NUCLEAR EXPLOSIONS - PEACEFUL
APPLICATIONS

NVO-112

PROJECT RULISON
FINAL OPERATIONAL RADIOACTIVITY REPORT
PRODUCTION TESTS

FEBRUARY 1972

PEACEFUL APPLICATIONS DIVISION
NEVADA OPERATIONS OFFICE

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ABSTRACT

This report represents a summary of most of the significant radiological surveillance data generated during the Production Tests of Project Rulison, a nuclear gas stimulation experiment, detonated September 10, 1969, in Northwestern Colorado. It also includes data on the radiochemical and chemical quality of the Rulison gas during the tests and estimates of the quantities of ^{3}H, ^{85}Kr, ^{14}C and ^{203}Hg released to the atmosphere as a result of the tests.

ACKNOWLEDGEMENTS

This report was prepared by Dr. R. L. Gotchy of the Peaceful Applications Division (formerly the Office of Peaceful Nuclear Explosives), Nevada Operations Office, with data provided by Eberline Instrument Company (on-site radiation safety), Environmental Protection Agency, Western Environmental Research Laboratory (off-site radiation safety and gas sample analyses; formerly the Southwestern Radiological Health Laboratory, a part of the U. S. Public Health Service); Lawrence Livermore Laboratory (environmental studies, scientific advisors and technical gas sample analyses; formerly the Lawrence Radiation Laboratory); Los Alamos Scientific Laboratory (scientific advisor); Isotopes, A Teledyne Company (technical gas sample analyses); CER Geonuclear Corporation (gas sample analyses); U. S. Geological Survey (stable isotope analyses of Rulison cores); Oak Ridge National Laboratory (technical gas sample analyses); and the National Oceanic and Atmospheric Agency, Air Resources Laboratory (meteorological predictions for flaring; formerly the Environmental Sciences Service Administration). The author wishes to acknowledge the wholehearted cooperation of numerous individuals from these organizations without whose data and assistance this report could not have been written. Final reports from each participating organization have been (or are being) prepared which describe their activities in detail. Some differences in data included in this report and some reported in later participant reports are to be expected as the data are refined.

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PROJECT RULISON FINAL OPERATIONAL RADIOACTIVITY REPORT ON THE PRODUCTION TESTS

I. Introduction

Project Rulison detonated September 10, 1969, in Garfield County, Colorado (Figure 1), is a joint Industry-Government experiment designed to examine the feasibility of nuclear stimulation of heretofore economically unrecoverable natural gas. It was the second natural gas stimulation project conducted by the AEC, and was the most deeply buried (8,430 feet) nuclear explosion ever carried out by the U. S. The project, sponsored by Austral Oil Company, Inc., of Houston, Texas, is defined in the Project Rulison Definition Plan prepared by CER Geonuclear Corporation of Las Vegas, Nevada.

II. First Production Test (High-Rate Flaring)

The high-rate flaring program was designed to estimate the volume of natural gas present in those areas of high permeability immediately in and around the rubble chimney created after the explosion in order to estimate chimney size. It followed the calibration flaring in October (NVOO report in preparation). The cumulative flow prior to the First Production Test was approximately 12.5 M^2CF (million standard cubic feet), containing 53 curies of ^{85}Kr and approximately 64 curies of ^{3}H. Gas flow-rates started at approximately 20 M^2CFD, were adjusted to about 17 M^2CFD and then allowed to gradually decline to approximately 12 M^2CFD at the end of flaring.

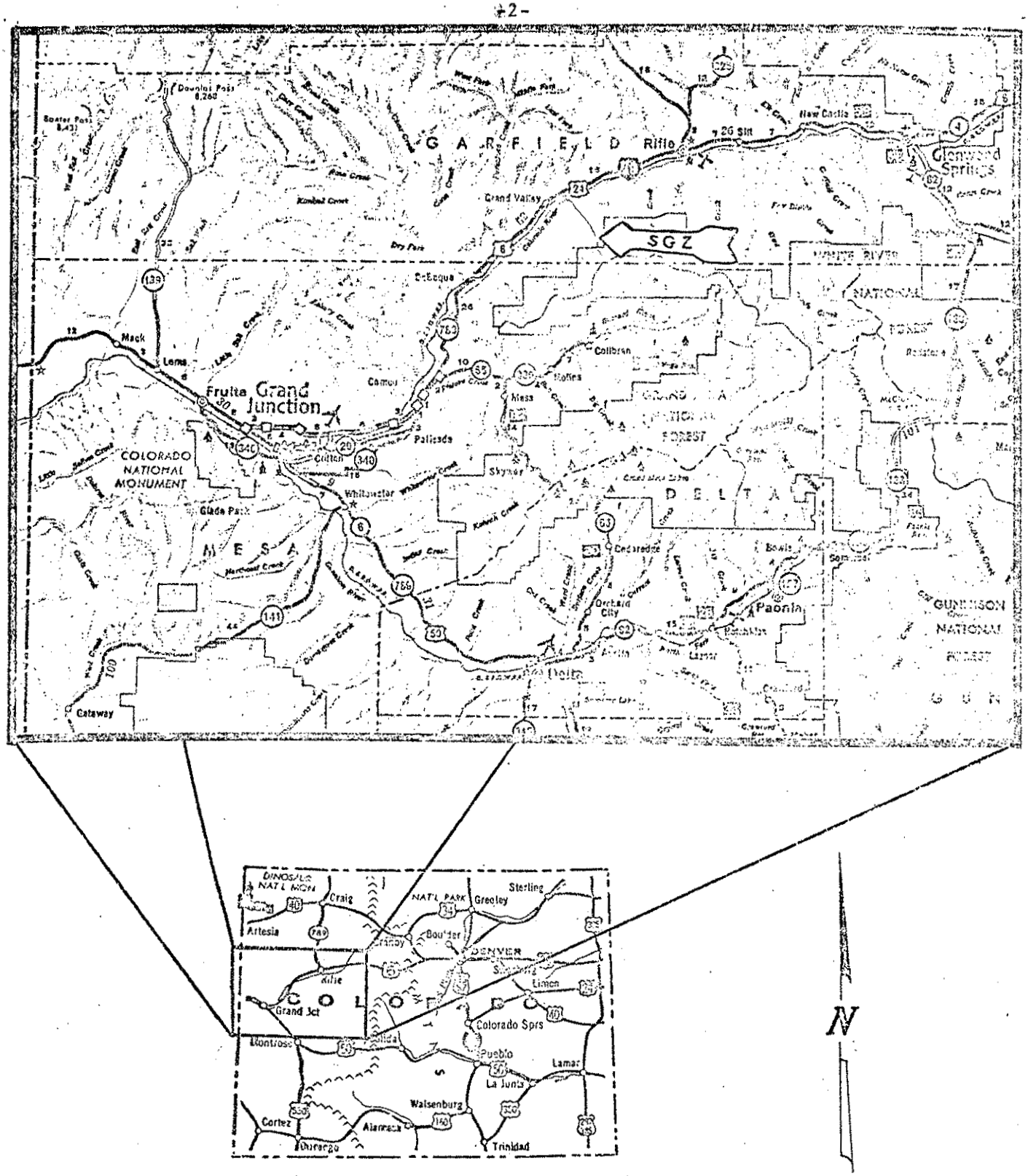

Figure I. ROAD MAP OF NORTHWEST COLORADO

0 5 10 15

SCALE IN MILES

The flaring (burning) commenced at 2:30 p.m. (MST), October 26, and ended at 2:17 p.m. (MST), November 3, 1970. The total gas flowed was 109 million cubic feet (M^2CF), referenced to sea level (14.65 psi) and 60°F.

Radioactivity released to the environment included 418 curies of ^{85}Kr, 619 curies of ^{3}H, about 0.9 curies of ^{14}C and, approximately 0.00004 curies of ^{203}Hg (see Figure 2). Radioactivity concentrations in the natural gas (after the separator) ranged from about 145 pCi/cc of ^{85}Kr, 185 pCi/cc of ^{3}H and 0.35 pCi/cc of ^{14}C at the start of flaring to about 125 pCi/cc of ^{85}Kr, 160 pCi/cc of ^{3}H and 0.30 pCi/cc of ^{14}C at the end of flaring (see Figure 3).

An extensive on-site and off-site radiation surveillance effort failed to detect any radioactivity other than ^{3}H and ^{85}Kr in the environment. Typically, the concentrations of these isotopes in air ranged from about one-millionth to one-100-millionth of their concentrations in the gas.

III. Second Production Test (Intermediate-Rate Flaring)

The intermediate-rate flaring program was intended to provide information on the gas flow characteristics of the Mesaverde sands stimulated by the explosion. The cumulative flow prior to the Second Production Test was approximately 122 M^2CF, containing 470 curies of ^{85}Kr and

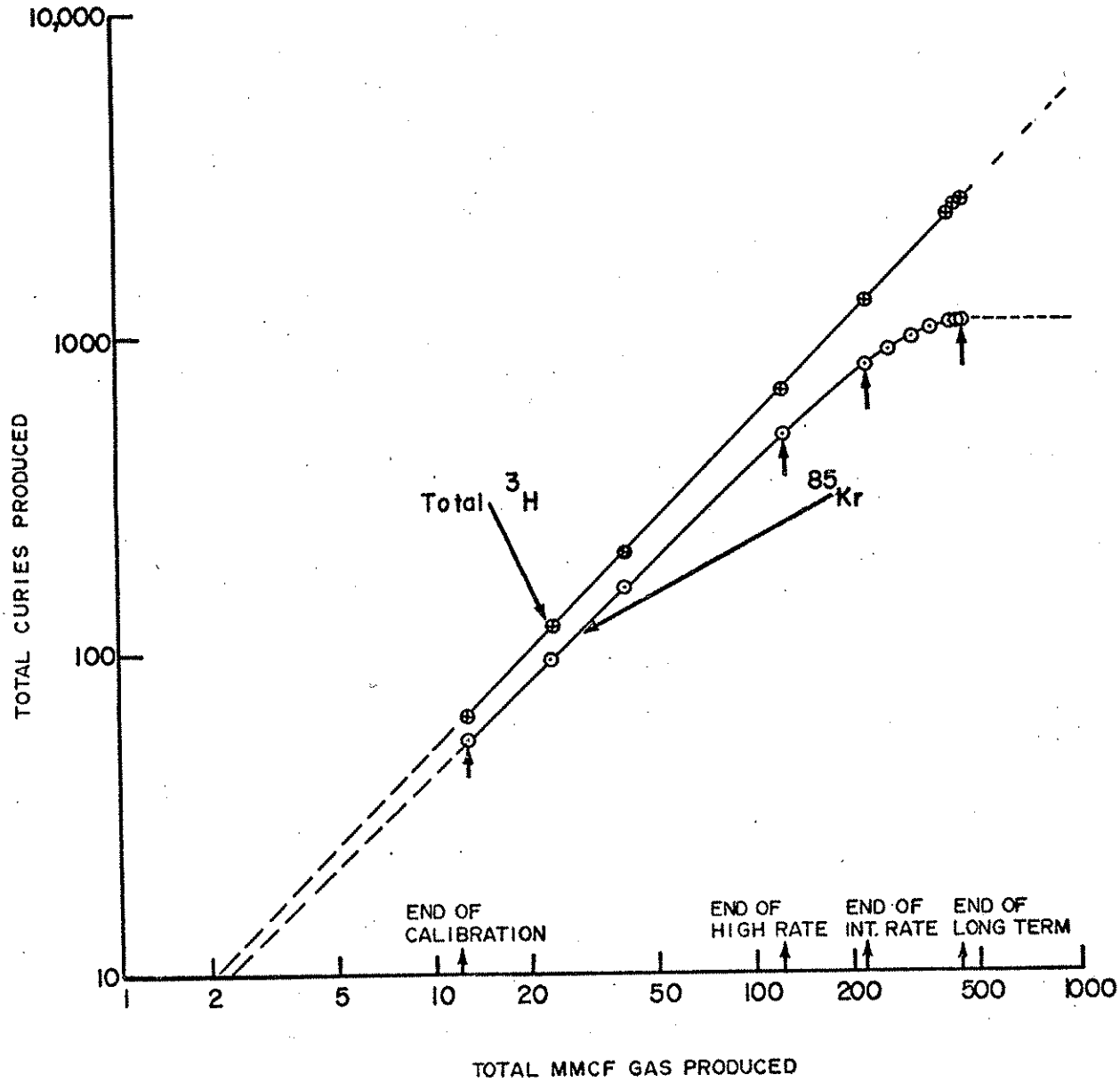

Figure II. Total ^{3}H and ^{85}Kr Released to the Environment.

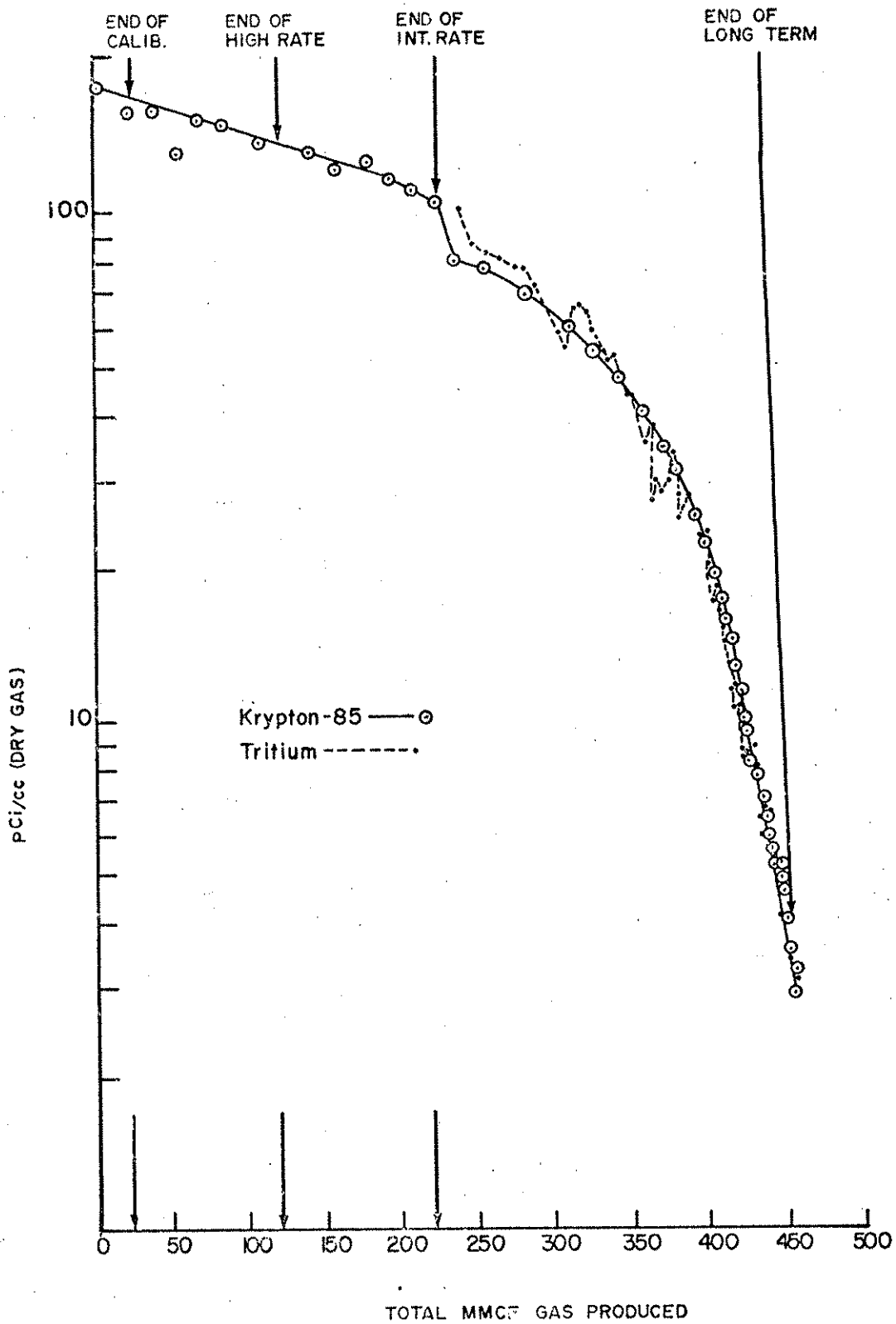

Figure III. ^{3}H and ^{85}Kr Concentrations in Dry Rulison Gas vs. Volume of Gas Produced

680 curies of ^{3}H. The gas flow rate was maintained at approximately 5 $M^{2}CFD$ until the well was shut in.

The flaring (burning) commenced at 12:40 p.m. (MST), December 1, and ended at 2:03 p.m. (MST), December 20, 1971. The total gas flowed was 100 million cubic feet ($M^{2}CF$), referenced to sea level (14.65 psi) and 60°F.

Radioactivity released to the environment included 321 curies of ^{85}Kr, 385 curies of ^{3}H, about 0.68 curies of ^{14}C and, approximately 0.00003 curies of ^{203}Hg (see Figure 2). Radioactivity concentrations in the natural gas (after the separator) ranged from about 125 pCi/cc of ^{85}Kr, 150 pCi/cc of ^{3}H and 0.28 pCi/cc of ^{14}C at the start of flaring to about 90 pCi/cc of ^{85}Kr, 100 pCi/cc of ^{3}H and 0.23 pCi/cc of ^{14}C at the end of the Second Production Test (see Figure 3).

An intensive on-site and off-site radiation surveillance effort failed to detect any project-related radioactivity other than ^{3}H and ^{85}Kr in the environment. Typically, the concentrations of these isotopes in air ranged from about one-millionth to one-100-millionth of their concentrations in the gas.

IV. Third Production Test (Long-Term Flaring)

The long-term flaring program was intended to provide information on the recovery of natural gas from outside the chimney in the fractured region surrounding the detonation point.

The cumulative flow prior to the Third Production Test was approximately 222 M^2CF, containing 791 curies of ^{85}Kr and approximately 1,330 curies of ^{3}H.

The flaring (burning) commenced at 8:40 a.m. (MST), February 2, and ended at 3:00 p.m. (MDT), April 23, 1971. The gas flowed was 228 million cubic feet (M^2CF), referenced to sea level (14.65 psi) and 60°F. The total flow for the project reached 455 M^2CF.

Radioactivity released to the environment included 273 curies of ^{85}Kr, 1,491 curies of ^{3}H, about 0.84 curies of ^{14}C, and approximately 0.000028 curies of ^{203}Hg. Radioactivity concentrations in natural gas (after the separator) ranged from about 80 pCi/cc of ^{85}Kr, 90 pCi/cc of ^{3}H and 0.19 pCi/cc of ^{14}C at the start of flaring to about 2.8 pCi/cc of ^{85}Kr, 3.3 pCi/cc of ^{3}H and 0.07 pCi/cc of ^{14}C at the end of flaring (see Figure 2).

The total radioactivity estimated to have been released to the environment during the production tests included 1,064 curies of ^{85}Kr, 2,824 curies of ^{3}H, 2.4 curies of ^{14}C and 0.00011 curies of ^{203}Hg (see Figure 3). A few curies of $^{37,39}Ar$ and naturally occurring ^{222}Rn were also released with the gas. $^{37,39}Ar$, ^{14}C, ^{3}H and ^{203}Hg were activation products of naturally occurring stable elements present at the detonation point.

An extensive on-site and off-site radiation surveillance effort failed to detect any radioactivity other than ^{3}H and ^{85}Kr in the environment. Typically, the concentrations of these isotopes in air ranged from about a 10-millionth to 100-millionth of their concentrations in the gas.

A preliminary analysis of exposure of members of the public as a result of the entire series of production tests indicated that the maximum dose received was much less than 0.04 mrem. Work recently reported by LLL Bio Medical Division indicates the actual population dose was about one order of magnitude lower (about 0.003 mrem), while the Environmental Protection Agency's Laboratory in Las Vegas estimates an even lower dose (about 0.001 mrem).

