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December 15, 1980
TLL 657

TMI Program Office
Attn: Mr. Lake Barrett, Deputy Director
U.S. Nuclear Regulatory Commission
c/o Three Mile Island Nuclear Station
Middletown, Pennsylvania 17057

Dear Sir:

Three Mile Island Nuclear Station, Unit 2 (TMI-2)
Operation License No. DPR-73
Docket No. 50-320
Cork Seal Contamination Report

The purpose of this letter is to provide a description of the cork seal contamination, to report the action taken to date, and to report our plans for future actions to mitigate the effects of the contamination.

Cork seal contamination was first discovered on November 26, 1980 during a routine radiation survey in the Control/Service Building area. Following this discovery the onsite NRC staff was informed of the problem. As a result of these surveys, it was discovered that the cork construction seam between the Air Intake Tunnel and the Service Building was contaminated. The cork is used as a joint filler between the various construction joints in the concrete. An investigation was initiated to determine if radioactive contamination was migrating along these seams, to determine the point of origin of this contamination and to determine the corrective action required to contain and isolate this contamination.

The investigation resulted in the following actions being taken. Surface samples and depth samples of the cork were taken along the seams in the Auxiliary Building, Control Building and Service Building and analyzed for radioactive isotopes. The construction and structural drawings were checked to determine possible sources of contamination. Radioactive waste disposal procedures were checked to ensure against unauthorized dumping of contaminated liquids; groundwater monitoring wells were sampled; and samples of standing water in various parts of the Unit were taken and analyzed.

To date, the results of the investigation have yielded the following:

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1. Water stops (barriers) are located across joints which are in contact with the ground. (See attached sketch) These stops consist of a hard rubber material imbedded into the concrete which form barriers to prevent groundwater from seeping into the building. They are specially shaped to provide a tortuous path for the water to travel and thus can inhibit waterborne contamination from migrating to the outside environment. In addition, plastic membranes are located at the bottom of the building mats and along the walls to provide an additional water barrier.

2. A total of 64 cork samples have been analyzed, the results of which are presented in Table 1. Conclusions drawn from these analyses are as follows:

   a. Cesium concentration is highest along the east-west building seam. (See attached drawing for location)

   b. The contamination is highest near the corner of the seal injection valve room and decreases with distance.

   c. The radioactive contamination is uniformly distributed over depth except that the samples taken near the corner of the seal injection valve room, showed a trend for cesium specific activity to increase with depth. The cause of this relatively even distribution may be due to cesium being readily soluble and therefore easily transported by water.

   d. At depths greater than two feet, the cork is water saturated to the point of deterioration.

3. The environmental groundwater monitoring wells have shown no increase in activity due to seepage from the cork seals.

4. Floor drains were checked and disposal procedures were verified to ensure that radioactive contaminants were not being routed to areas that would have a potential path to the environment.

The origin of the contamination has not been determined by the samples analyzed thus far but a likely source appears to be leakage from the auxiliary building into the east-west seam approximately 3 feet from the reactor building peripheral seam. This seam is adjacent to areas flooded during the accident and walls which received a gross washdown during decontamination of the auxiliary building.

Samples of cork have been sent to an independent laboratory to chemically separate the cesium and perform detailed analyses in order to study less soluble isotopes. In addition, samples of the water which is underneath the cork will be taken and analyzed. To determine if the water stops are functional, core samples of cork in the Air Intake Tunnel and the Fuel Handling Building/Reactor Building interface will be taken.

Several methods to isolate and contain the cork contamination are being studied. These include cork excavation, desiccant drying agents and the use of sealants and strippable coatings.

The solution of this problem depends upon determination of the cause and extent of contamination. We anticipate that our program described above will enable us to develop corrective actions and we should be able to provide a follow-up report on January 16, 1981 describing our program for resolving this problem.

