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Authors: L. C. Lasher

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SUMMARY

Operation of the Liquid and Gaseous Waste System for the month of July was about normal. The performance of the Process Waste Treatment Plant continued to improve during the month. The total ^{90}Sr discharged to White Oak Creek was 103 mCi compared to 132 mCi for the previous month. The ORNL Stacks discharged 330 mCi of ^{131}I . There were no unusual incidents during the month.

RADIOACTIVE EFFLUENTS

Liquid Waste

Release to Clinch River - June, 1978

Radioactive contamination of the Clinch River resulting from ORNL discharges during the month of June, 1978, was 0.2% of the MPC_W (see Figure 1). The concentrations of the main contaminants, ⁹⁰Sr and ³H, were 0.13% MPC_W and 0.04% MPC_W, respectively. These values represent 0.14 Ci of ⁹⁰Sr and 434 Ci of ³H. The above data for July, 1978, were not available at the time this report was prepared. These data will be presented in the August, 1978, report.

White Oak Creek Monitoring

The strontium and gross-beta activity measurements made at the White Oak Creek sampling stations are listed in Table 1. A monthly comparison of the strontium activity released into White Oak Lake is shown in Figure 2.

The total release of ⁹⁰Sr into White Oak Lake (103 mCi) was 29 mCi less than the amount reported for June. This improvement is attributed to a lower amount of precipitation during the period. The amount of ⁹⁰Sr released from the 190 ponds and the sanitary system into White Oak Creek remained essentially unchanged at 2 mCi and 8 mCi; respectively.

The following tabulation shows a breakdown of ⁹⁰Sr entering White Oak Creek compared to that measured at Station 3. The difference is presumed to be coming from Burial Ground No. 4 and other contaminated areas along White Oak Creek.

	<u>⁹⁰Sr, mCi</u>	<u>⁹⁰Sr, mCi</u>
Flume	13.0	
190 Ponds	2.0	
Process Waste Treatment Plant	11.0	
Sewage Treatment Plant	<u>8.0</u>	
	<u>34.0</u>	
Station 3, WOC	67.0	
Burial Ground No. 4		33.0
Station 4, Melton Branch	<u>36.0</u>	
(Burial Ground No. 5)		<u>36.0</u>
Total ⁹⁰ Sr to WOC	103	
Total ⁹⁰ Sr from Burial Grounds (Presumed)		69
% ⁹⁰ Sr Presumed from Burial Grounds		67%

Process Waste

A total of 4.2 million gallons of contaminated water was chemically treated this month. A monthly comparison of the strontium activity released from the process-waste system to White Oak Creek is shown in Figure 3. The main contributors to the system are listed in Table 2.

A brief summary of column operations is given below:

ION EXCHANGE COLUMN OPERATION DATA

Run No.	Column	Run Time, Hrs.	Bed Volumes
150	C	113	1045
151	A	94	1599
152	B	96	1704
153	A	103.5	1660
154	B	110	1882
155	C	140	1804
156	A	120	1811

Intermediate Level Waste

The waste evaporator operated at an average boildown rate of 126 gph.

	<u>Gallons</u>
<u>Total volume generated</u>	89,000
<u>Volume transferred to evaporator</u>	94,000
<u>Tank Farm free space at beginning of month</u>	350,000
<u>Tank Farm free space at end of month</u>	352,000
<u>Evaporator concentrate returned to tank farm</u>	3,000
<u>Volume of concentrate available for hydrofracture</u>	112,000

A list of the major contributors of intermediate-level waste is given below. Figure 5 compares the volumes of ILW generated each month.