V. DATA TABLES

A. First Production Test

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TABLE I. RADIOACTIVITY AND CHEMICAL COMPOSITION OF DRY RULISON GAS

Date	Org., method(s)** of analysis, source of sample	RADIOACTIVITY (pCi/cc) ^{85}Kr	^{3}H (in H_2)	^{3}H (in C_1)	^{3}H (in C_2)	^{3}H (in C_3)	^{3}H (total)	^{14}C	$^{37,39}Ar$ (total)	^{222}Rn	CHEMICAL COMPOSITION (%) H_2	C_1	C_2	C_3	C_4	C_5-C_8	C_6H_6	C_7H_8	CO	CO_2	N_2	O_2	Ar	Total Gas Flowed (M^2CF)
10/26	LRL, well-head	147	21.7	153	11.6	1.6	191	0.32			16.9	38.5	1.95	0.32	——	0.11	——	——		41.3	0.92	0.24*	ND	≈17
	Isotopes, H. P. Separator	150	19				180	0.37	2.5		15.1	31.5	1.90	0.43	0.19	0.032	0.046	0.0078		47+	2.88	0.75	0.040	≈17
	EIC, Stallkat, flare-line	158																						23
	EIC, Anton-112, flare-line	154																						23
10/27	EIC, Stallkat, flare-line	156																						39
	EIC, Anton-112 flare-line	156																						39
	EIC, Oxidizer flare-line						141																	39
	CER-TRY-KRY flare-line	149					206																	≈23
	SWRHL, lab. oxidation, L. P. separator	140					120																	≈28
10/28	EIC, Stallkat, flare-line	132																						54
	EIC, Anton-112 flare-line	130																						54
	EIC, Oxidizer, flare-line						159(5)																	54
	SWRHL, lab. oxidation, L. P. Separator	160					78																	≈34
10/29	LRL, well-head	134	21.1	146	12.0	1.5	191	0.29	1.5		15.7	38.9	2.02	0.37	——	0.13	——	——		42.1	0.83	0.096*	ND	≈62
	ORNL, H. P. Separator	149	19.8	126	8.4	2.6	154				15.0	34.5	1.80	0.75	<0.1				0.44	46.0	0.29			≈44
	Isotopes, H. P. Separator	120	20				180	0.33	2.4		14.9	35.7	1.59	0.39	0.20	0.029	0.052	0.011		44+	1.89	0.31	0.019	≈62
	EIC, Stallkat flare-line	140																						68
	EIC, Anton-112	149																						68
	EIC, Oxidizer flare-line						147																	68
	CER, TRY-KRY flare-line	176(2)					144(2)																	≈62
	SWRHL, lab. oxidation, L. P. Separator	160					110																	≈62
10/30	EIC, Anton-112 flare-line	147																						82
	EIC, Oxidizer flare-line						133(3)																	82
	CER, TRY-KEY flare-line	142(5)					136(5)																	≈75
	SWRHL, lab. oxidation, L. P. Separator	150					51																	≈75
10/31	EIC, Anton-112 flare-line	139																						95
	EIC, Oxidizer flare-line						133																	95
	CER, TRY-KRY flare-line	149					124																	≈85
11/1	EIC, Anton-112	134																						107
	EIC, Oxidizer flare-line						135(2)																	
11/2	EIC, Anton-112 flare-line	134																						118
11/3	LRL, well-head	129	21.7	156	11.6	1.6	165	0.26			14.4	44.9	2.27	0.46	——	0.19	——	——		37.1	0.69	0.14*		≈120
	ORNL, H. P. Separator	131	17.6	113	8.3	1.0	140				13.8	31.9	2.1	0.4	<0.1				0.14	42.3	0.23			≈106
	ORNL, H flare-line	130	18.7	116	7.7	0.8	141				14.3	40.6	2.03	0.45	< 0.1				0.17	41.4	0.19			≈106
	Isotopes, H. P. Separator	95	19				160	0.34	2.1	2.7	14.2	37.7	2.24	0.54	0.27	0.054	0.086	0.015		43+	1.28	0.38	0.020	≈120
	EIC, Anton-112 flare-line	133																						122
	CER, TRY-KRY flare-line	165(3)					156(3)																	≈118

*% normal air, based on O_2, was subtracted from the gross sample composition.

ND = Not detected

Key: H_2=hydrogen gas, C_1=methane, C_2=ethane, C_3=propane, C_4=butanes, C_5-C_8=higher hydrocarbons, C_6H_6=benzene, C_7H_8=toluene, CO=carbon monoxide, CO_2=carbon dioxide, N_2=nitrogen gas, O_2=oxygen gas, Ar=stable argon

Numbers in parentheses are number of samples analyzed. All radioactivity is corrected to time of sampling.

** All LRL, ORNL, and Isotopes samples were separated by gas chromatographic methods at their respective laboratories.

TABLE II. Rulison Radioactivity Release Estimates

(^{14}C data based on LRL data - all other data from EIC)
(^{3}H in gas based on assumed ^{3}H; ^{85}Kr ratio of 1.0; ^{203}Hg based on assumed concentration observed 12/15/70)

	RADIOACTIVITY IN DRY GAS								TRITIUM IN WATER & HYDROCARBONS							
TIME INTERVAL	$[^{85}Kr]$ (pCi/cc)	^{85}Kr (Ci)	$[^{3}H]_g$ (pCi/cc)	$^{3}H_g$ (Ci)	$[^{14}C]$ (pCi/cc)	^{14}C (Ci)	$[^{203}Hg]$ (pCi/m^3)	^{203}Hg (μCi)	$[^{3}H]_w$ (pCi/ml)	$[^{3}H]_v$ (pCi/ml)	$[^{3}H]_{sw}$ (pCi/ml)	$[^{3}H]_{sh}$ (pCi/ml)	^{3}H (Ci)	Total ^{3}H (Ci)	Total Out (Ci)	Gas Flow (60°F) (MMCF)
1430, 10/26 to 0800, 10/27/70	154	45.3	154	45.3	0.31	0.085	12.7	3.52	≈4.1(5)	5.38 (5)			11.2	56.5	101.8	10.39
0800, 10/27 to 0800, 10/28/70	156	65.1	156	65.1	0.30	0.125	12.7	5.29	4.07(5)	0.943(5)	0.385(5)	3.68(5)	25.1	90.2	155.3	15.61
0800, 10/28 to 0800, 10/29/70	130	53.3	130	53.3	0.29	0.119	12.7	5.18	3.27(5)	1.50(5)	0.137(5)		19.0	72.3	125.6	15.34
0800, 10/29 to 0800, 10/30/70	149	55.8	149	55.8	0.28	0.105	12.7	4.74	4.14(5)	2.34(5)	0.357(5)		22.2	78.0	133.8	14.01
0800, 10/30 to 0800, 10/31/70	147	54.0	147	54.0	0.27	0.099	12.7	4.65	3.86(5)	2.77(5)	3.47(5)		26.9	80.9	134.9	13.75
0800, 10/31 to 0800, 11/1/70	139	48.0	139	48.0	0.27	0.093	12.7	4.38	3.82(5)	2.29(5)	2.91(5) 1.59(5)		25.1	73.1	121.1	12.99
0800, 11/1 to 0800, 11/2/70	134	43.7	134	43.7	0.26	0.085	12.7	4.13	3.54(5)	2.95(5)	3.48(5)		22.2	65.9	109.6	12.22
0800, 11/2 to 0800, 11/2/70	134	41.7	134	41.7	0.25	0.078	12.7	3.94	3.65(5)	2.59(5)	3.70(5) 3.26(5) 3.28(5)		29.7	71.4	113.1	11.66
0800, 11/3 to 1417, 11/3/70	133	10.8	133	10.8	0.25	0.020	12.7	1.03	4.28(5)	2.67(5)	3.26(5) 4.65(5)		14.5	25.3	36.1	3.05
1130, 11/9 to 11/10/70											3.68(5) 3.38(5)		5.3	5.3	5.3	0.0
Totals for High Rate:		418		418		≈0.81		≈40					201	619	1,040	109
Grand Totals:		470		478		≈0.90		≈49					205	683	1,150	122

Subscript Key:
g = gas, w= water
v = vapor, sw = separated water, sh = separated hydrocarbons

Note: Numerical values enclosed in parentheses are powers of ten.
Eg: 4.1(5) = 4.1×10^5

TABLE III. ON-SITE RADIATION SURVEILLANCE
ATMOSPHERIC SAMPLES ABOVE BACKGROUND (EIC)

Sample Collection Period	*Net Tritium Concentrations (pCi/ml) (moisture)	(pCi/m^3) (air)	Atmospheric Dilution Factor
1200 - 2008, 10/27/70	40	25	$\approx 6 \times 10^6$
1215 - 2027, 10/28/70	7.2	9.9	$\approx 2 \times 10^7$
2028, 10/28 to 0400, 10/29/70	7.8	6.8	$\approx 2 \times 10^7$
1215 - 2003, 10/29/70	10	12	$\approx 1 \times 10^7$
2005, 10/29 to 0405, 10/30/70	8.0	7.1	$\approx 2 \times 10^7$
0405 - 1215, 10/30/70	26	22	$\approx 7 \times 10^6$
1215 - 2007, 10/30/70	5.9	4.8	$\approx 3 \times 10^7$
2010, 10/30 to 0410, 10/31/70	21	6.8	$\approx 2 \times 10^7$
1200 - 2008, 10/31/70	6.0	3.5	$\approx 4 \times 10^7$
2010, 10/31 to 0405, 11/1/70	51	53	$\approx 3 \times 10^6$
0405 - 1240, 11/1/70	6.5	2.6	$\approx 6 \times 10^7$
1240 - 2018, 11/1/70	12	4.0	$\approx 4 \times 10^7$
2018, 11/1 to 0405, 11/2/70	4.5	1.3	$\approx 1 \times 10^8$
0405 - 1200, 11/2/70	14	9.0	$\approx 2 \times 10^7$
2010, 11/2 to 0400, 11/3/70	6.5	3.9	$\approx 4 \times 10^7$
0400 - 1200, 11/3/70	31	14	$\approx 1 \times 10^7$
1200 - 2017, 11/3/70	39	20	$\approx 8 \times 10^6$
2020, 11/3 to 0404, 11/4/70	11	8.2	$\approx 2 \times 10^7$

(1200, 10/26 - 0404 11/4/70) Total Samples Collected: 26 (8 were background)
*Corrected for 1 pCi/ml ^{3}H Background at Access Control Van

Note: The validity of the pCi/m^3 and dilution factor values has been questioned due to the sampling technique. While it is probable that the actual concentrations were somewhat higher, they should not exceed these values by more than an order-of-magnitude.

TABLE IV. ON-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND (LRL BIO*MED)
(Page 1 of 3)

Sample Collection Period	Location	Net Tritium Concentrations (pCi/ml) (moisture) *	(pCi/m^3) (air)	Atmospheric Dilution Factor
10/27/70				
0842 - 1145	Area Surrounding Rulison flare stack, P1	34	≈21	≈7x10^6
" "	" " " , P2	35	≈22	≈7x10^6
0848 - 1150	" " " , P3	19	≈12	≈1x10^7
" "	" " " , P4	8.5	≈5.4	≈3x10^7
0855 - 1200	" " " , P5	20	≈13	≈1x10^7
" "	" " " , P6	6.6	≈4.2	≈4x10^7
0905 - 1155	AEC Trailer, Lower Pad	13	≈8.2	≈2x10^7
1145 - 1503	Area Surrounding , P1	33	≈21	≈7x10^6
" "	Rulison flare stack, P2	89	≈56	≈3x10^6
1200 - 1503	" " " , P3	14	≈8.8	≈2x10^7
1210 - 1503	" " " , P4	10	≈6.3	≈2x10^7
" "	" " " , P5	18	≈11	≈1x10^7
" "	" " " , P6	5.6	≈3.5	≈4x10^7
" "	" " " , P7	3.5	≈2.2	≈7x10^7
1145 - 1510	AEC Trailer, Lower Pad (A)	7.7	≈4.9	≈3x10^7
" "	" " " (B)	7.6	≈4.8	≈3x10^7
10/28/70				
0719 - 1019	Area Surrounding Rulison flare stack, P1	86	≈16	≈1x10^7
0720 - 1021	" " " , P2	83	≈16	≈1x10^7
0721 - 1030	" " " , P3	110	≈21	≈7x10^6
0722 - 1033	" " " , P4	97	≈18	≈8x10^6
0723 - 1033	" " " , P5	79	≈15	≈1x10^7
0724 - 1035	" " " , P6	88	≈17	≈8x10^6
0725 - 1036	" " " , P7	64	≈12	≈1x10^7
1019 - 1310	" " " , P1	36	≈6.8	≈2x10^7
1022 - 1310	" " " , P2	22	≈4.2	≈4x10^7
1030 - 1310	" " " , P3	18	≈3.4	≈4x10^7
1031 - 1310	" " " , P4	32	≈6.1	≈2x10^7
1033 - 1310	" " " , P5	24	≈4.6	≈3x10^7
1035 - 1310	" " " , P6	22	≈4.2	≈4x10^7
1037 - 1320	Near flare stack, P7	10	≈1.9	≈8x10^7
0730 - 1053	AEC Trailer, Lower Pad	260	≈49	≈3x10^6

*(Corrected for 1 pCi/ml ^{3}H Background)

Note: The validity of the pCi/m^3 and dilution factor values has been questioned, since the absolute humidity estimates were based on the EIC samples shown in Table III. It is probable that the actual concentrations do not exceed these values by more than an order-of-magnitude.

TABLE IV. ON-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND (LRL BIO MED)
(Page 2 of 3)

Sample Collection Period	Location	Net Tritium Concentrations (pCi/ml) * (moisture)	(pCi/m^3) (air)	Atmospheric Dilution Factor
10/29/70				
0735 - 1020	Area Surrounding Rulison flare stack, P1	57	≈52	≈$3x10^6$
0735 - 1022	" " " , P2	49	≈45	≈$3x10^6$
0735 - 1024	" " " , P3	65	≈59	≈$3x10^6$
0735 - 1025	" " " , P4	54	≈49	≈$3x10^6$
0735 - 1027	" " " , P5	44	≈40	≈$4x10^6$
0735 - 1029	" " " , P6	48	≈44	≈$3x10^6$
0735 - 1031	" " " , P7	42	≈38	≈$4x10^6$
0730 - 1015	AEC Trailer, Lower Pad	72	≈66	≈$2x10^6$
1315 - 10/29 to 1100 - 10/30	Near flare stack, P4	36	≈36	≈$4x10^6$
10/30/70				
1100 - 1358	" " " , P4	30	≈25	≈$6x10^6$
1105 - 1350	" " " , P1	7.1	≈5.8	≈$3x10^7$
1052 - 1340	" " "	3.3	≈2.7	≈$6x10^7$
1052 - 1345	" " "	3.5	≈2.9	≈$5x10^7$
1340 - 1503	Lower Pad	3.3	≈2.7	≈$6x10^7$
1345 - 1508	Near flare stack	1.8	≈1.5	≈$1x10^8$
1350 - 1515	" " " , P1	4.9	≈4.0	≈$4x10^7$
1400 - 1528	" " " P4	42	≈34	≈$4x10^6$
10/31/70				
1325 - 1945	" " " P1	5.3	≈3.1	≈$5x10^7$
1310 - 1947	" " " P4	30	≈17	≈$9x10^6$
1311 - 1945	" " " P5	15	≈8.7	≈$2x10^7$
1326 - 1945	" " " P8	5.2	≈3.0	≈$5x10^7$
1330 - 2000	" " " P1	6.6	≈3.8	≈$4x10^7$
1337 - 2005	AEC Trailer, Lower Pad	6.0	≈3.5	≈$4x10^7$
1945, 10/31 to 0830, 11/1/70	Near flare stack, P1	5.7	≈5.9	≈$3x10^7$
1945, 10/31 to 0903, 11/1/70	" " " P4	80	≈83	≈$2x10^6$
1945, 10/31 to 0905, 11/1/70	" " " P5	16	≈17	≈$9x10^6$
1945, 10/31 to 0850, 11/1/70	" " " P8	5.0	≈5.2	≈$3x10^7$
2010, 10/31 to 0833, 11/1/70	AEC Trailer, Lower Pad	5.0	≈5.2	≈$3x10^7$

* Corrected for 1 pCi/ml ^{3}H Background)

Note: The validity of the pCi/m^3 and dilution factor values has been questioned, since the absolute humidity estimates were based on the EIC samples shown in Table III. It is probable that the actual concentrations do not exceed these values by more than an order-of-magnitude.

TABLE IV. ON-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND (LRL BIO MED)
(page 3 of 3)

Sample Collection Period	Location		Net Tritium Concentrations (pCi/ml) (moisture) *	(pCi/m^3) (air)	Atmospheric Dilution Factor
11/1/70					
0830 - 1630	Near Flare stack	P1	7.2	≈2.7	≈6x10^7
0903 - 1615	" " "	P4	34	≈13	≈1x10^7
0905 - 1815	" " "	P5	13	≈4.8	≈3x10^7
0850 - 1630	" " "	P8	6.2	≈2.3	≈7x10^7
0833 - 1650	AEC Trailer, Lower Pad		4.0	≈1.5	≈1x10^8
1706, 11/1 0940, 11/2/70	Near flare stack	P1	28	≈13	≈1x10^7
1706, 11/1 to 0930, 11/2/70	" " "	P4	18	≈8.5	≈2x10^7
1706, 11/1 to 0930, 11/2/70	" " "	P5	7.1	≈3.1	≈5x10^7
1700, 11/1 to 0930, 11/2/70	" " "	P8	27	≈13	≈1x10^7
1705, 11/1 to 0930, 11/2/70	AEC Trailer, Lower Pad		24	≈11	≈1x10^7
11/2/70					
0940 - 1645	Near flare stack	P1	3.0	≈1.8	≈8x10^7
0930 - 1638	" " "	P4	34	≈20	≈8x10^6
0930 - 1637	" " "	P5	20	≈12	≈1x10^7
0930 - 1631	" " "	P8	1.9	≈1.1	≈1x10^8
0930 - 1634	AEC Trailer, Lower Pad		1.0	≈0.59	≈3x10^8
1645, 11/2 to 0905, 11/3/70	Near flare stack	P1	23	≈12	≈1x10^7
1640, 11/2 to 0905, 11/3/70	" " "	P4	29	≈15	≈1x10^7
1640, 11/2 to 0905, 11/3/70	" " "	P5	13	≈6.9	≈2x10^7
11/3/70					
0855 - 1405	" " "	P1	97	≈48	≈3x10^6
0905 - 1407	" " "	P4	91	≈45	≈3x10^6
0905 - 1407	" " "	P5	73	≈36	≈4x10^6

Total Samples Collected: 80

*(Corrected for 1 pCi/ml ^{3}H Background)

Note: The validity of the pCi/m^3 and dilution factor values has been questioned, since the absolute humidity estimates were based on the EIC samples shown in Table III. It is probable that the actual concentrations do not exceed these values by more than an order-of-magnitude.

