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Horan

APR 14 1966

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Original Signed
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SNAPTRAN-2 MONITORING DATA

HSHP:DFB

As you are aware, ID Health and Safety Division personnel participated in the environmental monitoring of material released as a result of the SNAPTRAN-2 Destructive Test. We have been requested by Mr. Ray Fielding of Phillips Petroleum Company to submit a brief summary of our results for inclusion in a STEP report on the Test. We have attached this information for transmittal to Mr. Fielding. We plan to publish a detailed report of the radiological results in collaboration with Phillips later this year.

Enclosure
Summary of SNAPTRAN-2 Radiological Results

cc: RH Fielding

REPOSITORY INEL
COLLECTION RESL, Files of Doug Carlson Division
Cabinet #4 Drawer #4
BOX No. RESL CFA690 Box #102
FOLDER SNAPTRAN-2 Monitoring Data and Summary

HSHP	HSHP	HSHP	HSCS	HS
DFBunch/gh	BDJohnson	WPGammill	RVBatie	JRHoran
4/12/66				

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SUMMARY OF SNAPTRAN-2 DATA

Note: The information below was derived entirely from the ID Health and Safety Division samples. Some of the information may slightly change when both PPCo and ID data are used.

I. ISOTOPE IDENTIFIED

A. The major activity found on air filters (microsorban and carbon cartridge), by gamma spectrometric methods, was from iodines, telluriums, and the daughters of noble gases. The first samples were analyzed about 1200 hours January 11, 1966. The following list includes the significant isotopes which were identified:

I-131, I-132, I-133, I-134, I-135
Mo-Tc-99
Ce-143
Zr-Nb-97
Te-132
La-142
Cs-138
Ba-139
Sr-92, Sr^{91}-Y^{91m}

II. METEOROLOGICAL DIFFUSION

Estimates of the diffusion from meteorological instrumentation and from analyses of the horizontal spread of activity with distance indicates the diffusion may be roughly classified as a class "D" of the Hilsmeir-Gifford Curves. A graphical presentation of the trajectory of the released material is shown in Figure 1. This may be compared to Figure 2 which shows isopleths of equal integrated airborne activity normalized to 1200 hours on January 11, 1966. Both indicate a change of wind direction and speed about one hour after the test.

III. RELEASE ESTIMATES

Based on estimates of diffusion and on the activity on filters, by both gross gamma and gamma spectrometry, it is estimated that about 30% of the fission products from a 57 MW-sec excursion were released to the atmosphere. We have also estimated the fractionation of the released material by the following equation:

$$A_n = \sum_{i=1}^{n} F_i A_{ni}$$

Where A_n = analyzed activity of the nth isotope in a chain (corrected for diffusion)
F_i = fraction released of precursor i
A_{ni} = computed activity of the nth isotope from decay of precursor i only.

Fractionation being the only unknown, this can be solved by comparison (normalizing noble gas release to 100%) or by direct solution of the simultaneous equations. On this basis we have estimated the following:

RELEASED PERCENTS

Group	Range	Estimate
Nobles	90-100	90
Iodines	50-80	70
Telluriums	40-50	50
Cesiums	10-20	15
Others	< 5	3
Total	20-40	30

III. DEPOSITION

Estimates of deposition were made, with $V_g(\frac{\mu Ci/m^2}{\mu Ci\text{-}sec/m^3})$ being about 0.003 m/s for iodine and about 0.001 m/s for other fission products. Gross point to point differences were observed and this will be detailed in a later report.

