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April 18, 1979

NOTE TO: V. Stello, Jr., Director, TMI Operations  
FROM: F. J. Miraglia, Jr., Coordinator, Team B

On April 14, 1979, R. Mattson requested that the NRR Teams in Bethesda provide information which would be useful in assessing off-site consequences associated with the use of SG-B in a steaming mode. The attached information was developed by F. Kantor and L. W. Bell.

F. J. Miraglia, Jr.  
Coordinator  
Team B

Attachment:  
As Stated

cc: see attached distribution list

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OFFICE	<del>FJM</del>				
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DATE	04/18/79				

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### Radiological Consequences of Steaming With SG-B

This memorandum presents a preliminary evaluation of the possible radiological consequences of placing steam generator "B" in operation in a steaming mode at TMI-2. Tube leaks are thought to have occurred in the early stages of the incident (as a result of some as yet unidentified mechanism) and SG-B has remained isolated since then. There does not appear to have been any significant leakage following isolation as the water level and activity in SG-B have not shown any noticeable increases. However, there is concern that tube leaks may reappear when SG-B is placed back in service.

We have attempted to develop a model to evaluate the offsite doses and in-plant concentrations of I-131 as a function of tube leaks ranging from zero to six gallons per minute. The assumptions used in our evaluation are listed in the attached table. Some of our assumptions concerning equipment volumes, flow rates, and partitioning factors are best estimate values which can be modified if necessary as better information becomes available.

The results of our analysis, shown in the attached figure, indicate the kind of offsite doses and activity concentrations which can occur as a result of SG tube leakage. The results also illustrate the relationship between I-131 concentrations in the steam generator water volume and I-131 concentrations at the air ejector exhaust. This suggests an approach for maintaining the air ejector exhaust concentration of I-131 activity below some prescribed level by monitoring the activity in the steam generator.

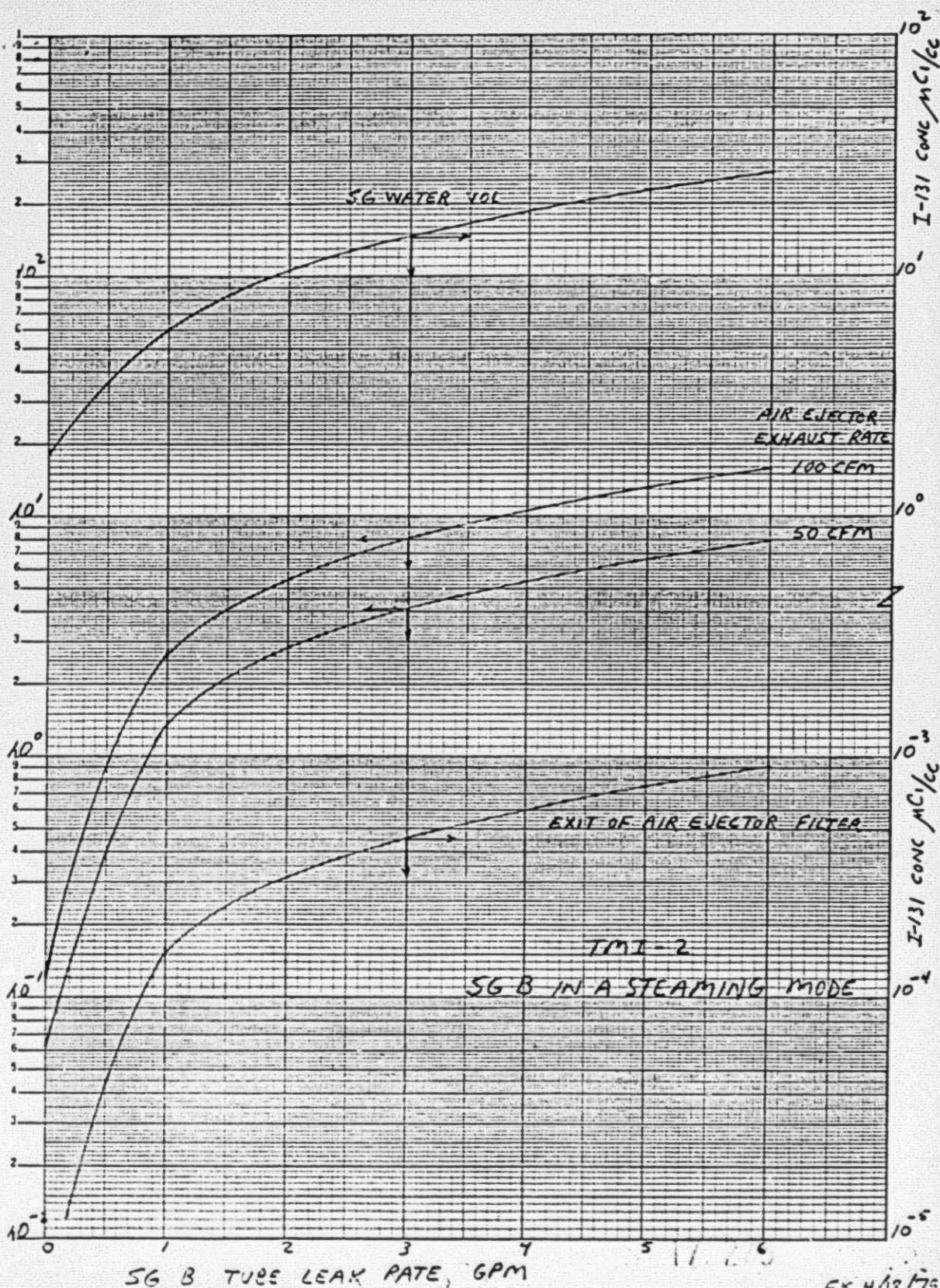
TABLE 1  
ASSUMPTIONS USED IN EVALUATING RADIOLOGICAL CONSEQUENCES  
OF SG B STEAMING

1. I-131 concentration in primary coolant =  $5.68 \times 10^3$   $\mu\text{Ci/cc}$  (decay corrected to 04/14/79)
2. I-131 concentration in SG B =  $1.22$   $\mu\text{Ci/cc}$  (decay corrected to 04/14/79)
3. Steam Rate = 25,000 lb/hr
4. Fraction of SG tube leakage sprayed to steam dome = 0.37
5. SG volume =  $80,000$   $\text{ft}^3$  of which 94% was assumed to be water filled and 6% steam filled
6. Partition factor for I-131 in steam generator = 500
7. Condenser hot well (water) volume =  $7,000$   $\text{ft}^3$
8. Condenser steam volume =  $140,000$   $\text{ft}^3$
9. Partition factor for I-131 in condenser = 10
10. Air ejector exhaust flow rate = 50 and 100 cfm (two cases)
11. Filter efficiency on air ejector exhaust = 99%
12.  $x/Q = 1.0 \times 10^{-4}$   $\text{sec/m}^3$  to exclusion area boundary
13. Breathing rate =  $3.47 \times 10^{-4}$   $\text{m}^3/\text{sec}$
14. I-131 dose conversion factor =  $1.485 \times 10^6$   $\text{rem/Ci}$



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TWO HOUR THYROID DOSE, MREM



FK 4/8/79