TABLE V. ON-SITE RADIATION SURVEILLANCE - SNOW AND WATER SAMPLES ABOVE BACKGROUND (LRL BIO-MED)

Sample Collection Period	Location	Type of Sample	Net Tritium Concentrations (pCi/ml) * (moisture)	
10/27/70				
0915	Near flare stack	Snow	73	
0921	" " "	"	143	
0923	" " " , P2	"	89	
0926	" " " , P3	"	23	
0927	" " " , P4	"	0.8	
0929	" " " , P5	"	1.3	Total Samples: 12
0949	" " "	"	89	(5 were background)
10/28/70				
1121	Near flare stack, P1	Snow (0-½" deep)	70	
1120	" " " , P1	" (0-1" deep)	21	
1115	AEC Trailer, Lower Pad	" (0-1" deep)	27	Total Samples: 6
1123	Near flare stack	" (0-½" deep)	74	(2 were background)
10/29/70				
1100	Near flare stack, P1	Snow (≈0-½" deep)	44	Total Snow Samples: 4
1105	" " "	" (≈0-½" deep)	81	Total Water Samples: 1
1126	" " " , P5	"	23	(background)
1330	" " " , P7	"	30	
10/30/70				
1115	Near flare stack	Snow (≈0-½" deep)	23	Total Snow Samples: 3
1135	AEC Trailer, Lower Pad	"	10	(2 were background)
1354	Near flare stack	"	17	
10/31/70				
1346	Near flare stack, P1	Snow	5.9	Total Samples: 1
11/1/70				
0830	Near flare stack, P1	Snow (new snow)	6.3	
0905	" " " , P5	" " "	60	
0850	" " " , P8	" " "	6.1	
0835	" " "	" " "	8.2	
0834	AEC Trailer, Lower Pad	" " "	5.0	
1725	Near flare stack, P1	" " "	5.6	Total Samples: 6
11/2/70				
1100	Battlement Creek (On-Site)	Water	-	Total Samples: 1 (background)

Total snow samples: 32 (9 were background)
Total water samples: 2 (background)

*(Corrected for 1 pCi/ml ^{3}H background)

TABLE VI. ON-SITE RADIATION SURVEILLANCE - SNOW SAMPLES ABOVE BACKGROUND (EIC)

Sample Collection	Heading and Distance From Flare (Degrees and Yards)	Net Tritium Concentrations (pCi/ml moisture) *
10/27/70	≈360°, 20 Yards	320
"	≈270°, " "	1,800
10/28/70	≈ 90°, " "	72
"	≈270°, " "	65
10/29/70	≈360°, " "	1,400
"	≈ 90°, " "	990
"	≈180°, " "	5.4
"	≈270°, " "	6.2
10/30/70	≈360°, " "	3.1
"	≈ 90°, " "	1.6
"	≈180°, " "	3.9
"	≈270°, " "	21
10/31/70	≈360°, " "	7.0
"	≈ 90°, " "	7.0
"	≈180°, " "	1.6
11/1/70	≈360°, " "	580
"	≈ 90°, " "	25
"	≈180°, " "	3.1
"	≈270°, " "	71
11/2/70	≈360°, " "	11
"	≈ 90°, " "	10
"	≈180°, " "	7.0
"	≈270°, " "	5.4
11/3/70	≈360°, " "	12
"	≈ 90°, " "	6.2
"	≈180°, " "	8.5
"	≈270°, " "	10
11/4/70	≈360°, " "	3.1

* (Corrected for Pre-flaring Background)

TABLE VII. OFF-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND

(Page 1 of 6)

Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Organization taking sample & type of sample	Radioactivity Concentrations (pCi/ml) (moisture)	Net ^{3}H (pCi/m^{3}) (air)	Net ^{85}Kr (pCi/m^{3}) (air)	Atmospheric Dilution Factor	Maximum Downwind Day (pCi/m^{3})	Predicted Concentration Night (pCi/m^{3})
10/27/60								
1720 - 1750	Station D-29, ≈80°, ≈16 miles	SWRHL, Portable compressed air sample	4.6	12	4	≈10^{7}	≈30	≈40
1530 - 1700	Station D-31, ≈90°, ≈17 miles	SWRHL, Portable molysieve sample	6.3	17	-	≈10^{7}	≈30	≈40
1547 - 1717	Station D-33, ≈100° ≈16 miles	SWRHL, Portable molysieve sample	7.9	23	-	≈7×10^{6}	≈30	≈40
1432	Plume, 40°, ≈1.0 mile (11,500 MSL)	SWRHL, Aircraft compressed air sample	I	-	140	≈10^{6}	-	-
1544	Plume, 80°, ≈7.5 miles (11,000 MSL)	SWRHL, Aircraft compressed air sample	I	-	21	≈5×10^{6}	-	-
D- 1010, 10/27 to 1225, 10/29/70	Grand Valley, ≈300°, ≈7.0 miles	SWRHL, Fixed molysieve* sample	0.8	0.2	-	≈7×10^{8}	≈160	≈5
0800, 10/27 to 1040, 10/29/70	Clem Ranch, ≈320°, ≈3.5 miles	SWRHL, Fixed molysieve sample	1.7	2.3	-	≈7×10^{7}	≈200	<1
D- 1020, 10/27 to 0840, 10/29/70	Jackett Ranch, ≈90°, ≈17 miles	SWRHL, Fixed molysieve sample	0.7	1.1	-	≈2×10^{8}	≈30	≈40
D- 0755, 10/27 to 1050, 10/28/70	Clem Ranch, ≈320°, ≈3.5 miles	SWRHL, Freeze-out sample	1.2	≈1.9	-	≈8×10^{7}	≈200	<1
D- 0830, 10/27 to 0730, 10/28/70	Griffith Ranch, ≈170°, ≈11 miles	SWRHL, Freeze-out sample	0.9	≈1.4	-	≈10^{8}	≈60	≈20
SWRHL (10/27/70) TOTAL SAMPLES COLLECTED: 20 (10 were background)								
1651, 10/27 to 0740, 10/28/70	Station D-2, ≈340° ≈0.25 mile	LRL Bio-Med, Freeze-out sample	47	≈75	-	≈2×10^{6}	-	-
1704, 10/27 to 0755, 10/28/70	Station D-3, ≈340° ≈0.5 mile	LRL Bio-Med, Freeze-out sample	29	≈46	-	≈3×10^{6}	-	-
1653, 10/27 to 0810, 10/28/70	Station D-4, ≈340° ≈1.0 mile	LRL Bio-Med, Freeze-out sample	23	≈37	-	≈4×10^{6}	≈150	<1

(LRL pCi/m^{3} estimates based on SWRHL values of ≈1.6 ml/m^{3} ± 0.3)
(Corrected for 1 pCi/ml ^{3}H and 10 pCi/m^{3} ^{85}Kr background)

I - Insufficient moisture for analysis
* Colloquialism for molecular sieve

TABLE VII.
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OFF-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND

Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Organization taking sample & type of sample	Radioactivity Concentrations (pCi/ml) (moisture)	Net ^{3}H (pCi/m^3) (air)	Net ^{85}Kr (pCi/m^3) (air)	Atmospheric Dilution Factor	Maximum Downwind Day (pCi/m^3)	Predicted Concentration Night (pCi/m^3)
1655, 10/27 to 0818, 10/28/70	Station D-5, ≈340° ≈1.5 miles	LRL Bio-Med, Freeze-out sample	3.6	≈5.7	-	$\approx 3\times10^{7}$	≈200	<1
1710, 10/27 to 0825, 10/28/70	Station D-6, ≈340° ≈2.0 miles	LRL Bio-Med, Freeze-out sample	3.9	≈6.2	-	$\approx 2\times10^{7}$	≈300	<1
D- 0725 - 1019, 10/27	Station A15, ≈340° ≈6 miles	LRL Bio-Med, Freeze-out sample	≈0.6	≈1.0	-	$\approx 2\times10^{8}$	≈110	≈3
		LRL (10/27/70) TOTAL SAMPLES COLLECTED: 18 (12 were background)						
10/28/70								
0615 - 0815	C. P. Pad, ≈330° ≈2.5 miles	SWRHL, Portable molysieve sample	18	27	-	$\approx 5\times10^{6}$	≈280	<1
0600 - 0800	Clem Ranch, ≈320° ≈3.5 miles	SWRHL, Portable molysieve sample	4.1	7.6	-	$\approx 2\times10^{7}$	≈200	<1
1003 - 1042	Plume, 135° ≈3.5 miles	SWRHL, Aircraft cryogenic sample	27	72	-	$\approx 2\times10^{6}$	-	-
0645 - 0710	C. P. Pad, ≈330° ≈2.5 miles	SWRHL, compressed air sample	I	-	37	$\approx 3\times10^{6}$	≈280	<1
		SWRHL (10/28/70) TOTAL SAMPLES COLLECTED: 4						
D- 0703 - 1035	Station A11, ≈280° ≈7.0 miles	LRL Bio-Med, Freeze-out sample	1.1	≈1.8	-	$\approx 8\times10^{7}$	≈100	≈5
0652 - 1019	Station A13, ≈300° ≈7.0 miles	LRL Bio-Med, Freeze-out sample	1.5	≈2.4	-	$\approx 6\times10^{7}$	≈100	≈5
D- 0647 - 1009	Station A14, ≈320° ≈6.5 miles	LRL Bio-Med, Freeze-out sample	1.3	≈2.1	-	$\approx 7\times10^{7}$	≈100	≈4
0644 - 1002	Station A15, ≈340° ≈6.0 miles	LRL Bio-Med, Freeze-out sample	4.3	≈6.9	-	$\approx 2\times10^{7}$	≈110	≈3
D- 0710 - 1106	Station B1, ≈300° ≈5.0 miles	LRL Bio-Med, Freeze-out sample	0.6	≈1.0	-	$\approx 2\times10^{8}$	≈130	≈1
0700 - 1040	Station B3, ≈315° ≈4.5 miles	LRL Bio-Med, Freeze-out sample	2.0	≈3.2	-	$\approx 5\times10^{7}$	≈150	<1
0652 - 1025	Station B4, ≈320° ≈4.0 miles	LRL Bio-Med, Freeze-out sample	3.1	≈5.0	-	$\approx 3\times10^{7}$	≈180	<1
0646 - 1015	Station B6, ≈335° ≈3.5 miles	LRL Bio-Med, Freeze-out sample	3.1	≈5.0	-	$\approx 3\times10^{7}$	≈200	<1

TABLE VII.
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OFF-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND

Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Organization taking sample & type of sample	Radioactivity Concentrations (pCi/ml) (moisture)	Net ^{3}H (pCi/m^3) (air)	Net ^{85}Kr (pCi/m^3) (air)	Atmospheric Dilution Factor	Maximum Downwind Day (pCi/m^3)	Predicted Concentration Night (pCi/m^3)
0642 - 1008	Station B8, ≈340° ≈4.5 miles	LRL Bio-Med, Freeze-out sample	2.2	≈3.5	-	$\approx 4 \times 10^{7}$	≈150	<1
0635 - 0950	Station B10, ≈10° ≈4.0 miles	LRL Bio-Med, Freeze-out sample	6.2	≈10	-	$\approx 2 \times 10^{7}$	≈180	<1
0630 - 0943	Station B11, ≈30° ≈4.0 miles	LRL Bio-Med, Freeze-out sample	11	≈17	-	$\approx 9 \times 10^{6}$	≈180	<1
0625 - 0938	Station B12, ≈30° ≈4.5 miles	LRL Bio-Med, Freeze-out sample	4.5	≈7.2	-	$\approx 2 \times 10^{7}$	≈200	<1
0621 - 0931	Station B13, ≈30° ≈5.5 miles	LRL Bio-Med, Freeze-out sample	7.4	≈12	-	$\approx 1 \times 10^{7}$	≈120	≈2
0603 - 0912	Station B14, ≈30° ≈5.5 miles	LRL Bio-Med, Freeze-out sample	3.6	≈5.8	-	$\approx 3 \times 10^{7}$	≈120	≈2
0611 - 0920	Station B15, ≈40° ≈6.5 miles	LRL Bio-Med, Freeze-out sample	3.0	≈4.8	-	$\approx 3 \times 10^{7}$	≈100	≈4
D-0624 - 0935	Station C1, ≈30° ≈7.0 miles	LRL Bio-Med, Freeze-out sample	0.6	≈1.0	-	$\approx 2 \times 10^{8}$	≈100	≈5
D-0630 - 0945	Station C2, ≈0° ≈5.8 miles	LRL Bio-Med, Freeze-out sample	0.9	≈1.4	-	$\approx 1 \times 10^{8}$	≈110	≈3
D-0635 - 0959	Station C3, ≈340° ≈5.1 miles	LRL Bio-Med, Freeze-out sample	1.3	≈2.1	-	$\approx 7 \times 10^{7}$	≈130	≈1
0610 - 0909	Station C17, ≈40° ≈13 miles	LRL Bio-Med, Freeze-out sample	1.8	≈2.9	-	$\approx 5 \times 10^{7}$	≈50	≈20
D-0605 - 0900	Station C18, ≈40° ≈13 miles	LRL Bio-Med, Freeze-out sample	1.3	≈2.1	-	$\approx 7 \times 10^{7}$	≈50	≈20
0740 - 1130	Station D2, ≈340° ≈0.25 miles	LRL Bio-Med, Freeze-out sample	21	≈34	-	$\approx 4 \times 10^{6}$	-	-
0755 - 1137	Station D3, ≈340° ≈0.50 miles	LRL Bio-Med, Freeze-out sample	18	≈29	-	$\approx 5 \times 10^{6}$	-	-
0810 - 1143	Station D4, ≈340° ≈1.0 miles	LRL Bio-Med, Freeze-out sample	8.4	≈13	-	$\approx 1 \times 10^{7}$	≈150	<1
0818 - 1150	Station D5, ≈340° ≈1.5 miles	LRL Bio-Med, Freeze-out sample	3.6	≈5.8	-	$\approx 3 \times 10^{7}$	≈200	<1
0825 - 1200	Station D6, ≈340° ≈2.0 miles	LRL Bio-Med, Freeze-out sample	3.1	≈5.0	-	$\approx 3 \times 10^{7}$	≈300	<1

TABLE VII.
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OFF-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND

Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Organization taking sample & type of sample	Radioactivity Concentrations (pCi/ml) (moisture)	Net ^{3}H (pCi/m^3) (air)	Net ^{85}Kr (pCi/m^3) (air)	Atmospheric Dilution Factor	Maximum Downwind Day (pCi/m^3)	Predicted Concentration Night (pCi/m^3)
2043 , 10/28 to 0635, 10/29/70	Station B11, ≈30° ≈4.0 miles	LRL Bio-Med, Freeze-out sample	7.0	≈11	-	$\approx 1 \times 10^7$	≈180	<1
2045, 10/28 to 0620, 10/29/70	Station B13, ≈30° ≈5.5 miles	LRL Bio-Med, Freeze-out sample	3.0	≈4.8	-	$\approx 3 \times 10^7$	≈120	≈2
LRL BIO-MED (10/28/70) TOTAL SAMPLES COLLECTED: 32 (5 were background)								
10/29/70								
0655 - 0959	Station A12, ≈290° ≈7.0 miles	LRL Bio-Med, Freeze-out sample	2.0	≈3.2	-	$\approx 5 \times 10^7$	≈110	≈5
0717 - 1050	Station B1, ≈300° ≈5.0 miles	LRL Bio-Med, Freeze-out sample	1.8	≈2.9	-	$\approx 5 \times 10^7$	≈130	≈1
D- 0704 - 1029	Station B4, ≈320° ≈4.0 miles	LRL Bio-Med, Freeze-out sample	1.2	≈1.9	-	$\approx 8 \times 10^7$	≈180	<1
D- 0700 - 1024	Station B5, ≈340° ≈4.1 miles	LRL Bio-Med, Freeze-out sample	1.2	≈1.9	-	$\approx 8 \times 10^7$	≈180	<1
D- 0655 - 1015	Station B6, ≈335° ≈3.5 miles	LRL Bio-Med, Freeze-out sample	1.2	≈1.9	-	$\approx 8 \times 10^7$	≈200	<1
D- 0651 - 1006	Station B7, ≈340° ≈4.3 miles	LRL Bio-Med, Freeze-out sample	0.9	≈1.4	-	$\approx 1 \times 10^8$	≈150	<1
0648 - 0957	Station B8, ≈340° ≈4.5 miles	LRL Bio-Med, Freeze-out sample	1.5	≈2.4	-	$\approx 6 \times 10^7$	≈150	<1
D- 0642 - 0950	Station B9, ≈0° ≈3.4 miles	LRL Bio-Med, Freeze-out sample	1.0	≈1.6	-	$\approx 9 \times 10^7$	≈220	<1
0638 - 0943	Station B10, ≈10° ≈4.0 miles	LRL Bio-Med, Freeze-out sample	1.5	≈2.4	-	$\approx 6 \times 10^7$	≈180	<1
D- 0635 - 0936	Station B11, ≈30° ≈4.0 miles	LRL Bio-Med, Freeze-out sample	1.4	≈2.2	-	$\approx 7 \times 10^7$	≈180	<1
0627 - 0928	Station B12, ≈30° ≈4.5 miles	LRL Bio-Med, Freeze-out sample	1.8	≈2.9	-	$\approx 5 \times 10^7$	≈150	<1
0626 - 0926	Station B13, ≈30° ≈5.5 miles	LRL Bio-Med, Freeze-out sample	3.4	≈5.4	-	$\approx 3 \times 10^7$	≈120	≈2
D- 0615 - 0912	Station B15, ≈40° ≈6.5 miles	LRL Bio-Med, Freeze-out sample	1.2	≈1.9	-	$\approx 8 \times 10^7$	≈100	≈4
D- 0615 - 0910	Station C14, ≈25° ≈10 miles	LRL Bio-Med, Freeze-out sample	0.9	≈1.4	-	$\approx 1 \times 10^8$	≈60	≈20

TABLE VII.
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OFF-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND

Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Organization taking sample & type of sample	Radioactivity Concentrations (pCi/ml) (moisture)	Net ^{3}H (pCi/m^3) (air)	Net ^{85}Kr (pCi/m^3) (air)	Atmospheric Dilution Factor	Maximum Downwind Day (pCi/m^3)	Predicted Concentration Night (pCi/m^3)
D-0610 - 0906	Station C17, ≈40° ≈13 miles	LRL Bio-Med, Freeze-out sample	1.1	≈1.8	-	$\approx 8 \times 10^7$	≈50	≈20
0749 - 1150	Station D2, ≈340° ≈0.25 miles	LRL Bio-Med, Freeze-out sample	22	≈35	-	$\approx 4 \times 10^6$	-	-
0752 - 1156	Station D3, ≈340° ≈0.50 miles	LRL Bio-Med, Freeze-out sample	18	≈29	-	$\approx 5 \times 10^6$	-	-
0756 - 1201	Station D4, ≈340° ≈1.0 miles	LRL Bio-Med, Freeze-out sample	11	≈18	-	$\approx 8 \times 10^6$	≈150	<1
0759 - 1208	Station D5, ≈340° ≈1.5 miles	LRL Bio-Med, Freeze-out sample	1.9	≈3.0	-	$\approx 5 \times 10^7$	≈200	<1
		LRL BIO-MED (10/29/70) TOTAL SAMPLES COLLECTED: 33 (14 were background)						
D-1245, 10/29 to 1240, 10/31/70	Grand Valley, ≈300° ≈7.0 miles	SWRHL, Fixed molysieve sample	0.6	0.8	-	$\approx 2 \times 10^8$	≈100	≈5
		SWRHL (10/29 to 10/31/70) TOTAL SAMPLES COLLECTED: 7 (6 were background)						
10/30/70 D-0648 - 1029	Station B5, ≈340° ≈4.1 miles	LRL Bio-Med, Freeze-out sample	1.2	≈1.9	-	$\approx 8 \times 10^7$	≈180	<1
D-0629 - 0939	Station B9, ≈0° ≈3.4 miles	LRL Bio-Med, Freeze-out sample	1.2	≈1.9	-	$\approx 8 \times 10^7$	≈220	<1
0625 - 0934	Station B10, ≈10° ≈4.0 miles	LRL Bio-Med, Freeze-out sample	2.4	≈3.8	-	$\approx 4 \times 10^7$	≈180	<1
0622 - 0929	Station B11, ≈30° ≈4.0 miles	LRL Bio-Med, Freeze-out sample	1.6	≈2.6	-	$\approx 6 \times 10^7$	≈180	<1
D-0608 - 0857	Station B14, ≈30° ≈5.5 miles	LRL Bio-Med, Freeze-out sample	0.7	≈1.1	-	$\approx 1 \times 10^8$	≈120	≈2
		LRL BIO-MED (10/30/70) TOTAL SAMPLES COLLECTED: 15 (10 were background)						

TABLE VII.
(Page 6 of 6)

OFF-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND

Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Organization taking sample & type of sample	Radioactivity Concentrations (pCi/ml) (moisture)	Net ^{3}H (pCi/m^{3}) (air)	Net ^{85}Kr (pCi/m^{3}) (air)	Atmospheric Dilution Factor	Maximum Downwind Day (pCi/m^{3})	Predicted Concentration Night (pCi/m^{3})
		LRL BIO-MED (10/31- 11/1/70) TOTAL SAMPLES COLLECTED: 28 (all were background)						
		SWRHL (10/31 - 11/2/70) TOTAL SAMPLES COLLECTED: 7 (all were background)						
		LRL BIO-MED (11/1/70) TOTAL SAMPLES COLLECTED: 14 (all were background)						
		LRL BIO-MED (11/2/70) TOTAL SAMPLES COLLECTED: 14 (all were background)						
D-1120, 11/2 to 1215, 11/4/70	Clem Ranch, ≈320° ≈3.5 miles	SWRHL, Fixed molysieve sample	1.0	1.6	-	$\approx 9 \times 10^{7}$	≈ 200	<1
		SWRHL (11/2 - 11/4/70) TOTAL SAMPLES COLLECTED: 7 (6 were background)						
		LRL BIO-MED (11/3/70) TOTAL SAMPLES COLLECTED: 14 (all were background)						
		TOTAL SAMPLES COLLECTED DURING HIGH-RATE: A. LRL Bio-Med: 168 (111 were background) B. SWRHL: 45 (29 were background)						

D- prefix indicates doubtful if really above background; near upper range of background samples. Included due to uncertainty as to practical upper limit on ^{3}H background.

