the krypton gas to disperse into the common air space (348' el. is common to both Unit 1 and 2) and be exhausted by both units' air handling systems which caused the alarms in both units.

It should be noted that it took ~20 minutes from the time of injection for the krypton gas to produce a Fuel Handling Building radiation monitor alarm in the Control Room. This is consistent with the approximate 18 minute time frame to detect the R-12 vapor at the 348' elevation of the Fuel Handling Building, during this test.

All of the verified leak paths appear to be due to the lack of drain system loop seals and door seals. Job tickets have been initiated to correct verified leak paths (see items 1, 2, 3 and 4). Loop seals were promptly re-established in the leaking floor drains and all appropriate floor drain loop seals were identified for inclusion in surveillance and maintenance procedures. Doors to the Spent Fuel Pool area (348' el.) and shipping and receiving area (305' el.) of the Fuel Handling Building have been made air tight. The drain line at the bottom of the elevator shaft (276' el.) will be permanently capped. Actions have also been completed to minimize any potential (See Items 5, 6, & 7 attached) leak paths between the Auxiliary and Fuel Handling Buildings.

The above test and corrective actions have elminated both verified and potential pathways for gross air exchange between units. It is not believed that further testing is necessary. Also, the design of the environmental barrier and separation of ventilation systems has been reviewed, and following completion of the corrective actions no further changes are deemed necessary.

ATTACHMENT 2 - CORRECTIVE ACTION LIST

The following is a list of company identified items and corrective actions.

Item 1 Auxiliary and Fuel Handling Building Drain System

The R-12 test results clearly establish drain system problems. Many of the floor drain loop seals are not maintained and some are not included in the Operation Surveillance Procedure (OPS-S59) or in Utility PM U-17 to clean all Zurn check valves.

Procedure changes are being generated identifying all the drain valves for inclusion in OPS-S59 and PM U-17 checklists.

Item 2 Entrance door to Spent Fuel Pool Area (348' elevation).

The door should be air tight. Install new door lock and door knob. Install new rubber door seal at the bottom of door. The door should be turned around to allow the door to seal against the door frame.

JT #CC435 was initiated to correct this problem. Door knob penetration is sealed. Doorknob is on order. The door was rehung and new seals installed.

Item 3 Personnel door for entrance to Shipping and Receiving Area (305' elevation) of Fuel Handling Building.

The door should be air tight. Fill the two (2) inch hole in door by installing a cover on both sides of door. Install new door knob and latch. Install new rubber door seals at the bottom of door and around door frame.

JT #CC383 initiated to correct this problem is complete.

Item 4 Drain line at bottom of elevator shaft. Fuel Handling Building (276' elevation).

Repair drain line that penetrates into bottom of elevator shaft. Drain line should be capped. If possible, braze cap on to drain line to prevent loosening of cap from vibrations.

JT #CC384 has been initiated to correct this problem.

Item 5 Opening under Intermediate Cooling Surge Tank, 348' elevation in Spent Fuel Pool Area.

Opening for penetration to Surge Tank should be sealed with fire barrier penetration sealant. This opening provides a potential flowpath from the 329' elevation to the Spent Fuel Pool Area (348' el.)

JT #CC385 initiated to correct this problem is complete.