IV. BERYLLIUM RELEASE

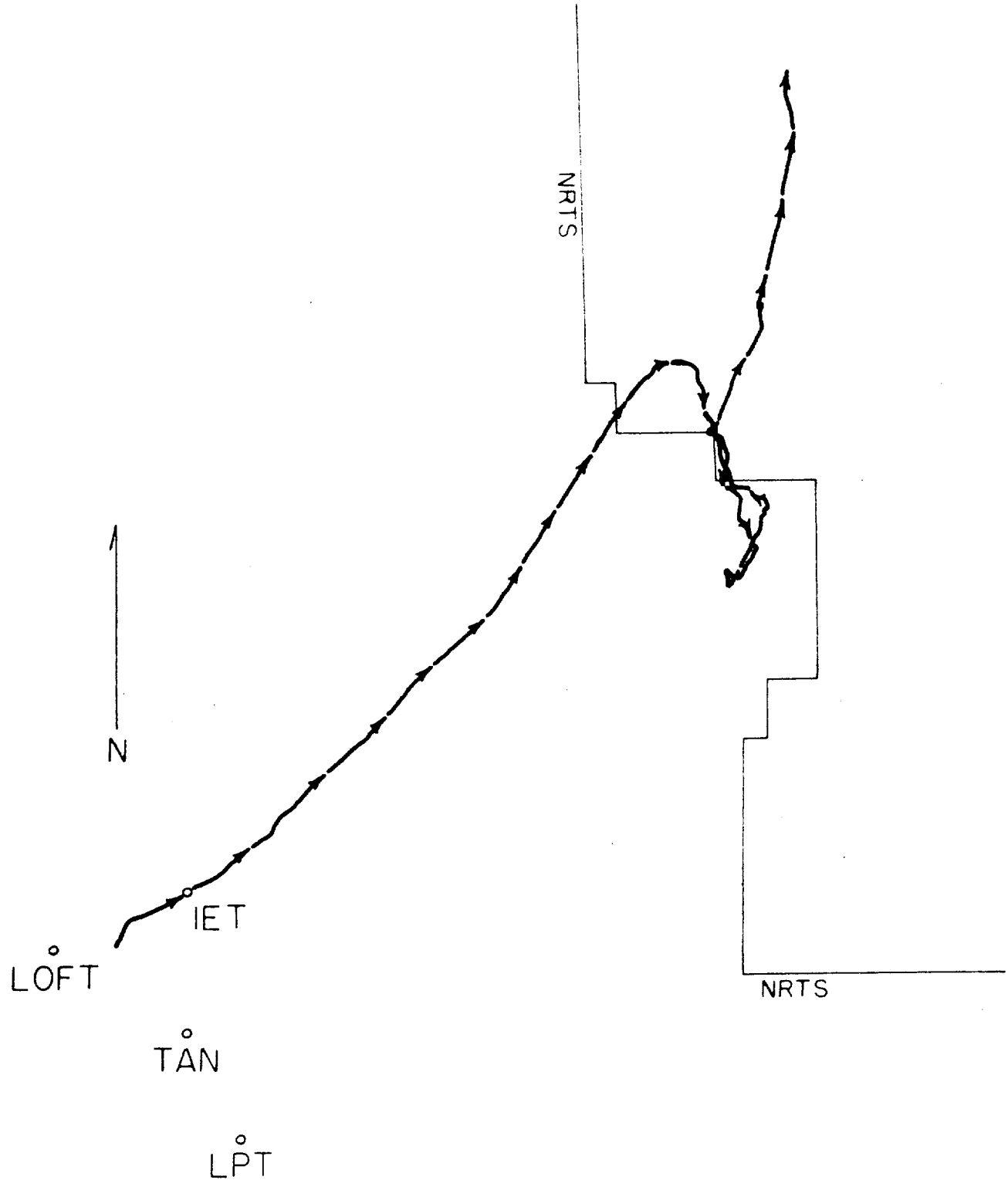
There was no detectable release of beryllium to the atmosphere.

V. DOSE

Summary doses are presented in Figure 3. The listed ingestion doses are potential doses since apperently there were no cows grazing on pasture during or after the test. Dose rates measurements were taken by mobile units on the grid and by the telemetry units off-site (Figure 4). These were (gross beta-gamma).

Distance	Dose Rate	Total Dose
4000 m	20 mrad/hour	1 mr
8400 m	1 mrad/hour	
16000 m	0.15 mrad/hour	