TABLE VIII. OFF-SITE RADIATION SURVEILLANCE - ENVIRONMENTAL SAMPLES

Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Organization taking sample and type of sample	Net Tritium Levels
10/26 - 11/5/70	Area Surrounding Rulison Site	SWRHL, Precipitation Samples:	6 (all were background)
		" Water Samples:	31 " " "
		" *Urine Samples:	20 " " "
		" Deer Kidneys:	3 " " "
		" Beef Kidneys:	1 (background)
		" Hog Kidneys:	1 "
		" Cow Blood:	1 "
		" Sheep Blood:	1 "
		" Milk Samples:	8 (all were background)
1400, 11/4/70	≈330°, ≈0.25 miles	" Vegetation Sample:	1.9 pCi/ml (1.0 pCi/gm wet)
1430, 11/4/70	≈330°, ≈0.5 miles	" " "	1.0 pCi/ml (0.47 pCi/gm wet)
1600, 11/5/70	≈330°, ≈0.25 miles	" " "	1.5 pCi/ml (0.60 pCi/gm wet)
1535, 11/5/70	≈330°, ≈0.5 miles	" " "	0.6 pCi/ml (0.30 pCi/gm wet)
	TOTAL SWRHL VEGETATION SAMPLES: 14 (10 were background)		
1400, 11/4/70	≈330°, ≈0.25 miles	" Soil Sample	0.50 pCi/ml (0.15 pCi/gm wet)
1545, 11/4/70	≈330°, ≈0.25 miles	" " "	0.60 pCi/ml (0.18 pCi/gm wet)
	TOTAL SWRHL SOIL SAMPLES: 14 (12 were background)		
10/27 - 11/3/70	Area Surrounding Rulison Site	LRL Bio-Med, Water Samples	
	TOTAL LRL BIO-MED WATER SAMPLES: 30 (all were background)		
1410, 10/28/70	Station D7, ≈170° ≈0.25 miles	LRL Bio-Med, Snow (top 1")	4.9 pCi/ml
	TOTAL LRL BIO-MED SNOW SAMPLES: 9 (8 were background)		

10/26 - 11/5/70 Area Surrounding Rulison - 51 SWRHL TLD measurements (all were background)

* All urine samples were at or below pre-flaring levels, but some had elevated ^{3}H levels before flaring - investigation showed they were due to tritium dialed wrist watches.

B. Second Production Test

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TABLE I. RADIOACTIVITY AND CHEMICAL COMPOSITION OF DRY RULISON GAS

Date	Org., method(s) of analysis, source of sample	RADIOACTIVITY (pCi/cc) ^{85}Kr	^{3}H (in H_2)	^{3}H (in C_1)	^{3}H (in C_2)	^{3}H (in C_3)	^{3}H (total)	^{14}C	$^{37,39}Ar$ (total)	^{222}Rn	CHEMICAL COMPOSITION (%) H_2	C_1	C_2	C_3	C_4	C_5-C_8	C_6H_6	C_7H_8	CO	CO_2	N_2	O_2	Ar	Total Gas Flowed (H^2CF)
12/1	EIC, Anton-112	130																						175
	EIC, Oxidizer						156(2)																	175
12/2	LRL, Lab.	116	13.9	113	8.3	1.1	136	0.28	-	0.035	12.7	44.4	2.23	0.48	←	0.24	→		ND	39.4	9.59	-	-	125
	SWRHL, Lab.	140					150																	125
	EIC, Anton-112	133																						130
	EIC, Oxidizer						143(3)																	130
12/3	EIC, Anton-112	130																						135
	EIC, Oxidizer						139(3)																	135
	CER, TRY-KRY	146(2)					147(2)																	135
12/4	EIC, Anton-112	129																						140
	EIC, Oxidizer						143(3)																	140
	CER, TRY-KRY	115(7)					133(7)																	140
12/5	EIC, Anton-112	128																						145
	EIC, Oxidizer						168(3)																	145
	CER, TRY-KRY	119(17)					129(17)																	145
	Isotopes, Lab.	130 17					140	0.42	1.44	0.011	10.9	46.0	2.77	0.53	0.37	0.14	0.034	0.003		38.7	0.26	0.060	0.018	140
12/6	EIC, Anton-112	128																						150
	EIC, Oxidizer						153(4)																	150
	CER, TRY-KRY	122(20)					132(20)																	150
12/7	EIC, Anton-112	122																						160
	EIC, Oxidizer						168																	160
	CER, TRY-KRY	119(13)					124(13)																	160
12/8	EIC, Anton-112	125																						165
	EIC, Oxidizer						127(3)																	165
	CER, TRY-KRY	127(5)					112(5)																	165
12/9	EIC, Anton-112	124																						170
	EIC, Oxidizer						152(3)																	170
12/10	LRL, Lab.	103	13.4	93.9	7.1	1.2	116	0.26	-	-	11.6	48.7	2.38	0.48	←	0.23	→		ND	36.1	0.46	ND	ND	170
	SWRHL, Lab.	110					120																	170
	EIC, Anton-112	124																						175
	EIC, Oxidizer						140(2)																	175
12/11	EIC, Anton-112	125																						180
	EIC, Oxidizer						129(2)																	180
12/12	EIC, Anton-112	121																						185
	EIC, Oxidizer						128(2)																	185
12/13	EIC, Anton-112	119																						190
	EIC, Oxidizer						141																	190
	Isotopes, Lab.	110	13				130	0.30	1.36	0.018	10.6	50.0	2.93	0.73	0.43	0.10	0.028	0.002		34.3	0.20	0.13	0.022	185
12/14	EIC, Anton-112	117																						195
	EIC, Oxidizer						118(2)																	195
12/15	EIC, Anton-112	113																						200
	EIC, Oxidizer						133(3)																	200
12/16	EIC, Anton-112	108																						205
	EIC, Oxidizer						132(2)																	205
12/17	EIC, Anton-112	103																						210
	EIC, Oxidizer						131(3)																	210

TABLE I. RADIOACTIVITY AND CHEMICAL COMPOSITION OF DRY SULISON GAS

Date	Org., method(s) of analysis, source of sample	RADIOACTIVITY (pCi/cc) ^{85}Kr	^{3}H (in H_2)	^{3}H (in C_1)	^{3}H (in C_2)	^{3}H (in C_3)	^{3}H (total)	^{14}C	$^{37,39}Ar$ (total)	^{222}Rn	CHEMICAL COMPOSITION (%) H_2	C_1	C_2	C_3	C_4	C_5-C_8	C_6H_6	C_7H_8	CO	CO_2	N_2	O_2	Ar	Total Gas Flowed (M^2CF)
12/18	EIC, Anton-112	105																						215
	EIC, Oxidizer						113(3)																	215
12/19	EIC, Anton-112	104																						220
	EIC, Oxidizer						138(3)																	220
12/20	LRL, Lab.	85.7	10.7	76.4	6.0	1.0	94.1	0.23	-	-	9.8	54.0	2.67	0.66	←		0.36	→	ND	32.2	0.30	ND	ND	225
	ORNL, Lab.	88	13.3	75.8	5.8	0.9	96	-	-	-	10.4	52.1	2.80	0.69	0.27	-	-	-	ND	32.7	ND	-	-	225
	Isotopes, Lab.	100	14.9	-	-	-	110	0.25	-	-	7.7	56.0	2.77	0.70	←		0.55	→	-	31.7	0.40	-	-	220
	SWRHL, Lab.	100					110																	225
	EIC, Anton-112	104																						225
	EIC, Oxidizer						130(2)																	225
	ORNL, Lab. (After Separator)	91	13.0	76.5	5.7	0.9	96	-	-	-	10.2	50.3	2.67	0.70	0.24	-	-	-	ND	32.5	ND	ND	-	225

Key: H_2 = hydrogen gas, C_1 = methane, C_2 = ethane, C_3 = propane, C_4 = butane, C_5-C_8 = higher hydrocarbons, C_6H_6 = benzene, C_7H_8 = toluene, CO = carbon monoxide, CO_2 = carbon dioxide, N_2 = nitrogen gas, O_2 = oxygen gas, Ar = stable argon.

Note: Values in ( ) represent the number of samples included in the mean.

All radioactivity corrected to time of sampling. All EIC samples taken from flare line; all others from wellhead unless otherwise noted.

ND - not detected.

TABLE II. Rulison Radioactivity Release Estimates

TIME INTERVAL	RADIOACTIVITY IN DRY GAS								TRITIUM IN WATER & HYDROCARBONS					Total ^3H (Ci)	Total Gas Out (Ci)	Gas Flow (MMCF)
	$[^{85}Kr]$ (pCi/cc)	^{85}Kr (Ci)	$[^3H]_g$ (pCi/cc)	^3H_g (Ci)	$[^{14}C]$ (pCi/cc)	^{14}C (Ci)	$[^{203}Hg]$ (pCi/m^3)	^{203}Hg (μCi)	$[^3H]_w$ (pCi/ml)	$[^3H]_v$ (pCi/ml)	$[^3H]_{sw}$ (pCi/ml)	$[^3H]_{sh}$ (pCi/ml)	^3H (Ci)			
1240, 12/1 to 0800, 12/2/70	130	15.3	156	18.3	0.28	0.033	12.7	1.49	None	0.886(5)	None	None	0.13	18.4	33.7	4.40
0800, 12/2 to 0800, 12/3/70	133	19.0	160	22.8	0.27	0.039	12.7	1.81	None	1.92(5)	3.64(5) 5.23(5)	0.819(5)	2.09	24.9	43.9	5.34
0800, 12/3 to 0800, 12/4/70	130	17.6	156	21.1	0.27	0.037	12.7	1.72	0.905(5)	0.796(5)	4.81(5) 3.14(5)		12.60	33.7	51.3	5.09
0800, 12/4 to 0800, 12/5/70	129	17.5	155	21.0	0.27	0.036	12.7	1.72	0.961(5)	1.23(5)	3.14(5) 4.27(5) 4.81(5) 3.82(5)	0.908(5)	23.50	44.5	62.0	5.07
0800, 12/5 to 0800, 12/6/70	128	17.6	154	21.1	0.27	0.037	12.7	1.74	3.60(5)	3.85(5)	4.27(5) 5.16(5)	0.845(5)	12.86	34.0	51.6	5.13
0800, 12/6 to 0800, 12/7/70	128	17.5	154	21.0	0.27	0.037	12.7	1.74	2.49(5)	2.83(5)	4.83(5) 5.98(5)	0.845(5) 0.936(5)	11.59	32.6	50.1	5.12
0800, 12/7 to 0800, 12/8/70	122	16.8	146	20.2	0.26	0.036	12.7	1.75	3.86(5)	3.34(5)	4.83(5) 4.83(5)		9.53	29.7	46.5	5.17
0800, 12/8 to 0800, 12/9/70	125	17.4	150	20.8	0.26	0.036	12.7	1.75	3.90(5)	3.30(5)	4.83(5)		11.71	32.5	49.9	5.15
0800, 12/9 to 0800, 12/10/70	124	17.3	149	20.8	0.26	0.036	12.7	1.77	5.40(5)	4.23(5)	4.68(5) 5.05(5) 4.93(5)		16.58	37.4	54.7	5.22
0800, 12/10 to 0800, 12/11/70	124	17.3	149	20.8	0.26	0.036	12.7	1.77	4.77(5)	4.17(5)	5.08(5) 5.24(5)	0.562(5)	14.30	35.1	52.4	5.24

TABLE II. Rulison Radioactivity Release Estimates
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	RADIOACTIVITY IN DRY GAS								TRITIUM IN WATER & HYDROCARBONS							
TIME INTERVAL	$[^{85}Kr]$ (pCi/cc)	^{85}Kr (Ci)	$[^{3}H]_g$ (pCi/cc)	$^{3}H_g$ (Ci)	$[^{14}C]$ (pCi/cc)	^{14}C (Ci)	$[^{203}Hg]$ (pCi/m^3)	^{203}Hg (μCi)	$[^{3}H]_w$ (pCi/ml)	$[^{3}H]_v$ (pCi/ml)	$[^{3}H]_{sw}$ (pCi/ml)	$[^{3}H]_{sh}$ (pCi/ml)	^{3}H (Ci)	Total ^{3}H (Ci)	Total Gas Out (Ci)	Gas Flow (60°F) (MMCF)
0800, 12/11 to 0800, 12/12/70	125	17.5	150	21.0	0.25	0.035	12.7	1.78	5.44(5)	4.08(5)	5.07(5) 5.24(5)		13.42	34.4	51.9	5.25
0800, 12/12 to 0800, 12/13/70	121	17.0	145	20.4	0.25	0.035	12.7	1.80	4.65(5)	4.12(5)	4.58(5) 5.60(5)		15.02	35.4	52.4	5.27
0800, 12/13 to 0800, 12/14/70	119	16.8	143	20.2	0.25	0.035	12.7	1.79	4.56(5)	3.50(5)	5.54(5) 4.58(5)	0.954(5)	17.88	38.1	54.9	5.27
0800, 12/14 to 0800, 12/15/70	117	16.5	140	19.8	0.25	0.035	12.7	1.78	5.91(5)	3.07(5)	5.23(5) 5.53(5)		15.56	35.4	51.8	5.26
0800, 12/15 to 0800, 12/16/70	113	15.8	136	19.0	0.24	0.034	12.7	1.78	5.57(5)	4.03(5)	4.05(5) 5.42(5)	1.30(5)	16.61	35.6	51.4	5.25
0800, 12/16 to 0800, 12/17/70	109	15.4	131	18.5	0.24	0.034	11.7	1.66	5.53(5)	3.93(5)	5.50(5) 4.05(5)		13.99	32.5	47.9	5.29
0800, 12/17 to 0800, 12/18/70	108	15.2	130	18.2	0.24	0.034	12.5	1.75	5.53(5)	4.25(5)	5.49(5) 7.39(5) 5.64(5) 5.68(5)		13.31	31.5	46.7	5.25
0800, 12/18 to 0800, 12/19/70	105	14.8	126	17.8	0.24	0.034	10.8	1.52	3.77(5)	4.20(5)	7.39(5) 4.71(5) 4.74(5) 5.06(5)	0.971(5)	20.39	38.2	53.0	5.27
0800, 12/19 to 0800, 12/20/70	104	14.7	120	17.7	0.23	0.032	11.7	1.65	6.24(5)	4.35(5)	4.71(5) 5.37(5) 4.18(5) 5.36(5)		16.33	34.0	48.7	5.27

TABLE II. Rulison Radioactivity Release Estimates

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	RADIOACTIVITY IN DRY GAS								TRITIUM IN WATER & HYDROCARBONS							
TIME INTERVAL	$[^{85}Kr]$ (pCi/cc)	^{85}Kr (Ci)	$[^{3}H]_g$ (pCi/cc)	$^{3}H_g$ (Ci)	$[^{14}C]$ (pCi/cc)	^{14}C (Ci)	$[^{203}Hg]$ (pCi/m^3)	^{203}Hg (μCi)	$[^{3}H]_w$ (pCi/ml)	$[^{3}H]_v$ (pCi/ml)	$[^{3}H]_{sw}$ (pCi/ml)	$[^{3}H]_{sh}$ (pCi/ml)	^{3}H (Ci)	Total ^{3}H (Ci)	Total Out (Ci)	Gas Flow (60°F) (MMCF)
0800, 12/20 to 1403, 12/20/70	104	3.7	125	4.4	0.23	0.008	11.0	0.39	4.21(5)	3.74(5)	4.85(5) 5.37(5)	0.857(5) 0.875(5)	7.59	12.0	15.7	1.34
Totals: (Int.-Rate)		321		385		≃0.68		≃32					265	650	971	99.7
Grand Total To Date:		791		863		≃1.6		≃81					470	1,333	2,120	222

Subscript Key: g = gas, w = water in gas after the separator, v = water vapor in gas after bulk liquid traps.

sw = water removed by separator, sh = hydrocarbon condensates removed by the separator

Note: Numerical values enclosed in parentheses are powers of ten, e.g. 4.1(5) = 4.1×10^5

TABLE III. ON-SITE RADIATION SURVEILLANCE
ATMOSPHERIC SAMPLES ABOVE BACKGROUND (EIC)

Sample Collection Period	*Net Tritium Concentrations (pCi/ml) (moisture)	(pCi/m^3) (air)	Atmospheric Dilution Factor
1900, 12/2 - 0020, 12/3/70	26	11	$\approx 1 \times 10^7$
0810, 12/2 - 0020, 12/3/70	23	14	$\approx 1 \times 10^7$
0020, 12/3 - 0813, 12/3/70	55	61	$\approx 2 \times 10^6$
0815, 12/3 - 0813, 12/4/70	7.2	5.5	$\approx 2 \times 10^7$
0815, 12/4 - 0827, 12/5/70	11	10	$\approx 1 \times 10^7$
0830, 12/5 - 0800, 12/6/70	27	26	$\approx 5 \times 10^6$
0800, 12/6 - 0830, 12/7/70	40	41	$\approx 3 \times 10^6$
0830, 12/7 - 0823, 12/8/70	26	27	$\approx 5 \times 10^6$
0800, 12/10 - 0800, 12/11/70	64	43	$\approx 3 \times 10^6$
0800, 12/11 - 0800, 12/12/70	27	24	$\approx 5 \times 10^6$
0800, 12/12 - 0800, 12/13/70	170	2.7	$\approx 5 \times 10^7$
0800, 12/13 - 0800, 12/14/70	34	30	$\approx 4 \times 10^6$
0800, 12/14 - 0800, 12/15/70	6.7	3.1	$\approx 4 \times 10^7$
0800, 12/15 - 0800, 12/16/70	18	17	$\approx 8 \times 10^6$
0800, 12/17 - 0800, 12/18/70	18	21	$\approx 6 \times 10^6$
0800, 12/18 - 0800, 12/19/70	3.4	1.2	$\approx 1 \times 10^8$
0800, 12/19 - 0800, 12/20/70	7.6	7.6	$\approx 2 \times 10^7$

* Corrected for 1 pCi/ml ^3H background at Access Control Van.