	<u>Gallons</u>
<u>Building 3019</u>	5,300
<u>Fission Products Development Laboratory</u>	9,900*
<u>ORR and BSR</u>	14,200
<u>High Flux Isotope Reactor</u>	16,700
<u>Radioisotopes Processing Area</u>	12,700
<u>4500 Complex</u>	11,500
<u>Transuranium Processing Area</u>	1,400

GASEOUS WASTE

The ORNL stacks discharged \leq 330 mCi of ^{131}I this month. The bulk of this activity was released by the 3039 system as a result of ^{131}I processing. The filterable particulate activities released during the period amounted to 283 μCi . Inert gases released from the 3039 and 7911

* Storage tank pit has a water inleakage problem from groundwater. This represents the volume jettied from the storage tank pit during the month. The "pit" can only be jettied to ILW, since it was designed in this fashion.

stacks averaged less than 1.9% and 0.2% of the calculated maximum permissible operating level for these stacks. Individual stack releases are listed in Table 3; the total releases are compared on a monthly basis in Figure 6.

ORNL-DWG 75-2539R3

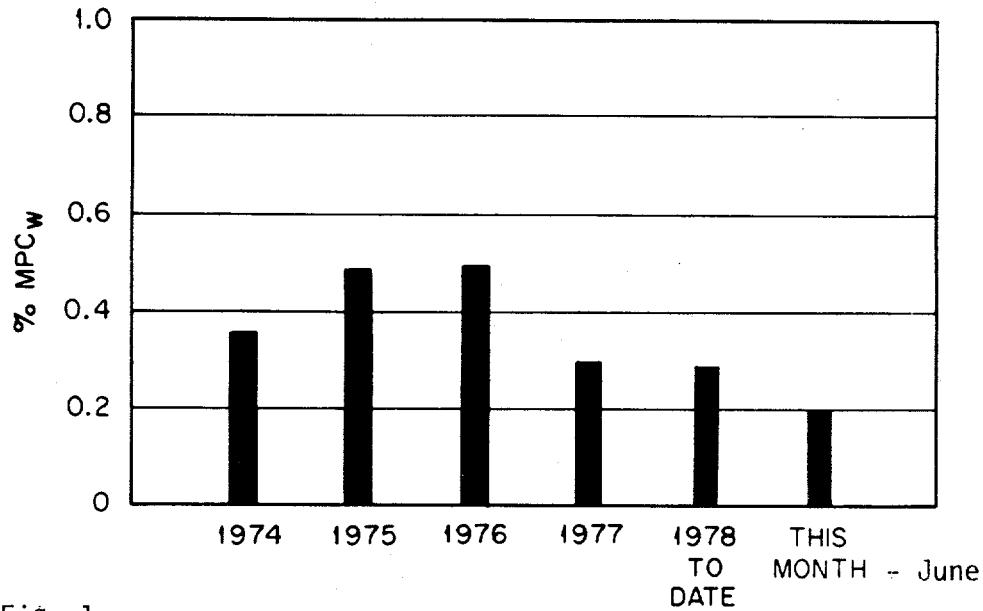


Fig. 1
Calculated Percent of MPC in Clinch River Due to ORNL Discharges.
(Health Physics Measurements at White Oak Dam)

