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W. Kenneth Davis, Director
Division of Reactor Development

September 18, 1957

Allan C. Johnson, Manager
Idaho Operations Office

OPERATION OF HTRE-2, INSERT NO. 2 (a)

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SYMBOL: HSSS:PG

With reference to your memorandum of August 26 concerning possible effects to the NRTS, and surrounding areas, from the operation of HTRE-2, Insert No. 2, we feel that APEX-319 provides realistic calculations of thyroid exposure. In addition, we have made calculations of body and bone doses, using APEX-319 as a guide. In all cases up to a distance of 5×10^4 meters, we find that the bone dose is less than the thyroid dose; therefore, our assumptions are based entirely on thyroid and whole body exposure.

The ensuing calculations are based upon:

- a. 25 hours' operation at one megawatt in the insert;
- b. Use of the $t^{-1.2}$ law beyond the top of the stack;
- c. Dosages delivered from an effluent spread uniformly over a 90° sector. (Reference APEX-319).

Exposures on the NRTS

<u>Distance</u>	<u>Condition</u>	<u>Thyroid</u>	<u>Body</u>
10^3 meters	Strong lapse	25 mrep	110 mrep
	Mild inversion	.002 "	125 "
10^4 meters	Strong lapse	.3 mrep	.001 mrep
	Mild inversion	3.5 "	.55 "
	Strong inversion	1.2 "	---

Exposures Beyond the NRTS

<u>Distance</u>	<u>Condition</u>	<u>Thyroid</u>	<u>Body</u>
2×10^4 meters	Strong lapse	.07 mrep	< .001 mrep
	Mild inversion	1.0 "	.08 "
	Strong inversion	3.3 "	.3 "

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5 x 10 ⁴ meters	Mild inversion	.14 mrep	< .08 mrep
	Strong inversion	1.5 "	< .3 "

Conclusions:

Dosage as calculated above will not afford too great a problem on the NRTS beyond the one-mile exclusion area. Monitoring controls and procedures formerly used should be entirely adequate to maintain exposures considerably below maximum permissible levels. Off-site exposures are expected to be well within maximum permissible levels. Assuming an extreme case, during strong inversion conditions, over a 25-hour operation period in which all the effluent released passes a single point 2 x 10⁴ meters from the stack, the dose delivered to the thyroid would be approximately 40 mrep.

PCC: W. J. Lagarde, IDO Liaison Officer
Major H. W. Baker, LABO

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