Sincerely,

G K Hovey

G. K. Hovey
Vice-President and
Director, TMI-2

GKH:RPW:lh

cc: Bernard J. Snyder

TABLE 1

SAMPLE ANALYSES RESULTS

POINT	DEPTH	Total Concentration (μ Ci) C_s-134	C_s-137
1	Surface	1.5 E+1	1.0 E+2
2	Surface	1.5 E-0	1.0 E+1
3*	Surface	4.0 E-3	2.9 E-2
4	Surface	6.7 E-3	5.4 E-2
5	Surface	7.0 E-3	4.3 E-2
6	Surface	1.4 E-3	8.7 E-3
7	Surface	3.0 E-4	2.5 E-4
8	Surface	3.0 E-4	2.5 E-4
9	Surface	5.2 E-2	3.7 E-1
10	Surface	2.9 E-1	1.9 E-0
EW-1	6"**	8.9 E-2	6.1 E-1
	12"	4.6 E-0	3.2 E+1
	18	4.8 E-1	3.3 E-0
	24	5.2 E-1	3.5 E-0
	30	8.0 E-1	5.4 E-0
	36	1.2 E-0	7.9 E-0
EW-2	6	5.7 E-3	4.0 E-2
	12	2.2 E-1	1.5 E-0
	18	5.8 E-1	4.0 E-0
	24	2.1 E-0	1.5 E+1
	30	1.6 E-0	1.1 E+1
	36	4.6 E-0	3.1 E+1
EW-3	6	Results not available	
	12	"	
	18	"	

TABLE 1 (Continued)