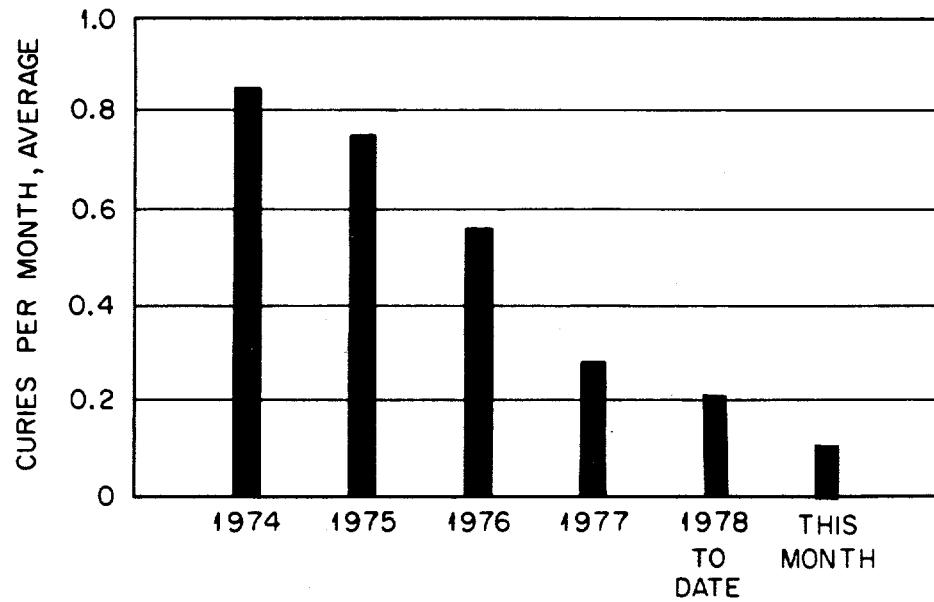


Fig. 2. ^{90}Sr Released to White Oak Lake as Measured at Sampling Stations 3 and 4 (See Fig. 7).

ORNL-DWG 75-2540R3

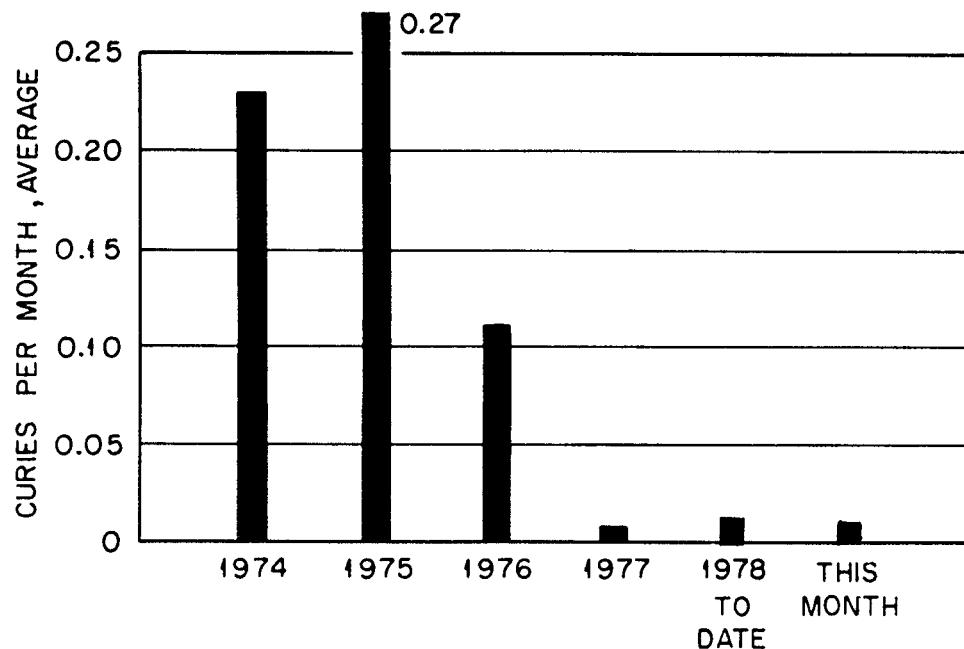


Fig 3. ^{90}Sr Discharge in Process Waste to White Oak Creek.

