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4410-86-L-0157
Document ID 0088P

September 5, 1986

TMI-2 Cleanup Project Directorate
Attn: Dr. W. D. Travers
Director
US Nuclear Regulatory Commission
c/o Three Mile Island Nuclear Station
Middletown, PA 17057

Dear Dr. Travers:

Three Mile Island Nuclear Station, Unit 2 (TMI-2)
Operating License No. DPR-73
Docket No. 50-320
Reactor Building Sump Criticality Safety Evaluation Report

In response to a request by your staff, forwarded herein is TMI-2 Technical Bulletin 86-36, "Characterization of Sediment on Reactor Building Basement Floor." This Technical Bulletin supports the conclusions of the Reactor Building Sump Criticality Safety Evaluation Report.

Sincerely,

F. R. Standerfer
Vice President/Director, TMI-2

FRS/CJD/eml

Attachment

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TMI-2 TECHNICAL BULLETIN

TB 86-36 REV. 0
DATE 8/21/86
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SUBJECT: CHARACTERIZATION OF SEDIMENT ON REACTOR BUILDING BASEMENT FLOOR

REFERENCES:

1. GEND-042. October 1984. TMI-2 Reactor Building Source Term Measurements.
2. GPUNC Memorandum and attached Agenda of November 20, 1985 from G. Cremeans to Meeting Attendees. "Sludge Removal Program Open Issues." 4341-85-068.
3. GPUNC Memorandum of July 11, 1986 from P. Bengel to G. Eidam. "Standardization of Reactor Building Basement Sediment Volume Estimate." 4320-86-0445.
4. GPUNC Calculation No. 4320-4340-86-036. June 20, 1986. "Sludge Mass on Reactor Building Basement Floor."
5. GPUNC Memorandum of December 5, 1986 from K. Hofstetter to G. Eidam. "Analyses of Reactor Building Sludge Samples." 4240-85-0427.
6. Technical Bulletin. January 14, 1986. "Robotic Sediment Sampling." TB-85-35, Rev. 1
7. Technical Bulletin. May 13, 1985. "Reactor Building Basement Fuel Estimate." TB-85-08, Rev. 1

SUMMARY:

Several estimates of the mass of sediment on the reactor building basement floor were combined and averaged to provide a single value that is considered to be the most accurate currently available. In addition, the wet sediment density, fuel content, and curie values for Cs-137 and Sr-90 have been derived (directly or extrapolated) from existing data (Reference 1).

Average Sediment Total Mass from Recent Samples	1.5×10^7 gm
Wet Sediment Density	1.03 gm/ml
Total Fuel Content in Sediment	1.7-3.2 kg as UO_2
Cs-137	1540-2540 Ci
Sr-90	654-687 Ci

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DISCUSSION:

Three recent calculations have been made of the mass of sediment on the reactor building basement floor. The calculations were based upon reasoned assumptions and interpretations of video tapes taken during remotely controlled reconnaissance vehicle surveys of accessible basement areas. The bulk of the sediment was found to be concentrated in the impingement area; fuel and associated fission products were more uniformly deposited as determined by sampling and area gamma surveys. The mass projections, as noted below, lie within a narrow range.

Site Engineering -	1.47×10^7 gm	(corrected to a density of 1.03 gm/ml, Reference 2)
Decon. Planning -	1.58×10^7 gm	(derived from a reported volume of 540 ft^3 at a density of 1.03 gm/ml, Reference 3)
Data Management -	1.43×10^7 gm	(note calculations, Reference 4)
Average Value	1.5×10^7	

The calculations are summarized and referenced to supporting documents in Table 1. Since not all basement areas have been sampled or inspected by remotely controlled video equipment, it was necessary to infer appropriate volumes and analytical information. The results obtained are not uniformly firm and factual, but can be considered the best available. This bulletin will be updated as more information is obtained.

IMPLICATIONS & USE:

The sediment characterization noted is based on the most credible data at hand and is recommended for use in planning. It should be used carefully in recognition of some basic uncertainties in source information.

ATTACHMENTS:

Table

1. Characterization of Reactor Building Floor Sediment

Figure

1. Reactor Building Basement Zones/Areas

Doc. Id. 0336V

TABLE 1

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CHARACTERIZATION OF REACTOR BUILDING BASEMENT FLOOR SEDIMENT

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BASEMENT LOCALE	SEDIMENT MASS (gm)	FUEL		Cs-137		Sr-90	
		ANALYSIS	CONTENT (Kg)	ANALYSIS (μCi/gm)	CONTENT (μCi)	ANALYSIS (μCi/gm)	CONTENT (μCi)
Impingement Area	6.7×10^6(1)	16-140 gm in gen'l. imping. area (5)	$0.2\text{-}1.4 \times 10^{-1}$	15 - 30 (5)	$10\text{-}20 \times 10^8$	7 - 12 (6)	$4.7\text{-}8.0 \times 10^7$
O-rings	1.3×10^5(2)	2.0 mg/gm (3) Covered Hatch Area	2.6×10^{-1}	1.1×10^3 (3)	1.4×10^8	1.7×10^3 (3)	22×10^7
RCOT Dischg. Area	0.2×10^5(2)	1.8-2.4 gm/ft^2 from TB-85-8 (0)	0.9 - 1.2	1.0×10^3 (2) Open Stairwell	1.9×10^7	3.5×10^3 (3) Open Stairwell	6.6×10^7
Sump	6.4×10^5(2)	0.2 mg/gm (3)	1.2×10^{-1}	54 (2)	3.2×10^7	150 (2)	9.0×10^7
Incore Area	0.2×10^5(4)	From TB-85-8 (1)	0 - 1.1	1.1×10^3 (3)	2.1×10^7	1.7×10^3 (3)	3.2×10^7
Enclosed Stairwell Area	0.7×10^5(2)	2.2 mg/gm (2) Covered Hatch Area	1.6×10^{-1}	3.6×10^3 (2) Covered Hatch Area	2.6×10^8	1.2×10^3 (2) Covered Hatch Area	8.7×10^7
Leak Cooler Area	0.2×10^5(2)	3.0 mg/gm (2) Penetr. 225	0.6×10^{-1}	30 (2) Penetr. 225	5.7×10^5	84 (2) Penetr. 225	0.2×10^7
Remaining Area	0.6×10^5(2)	2.0 mg/gm (3)	1.3×10^{-1}	1.1×10^3 (3)	7.0×10^7	1.7×10^3 (3)	11.0×10^7
Totals			1.7 - 3.2 Kg		1540-2540 Ci		654 - 687 Ci