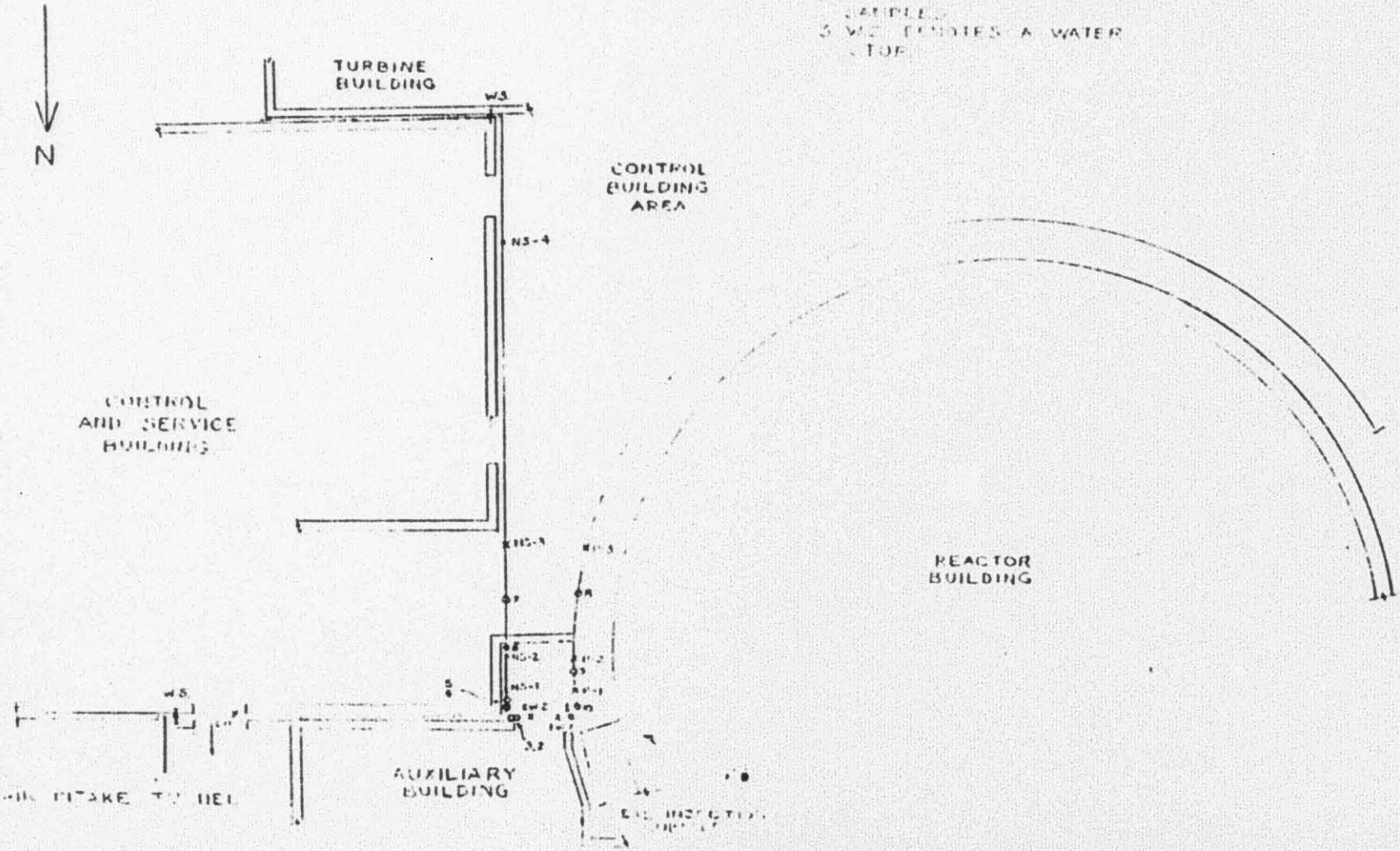
POINT	DEPTH	Total Concentration (μCi)	
		C_s-134	C_s-137
EW-3	24	Results not available	
	30	"	
	36	"	
NS-1	6	1.0 E-3	7.1 E-3
	12	3.2 E-3	2.1 E-2
	18	6.1 E-3	4.2 E-2
	24	9.6 E-3	7.1 E-2
	30	9.0 E-3	6.5 E-2
	36	1.5 E-2	1.0 E-1
NS-2	6	5.9 E-5	5.1 E-4
	12	1.3 E-4	7.4 E-4
	18	1.6 E-4	1.4 E-3
	24	1.9 E-4	1.3 E-3
	30	6.6 E-3	5.0 E-2
	36	1.7 E-2	1.2 E-1
NS-3	6		1.1 E-4
	12		2.7 E-4
	18		3.8 E-4
	24		3.4 E-4
	30		3.5 E-4
	36	No isotopes detected	
NS-4	6	No isotopes detected	
	12	No isotopes detected	
	18	No isotopes detected	
	24	---	7.9 E-5

TABLE 1 (Continued)

POINT	DEPTH	Total Concentration (μCi)	
		C_s-134	C_s-137
NS-4	30	No isotopes detected	
	36	No isotopes detected	
P-1	6	6.1 E-2	4.4 E-1
	12	2.4 E-2	1.7 E-1
	18	9.7 E-2	6.9 E-1
	24	6.3 E-2	4.6 E-1
	30	1.6 E-1	1.2 E-0
	36	5.7 E-2	3.9 E-1
P-2	6	5.3 E-3	3.5 E-2
	12	3.6 E-3	2.8 E-2
	18	3.2 E-3	2.2 E-2
	24	4.8 E-3	3.2 E-2
	30	9.2 E-4	5.6 E-3
	36	1.4 E-3	1.0 E-2
P-3	6	-	3.3 E-4
	12	-	4.3 E-4
	18	-	4.2 E-4
	24	-	3.2 E-4
	30	-	4.5 E-4
	36	-	2.9 E-4

* Ce-144 - 2.3 E-4

** Co-60 - 3.5 E-4


NOTES:
1. X DENOTES CORE SAMPLES
2. O DENOTES SURFACE SAMPLES
3. WS DENOTES A WATER STOP
N
TURBINE BUILDING
W3
CONTROL BUILDING AREA
N3-4
CONTROL AND SERVICE BUILDINGS
REACTOR BUILDING
W5
AUXILIARY BUILDING