FIGURE 1



FLIGHT NO. 95

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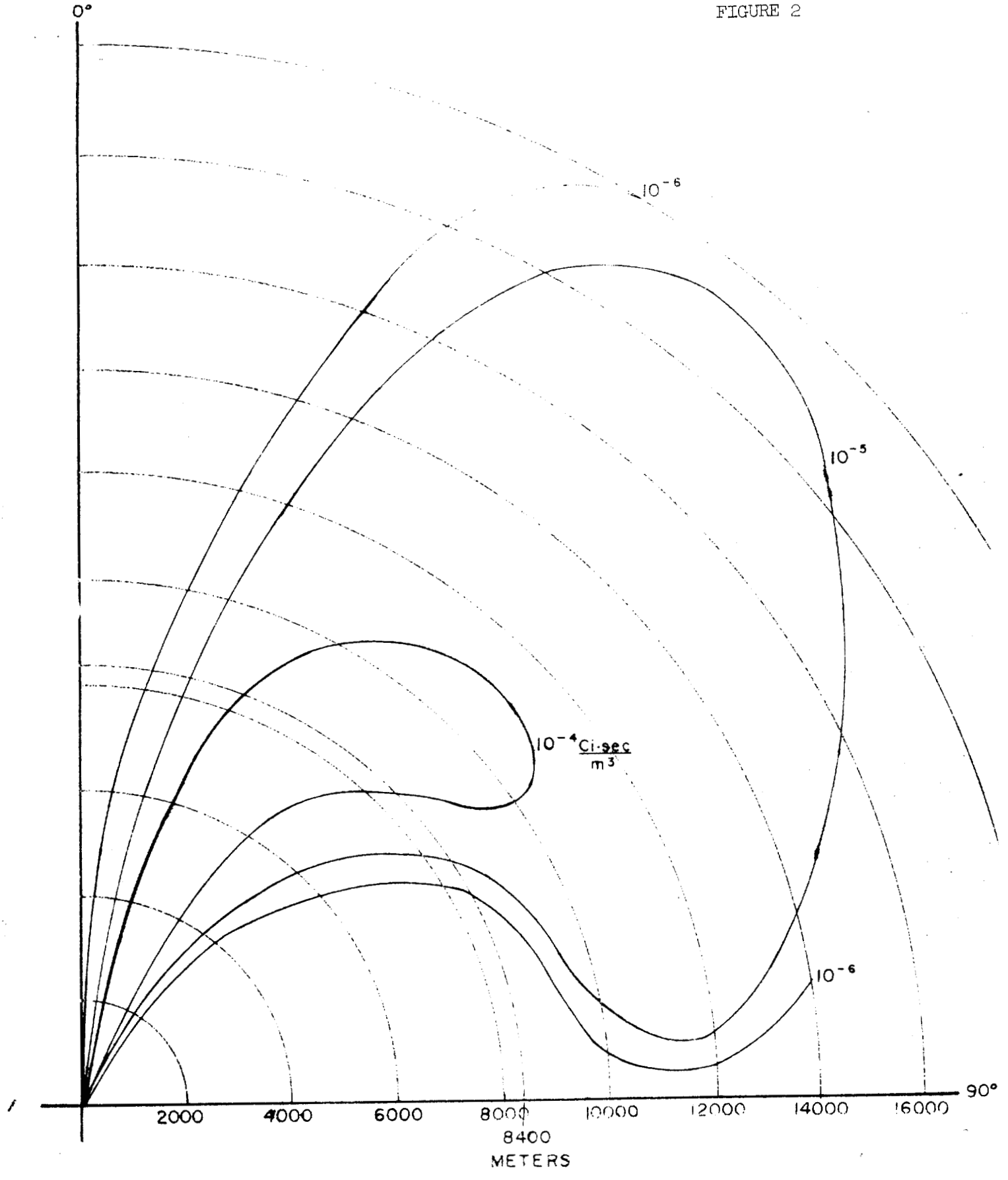
FIGURE 2