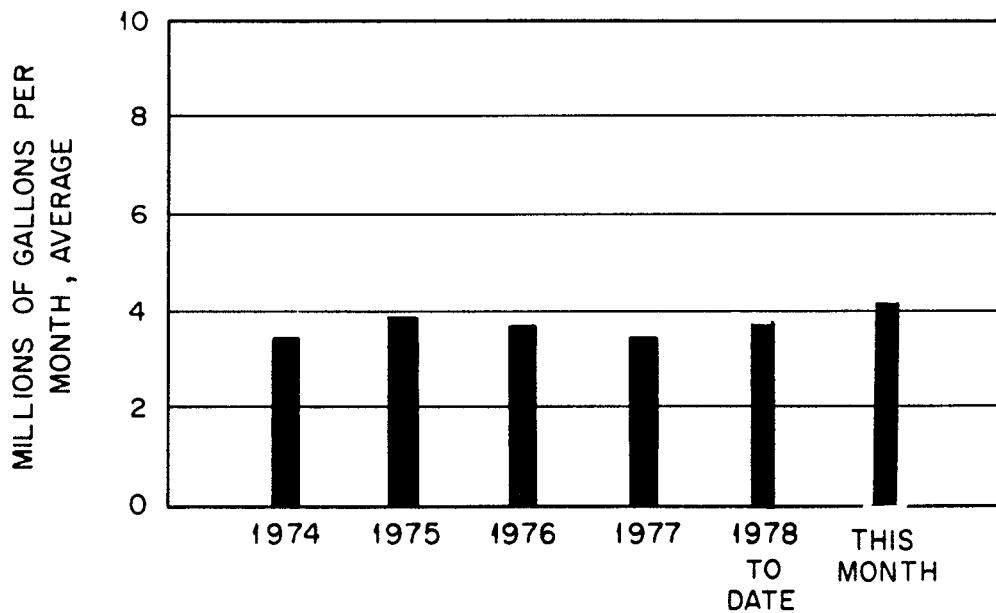


Fig 4. Process Waste Volumes.

ORNL-DWG 75-2541R3

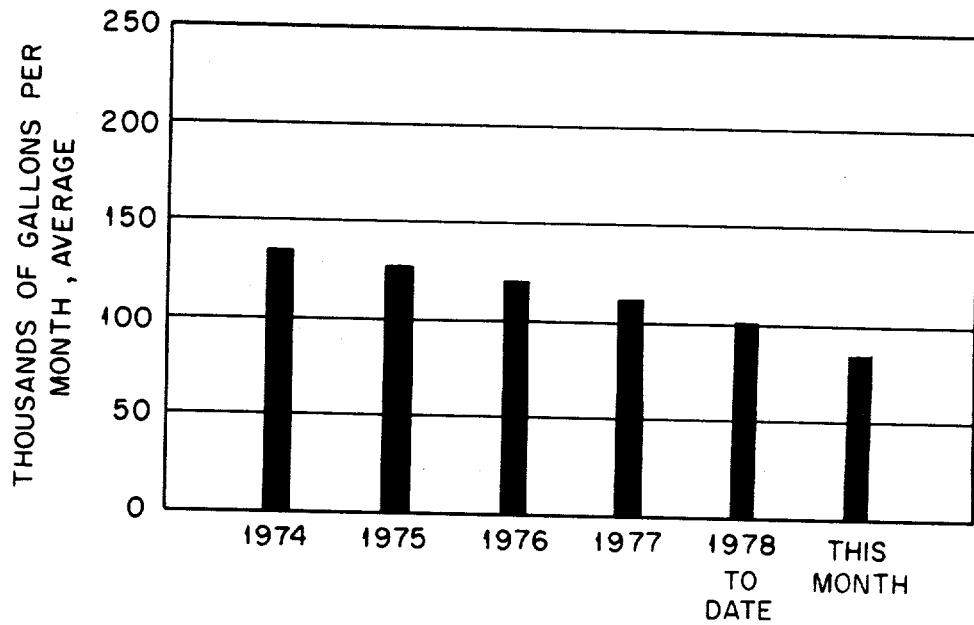


Fig 5. Intermediate - Level Waste Volumes.