Note: The validity of the pCi/m^3 and atmospheric dilution factor values has been questioned due to the sampling technique. While it is probable that the actual concentrations were somewhat higher, they should not exceed these values by more than an order-of-magnitude.

TABLE IV. ON-SITE RADIATION SURVEILLANCE
SNOW SAMPLES ABOVE BACKGROUND (EIC)

Sample Collection Period	Heading and Distance from Flare (Degrees & Yards)	*Net Tritium Concentrations (pCi/ml moisture)
12/3/70	360°, 20 Yards	1,100
	90°, " "	580
	180°, " "	360
	270°, " "	490
12/4/70	360°, " "	2.4
	90°, " "	5,100
	180°, " "	31
	270°, " "	25
12/10/70	360°, " "	180
	90°, " "	33
	180°, " "	64
	270°, " "	21
12/15/70	360°, " "	100
	90°, " "	66
	180°, " "	110
	270°, " "	44
12/18/70	360°, " "	2,000
	90°, " "	600
	180°, " "	210
	270°, " "	100
12/19/70	360°, " "	440
	90°, " "	140
	180°, " "	230
	270°, " "	31
12/20/70	360°, " "	350
	90°, " "	220
	180°, " "	46
	270°, " "	250

* Corrected for background prior to high-rate flaring.

TABLE V.

(Page 1 of 3)

OFF-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND

Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Type of Sample	Radioactivity Concentrations* Net ^{3}H (pCi/ml) (moisture)	Net ^{3}H (pCi/m^3) (air)	Net ^{85}Kr (pCi/m^3) (air)	Atmospheric Dilution Factor
12/1/70						
1935 - 2005	Station D-11, ≈340° ≈4.3 miles	Portable compressed air sample	-		2	≈7x10^{7}
D- 1200, 11/30 to 1205, 12/2/70	Clem Ranch, ≈340° ≈3.5 miles	Fixed molysieve** sample	0.6	1.2		≈1x10^{8}
12/3/70	(11/30 - 12/2) Total Samples Collected: 7 (5 were background)					
D- 1955 - 2025	Station D-11, ≈340° ≈4.3 miles	Portable compressed air sample	1.2	5.1	10	≈2x10^{7}
	(12/2 - 12/4) Total Samples Collected: 10 (9 were background)					
12/5/70						
0645 - 0845	Station D-11, ≈340° ≈4.3 miles	Portable molysieve sample	2.6	7.0		≈2x10^{7}
0700 - 0900	C. P. Pad, ≈340° ≈2.5 miles	Portable molysieve sample	10	20		≈7x10^{6}
	(12/3 - 12/5) Total Samples Collected: 5 (3 were background)					
12/6/70						
D- 0810 - 0947	Station D-1, ≈300° ≈3.5 miles	Portable molysieve sample	0.9	2.2		≈6x10^{7}
D- 0800 - 0940	Station D-3, ≈310° ≈3.5 miles	Portable molysieve sample	1.4	0.9		≈2x10^{8}
D- 0802 - 0955	Station D-5, ≈320° ≈3.5 miles	Portable molysieve sample	1.3	3.2		≈4x10^{7}
D- 0824 - 0952	Station D-7, ≈330° ≈4.7 miles	Portable molysieve sample	0.8	2.0		≈7x10^{7}
D- 0745 - 0945	Station D-11, ≈340° ≈4.3 miles	Portable molysieve sample	0.6	1.6		≈8x10^{7}

TABLE V.

(Page 2 of 3)

OFF-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND

Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Type of Sample	Radioactivity Concentrations* Net ^{3}H (pCi/ml) (moisture)	Net ^{85}Kr (pCi/m^3) (air)	(pCi/m^3) (air)	Atmospheric Dilution Factor
12/6/70						
D- 0905 - 1005	Wallace Cr. School, ≈260° ≈7.8 miles	Portable molysieve sample	0.8	2.4		≈5x10^{7}
0735 - 0935	C. P. Pad, ≈340° ≈2.5 miles	Portable molysieve sample	17	34		≈4x10^{6}
1130, 12/4 to 1000, 12/6/70	Clem Ranch, ≈340° ≈3.5 miles	Fixed molysieve sample	6.5	8.7		≈2x10^{7}
D- 1235, 12/4 to 1035, 12/6/70	Duplice Ranch, ≈320° ≈4.0 miles	Fixed molysieve sample	1.2	3.1		≈4x10^{7}
D- 0851 - 0916	Station D-1, ≈300° ≈3.5 miles	Portable compressed air sample	1.2	4.8	17	≈2x10^{7}
0852	Monument Gulch, ≈270° ≈4 miles	Aircraft Grab sample	2.5	9.3	9	≈1x10^{7}
0940	Battlement Mesa, ≈40° ≈4 miles	Aircraft Grab sample	10	18	21	≈6x10^{6}
	(12/4 - 12/6) - Total	Samples Collected: 16 (4 were background)				
12/7/70						
0720 - 0920	C. P. Pad, ≈340° ≈2.5 miles	Portable molysieve sample	7.1	7.8		≈2x10^{7}
0706 - 0906	Station D-11, ≈340° ≈4.3 miles	Portable molysieve sample	1.8	3.2		≈4x10^{7}
0755 - 0955	Reese Ranch, ≈340° ≈3.5 miles	Portable molysieve sample	1.5	2.9		≈2x10^{7}
D- 1350 - 1520	Rifle Airport, ≈50° ≈15 miles	Portable molysieve sample	0.9	1.8		≈8x10^{7}
1535 - 1600	3 mi. South Rifle Airport ≈70°, ≈13 miles	Portable compressed air sample	1.5	6.6	2.0	≈2x10^{7}
1608 - 1630	≈50°, 3 miles	Aircraft cryogenic air sample	21	20		≈7x10^{6}
	(12/5 - 12/7) - Total Samples Collected: 11 (5 were background)					

TABLE V.

(Page 3 of 3)

OFF-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND

Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Type of Sample	Radioactivity Concentrations* Net ^{3}H (pCi/ml) (moisture)	Net ^{85}Kr (pCi/m^3) (air)	(pCi/m^3) (air)	Atmospheric Dilution Factor
1020, 12/6 to 1025, 12/8/70	Clem Ranch, ≈340° ≈3.5 miles	Fixed molysieve sample	3.4	7.1		$\approx 2\times10^{7}$
12/8/70 1008 - 1035	Rifle Airport, ≈50° ≈15 miles	Portable compressed air sample	1.9	4.9		$\approx 3\times10^{7}$
0923	Battlement Mesa, ≈40° ≈2 miles	Aircraft Grab sample	6.9	32	42	$\approx 4\times10^{6}$
0957	Rifle, ≈40°, ≈13 miles	Aircraft Grab sample	<2	<3	≈0	
(12/6 - 12/8) Total Samples Collected: 8 (4 were background)						
(12/9 - 12/11) Total Samples Collected: 9 (all were background)						
12/12/70 D- ≈1000, 12/10 to 1010, 12/12/70	Clem Ranch, ≈340° ≈3.5 miles	Fixed molysieve sample	1.0	2.4		$\approx 6\times10^{7}$
0625 - 0825	C. P. Pad, ≈340° ≈2.5 miles	Portable molysieve sample	4.0	6.2		$\approx 2\times10^{7}$
D- 0610 - 0810	Station D-11, ≈340° ≈4.3 miles	Portable molysieve sample	0.6	1.1		$\approx 1\times10^{8}$
(12/10 - 12/12) Total Samples Collected: 7 (4 were background)						
12/14/70 1015, 12/12 to 1035, 12/14/70	Clem Ranch, ≈340° ≈3.5 miles	Fixed molysieve sample	10	19		$\approx 8\times10^{6}$
1105, 12/12 to 1000, 12/14/70	Duplice Ranch, ≈320° ≈4.0 miles	Fixed molysieve sample	1.6	3.0		$\approx 4\times10^{7}$
(12/12 - 12/14) Total Samples Collected: 5 (3 were background)						
12/16/70 D- 1040, 12/14 to 1025, 12/16/70	Clem Ranch, ≈340° ≈3.5 miles	Fixed molysieve sample	0.6	1.2		$\approx 1\times10^{8}$
(12/14 - 12/20) Total Samples Collected: 15 (14 were background)						

Grand Total Samples Collected: 93 (60 were background)

* Corrected for 1 pCi/ml ^{3}H and 10 pCi/cc ^{85}Kr background.

** Molysieve is a colloquialism for molecular sieve.

D- prefix indicates doubtful if really above background; near upper range of background samples. Included due to uncertainties as to practical upper limit on ^{3}H background.

TABLE VI. OFF-SITE RADIATION SURVEILLANCE - ENVIRONMENTAL SAMPLES

Sample Collection Period	Heading & Distance from flare (degrees & miles)	Sample Type	Net Tritium Concentrations (pCi/ml Moisture)
(12/9 - 12/11) Total Fixed Station Precipitation Samples Collected: 17 (all were background)			
1200, 12/15/70	≈340°, ≈0.1 mile	Snow Sample	1.3
1245, 12/16/70	≈340°, ≈0.1 mile	" "	4.2
1250, 12/16/70	≈340°, ≈0.25 mile	" "	6.3
1255, 12/16/70	≈340°, ≈0.5 mile	" "	3.7
1300, 12/16/70	≈340°, ≈1.0 mile	" "	4.2
1315, 12/18/70	≈340°, ≈0.1 mile	" "	3.2
1320, 12/18/70	≈340°, ≈0.25 mile	" "	1.7
1415, 12/20/70	≈340°, ≈0.1 mile	" "	6.9
1405, 12/20/70	≈340°, ≈0.25 mile	" "	3.3
1420, 12/20/70	≈340°, ≈0.5 mile	" "	1.4

(12/10 - 12/20/70) - Total Snow Samples Collected: 32 (22 were background)

(12/1 - 12/20/70) - Total Water Samples Collected: 39 (all were background)

(End of Flaring) Total Milk Samples Collected: 9 (all were background)
(End of Flaring) Total Vegetation Samples Collected: 9 (all were background)
(End of Flaring) Total Urine Samples Collected: 21 (all were background)
(End of Flaring) Total Blood (animal) Samples Collected: 2 (all were background)

1422, 12/20/70	≈340°, ≈0.5 mile	Soil Sample	2.2 (0.63 pCi/gm) wet weight

(End of Flaring) Total Soil Samples Collected: 12 (11 were background)

(12/1 - 12/20/70) - Total TLD's Collected: 12 (all were background)

Note: 18 particulate and 18 charcoal cartridges were used for air sampling at the Clem Ranch (Morrisania Mesa) during the flaring. All were background.

C. Third Production Test

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TABLE I. RADIOACTIVITY AND CHEMICAL COMPOSITION OF DRY RULISON GAS

(Page 1 of 6)

Date	Org., method(s) of analysis, source of sample	RADIOACTIVITY (pCi/cc)* ^{85}Kr	^{3}H (in H_2)	^{3}H (in C_1)	^{3}H (in C_2)	^{3}H (in C_3)	^{3}H (total)	^{14}C	$^{37,39}Ar$ (total)	^{222}Rn	CHEMICAL COMPOSITION (%) H_2	C_1	C_2	C_3	C_4	C_5-C_8	C_6H_6	C_7H_8	CO	CO_2	N_2	O_2	Ar	Total Gas Flowed (M^2CF)
1971																								
2/2	EIC, STALLKAT	80																						230
to	EIC, Anton-112	80																						"
2/3	EIC, Oxidizer						100																	"
2/3	LRL, Lab.	70	11	68	4.9	0.71	85				8.3	58.8	2.8	0.64	←3.39→				-	25.8	0.29	-	-	"
to	Isotopes, Lab.	78	11				100	0.19			7.4	60.0	2.92	0.94	0.44	0.19	0.038	0.0044	ND	27.2	0.14	0.028	ND	"
2/4	SWRHL, Lab.	130					98																	"
	SWRHL, Lab., Flare Line	110					97																	"
	EIC, STALLKAT	82																						240
	EIC, Anton-112	80																						"
	EIC, Oxidizer						87																	"
2/4	EIC, STALLKAT	79																						250
to	EIC, Anton-112	77																						"
2/5	EIC, Oxidizer						83																	"
2/5	EIC, STALLKAT	76																						260
to	EIC, Anton-112**	67																						"
2/6	EIC, Oxidizer						81																	"
2/6	EIC, STALLKAT	73																						270
to	EIC, Anton-112	70																						"
2/7	EIC, Oxidizer						78																	"
2/7	EIC, STALLKAT	72																						280
to	EIC, Anton-112	69																						"
2/8	EIC, Oxidizer						77																	"
2/8	EIC, STALLKAT	68																						290
to	EIC, Anton-112	67																						"
2/9	EIC, Oxidizer						71																	"
2/9	EIC, STALLKAT	66																						295
to	EIC, Anton-112	64																						"
2/10	EIC, Oxidizer						59																	"
2/10	LRL, Lab.	53	8.2	52	3.8	0.55	65				7.0	65.8	3.2	0.79	←0.4→				ND	22.5	0.4			300
to	EIC, STALLKAT	62																						"
2/11	EIC, Anton-112	61																						"
	EIC, Oxidizer						53																	"
2/11	EIC, STALLKAT	62																						310
to	EIC, Anton-112	59																						"
2/12	EIC, Oxidizer						65																	"
2/12	EIC, STALLKAT	60																						315
to	EIC, Anton-112	57																						"
2/13	EIC, Oxidizer						66																	"
2/13	EIC, STALLKAT	57																						320
to	EIC, Anton-112	54																						"
2/14	EIC, Oxidizer						63																	"
2/14	EIC, STALLKAT	55																						325
to	EIC, Anton-112	52																						"
2/15	EIC, Oxidizer						57																	"
2/15	EIC, STALLKAT	53																						330
to	EIC, Anton-112	50																						"
2/16	EIC, Oxidizer						52																	"
2/16	EIC, STALLKAT	51																						336
to	EIC, Anton-112	48																						"
2/17	EIC, Oxidizer						50																	"

TABLE I. RADIOACTIVITY AND CHEMICAL COMPOSITION OF DRY RULISON GAS
(Page 2 of 6)

Date	Org., method(s) of analysis, source of sample	RADIOACTIVITY (pCi/cc) ^{85}Kr	^{3}H (in H_2)	^{3}H (in C_1)	^{3}H (in C_2)	^{3}H (in C_3)	^{3}H (total)	^{14}C	$^{37,39}Ar$ (total)	^{222}Rn	CHEMICAL COMPOSITION (%) H_2	C_1	C_2	C_3	C_4	C_5-C_8	C_6H_6	C_7H_8	CO	CO_2	N_2	O_2	Ar	Total Gas Flowed (M^2CF)
1971																								
2/17	EIC, STALLKAT	49																						340
to	EIC, Anton-112	46																						"
2/18	EIC, Oxidizer						51																	"
	SWRHL, Lab.	57					52																	"
	SWRHL, Lab. L.P. Flare Line	49					50																	"
2/18	EIC, STALLKAT	47																						345
to	EIC, Anton-112	45																						"
2/19	EIC, Oxidizer						43																	"
2/19	EIC, STALLKAT	45																						349
to	EIC, Anton-112	43																						"
2/20	EIC, Oxidizer						43																	"
2/20	EIC, STALLKAT	43																						353
to	EIC, Anton-112	41																						"
2/21	EIC, Oxidizer						35																	"
2/21	EIC, STALLKAT	42																						357
to	EIC, Anton-112	40																						"
2/22	EIC, Oxidizer						40																	"
2/22	EIC, STALLKAT	35																						361
to	EIC, Anton-112	37																						"
2/23	EIC, Oxidizer						27																	"
2/23	EIC, STALLKAT	33																						365
to	EIC, Anton-112	36																						"
2/24	EIC, Oxidizer						30																	"
2/24	EIC, STALLKAT	34																						368
to	EIC, Anton-112	34																						"
2/25	EIC, Oxidizer						28																	"
2/25	EIC, STALLKAT	33																						371
to	EIC, Anton-112	32																						"
2/26	EIC, Oxidizer						30																	"
2/26	EIC, STALLKAT	33																						374
to	EIC, Anton-112	32																						"
2/27	EIC, Oxidizer						32																	"
2/27	EIC, STALLKAT	32																						377
to	EIC, Anton-112	31																						"
2/28	EIC, Oxidizer						33																	"
	Isotopes, Lab.	31	4.2				32	0.11			3.31	71+	3.24	0.95	0.68	0.18	0.026	0.0046	-	19.0	0.46	0.12	ND	"
2/28	EIC, STALLKAT	28																						380
to	EIC, Anton-112	28																						"
3/1	EIC, Oxidizer						25																	"
3/1	EIC, STALLKAT	28																						383
to	EIC, Anton-112	27																						"
3/2	EIC, Oxidizer						25																	"
3/2	EIC, STALLKAT	26																						385
to	EIC, Anton-112	27																						"
3/3	EIC, Oxidizer						25																	"
3/3	EIC, STALLKAT	26																						388
to	EIC, Anton-112	26																						"
3/4	EIC, Oxidizer						25																	"

TABLE 1. RADIOACTIVITY AND CHEMICAL COMPOSITION OF DRY RULISON GAS
(Page 3 of 6)

Date	Org., method(s) of analysis, source of sample	RADIOACTIVITY (pCi/cc) ^{85}Kr	^{3}H (in H_2)	^{3}H (in C_1)	^{3}H (in C_2)	^{3}H (in C_3)	^{3}H (total)	^{14}C	$^{37,39}Ar$ (total)	^{222}Rn	CHEMICAL COMPOSITION (%) H_2	C_1	C_2	C_3	C_4	C_5-C_8	C_6H_6	C_7H_8	CO	CO_2	N_2	O_2	Ar	Total Gas Flowed (M^2CF)
1971																								
3/4	LRL, Lab.	22	3.7	20	1.5	0.26	26				3.2	70.7	3.46	0.86	←0.65			→	-	21.1	0.08	-	-	390
to	EIC, STALLKAT	25																						"
3/5	EIC, Anton-112	23																						"
	EIC, Oxidizer						25																	"
3/5	EIC, STALLKAT	24																						392
to	EIC, Anton-112	23																						"
3/6	EIC, Oxidizer						24																	"
3/6	EIC, STALLKAT	23																						395
to	EIC, Anton-112	23																						"
3/7	EIC, Oxidizer						22																	"
3/7	EIC, STALLKAT	22																						397
to	EIC, Anton-112	21																						"
3/8	EIC, Oxidizer						20																	"
3/8	EIC, STALLKAT	21																						399
to	EIC, Anton-112	20																						"
3/9	EIC, Oxidizer						20																	"
3/9	EIC, STALLKAT	20																						401
to	EIC, Anton-112	20																						"
3/10	EIC, Oxidizer						19																	"
3/10	EIC, STALLKAT	19																						402
to	EIC, Anton-112	19																						"
3/11	EIC, Oxidizer						17																	"
3/11	EIC, STALLKAT	18																						404
to	EIC, Anton-112	17																						"
3/12	EIC, Oxidizer						18																	"
3/12	EIC, STALLKAT	17																						406
to	EIC, Anton-112	17																						"
3/13	EIC, Oxidizer						16																	"
3/13	EIC, STALLKAT	17																						408
to	EIC, Anton-112	16																						"
3/14	EIC, Oxidizer						15																	"
3/14	EIC, STALLKAT	15																						409
to	EIC, Anton-112	15																						"
3/15	EIC, Oxidizer						14																	"
3/15	EIC, STALLKAT	15																						411
to	EIC, Anton-112	15																						"
3/16	EIC, Oxidizer						14																	"
3/16	EIC, STALLKAT	14																						413
to	EIC, Anton-112	14																						"
3/17	EIC, Oxidizer						13																	"
3/17	EIC, STALLKAT	14																						414
to	EIC, Anton-112	14																						"
3/18	EIC, Oxidizer						13																	"

