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April 18, 1979

NOTE TO: L. Barrett, NRR, TMI-2
FROM: F. J. Miraglia, Jr., Coordinator, Team B

Attached is information requested by E. Adensam on April 14, 1979.
The material was prepared by R. Emch and S. Bland.

F. J. Miraglia, Jr.
Coordinator
Team B

Attachment:
As Stated

cc: see attached distribution list

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OFFICE	Team B				
SURNAME	Miraglia:dr				
DATE	04/18/79				

We were asked by E. Adensam to calculate the radiation dose rates due to piping in a system filled with diluted secondary water.

The attached table shows the results ORNL obtained for calculated dose rates at various distances from various sizes of pipe. As a quick check, J. Emch and F. Akstulewicz performed hand calculations of the dose rate at one meter from the various sizes of pipe. Those hand calculations gave dose rates of 5-11 mr/hr. Since the hand and ORNL calculations are in good agreement, we believe the ORNL results are valid.

E. Adensam gave us the following information to use in our calculations.

The source term is:

I-131	1.4 $\mu\text{Ci/cc}$
Cs-134	8.6×10^{-3} $\mu\text{Ci/cc}$
Cs-136	1.1×10^{-2} $\mu\text{Ci/cc}$
Cs-137	3.4×10^{-2} $\mu\text{Ci/cc}$

in 6.5×10^7 cc of water. This source term is diluted to a total water volume of 1.7×10^8 cc. The piping is infinite lengths of Schedule 40 with nominal sizes of 12", 16", and 20". The dose rates are due almost entirely in I-131 (98%).

DOSE RATES VERSUS DISTANCE FOR
INFINITE LENGTHS OF SCHEDULE 40 PIPE
OF VARIOUS NOMINAL SIZES (mr/hr)*

Distance from Pipe Center (feet)	12"	16"	20"
Contact	53	50	45
2.5	10	12	13-1/2
4.5	6	7	8
10	3	3	4
18	2	2	2

* Radionuclide concentrations in water

I-131	$5.3 \times 10^{-1} \mu\text{Ci/cc}$
Cs-134	$3.3 \times 10^{-3} \mu\text{Ci/cc}$
Cs-136	$4.2 \times 10^{-2} \mu\text{Ci/cc}$
Cs-137	$1.3 \times 10^{-2} \mu\text{Ci/cc}$

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