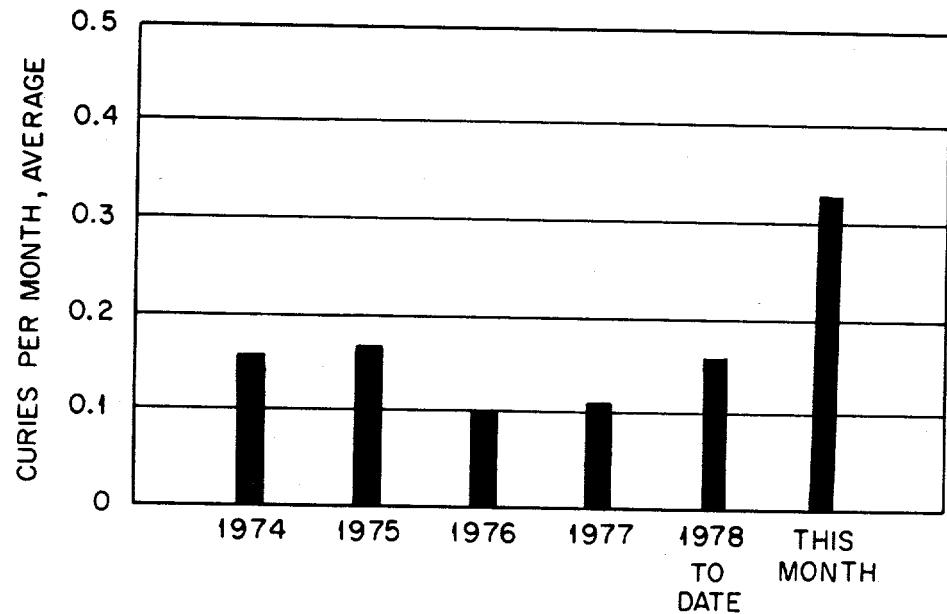


Fig 6. Total Activity Released in Gaseous Waste (Mainly ^{131}I ; Does not Include Rare Gases or Other Non-Adsorbable Species). ORNL's Maximum Permissible Operating Level is 13 curies Per Quarter.

