

## OFFICE MEMORANDUM

TO : Distribution DATE: December 24, 1963

FROM : Dale E. Hankins, H-1 Health Physicist

SUBJECT: RESULTS OF GAS SAMPLING AND BACKGROUND MONITORING IN THE  
OLD TRAILER COURT AREA

SYMBOL : H-1H-1

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TA-2

The concentrations of radioactive gases in the old Trailer Court Area resulting from Omega Stack releases were calculated and reported in a memo dated July 22, 1963, "Radioactive Gas Concentration in Old Trailer Court Area Originating from the Omega Stack". The calculations given in this memo indicated concentrations which were sufficiently high to warrant further study. Consequently, a gas sampler which had been used at the Omega Stack prior to the receipt of the new stack monitor and two 10 mr Landsverk ion chambers were placed in operation at the old Trailer Court Area from August 13 to December 2, 1963, to evaluate the concentrations of radioactive gas and the increase in background in the area due to gas released from the Omega Stack. The equipment was placed in the laundry house at 158 Academy Street.

The ion chambers were read daily except for weekends and holidays, and the gas sampler recorded continuously. The sensitivity of the gas sampler was 1/10 full scale reading for a gas concentration of  $1 \times 10^{-5}$  uc/cc (calibrated with stack gas, see memo dated July 30, 1963, "Calibration of Area Monitor for the Old Trailer Court Area"). A gas concentration of  $1 \times 10^{-5}$  uc/cc is 100 times MPC for a nonoccupational 168 hour exposure to  $Xe^{135}$ , which is the predominate gas activity in the stack (LAMS 2937, Radioactive Gaseous Effluents from a Homogeneous Reactor).

Throughout the 3½ months there was no indication of gas activity recorded by the gas sampler, even though on one occasion, to be discussed later, gas was known to be present in the Trailer Court Area. The results indicate that the concentrations of radioactive gases never reached a value greater than 50 times MPC, even for short periods of time.



The background readings obtained with the two ion chambers have been evaluated (Table I). Except for three high readings the readings were within  $\pm 22\%$  of the weighted average. The readings of the Bemis ion chamber were average or below for the period in which the H-1 ion chamber gave the three high readings, indicating that the high readings resulted from charging difficulties with the H-1 ion chamber and did not represent a true high background reading. The readings of the ion chambers did not show any significant fluxuations which could be correlated with stack gas output. Although the reactor was shut down twice for one week or more during the  $3\frac{1}{2}$  months, the ion chamber readings remained around the weighted average.

The integrated background activity in the old Trailer Court Area is not significantly affected by the gases released from the Omega Stack. Based on a maximum permissible exposure of 500 mr/year, the chambers would have to continuously read greater than 42 mr/month plus background to present an exposure problem. Our readings indicate the background in this particular building is about 19 mr/month, which agrees with the accepted background values for this type structure.

On one occasion during the  $3\frac{1}{2}$  month period there was particulate activity in the old Trailer Court Area (see Notes on Stack Gas Release of November 1, 1963). During this period the background in the area, which is normally 0.02 to 0.05 mr/hr, increased to GM readings of 0.15 to 0.5 mr/hr. This high background resulted from the plating out of  $Rb^{86}$  activity from the stack gases that were being blown through the area ( $Rb^{86}$  half life is 18 minutes). The duration of this activity was short and did not result in high background readings on the ion chambers, nor was it detected on the gas sampler. Everything in the area was slightly contaminated with  $Rb^{86}$ . The stack modification which has just been completed has reduced the  $Rb^{86}$  output of the stack by a factor of nearly 100, probably because the  $Rb^{86}$  is removed from the gas by plating out onto the stainless steelwool which was packed into the delay tanks. This reduction in  $Rb^{86}$  should eliminate any future repetitions of this type of contamination.

Dale E. Hankins,  
H-1 Health Physicist

Table 1

Results of Background Readings in the Old Trailer Court Area

Dose Rate <u>mr/hr</u>	Frequency of Occurance	
	<u>H-1 ion chamber</u>	<u>Bemis ion chamber</u>
0.021	1	2
0.022		1
0.023		5
0.024	6	7
0.025	9	6
0.026	12	8
0.027	11	12
0.028	8	10
0.029	4	9
0.030	5	3
0.031	1	1
0.032		
0.033	1	
0.034	1	
0.035	1	
Weighted Average	0.027 mr/hr	0.0264 mr/hr

Dose Rate Based on total readings

<u>H-1 ion chamber</u>	<u>Bemis ion chamber</u>
0.64 mr/day	0.64 mr/day
19.3 mr/month	19.4 mr/month

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