TABLE I. RADIOACTIVITY AND CHEMICAL COMPOSITION OF DRY RULISON GAS
(Page 4 of 6)

Date	Org., method(s) of analysis, source of sample	RADIOACTIVITY (pCi/cc) ^{85}Kr	^{3}H (in H_2)	^{3}H (in C_1)	^{3}H (in C_2)	^{3}H (in C_3)	^{3}H (total)	^{14}C	$^{37,39}Ar$ (total)	^{222}Rn	CHEMICAL COMPOSITION (%) H_2	C_1	C_2	C_3	C_4	C_5-C_8	C_6H_6	C_7H_8	CO	CO_2	N_2	O_2	Ar	Total Gas Flowed (M^2CF)
1971																								
3/18	EIC, STALLKAT	14																						416
to	EIC, Anton-112	13																						"
3/19	EIC, Oxidizer						11																	"
3/19	LRL, Lab.	11	2.3	9.0	0.79	0.12	12				1.9	71.6	3.53	0.93	←	0.50	→		-	21.5	0.11	-	-	417
to	SWRHL, Lab.	14					12																	"
3/20	SWRHL, Lab. (L.P. Separator)	13					11																	"
	EIC, STALLKAT	13																						"
	EIC, Anton-112	12																						"
	EIC, Oxidizer						12																	"
3/20	EIC, STALLKAT	12																						418
to	EIC, Anton-112	12																						"
3/21	EIC, Oxidizer						11																	"
3/21	EIC, STALLKAT	11																						420
to	EIC, Anton-112	11																						"
3/22	EIC, Oxidizer						9.7																	"
3/22	EIC, STALLKAT	10																						421
to	EIC, Anton-112	11																						"
3/23	EIC, Oxidizer						9.6																	"
3/23	EIC, STALLKAT	9.9																						422
to	EIC, Anton-112	9.9																						"
3/24	EIC, Oxidizer						8.7																	"
3/24	Isotopes, Lab.	9.5	2.3				10	0.11			2.1	70+	3.54	1.00	0.57	0.13	0.21	0.0099	-	21.3	0.71	0.15	ND	423
to	EIC, STALLKAT	9.5																						"
3/25	EIC, Anton-112	9.3																						"
	EIC, Oxidizer						8.3																	"
3/25	EIC, STALLKAT	9.2																						425
to	EIC, Anton-112	8.7																						"
3/26	EIC, Oxidizer						8.4																	"
3/26	EIC, STALLKAT	8.5																						426
to	EIC, Anton-112	8.1																						"
3/27	EIC, Oxidizer						8.8																	"
3/27	EIC, STALLKAT	8.2																						427
to	EIC, Anton-112	7.7																						"
3/28	EIC, Oxidizer						8.0																	"
3/28	EIC, STALLKAT	8.1																						428
to	EIC, Anton-112	7.6																						"
3/29	EIC, Oxidizer						7.6																	"
3/29	EIC, STALLKAT	7.7																						429
to	EIC, Anton-112	7.6																						"
3/30	EIC, Oxidizer						6.9																	"

TABLE I. RADIOACTIVITY AND CHEMICAL COMPOSITION OF DRY RULISON GAS
(Page 5 of 6)

Date	Org., method(s) of analysis, source of sample	RADIOACTIVITY (pCi/cc) ^{85}Kr	^{3}H (in H_2)	^{3}H (in C_1)	^{3}H (in C_2)	^{3}H (in C_3)	^{3}H (total)	^{14}C	$^{37,39}Ar$ (total)	^{222}Rn	CHEMICAL COMPOSITION (%) H_2	C_1	C_2	C_3	C_4	C_5-C_8	C_6H_6	C_7H_8	CO	CO_2	N_2	O_2	Ar	Total Gas Flowed (M^2CF)
1971																								
3/30	EIC, STALLKAT	7.5																						431
to	EIC, Anton-112	7.3																						"
3/31	EIC, Oxidizer						7.9																	"
3/31	EIC, STALLKAT	7.3																						432
to	EIC, Anton-112	7.3																						"
4/1	EIC, Oxidizer						6.7																	"
4/1	EIC, STALLKAT	7.0																						433
to	EIC, Anton-112	6.9																						"
4/2	EIC, Oxidizer						6.7																	"
4/2	EIC, STALLKAT	6.5																						434
to	EIC, Anton-112	6.5																						"
4/3	EIC, Oxidizer						6.5																	"
4/3	EIC, STALLKAT	6.3																						435
to	EIC, Anton-112	6.3																						"
4/4	EIC, Oxidizer						6.0																	"
4/4	EIC, STALLKAT	6.2																						436
to	EIC, Anton-112	6.1																						"
4/5	EIC, Oxidizer						6.6																	"
4/5	EIC, STALLKAT	5.9																						438
to	EIC, Anton-112	5.9																						"
4/6	EIC, Oxidizer						6.4																	"
4/6	EIC, STALLKAT	5.6																						439
to	EIC, Anton-112	5.5																						"
4/7	EIC, Oxidizer						6.4																	"
4/7	LRL, Lab.	4.50	1.34	3.7	0.40	0.06	5.46				1.2	70.6	3.5	0.95	←	0.71	→		-	23.2	-	-	-	440
to	EIC, STALLKAT	5.4																						"
4/8	EIC, Anton-112	5.1																						"
	EIC, Oxidizer						5.3																	"
4/8	EIC, STALLKAT	5.2																						441
to	EIC, Anton-112	4.8																						"
4/9	EIC, Oxidizer						4.9																	"
4/9	EIC, STALLKAT	4.9																						442
to	EIC, Anton-112	4.5																						"
4/10	EIC, Oxidizer						4.1																	"
4/10	EIC, STALLKAT	4.7																						443
to	EIC, Anton-112	4.6																						"
4/11	EIC, Oxidizer						4.1																	"
4/11	EIC, STALLKAT	4.6																						444
to	EIC, Anton-112	4.2																						"
4/12	EIC, Oxidizer						3.9																	"
4/12	EIC, STALLKAT	4.4																						445
to	EIC, Anton-112	4.2																						"
4/13	EIC, Oxidizer						3.9																	"

TABLE I. RADIOACTIVITY AND CHEMICAL COMPOSITION OF DRY RULISON GAS
(Page 6 of 6)

Date	Org., method(s) of analysis, source of sample	RADIOACTIVITY (pCi/cc) ^{85}Kr	^{3}H (in H_2)	^{3}H (in C_1)	^{3}H (in C_2)	^{3}H (in C_3)	^{3}H (total)	^{14}C	$^{37,39}Ar$ (total)	^{222}Rn	CHEMICAL COMPOSITION (%) H_2	C_1	C_2	C_3	C_4	C_5-C_8	C_6H_6	C_7H_8	CO	CO_2	N_2	O_2	Ar	Total Gas Flowed (M^2CF)
1971																								
4/13	EIC, STALLKAT	4.3																						446
to	EIC, Anton-112	4.0																						"
4/14	EIC, Oxidizer						3.9																	"
4/14	EIC, STALLKAT	4.2																						447
to	EIC, Anton-112	3.8																						"
4/15	EIC, Oxidizer						3.7																	"
4/15	EIC, STALLKAT	4.0																						448
to	EIC, Anton-112	3.8																						"
4/16	EIC, Oxidizer						3.7																	"
4/16	EIC, STALLKAT	3.9																						449
to	EIC, Anton-112	3.6																						"
4/17	EIC, Oxidizer						3.5																	"
4/17	EIC, STALLKAT	3.9																						450
to	EIC, Anton-112	3.6																						"
4/18	EIC, Oxidizer						3.3																	"
4/18	EIC, STALLKAT	3.9																						451
to	EIC, Anton-112	3.5																						"
4/19	EIC, Oxidizer						3.4																	"
4/19	EIC, STALLKAT	3.8																						452
to	EIC, Anton-112	3.4																						"
4/20	EIC, Oxidizer						3.3																	"
4/20	EIC, STALLKAT	3.7																						453
to	EIC, Anton-112	3.2																						"
4/21	EIC, Oxidizer						3.3																	"
4/21	EIC, STALLKAT	3.6																						454
to	EIC, Anton-112	3.2																						"
4/22	EIC, Oxidizer						3.2																	"
4/22	EIC, STALLKAT	3.4																						455
to	EIC, Anton-112	2.9																						"
4/23	EIC, Oxidizer						3.3																	"
4/23	LRL, Lab.	2.58	1.26	1.85	0.23	-	3.34				0.98	71.6	3.60	0.98	←0.68→				-	22.2	0.02	-	-	"
to	ORNL, Lab.	3.0	1.28	1.88	0.28	0.048	3.49				1.4	71.1	3.3	0.9	0.4				ND	23.0	ND	ND	-	"
3:00	ORNL, Lab.	-	1.19	1.96	-	-	~3.3																	
p.m.	(Flare Line)																							"
4/23	Isotopes, Lab.	2.6	1.2				7.5	0.073			0.5	69+	4.3	1.13	0.72	0.18	0.027	0.031	22.4	1.36	0.17	ND	"
	SWRHL, Lab.	11?					36?																	"
	SWRHL, Lab. (L.P. Separator)	31?					10?																	"
	EIC, Anton-112	2.9																						"
	EIC, Oxidizer						3.3																	"

Key: H_2 = hydrogen gas, C_1 = methane, C_2 = ethane, C_3 = propane, C_4 = butane, C_5-C_8 = higher hydrocarbons, C_6H_6 = benzene, C_7H_8 = toluene, CO = carbon monoxide, CO_2 = carbon dioxide, N_2 = nitrogen gas, O_2 = oxygen gas, Ar = stable argon.

* Note: All radioactivity corrected to time of sampling. All EIC samples taken from flare line; all others from wellhead unless otherwise noted.

ND - not detected.

** Anton-112 reading low due to excessive water in chamber (reduced efficiency).

TABLE II. Rulison Radioactivity Release Estimates

TIME INTERVAL	RADIOACTIVITY IN DRY GAS				TRITIUM IN WATER & HYDROCARBONS								CUMULATIVE DATA		
	^{3}H pCi/cc (Ci)	^{85}Kr pCi/cc (Ci)	^{203}Hg pCi/m^{3} (μCi)	^{14}C pCi/cc (Ci)	Bulk Water pCi/ml (Ci)	Freeze Water pCi/ml (Ci)	Stored Water pCi/ml (Ci)	Bulk Cond. pCi/ml (Ci)	Freeze Cond pCi/ml (Ci)	Stored Cond, pCi/ml (Ci)	Total ^{3}H (Ci)	Gas Flow ($M^{2}CF$)	Cumulative Release ^{3}H(Ci)	Cumulative Release ^{85}Kr(Ci)	Cumulative Gas Flow ($M^{2}CF$)
1971 0840, 2/2 to 0800, 2/3	100 (27.5)	80 (22.0)	4.27 (1.18)	0.20 (0.055)	4.66(5) (22.2)	3.57(5) (0.677)	3.92(5) 4.13(5) 4.35(5) 3.95(5) (15.03)	0.655(5) (0.021)	0.456(5) (0.122)	None	65.6	10.3	1,399	813	231.8
0800, 2/3 to 0800, 2/4	87 (25.2)	80 (23.1)	6.01 (1.74)	0.19 (0.055)	4.41(5) (21.7)	3.57(5) (0.537)	3.95(5) (0.15)	0.628(5) (0.063)	0.456(5) (0.097)	None	47.8	10.8	1,446	836	242.6
0800,2/4 to 0800,2/5	83 (22.4)	77 (20.8)	7.50 (2.02)	0.18 (0.049)	4.48(5) (23.8)	3.13(5) (0.264)	3.80(5) (8.68)	0.770(5) (0.085)	0.406(5) (0.024)	None	55.3	10.1	1,502	857	252.7
0800, 2/5 to 0800, 2/6	81 (20.3)	76 (18.9)	7.81 (1.96)	0.17 (0.043)	4.34(5) (20.7)	3.15(5) (0.250)	4.91(5) 3.80(5) (2.10)	0.777(5) (0.049)	0.374(5) (0.045)	None	43.4	9.38	1,545	876	262.1
0800, 2/6 to 0800, 2/7	78 (18.4)	70 (16.5)	6.26 (1.48)	0.17 (0.040)	5.05(5) (21.8)	3.40(5) (0.126)	4.91(5) 4.47(5) (11.74)	0.697(5) (0.079)	0.415(5) (0.027)	None	52.2	8.84	1,597	892	270.9
0800, 2/7 to 0800, 2/8	77 (17.2)	69 (15.4)	7.20 (1.61)	0.16 (0.036)	5.03(5) (18.8)	3.68(5) (0.358)	4.47(5) 3.96(5) (12.90)	0.758(5) (0.062)	0.406(5) (0.045)	None	49.4	8.34	1,647	908	279.3
0800, 2/8 to 0800, 2/9	71 (14.7)	67 (13.8)	6.30 (1.35)	0.16 (0.033)	4.67(5) (14.2)	3.88(5) (0.284)	3.96(5) 5.00(5) (12.82)	0.719(5) (0.066)	0.342(5) (0.029)	None	42.1	7.72	1,689	922	287.0
0800, 2/9 to 0800, 2/10	59 (11.4)	64 (12.4)	6.10 (1.18)	0.15 (0.029)	4.89(5) (12.8)	3.57(5) (0.547)	4.35(5) 5.00(5) 4.71(5) (13.64)	0.738(5) (0.049)	0.325(5) (0.030)	None	38.5	7.25	1,727	934	294.2
0800, 2/10 to 0800, 2/11	53 (9.70)	61 (11.2)	5.10 (0.935)	0.15 (0.027)	4.40(5) (10.3)	3.48(5) (0.600)	4.02(5) 4.23(5) (10.85)	0.649(5) (0.034)	0.377(5) (0.022)	None	31.5	6.85	1,759	945	301.1

TABLE II. Rulison Radioactivity Release Estimates

TIME INTERVAL	RADIOACTIVITY IN DRY GAS				TRITIUM IN WATER & HYDROCARBONS								CUMULATIVE DATA		
	^{3}H pCi/cc (Ci)	^{85}Kr pCi/cc (Ci)	^{203}Hg pCi/m^{3} (μCi)	^{14}C pCi/cc (Ci)	Bulk Water pCi/ml (Ci)	Freeze Water pCi/ml (Ci)	Stored Water pCi/ml (Ci)	Bulk Cond. pCi/ml (Ci)	Freeze Cond pCi/ml (Ci)	Stored Cond. pCi/ml (Ci)	Total ^{3}H (Ci)	Gas Flow (M^2CF)	Cumulative Release ^{3}H(Ci)	Cumulative Release ^{85}Kr(Ci)	Cumulative Gas Flow (M^2CF)
1971 0800, 2/11 to 0800, 2/12	65 (11.1)	59 (10.1)	8.29 (1.42)	0.15 (0.026)	4.45(5) (9.00)	3.55(5) (0.351)	4.02(5) 4.20(5) (9.38)	0.651(5) (0.027)	0.390(5) (0.038)	None	29.9	6.42	1,789	955	307.5
0800, 2/12 to 0800, 2/13	66 (10.8)	57 (9.30)	7.27 (1.19)	0.14 (0.023)	4.05(5) (7.55)	3.70(5) (0.105)	4.20(5) 4.50(5) (13.32)	0.728(5) (0.043)	0.274(5) (0.003)	None	31.8	6.12	1,820	965	313.0
0800, 2/13 to 0800, 2/14	63 (9.72)	54 (8.35)	6.43 (0.99)	0.14 (0.022)	3.62(5) (7.59)	3.67(5) (0.292)	4.50(5) 4.06(5) 4.41(5) (10.93)	0.781(5) (0.025)	0.312(5) (0.016)	None	28.6	5.78	1,849	973	319.4
0800, 2/14 to 0800, 2/15	57 (8.40)	52 (7.72)	2.54 (0.37)	0.14 (0.021)	3.05(5) (6.01)	3.44(5) (0.064)	4.41(5) 4.23(5) (14.31)	0.809(5) (0.021)	0.229(5) (0.007)	None	28.8	5.52	1,878	981	325.2
0800, 2/15 to 0800, 2/16	52 (7.22)	50 (6.93)	3.52 (0.49)	0.13 (0.018)	5.66(5) (9.91)	4.22(5) (0.396)	4.23(5) 4.16(5) 5.61(5) (11.11)	0.654(5) (0.022)	0.399(5) (0.014)	None	28.7	5.19	1,906	988	330.4
0800, 2/16 to 0800, 2/17	50 (6.61)	48 (6.36)	4.56 (0.61)	0.13 (0.017)	4.47(5) (7.74)	3.26(5) (0.115)	5.61(5) 5.43(5) (10.87)	0.621(5) (0.009)	0.336(5) (0.001)	None	25.4	4.97	1,932	994	335.3
0800, 2/17 to 0800, 2/18	51 (6.46)	46 (5.82)	5.38 (0.68)	0.13 (0.016)	4.22(5) (8.30)	3.48(5) (0.103)	5.43(5) 4.51(5) (12.69)	0.627(5) (0.010)	0.297(5) (0.009)	None	27.6	4.74	1,960	1,000	340.1
0800, 2/18 to 0800, 2/19	43 (5.17)	45 (5.40)	3.99 (0.48)	0.13 (0.016)	4.21(5) (6.67)	3.22(5) (0.030)	4.51(5) 4.37(5) 3.85(5) (10.86)	0.593(5) (0.019)	0.320(5) (0.001)	None	22.8	4.50	1,982	1,005	344.6
0800, 2/19 to 0800, 2/20	43 (4.83)	43 (4.83)	4.86 (0.54)	0.12 (0.013)	4.52(5) (6.03)	3.34(5) (0.102)	3.85(5) 4.18(5) (9.75)	0.714(5) (0.019)	0.184(5) (0.001)	None	20.7	4.21	2,003	1,010	348.8

TABLE II. Rulison Radioactivity Release Estimates

	RADIOACTIVITY IN DRY GAS				TRITIUM IN WATER & HYDROCARBONS								CUMULATIVE DATA		
TIME INTERVAL	^{3}H pCi/cc (Ci)	^{85}Kr pCi/cc (Ci)	^{203}Hg pCi/m^3 (μCi)	^{14}C pCi/cc (Ci)	Bulk Water pCi/ml (Ci)	Freeze Water pCi/ml (Ci)	Stored Water pCi/ml (Ci)	Bulk Cond. pCi/ml (Ci)	Freeze Cond. pCi/ml (Ci)	Stored Cond. pCi/ml (Ci)	Total ^{3}H (Ci)	Gas Flow (M^{2}CF)	Cumulative Release ^{3}H(Ci)	Cumulative Release ^{85}Kr(Ci)	Cumulative Gas Flow (M^{2}CF)
1971 0800, 2/20 to 0800, 2/21	35 (3.93)	41 (4.59)	6.11 (0.69)	0.12 (0.013)	4.21(5) (5.22)	2.66(5) (0.023)	4.18(5) 4.45(5) 3.90(5) (12.67)	0.574(5) (0.012)	0.254(5) (0.002)	None	21.9	4.21	2,025	1,015	353.0
0800, 2/21 to 0800, 2/22	40 (4.23)	40 (4.23)	2.66 (0.28)	0.12 (0.013)	5.38(5) (5.77)	3.97(5) (0.045)	3.90(5) 4.48(5) (10.19)	0.816(5) (0.023)	0.333(5) (0.013)	None	20.3	3.97	2,045	1,019	357.0
0800, 2/22 to 0800, 2/23	37 (3.90)	27 (2.85)	0.23 (0.02)	0.12 (0.013)	5.42(5) (10.90)	3.73(5) (0.156)	4.48(5) 3.64(5) 3.65(5) (8.88)	0.836(5) (0.002)	0.261(5) (0.036)	None	22.8	3.94	2,068	1,022	360.9
0800, 2/23 to 0800, 2/24	30 (2.98)	36 (3.57)	~0 ~0	0.12 (0.012)	4.52(5) (8.25)	3.13(5) (0.147)	3.65(5) 4.39(5) (6.40)	0.816(5) (0.007)	0.353(5) (0.010)	None	17.8	3.71	2,086	1,025	364.6
0800, 2/24 to 0800, 2/25	28 (2.33)	34 (2.94)	1.95 (0.17)	0.12 (0.010)	5.46(5) (2.81)	3.63(5) (0.018)	3.65(5) 4.27(5) (8.05)	None	0.281(5) (0.001)	None	13.2	3.24	2,099	1,028	367.9
0800, 2/25 to 0800, 2/26	30 (2.56)	32 (2.74)	2.82 (0.24)	0.11 (0.009)	5.55(5) (5.29)	4.07(5) (0.136)	4.27(5) 5.57(5) (14.63)	0.928(5) (0.004)	0.336(5) (0.016)	None	22.6	3.20	2,122	1,031	371.1
0800, 2/26 to 0800, 2/27	32 (2.77)	32 (2.77)	4.03 (0.35)	0.11 (0.010)	3.71(5) (4.66)	2.88(5) (0.488)	5.57(5) 3.65(5) 4.02(5) (13.24)	0.633(5) (0.005)	0.159(5) (0.003)	None	21.2	3.24	2,143	1,034	374.3
0800, 2/27 to 0800, 2/28	33 (2.66)	31 (2.50)	4.20 (0.34)	0.11 (0.009)	4.05(5) (4.96)	3.60(5) (0.935)	4.02(5) 4.45(5) (11.42)	0.649(5) (0.002)	0.196(5) (0.002)	None	20.0	3.02	2,163	1,036	377.3
0800, 2/28 to 0800, 3/1	25 (1.85)	28 (2.07)	3.13 (0.23)	0.11 (0.008)	5.35(5) (4.25)	4.07(5) (0.038)	4.45(5) 4.04(5) 4.25(5) (11.71)	0.787(5) (0.009)	0.330(5) (0.001)	None	17.9	2.77	2,181	1,038	380.1