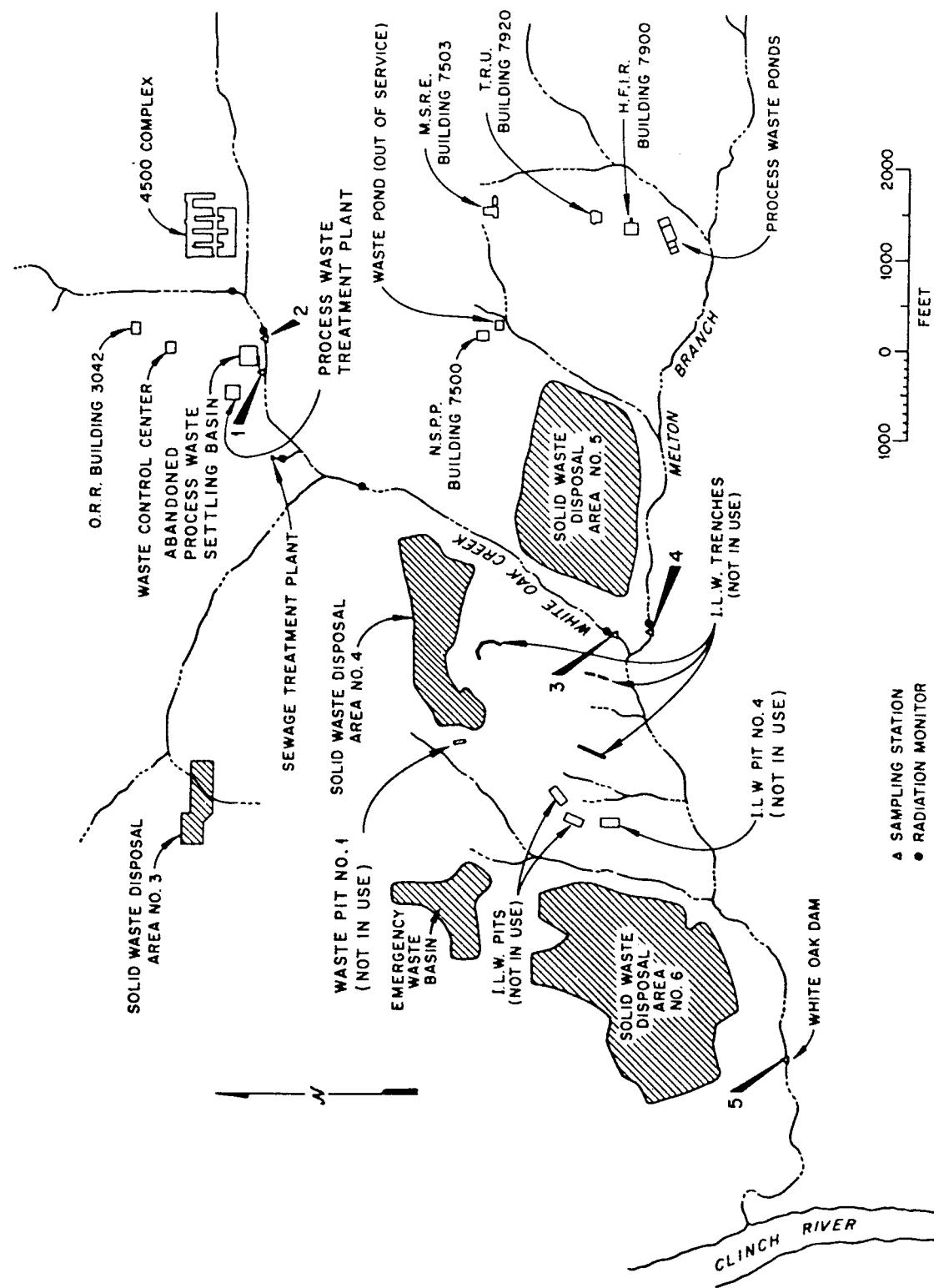


Fig. 7. Location Plan for White Oak Creek Sampling Stations and Radiation Monitors

Table 1. Activity Released in Liquid Wastes to White Oak Creek

Process Waste	Monitoring Station Number ^a	Total Sr, Curies	Gross Beta, Curies ^b
Miscellaneous discharges from east end of plant	1	0.011	0.051
Discharge from Bethel Valley Operations and Burial Ground No. 4	2	0.013	0.027
Discharge from Melton Valley Operations and Burial Ground No. 5	3	0.067	0.164
Total discharge from all sources	3,4	0.103	0.248
White Oak Dam to Clinch River (Health Physics measurement)	5	0.14 ^c	0.18 ^c

^aRefers to Fig. 7.^bApproximation based on an estimated average counting efficiency for a mixture of radionuclides normally present in White Oak Creek discharges to the Clinch River. The method of analysis used in determining gross-beta activity is not sensitive to energies below that of ^{90}Sr .^cJune data - July figures not available at the time this report was prepared. These figures will be shown next month.