(1) Mass calculations based on sediment sampling in Nov., 1985 and RRV video surveys made during 3rd Q., 1984.
(2) Mass estimates and analyses taken from data presented in GEND-042, Table 6. Reference 1.
(3) Analyses from GEND-042, Table 6, averaged for use in preparation of above table. Reference 1.
(4) Sludge Removal Program, 4341-85-068, 11/20/85, with table attached, Reference 2.
(5) Data from TB-85-35, Table 1, Reference 6.
(6) Horstetter Memo, page 2, item 5, Reference 5.

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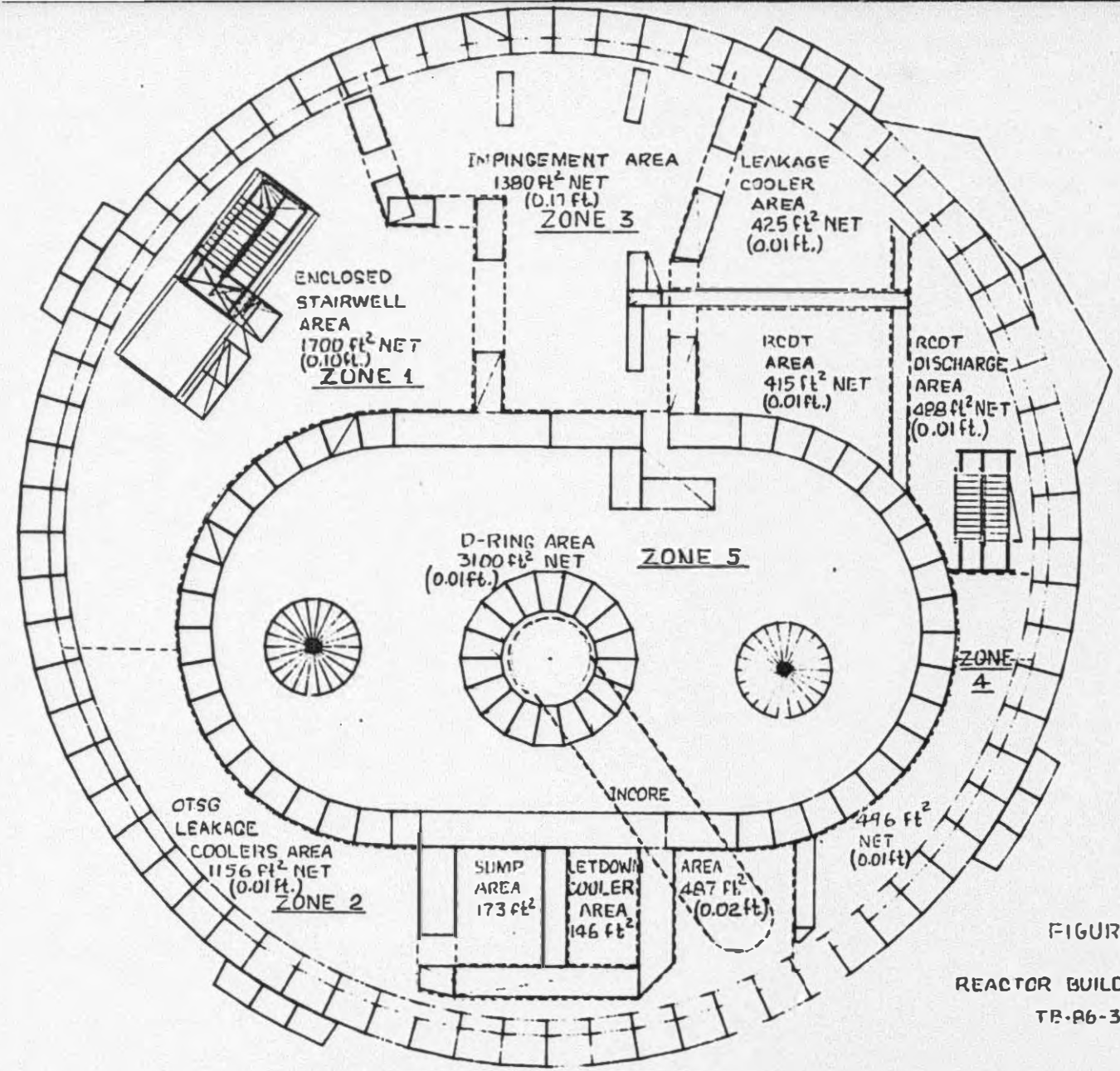

NOTE:
SEDIMENT DEPTH IN (ft.).

FIGURE 1

REACTOR BUILDING ZONES/AREAS

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