TABLE II. Rulison Radioactivity Release Estimates

	RADIOACTIVITY IN DRY GAS				TRITIUM IN WATER & HYDROCARBONS								CUMULATIVE DATA		
TIME INTERVAL	^{3}H pCi/cc (Ci)	^{85}Kr pCi/cc (Ci)	^{203}Hg pCi/m^3 (μCi)	^{14}C pCi/cc (Ci)	Bulk Water pCi/ml (Ci)	Freeze Water pCi/ml (Ci)	Stored Water pCi/ml (Ci)	Bulk Cond. pCi/ml (Ci)	Freeze Cond. pCi/ml (Ci)	Stored Cond. pCi/ml (Ci)	Total ^{3}H (Ci)	Gas Flow (M^2CF)	Cumulative Release ^{3}H(Ci)	Cumulative Release ^{85}Kr(Ci)	Cumulative Gas Flow (M^2CF)
1971 0800, 3/1 to 0800, 3/2	28 (2.02)	28 (2.02)	2.21 (0.16)	0.11 (0.008)	3.77(5) (2.75)	2.44(5) (0.077)	4.25(5) 4.37(5) (11.44)	0.739(5) (0.014)	0.316(5) (0.016)	None	16.3	2.70	2,197	1,040	382.8
0800, 3/2 to 0800, 3/3	25 (1.72)	27 (1.87)	3.45 (0.24)	0.11 (0.008)	4.27(5) (2.04)	3.22(5) (0.052)	4.37(5) 4.11(5) (11.15)	0.672(5) (0.005)	0.260(5) (0.002)	None	15.0	2.59	2,212	1,042	385.4
0800, 3/3 to 0800, 3/4	25 (1.72)	26 (1.77)	3.09 (0.21)	0.11 (0.008)	3.67(5) (3.50)	2.81(5) (0.061)	4.11(5) 4.12(5) 4.18(5) (11.69)	0.569(5) (0.008)	0.239(5) (0.004)	None	17.0	2.55	2,229	1,044	387.9
0800, 3/4 to 0800, 3/5	25 (1.64)	23 (1.59)	3.62 (0.24)	0.11 (0.007)	4.25(5) (1.97)	3.01(5) (0.037)	4.18(5) 4.09(5) (9.10)	0.561(5) (0.003)	0.190(5) (0.001)	None	12.8	2.45	2,242	1,045	390.4
0800, 3/5 to 0800, 3/6	24 (1.42)	23 (1.38)	2.71 (0.16)	0.11 (0.007)	3.51(5) (1.46)	3.24(5) (0.065)	4.09(5) 4.50(5) (13.46)	0.557(5) (0.002)	0.174(5) (0.004)	None	16.4	2.22	2,258	1,047	392.6
0800, 3/6 to 0800, 3/7	22 (1.23)	23 (1.29)	3.28 (0.19)	0.11 (0.006)	3.55(5) (2.52)	3.10(5) (0.016)	4.50(5) 4.41(5) 4.77(5) (13.96)	0.634(5) (0.005)	0.170(5) (0.001)	None	17.7	2.14	2,276	1,048	394.7
0800, 3/7 to 0800, 3/8	20 (1.08)	21 (1.12)	2.78 (0.15)	0.11 (0.006)	5.07(5) (1.93)	3.47(5) (0.087)	4.77(5) 3.84(5) (13.68)	0.612(5) (0.001)	0.190(5) (0.002)	None	16.8	1.98	2,293	1,049	396.7
0800, 3/8 to 0800, 3/9	20 (1.04)	20 (1.05)	3.63 (0.19)	0.10 (0.005)	3.87(5) (1.72)	3.27(5) (0.028)	3.81(5) 4.98(5) (13.78)	0.554(5) (0.001)	0.194(5) (0.001)	None	16.6	1.98	2,309	1,050	398.7
0800, 3/9 to 0800, 3/10	19 (0.95)	20 (1.00)	3.52 (0.18)	0.10 (0.005)	3.88(5) (1.60)	3.27(5) (0.023)	4.63(5) 4.39(5) (11.66)	0.828(5) (0.003)	0.210(5) (0.001)	None	14.2	1.91	2,324	1,051	400.6

TABLE II. Rulison Radioactivity Release Estimates

	RADIOACTIVITY IN DRY GAS				TRITIUM IN WATER & HYDROCARBONS								CUMULATIVE DATA		
TIME INTERVAL	^{3}H pCi/cc (Ci)	^{85}Kr pCi/cc (Ci)	^{203}Hg pCi/m^{3} (μCi)	^{14}C pCi/cc (Ci)	Bulk Water pCi/ml (Ci)	Freeze Water pCi/ml (Ci)	Stored Water pCi/ml (Ci)	Bulk Cond. pCi/ml (Ci)	Freeze Cond pCi/ml (Ci)	Stored Cond. pCi/ml (Ci)	Total ^{3}H (Ci)	Gas Flow (M^{2}CF)	Cumulative Release ^{3}H(Ci)	Cumulative Release ^{85}Kr(Ci)	Cumulative Gas Flow (M^{2}CF)
1971 0800, 3/10 to 0800, 3/11	17 (0.84)	19 (0.91)	4.28 (0.21)	0.10 (0.005)	4.37(5) (0.98)	4.14(5) (0.073)	4.39(5) 3.99(5) (13.45)	0.809(5) (0.003)	0.218(5) (0.001)	None	15.4	1.85	2,339	1,052	402.5
0800, 3/11 to 0800, 3/12	18 (0.88)	17 (0.82)	3.69 (0.18)	0.10 (0.005)	4.56(5) (0.73)	3.16(5) (0.030)	3.99(5) 4.11(5) 4.36(5) (14.20)	0.733(5) (0.003)	0.187(5) (*)	None	15.8	1.79	2,355	1,053	404.3
0800, 3/12 to 0800, 3/13	16 (0.75)	17 (0.77)	3.45 (0.16)	0.10 (0.005)	4.13(5) (0.33)	3.53(5) (0.055)	4.36(5) 4.12(5) (8.72)	0.708(5) (*)	0.179(5) (*)	None	9.9	1.73	2,365	1,054	406.0
0800, 3/13 to 0800, 3/14	15 (0.68)	16 (0.73)	3.13 (0.14)	0.10 (0.005)	3.26(5) (0.22)	0.781(5) (0.003)	4.12(5) 3.62(5) (12.32)	0.511(5) (0.004)	None	None	13.1	1.69	2,378	1,055	407.7
0800, 3/14 to 0800, 3/15	14 (0.63)	15 (0.68)	3.68 (0.17)	0.10 (0.004)	4.22(5) (0.34)	3.37(5) (0.046)	4.17(5) 3.64(5) (11.81)	0.532(5) (0.002)	0.162(5) (0.001)	None	12.8	1.66	2,391	1,055	409.3
0800, 3/15 to 0800, 3/16	14 (0.60)	15 (0.66)	3.78 (0.16)	0.10 (0.004)	3.61(5) (0.222)	3.36(5) (0.027)	3.64(5) 4.05(5) (13.33)	0.543(5) (0.003)	0.164(5) (0.001)	None	14.2	1.61	2,405	1,056	410.9
0800, 3/16 to 0800, 3/17	13 (0.53)	14 (0.59)	3.72 (0.15)	0.10 (0.004)	4.18(5) (0.333)	3.32(5) (0.043)	4.05(5) 4.05(5) 3.73(5) (15.49)	0.597(5) (0.002)	0.199(5) (0.001)	None	16.5	1.57	2,421	1,056	412.5
0800, 3/17 to 0800, 3/18	13 (0.53)	14 (0.58)	3.34 (0.14)	0.10 (0.004)	3.98(5) (0.351)	3.39(5) (0.011)	3.73(5) 3.60(5) (10.94)	0.514(5) (0.004)	0.157(5) (0.001)	None	11.8	1.55	2,433	1,057	414.1
0800, 3/18 to 0800, 3/19	11 (0.41)	13 (0.51)	3.00 (0.12)	0.10 (0.004)	3.93(5) (0.334)	3.26(5) (0.019)	3.60(5) 3.72(5) 3.55(5) (18.93)	0.586(5) (0.004)	0.255(5) (0.001)	None	19.7	1.46	2,453	1,058	415.5

TABLE II. Rulison Radioactivity Release Estimates

TIME INTERVAL	RADIOACTIVITY IN DRY GAS				TRITIUM IN WATER & HYDROCARBONS								CUMULATIVE DATA		
	^{3}H pCi/cc (Ci)	^{85}Kr pCi/cc (Ci)	^{203}Hg pCi/m^{3} (μCi)	^{14}C pCi/cc (Ci)	Bulk Water pCi/ml (Ci)	Freeze Water pCi/ml (Ci)	Stored Water pCi/ml (Ci)	Bulk Cond. pCi/ml (Ci)	Freeze Cond. pCi/ml (Ci)	Stored Cond. pCi/ml (Ci)	Total ^{3}H (Ci)	Gas Flow (M^{2}CF)	Cumulative Release ^{3}H(Ci)	Cumulative Release ^{85}Kr(Ci)	Cumulative Gas Flow (M^{2}CF)
1971 0800, 3/19 to 0800, 3/20	12 (0.44)	12 (0.46)	2.45 (0.09)	0.10 (0.004)	3.38(5) (0.240)	3.31(5) (0.004)	3.55(5) 4.79(5) (13.26)	0.515(5) (0.004)	0.192(5) (*)	None	13.9	1.41	2,467	1,058	416.9
0800, 3/20 to 0800, 3/21	11 (0.39)	12 (0.44)	2.93 (0.11)	0.10 (0.004)	4.26(5) (0.270)	3.04(5) (0.019)	4.79(5) 3.58(5) 4.45(5) (9.51)	0.498(5) (0.001)	0.193(5) (*)	None	10.2	1.37	2,477	1,058	418.3
0800, 3/21 to 0800, 3/22	9.7 (0.35)	11 (0.41)	2.06 (0.075)	0.10 (0.004)	3.74(5) (0.242)	3.12(5) (0.053)	4.45(5) 4.09(5) (10.87)	0.548(5) (0.002)	0.235(5) (0.003)	None	11.5	1.36	2,488	1,059	419.7
0800, 3/22 to 0800, 3/23	9.6 (0.34)	11 (0.37)	2.14 (0.076)	0.09 (0.003)	4.45(5) (0.286)	3.11(5) (0.030)	4.09(5) 3.98(5) (10.79)	0.582(5) (0.001)	0.185(5) (*)	0.613(5) (0.024)	11.5	1.33	2,500	1,059	421.0
0800, 3/23 to 0800, 3/24	8.7 (0.29)	10 (0.32)	1.38 (0.045)	0.09 (0.003)	4.21(5) (0.210)	3.69(5) (0.095)	3.98(5) 4.58(5) 4.76(5) (10.02)	0.701(5) (0.002)	0.157(5) (0.003)	None	10.6	1.23	2,510	1,060	422.2
0800, 3/24 to 0800, 3/25	8.3 (0.26)	9.3 (0.30)	2.62 (0.083)	0.09 (0.003)	5.58(5) (0.328)	3.35(5) (0.019)	4.76(5) 3.59(5) (11.45)	0.735(5) (0.002)	0.145(5) (0.001)	None	12.1	1.19	2,523	1,060	423.4
0800, 3/25 to 0800, 3/26	8.4 (0.26)	8.7 (0.27)	2.20 (0.069)	0.09 (0.003)	4.08(5) (0.214)	3.10(5) (0.026)	3.59(5) 4.30(5) (12.54)	0.735(5) (0.002)	0.196(5) (0.001)	None	13.1	1.18	2,536	1,060	424.6
0800, 3/26 to 0800, 3/27	8.8 (0.28)	8.1 (0.25)	2.66 (0.083)	0.09 (0.003)	3.51(5) (0.186)	3.32(5) (0.026)	4.30(5) 4.02(5) 4.26(5) (8.86)	0.527(5) (0.001)	0.325(5) (0.001)	None	9.3	1.17	2,545	1,060	425.8
0800, 3/27 to 0800, 3/28	8.0 (0.25)	7.7 (0.24)	2.55 (0.078)	0.09 (0.003)	3.45(5) (0.184)	3.07(5) (0.027)	4.26(5) 3.29(5) (12.87)	0.566(5) (0.001)	0.152(5) (0.001)	None	13.3	1.15	2,558	1,061	426.9

TABLE II. Rulison Radioactivity Release Estimates

	RADIOACTIVITY IN DRY GAS				TRITIUM IN WATER & HYDROCARBONS								CUMULATIVE DATA		
TIME INTERVAL	^{3}H pCi/cc (Ci)	^{85}Kr pCi/cc (Ci)	^{203}Hg pCi/m^{3} (μCi)	^{14}C pCi/cc (Ci)	Bulk Water pCi/ml (Ci)	Freeze Water pCi/ml (Ci)	Stored Water pCi/ml (Ci)	Bulk Cond. pCi/ml (Ci)	Freeze Cond pCi/ml (Ci)	Stored Cond. pCi/ml (Ci)	Total ^{3}H (Ci)	Gas Flow (M^{2}CF)	Cumulative Release ^{3}H(Ci)	Cumulative Release ^{85}Kr(Ci)	Cumulative Gas Flow (M^{2}CF)
1971 0800, 3/28 to 0800, 3/29	7.6 (0.25)	7.6 (0.25)	2.7 (0.088)	0.09 (0.003)	3.70(5) (0.028)	3.29(5) (0.015)	3.29(5) 3.60(5) 2.77(5) (9.74)	0.554(5) (*)	0.099(5) (*)	None	10.3	1.22	2,569	1,061	428.1
0800, 3/29 to 0800, 3/30	6.9 (0.23)	7.6 (0.25)	2.82 (0.094)	0.09 (0.003)	3.74(5) (0.298)	2.96(5) (0.011)	2.77(5) 3.87(5) (9.95)	0.487(5) (0.003)	0.188(5) (*)	None	10.5	1.24	2,579	1,061	429.4
0800, 3/30 to 0800, 3/31	7.9 (0.26)	7.3 (0.24)	2.42 (0.079)	0.09 (0.003)	3.76(5) (0.326)	3.26(5) (0.035)	3.87(5) 3.77(5) (8.77)	0.560(5) (0.003)	0.179(5) (0.001)	None	9.4	1.23	2,588	1,061	430.6
0800, 3/31 to 0800, 4/1	6.7 (0.22)	7.3 (0.24)	1.64 (0.053)	0.09 (0.003)	3.69(5) (0.276)	3.64(5) (0.038)	3.77(5) 3.87(5) 4.35(5) (7.65)	0.575(5) (0.002)	0.153(5) (*)	None	8.2	1.21	2,597	1,062	431.8
0800, 4/1 to 0800, 4/2	6.7 (0.21)	6.9 (0.22)	1.28 (0.040)	0.09 (0.003)	3.87(5) (0.263)	3.19(5) (0.011)	4.35(5) 3.79(5) (9.96)	0.497(5) (0.002)	0.138(5) (*)	0.050(5) (0.028)	10.5	1.18	2,607	1,062	433.0
0800, 4/2 to 0800, 4/3	6.4 (0.20)	6.5 (0.20)	1.35 (0.042)	0.09 (0.003)	3.65(5) (0.203)	2.93(5) (0.042)	3.79(5) 4.80(5) 3.70(5) (11.61)	0.654(5) (0.002)	0.213(5) (*)	None	12.1	1.17	2,619	1,062	434.2
0800, 4/3 to 0800, 4/4	6.0 (0.19)	6.3 (0.20)	0.96 (0.031)	0.09 (0.003)	3.60(5) (0.254)	4.40(5) (0.022)	3.70(5) 3.40(5) 3.60(5) (11.21)	0.187(5) (0.001)	0.515(5) (0.001)	None	11.7	1.20	2,631	1,062	435.4
0800, 4/4 to 0800, 4/5	6.6 (0.20)	6.1 (0.18)	0.80 (0.024)	0.09 (0.003)	4.99(5) (0.341)	1.98(5) (0.006)	3.62(5) 3.84(5) 4.45(5) (7.83)	0.474(5) (0.002)	0.222(5) (*)	None	8.4	1.13	2,639	1,062	436.5