Table 2. Process-Waste Discharges

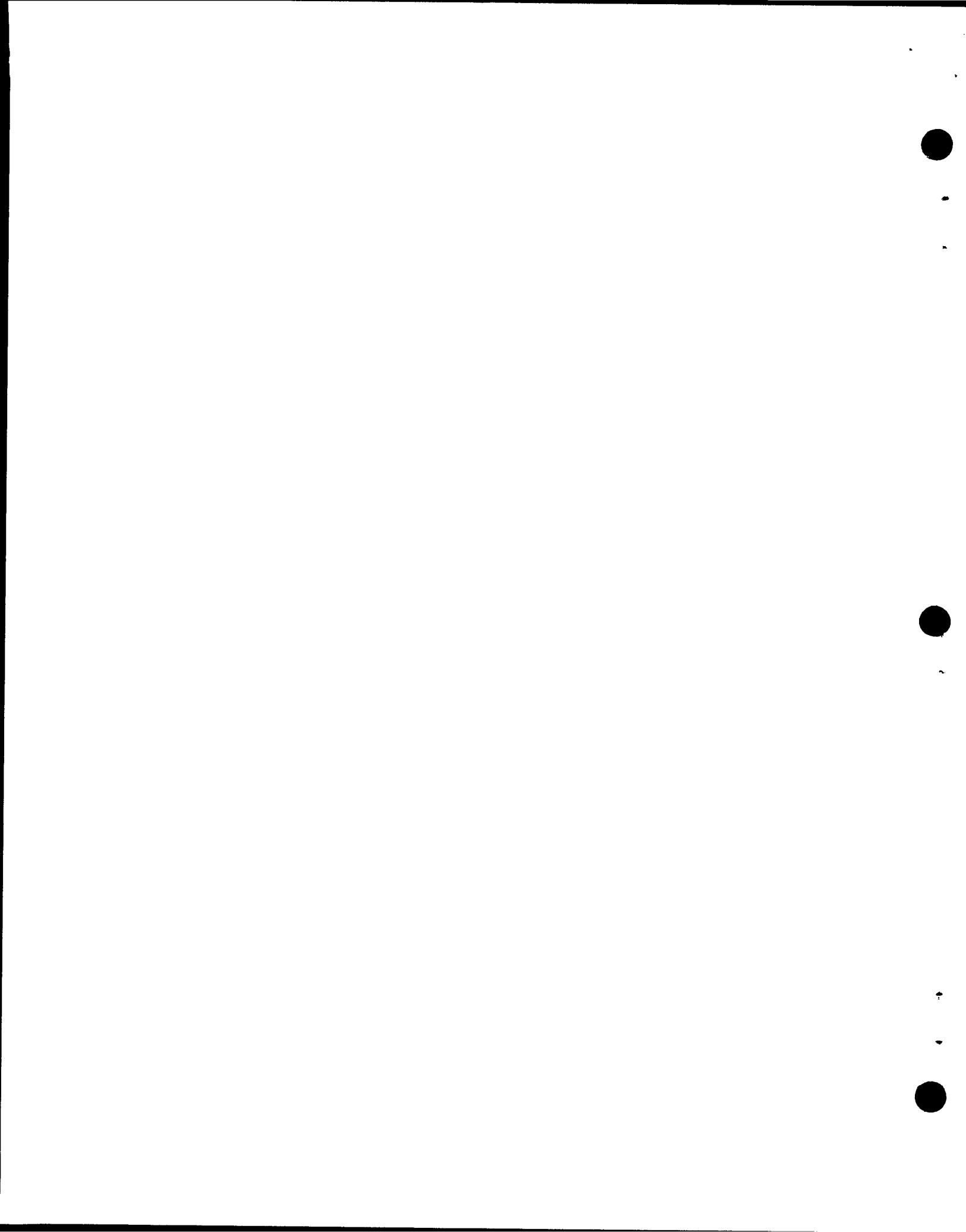
	90 Sr dpm/ml	90 Sr Curies	% of Total	Volume Million Gallons	% of Total
1. Radioisotopes Processing Area (MH234).	39	0.012	2.2	0.18	4.3
2. Radioisotopes Processing Area (MH114 minus MH112)	—	0.137 ^a	25.0	0.63	15.2
3. Reactor Operations (MH112)	0.54	0.001	0.2	. 0.99	23.9
4. Buildings 3503 and 3508	3.2	0.001	0.2	0.19	4.6
5. Buildings 3025 and 3026	0.60	0.001	0.2	0.73	17.6
6. Building 3019	11.9	0.003	0.5	0.17	4.1
7. Waste Evaporator, Bldg. 2531	86	0.035	6.4	0.24	5.7
8. Building 3525	0.13	< 0.001	—	0.10	2.4
9. Building 2026	5.7	0.001	0.2	0.15	3.6
10. Tank Farm Drainage	273	0.357	65.1	0.77	18.6

^aThe activity entered the process-waste system with inleakage of contaminated ground water under Building 3047. The value given was obtained by difference in measurements in manholes 112 and 114.

Table 3. Activity Released in Gaseous Wastes

	Stack No.	Activity ^a (Curies)	Filterable Particulate Activity ^a (Microcuries)
HRLAL	2026	< 0.01	0.1
Central Radioactive Gas Disposal Facilities	3039	<u>< 0.33</u>	271
Radiochemical-Processing Pilot Plant	3020	< 0.01	1
MSRE	7512	< 0.01	0.1
HFIR & TRU	7911	< 0.01	11
Total Activity in Gases Released at X-10 Site		<u>< 0.33</u>	283
Chem. Tech. Division - Y-12 Area			0.4
Tritium Target Fabrication Building		^(³H) 0.6	
Building 4508 Ventilation Discharges			
Room 136			1.3×10^{-2}
Room 265			5.8×10^{-4}
Building 5505 Discharges Glove Box			7.2×10^{-3}
Hood			6.5×10^{-2}

^a Activity primarily ¹³¹I as noted.^b These values were obtained by allowing the filter papers used in the samplers to decay for a period of four days and then measuring the activity.



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