ISOPLETHS OF ACTIVITY IN AIR

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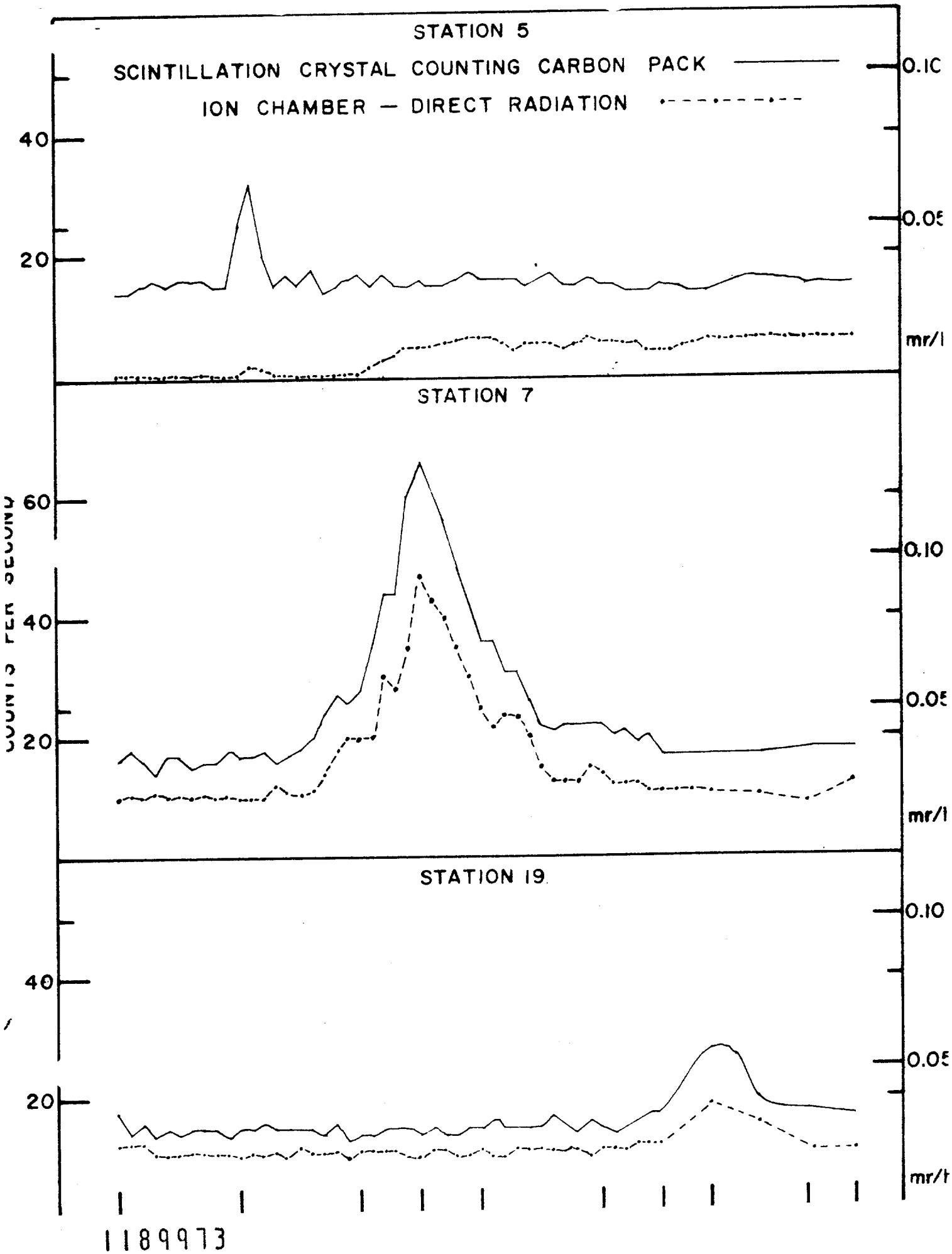
February 1966

COMPARISON OF SNAPTRAN-2 AND SNAPTRAN-3 RELEASES

	SNAPTRAN-2	SNAPTRAN-3
PERCENT RELEASED TO ATMOSPHERE		
TOTAL	32	0.4
Kr-Xe	90	4
I	70	$<10^{-2}$
OTHER	<10	$<10^{-3}$
PERCENT RELEASED FROM FUEL		
TOTAL	32	5
Kr-Xe	90	6
I	70	13
ESTIMATED OFF-SITE DOSE (REM)		
THYROID-INGESTION	3×10^{-2}	$<10^{-5}$
-INHALATION	10^{-4}	$< 10^{-8}$
WHOLE BODY	3×10^{-4}	3×10^{-6}

FIGURE 4


STATION 5
SCINTILLATION CRYSTAL COUNTING CARBON PACK
ION CHAMBER — DIRECT RADIATION
40
20
0.10
0.05
mr/h
STATION 7
60
40
20
0.10
0.05
mr/h
STATION 19
40
20
0.10
0.05
mr/h
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