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HW--82779-RD

DE91 000050

SEP 28 1990

GENERAL ELECTRIC

HANFORD ATOMIC PRODUCTS OPERATION - RICHLAND, WASHINGTON

DATE

June 15, 1964

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TITLE

ESTIMATES OF RIVER DILUTION FACTORS FROM
UPSTREAM REACTORS

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R. L. Junkins
762 Building
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Per LOC May 1973
By B. Roberts 1/29/74

This document consists of

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ESTIMATES OF RIVER DILUTION FACTORS FROM UPSTREAM REACTORS

The attached table has been prepared to assist in the evaluation of hazards associated with radioactive liquids discharged to the river in the event of reactor accidents to occupants of the Wahluke Slope. ^{have been estimated} ~~Estimated~~ Concentration ratios for both the maximum point in the river as well as along the shoreline opposite the reactors for several locations of potential interest and for reactors in B, K, and D Areas. The shoreline concentrations apply to water up to 25 yards from shore.

In order to use the table, the rate of release in curies per unit time and the river flow rate must be known. C_m is the mean river concentration at the point of release obtained by dividing the release rate by the river flow-rate with the same time units. C_s , the shoreline concentration at the point of interest is then obtained by multiplying C_m by the appropriate factor from the table.

Data used in preparing this table is from two different sources. Dye studies by the author are the basis for the K and D reactor ratios. The relative insensitivity of these tests for shoreline locations is reflected in the "less-than" values. Activity sampling in the C effluent plume during a special test in 1953 is the basis for the B-C ratios. The B-C ratios are believed to be high at the downriver locations, but no better data is currently available.

SPECIAL RE-REVIEW

FINAL DETERMINATION

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BY DeSantis DATE 11-2-81

BY Barber DATE 11-4-81

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All data was adjusted to a river flow rate of 60,000 cfs. Although the concentration ratios will change somewhat with river flow, the shoreline ratios are relatively insensitive to river flow between 40,000 and 80,000 cfs, which covers the flow conditions of greatest interest.

A release duration to the river of one hour has been assumed. All ratios will reflect this duration time proportionately for locations with arrival times of greater than one hour. For travel times of less than one hour, there is no simple correction, but shoreline ~~local~~ concentrations generally would not be significant in that distance.

senior Engineer
Environmental Studies and Evaluation

JP Corley:fo

Attachment

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ESTIMATED DILUTION FACTORS

River Flow Rate 60,000 cfs
Duration of Release 1 Hour

	<u>B-C</u>		<u>KE-KW</u>		<u>D-DR</u>	
	$\frac{C_c}{C_m}$	$\frac{C_s}{C_m}$	$\frac{C_c}{C_m}$	$\frac{C_s}{C_m}$	$\frac{C_c}{C_m}$	$\frac{C_s}{C_m}$
Opp. N	3	<0.01	1.2	<0.006	-	-
Opp. D	1.1	<0.01	0.6	<0.004	75	0
Opp. F Area	0.4	0.1	0.10	0.015	0.15	<0.01
Opp. Hanford	0.3	0.1	0.09	<0.01	0.12	0.03
Ringold	0.3	0.1	0.06	<0.01	0.06	<0.01

END

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10 / 16 / 90