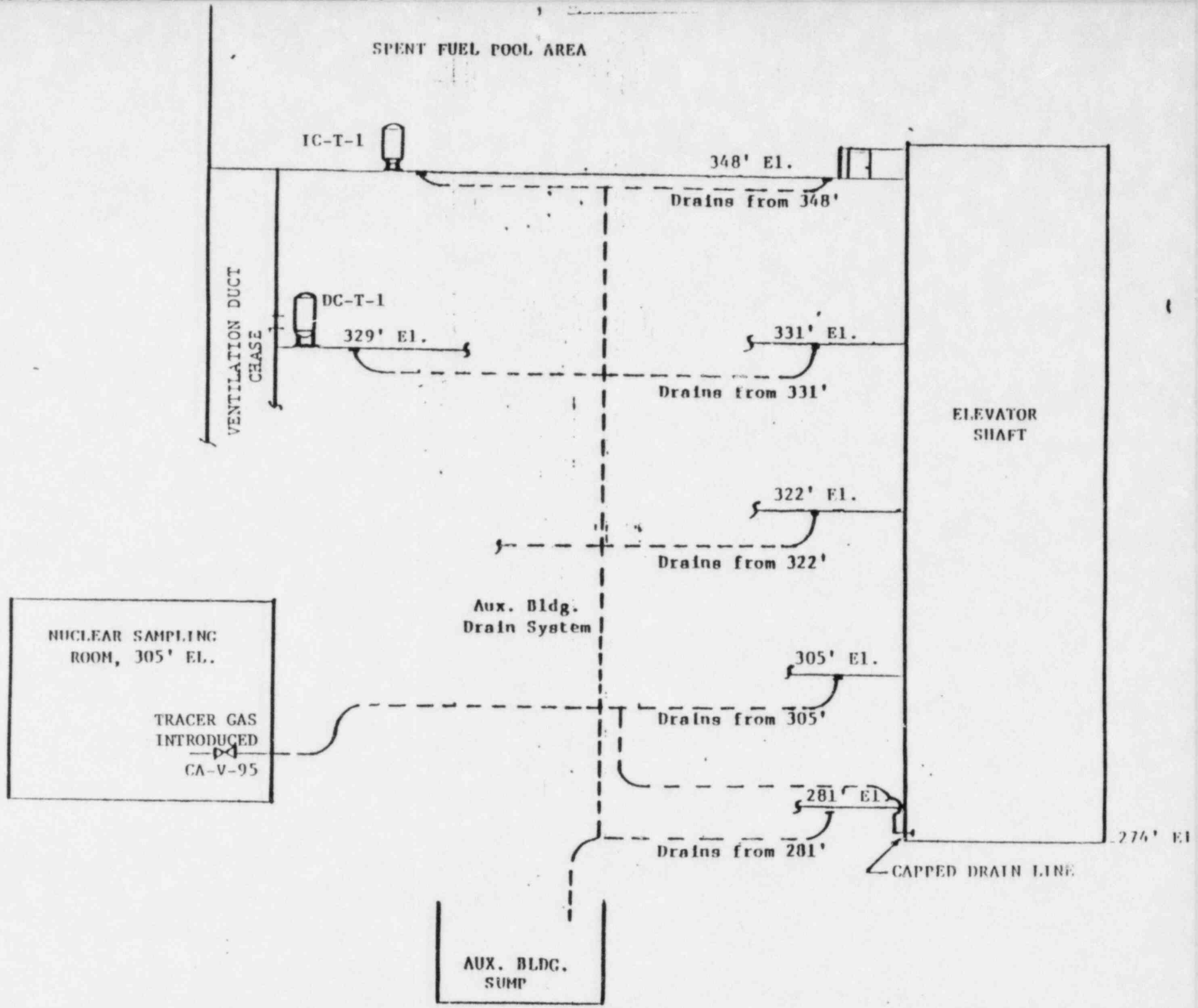
Item 6 Decay Heat Closed Surge Tank Toom, 329' elevation of Fuel Handling Building.

There are several open penetrations in the wall of this room leading into the Fuel Handling Building ventilation chase. The chase is open down to the 281' elevation of the Auxiliary Building. Fill openings with fire barrier penetration sealant.

JT #CC386 initiated to correct this problem is complete.

Item 7 Environmental Barrier Roof Decking, 351' elevation of the Spent Fuel Pool Area. Gaps in the sheet metal seam must be filled. Use RTV sealant.

JT #CC382 initiated to correct this problem is complete.


SPENT FUEL POOL AREA
IC-T-1
348' El.
Drains from 348'
VENTILATION DUCT CHASE
DC-T-1
329' El.
331' El.
Drains from 331'
ELEVATOR SHAFT
322' El.
Drains from 322'
Aux. Bldg. Drain System
NUCLEAR SAMPLING ROOM, 305' EL.
305' El.
TRACER GAS INTRODUCED
CA-V-95
Drains from 305'
281' El.
Drains from 281'
274' El
CAPPED DRAIN LINE
AUX. BLDG. SUMP