TABLE II. Rulison Radioactivity Release Estimates

TIME INTERVAL	RADIOACTIVITY IN DRY GAS				TRITIUM IN WATER & HYDROCARBONS								CUMULATIVE DATA		
	^{3}H pCi/cc (Ci)	^{85}Kr pCi/cc (Ci)	^{203}Hg pCi/m^{3} (μCi)	^{14}C pCi/cc (Ci)	Bulk Water pCi/ml (Ci)	Freeze Water pCi/ml (Ci)	Stored Water pCi/ml (Ci)	Bulk Cond. pCi/ml (Ci)	Freeze Cond pCi/ml (Ci)	Stored Cond. pCi/ml (Ci)	Total ^{3}H (Ci)	Gas Flow (M^{2}CF)	Cumulative Release ^{3}H(Ci)	Cumulative Release ^{85}Kr(Ci)	Cumulative Gas Flow (M^{2}CF)
1971 0800, 4/5 to 0800, 4/6	6.4 (0.19)	5.9 (0.18)	1.30 (0.039)	0.09 (0.003)	4.16(5) (0.288)	2.58(5) (0.013)	4.45(5) 3.66(5) (9.67)	0.505(5) (0.002)	0.202(5) (*)	None	10.2	1.12	2,650	1,063	437.6
0800, 4/6 to 0800, 4/7	6.4 (0.19)	5.5 (0.16)	0.73 (0.022)	0.09 (0.003)	3.96(5) (0.225)	2.75(5) (0.011)	4.71(5) 3.80(5) 3.88(5) (10.50)	0.607(5) (0.001)	0.370(5) (*)	None	10.9	1.11	2,660	1,063	438.7
0800, 4/7 to 0800, 4/8	5.3 (0.15)	5.1 (0.15)	1.76 (0.053)	0.09 (0.003)	3.86(5) (0.269)	2.95(5) (0.026)	3.88(5) 4.47(5) (8.54)	0.576(5) (0.002)	0.175(5) (0.001)	None	9.0	1.09	2,669	1,063	439.8
0800, 4/8 to 0800, 4/9	4.9 (0.14)	4.8 (0.13)	1.25 (0.038)	0.09 (0.002)	3.59(5) (0.169)	2.72(5) (0.032)	4.97(5) 2.95(5) (7.82)	0.519(5) (0.001)	0.174(5) (*)	None	8.2	1.00	2,678	1,063	440.8
0800, 4/9 to 0800, 4/10	4.1 (0.12)	4.5 (0.13)	1.00 (0.029)	0.09 (0.003)	3.74(5) (0.167)	3.32(5) (0.025)	2.95(5) 5.12(5) (11.26)	0.714(5) (0.002)	0.169(5) (*)	None	11.6	1.07	2,689	1,063	441.9
0800, 4/10 to 0800, 4/11	4.1 (0.12)	4.5 (0.13)	1.47 (0.042)	0.09 (0.003)	4.11(5) (0.294)	4.03(5) (0.028)	5.12(5) 3.81(5) 3.43(5) (9.95)	0.713(5) (0.002)	0.188(5) (*)	None	10.4	1.06	2,700	1,063	442.9
0800, 4/11 to 0800, 4/12	4.2 (0.12)	4.6 (0.13)	2.25 (0.063)	0.09 (0.003)	4.16(5) (0.280)	3.30(5) (0.028)	3.43(5) 3.87(5) (9.42)	0.755(5) (0.002)	0.195(5) (*)	None	9.9	1.05	2,710	1,063	444.0
0800, 4/12 to 0800, 4/13	3.9 (0.11)	4.2 (0.12)	0.94 (0.026)	0.09 (0.003)	4.53(5) (0.214)	1.96(5) (0.011)	3.87(5) 3.70(5) 3.70(5) (10.03)	0.694(5) (0.001)	0.172(5) (*)	None	10.4	1.03	2,720	1,064	445.0

TABLE II. Rulison Radioactivity Release Estimates

TIME INTERVAL	RADIOACTIVITY IN DRY GAS				TRITIUM IN WATER & HYDROCARBONS								CUMULATIVE DATA		
	^{3}H pCi/cc (Ci)	^{85}Kr pCi/cc (Ci)	^{203}Hg pCi/m^3 (μCi)	^{14}C pCi/cc (Ci)	Bulk Water pCi/ml (Ci)	Freeze Water pCi/ml (Ci)	Stored Water pCi/ml (Ci)	Bulk Cond. pCi/ml (Ci)	Freeze Cond pCi/ml (Ci)	Stored Cond. pCi/ml (Ci)	Total ^{3}H (Ci)	Gas Flow (M^{2}CF)	Cumulative Release ^{3}H(Ci)	Cumulative Release ^{85}Kr(Ci)	Cumulative Gas Flow (M^{2}CF)
1971 0800, 4/13 to 0800, 4/14	3.9 (0.11)	4.0 (0.11)	1.32 (0.036)	0.08 (0.002)	3.29(5) (0.173)	3.04(5) (0.019)	3.70(5) 3.73(5) 4.16(5) (11.67)	0.724(5) (0.001)	0.162(5) (*)	None	12.0	1.02	2,732	1,064	446.0
0800, 4/14 to 0800, 4/15	3.7 (0.10)	3.8 (0.11)	1.06 (0.029)	0.08 (0.002)	3.45(5) (0.147)	3.01(5) (0.018)	4.16(5) 2.37(5) 2.14(5) (8.27)	0.751(5) (0.001)	0.181(5) (*)	None	9.2	1.01	2,741	1,064	447.1
0800, 4/15 to 0800, 4/16	3.7 (0.10)	3.8 (0.10)	1.38 (0.037)	0.08 (0.002)	4.92(5) (0.242)	3.37(5) (0.027)	2.14(5) 3.93(5) 3.40(5) 4.19(5) (11.16)	0.732(5) (0.001)	0.172(5) (0.001)	None	11.5	0.994	2,753	1,064	448.0
0800, 4/16 to 0800, 4/17	3.5 (0.09)	3.6 (0.10)	1.04 (0.027)	0.08 (0.002)	3.88(5) (0.169)	3.35(5) (0.024)	4.19(5) 2.91(5) 3.29(5) (7.12)	0.582(5) (0.001)	0.512(5) (0.002)	None	7.4	0.985	2,760	1,064	449.0
0800, 4/17 to 0800, 4/18	3.3 (0.09)	3.6 (0.09)	0.83 (0.021)	0.08 (0.002)	4.13(5) (0.209)	3.31(5) (0.025)	3.29(5) 3.55(5) 3.75(5) (7.56)	0.676(5) (0.001)	0.295(5) (0.001)	None	7.9	0.968	2,768	1,064	450.0
0800, 4/18 to 0800, 4/19	3.4 (0.09)	3.5 (0.09)	1.34 (0.034)	0.08 (0.002)	3.82(5) (0.222)	3.53(5) (0.005)	3.75(5) 3.62(5) 4.46(5) (10.88)	0.542(5) (0.001)	0.179(5) (*)	None	11.2	0.948	2,779	1,064	451.0
0800,4/19 to 0800, 4/20	3.3 (0.08)	3.4 (0.09)	1.20 (0.030)	0.08 (0.002)	4.00(5) (0.243)	2.77(5) (0.013)	4.46(5) 2.71(5) 1.88(5) (9.07)	0.531(5) (0.001)	0.140(5) (*)	None	9.4	0.942	2,788	1,064	451.9

TABLE II. Rulison Radioactivity Release Estimates

	RADIOACTIVITY IN DRY GAS				TRITIUM IN WATER & HYDROCARBONS								CUMULATIVE DATA		
TIME INTERVAL	^{3}H pCi/cc (Ci)	^{85}Kr pCi/cc (Ci)	^{203}Hg pCi/m^{3} (μCi)	^{14}C pCi/cc (Ci)	Bulk Water pCi/ml (Ci)	Freeze Water pCi/ml (Ci)	Stored Water pCi/ml (Ci)	Bulk Cond. pCi/ml (Ci)	Freeze Cond pCi/ml (Ci)	Stored Cond. pCi/ml (Ci)	Total ^{3}H (Ci)	Gas Flow (M^2CF)	Cumulative Release ^{3}H(Ci)	Cumulative Release ^{85}Kr(Ci)	Cumulative Gas Flow (M^2CF)
1971 0800, 4/20 to 0800, 4/21	3.3 (0.08)	3.2 (0.08)	1.11 (0.028)	0.08 (0.002)	4.42(5) (0.258)	3.00(5) (0.008)	1.88(5) 3.39(5) 3.95(5) 3.20(5) (11.13)	0.522(5) (0.001)	0.135(5) (0.001)	None	11.5	0.935	2,800	1,064	452.8
0800, 4/21 to 0800, 4/22	3.2 (0.08)	3.2 (0.08)	1.33 (0.033)	0.08 (0.002)	4.05(5) (0.224)	4.08(5) (0.021)	3.20(5) 3.45(5) 3.39(5) (8.63)	0.588(5) (0.001)	0.182(5) (*)	None	9.0	0.923	2,809	1,064	453.8
0800, 4/22 to 0800, 4/23	3.3 (0.08)	2.9 (0.07)	1.05 (0.025)	0.08 (0.002)	3.61(5) (0.206)	2.97(5) (0.007)	3.52(5) 3.48(5) 3.38(5) (8.83)	0.542(5) (0.001)	0.177(5) (*)	None	9.1	0.908	2,818	1,064	454.7
0800, 4/23 to 1500, 4/23	3.3 (0.02)	2.9 (0.02)	0.61 (0.004)	0.08 (0.002)	3.64(5) (0.037)	1.94(5) (0.033)	3.38(5) 3.13(5) (5.78)	0.530(5) (*)	0.157(5) (0.001)	None	5.8	0.267	2,824	1,064	454.9
Subtotals:	290	273	27.5	0.835	319	8.79	872	0.887	0.672	0.052	1,491	233			
Totals to Date:	1,153	1,064	108	≈2.4							2,824	455			

NOTE: Values in ( ) after concentrations are powers of 10; e.g., 4.66(5) = 4.66×10^5

(*) = <0.0005 Ci

TABLE III. ON-SITE RADIATION SURVEILLANCE
ATMOSPHERIC SAMPLES ABOVE BACKGROUND (EIC)

Sample Collection Period	*Net Tritium Concentrations (pCi/ml) (moisture)	(pCi/m^3) (air)
0800, 2/2 to 0800, 2/3/71	2.1	3.5
0800, 2/3 to 0800, 2/4/71	7.0	5.6
0800, 2/4 to 0800, 2/5/71	13	8.0
0800, 2/5 to 0800, 2/6/71	15	8.8
0800, 2/6 to 0800, 2/7/71	25	13
0800, 2/7 to 0800, 2/8/71	27	9.2
0800, 2/8 to 0800, 2/9/71	19	3.0
0800, 2/9 to 0800, 2/10/71	45	36
0800, 2/10 to 0800, 2/11/71	22	24
0800, 2/11 to 0800, 2/12/71	47	45
0800, 2/12 to 0800, 2/13/71	75	72
0800, 2/13 to 0800, 2/14/71	14	15
0800, 2/14 to 0800, 2/15/71	25	27
0800, 2/15 to 0800, 2/16/71	35	49
0800, 2/16 to 0800, 2/17/71	7.6	7.4
0800, 2/17 to 0800, 2/18/71	3.8	7.3
0800, 2/18 to 0800, 2/19/71	2.5	3.9
0800, 2/19 to 0800, 2/20/71	6.0	8.5
0800, 2/20 to 0800, 2/21/71	6.8	6.5
0800, 2/21 to 0800, 2/22/71	5.2	1.4
0800, 2/22 to 0800, 2/23/71	53	14
0800, 2/23 to 0800, 2/24/71	28	11
0800, 2/24 to 0800, 2/25/71	24	13
0800, 2/25 to 0800, 2/26/71	30	21
0800, 2/26 to 0800, 2/27/71	147	72
0800, 2/27 to 0800, 2/28/71	32	11
0800, 2/28 to 0800, 3/1/71	192	82
0800, 3/1 to 0800, 3/2/71	12	4.6
0800, 3/2 to 0800, 3/3/71	38	13
0800, 3/3 to 0800, 3/4/71	35	13
0800, 3/4 to 0800, 3/5/71	17	19
0800, 3/5 to 0800, 3/6/71	4.8	2.7
0800, 3/6 to 0800, 3/7/71	8.3	2.8
0800, 3/7 to 0800, 3/8/71	28	16
0800, 3/8 to 0800, 3/9/71	14	12
0800, 3/9 to 0800, 3/10/71	6.6	4.7
0800, 3/10 to 0800, 3/11/71	6.9	7.3
0800, 3/11 to 0800, 3/12/71	6.5	8.1
0800, 3/12 to 0800, 3/13/71	3.9	5.2
0800, 3/13 to 0800, 3/14/71	2.1	1.9
0800, 3/14 to 0800, 3/15/71	12	3.5
0800, 3/15 to 0800, 3/16/71	14	14
0800, 3/16 to 0800, 3/17/71	8.8	7.6
0800, 3/17 to 0800, 3/18/71	18	12
0800, 3/18 to 0800, 3/19/71	20	8.1

TABLE III. ON-SITE RADIATION SURVEILLANCE
ATMOSPHERIC SAMPLES ABOVE BACKGROUND (EIC)

Sample Collection Period	*Net Tritium Concentrations (pCi/ml) (moisture)	(pCi/m^3) (air)
0800, 3/19 to 0800, 3/20/71	8.0	4.3
0800, 3/20 to 0800, 3/21/71	15	9.5
0800, 3/21 to 0800, 3/22/71	8.8	6.8
0800, 3/22 to 0800, 3/23/71	25	8.3
0800, 3/23 to 0800, 3/24/71	20	26
0800, 3/24 to 0800, 3/25/71	13	23
0800, 3/25 to 0800, 3/26/71	8.4	11
0800, 3/26 to 0800, 3/27/71	11	16
0800, 3/27 to 0800, 3/28/71	41	37
0800, 3/28 to 0800, 3/29/71	23	24
0800, 3/29 to 0800, 3/30/71	9.6	9.4
0800, 3/30 to 0800, 3/31/71	12	9.5
0800, 3/31 to 0800, 4/1/71	16	7.8
0800, 4/1 to 0800, 4/2/71	26	16
0800, 4/2 to 0800, 4/3/71	50	8.4
0800, 4/3 to 0800, 4/4/71	87	59
0800, 4/4 to 0800, 4/5/71	26	17
0800, 4/5 to 0800, 4/6/71	33	8.2
0800, 4/6 to 0800, 4/7/71	15	11
0800, 4/7 to 0800, 4/8/71	3.6	2.0
0800, 4/8 to 0800, 4/9/71	24	37
0800, 4/9 to 0800, 4/10/71	8.9	7.5
0800, 4/10 to 0800, 4/11/71	16	12
0800, 4/11 to 0800, 4/12/71	24	17
0800, 4/12 to 0800, 4/13/71	59	60
0800, 4/13 to 0800, 4/14/71	22	31
0800, 4/14 to 0800, 4/15/71	9.1	15
0800, 4/15 to 0800, 4/16/71	26	53
0800, 4/16 to 0800, 4/17/71	9.5	16
0800, 4/17 to 0800, 4/18/71	15	18
0800, 4/18 to 0800, 4/19/71	12	23
0800, 4/19 to 0800, 4/20/71	16	21
0800, 4/20 to 0800, 4/21/71	24	35
0800, 4/21 to 0800, 4/22/71	16	29
0800, 4/22 to 0800, 4/23/71	12	19
0800, 4/23 to 0800, 4/24/71	12	23

*Corrected for 1 pCi/ml of ^{3}H background in atmospheric moisture at Access Control van.

Note: The validity of the pCi/m^3 values for this report has been questioned due to sampling technique. It is probable that the actual figures will be somewhat higher, but should not exceed these values by more than an order-of-magnitude.

TABLE IV. ON-SITE RADIATION SURVEILLANCE - ENVIRONMENTAL SAMPLES ABOVE BACKGROUND

(Page 1 of 2)

Sample Collection Period	Location	Type of Sample	Net Tritium Concentrations (pCi/ml) (moisture)
0830, 2/3/71	SE of stack	Snow*	177
0835, 2/3/71	N of stack	Snow	90
0840, 2/3/71	S of stack	Snow	12
0845, 2/3/71	E of stack	Snow	61
0850, 2/3/71	W of stack	Snow	14
1000, 2/4/71	N of stack	Snow	21
1000, 2/4/71	S of stack	Snow	147
1000, 2/4/71	E of stack	Snow	145
1000, 2/4/71	W of stack	Snow	98
1015, 2/11/71	N of stack	Snow	166
1020, 2/11/71	S of stack	Snow	178
1025, 2/11/71	E of stack	Snow	160
1040, 2/11/71	W of stack	Snow	4
0900, 2/15/71	N of stack	Snow	16
0945, 2/15/71	S of stack	Snow	64
0930, 2/15/71	E of stack	Snow	134
0935, 2/15/71	W of stack	Snow	52
0900, 2/17/71	N of stack	Snow	244
0905, 2/17/71	S of stack	Snow	54
0910, 2/17/71	E of stack	Snow	26
0915, 2/17/71	W of stack	Snow	180
0905, 2/18/71	N of stack	Snow	108
0900, 2/18/71	S of stack	Snow	94
0910, 2/18/71	E of stack	Snow	235
0920, 2/18/71	W of stack	Snow	37
0930, 2/19/71	SW of stack	Snow	339
1345, 2/19/71	N of stack	Snow	2
1340, 2/19/71	S of stack	Snow	80
1400, 2/19/71	E of stack	Snow	291
1350, 2/19/71	W of stack	Snow	105
0810, 2/20/71	N of stack	Snow	579
0800, 2/20/71	S of stack	Snow	370
0805, 2/20/71	E of stack	Snow	921
0815, 2/20/71	W of stack	Snow	761
1010, 2/26/71	N of stack	Snow	515
1015, 2/26/71	S of stack	Snow	88
1020, 2/26/71	E of stack	Snow	490
1025, 2/26/71	W of stack	Snow	39
2/71	NE of stack	Porcupine	160-180(120-130 pCi/gm wet)
2/71	NE of stack	Porcupine	34-38(24-29 pCi/gm wet)

Note: These animals grazed directly under the stack in an area of highest surface deposition of tritium for several days before being collected.

TABLE IV. ON-SITE RADIATION SURVEILLANCE - ENVIRONMENTAL SAMPLES ABOVE BACKGROUND

(Page 2 of 2)

Sample Collection Period	Location	Type of Sample	Net Tritium Concentrations (pCi/ml) (Moisture)
1035, 3/5/71	N of stack	Snow*	94
1025, 3/5/71	S of stack	Snow	41
1040, 3/5/71	E of stack	Snow	237
1030, 3/5/71	W of stack	Snow	26
1105, 3/6/71	N of stack	Snow	146
1120, 3/6/71	S of stack	Snow	282
1110, 3/6/71	E of stack	Snow	267
1100, 3/6/71	W of stack	Snow	881
1140, 3/9/71	N of stack	Snow	218
1130, 3/9/71	S of stack	Snow	152
1135, 3/9/71	E of stack	Snow	284
1145, 3/9/71	W of stack	Snow	874
0930, 3/14/71	N of stack	Snow	116
0935, 3/14/71	S of stack	Snow	264
0940, 3/14/71	E of stack	Snow	270
0945, 3/14/71	W of stack	Snow	134
1050, 3/16/71	N of stack	Snow	204
1055, 3/16/71	S of stack	Snow	450
1100, 3/16/71	E of stack	Snow	777
1105, 3/16/71	W of stack	Snow	265
1050, 3/25/71	N of stack	Snow	108
1040, 3/25/71	S of stack	Snow	118
1045, 3/25/71	E of stack	Snow	148
1055, 3/25/71	W of stack	Snow	253
0945, 4/19/71	N of stack	Snow	301
0950, 4/19/71	S of stack	Snow	250
0955, 4/19/71	E of stack	Snow	81
1000, 4/19/71	W of stack	Snow	468
0945, 4/20/71	N of stack	Snow	497
0950, 4/20/71	S of stack	Snow	103
0955, 4/20/71	E of stack	Snow	101
1000, 4/20/71	W of stack	Snow	99
0900, 4/21/71	N of stack	Snow	278
0905, 4/21/71	S of stack	Snow	20
0910, 4/21/71	E of stack	Snow	59
0915, 4/21/71	W of stack	Snow	34

* All snow samples collected on a 20-yard radius around the flare stack unless otherwise noted.

TABLE V.

(Page 1 of 10)

OFF-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND

Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Type of Sample	Radioactivity Concentrations: Net ^{3}H (pCi/ml) (moisture)	Net ^{3}H (pCi/m^{3}) (air)	Net ^{85}Kr (pCi/m^{3}) (air)	Atmospheric Dilution Factor **
D - 1050, 2/3 to 1030, 2/5/71	Latham Ranch, ≈ 250°, ≈ 15 miles	Fixed molysieve* sample	0.9	0.5		~ 4 x 10^{8}
D - 1145, 2/3 to 1055, 2/5/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	1.4	2.0		~ 1 x 10^{8}
D - 0925, 2/3 to 0850, 2/5/71	Griffith Ranch, ≈ 170°, ≈ 11 miles	Fixed molysieve sample	1.0	1.9		~ 1 x 10^{8}
	(2/2 - 2/5/71) Total Samples Collected: 14 (11 were background)					
1045, 2/5 to 1045, 2/7/71	Latham Ranch, ≈ 250°, ≈ 15 miles	Fixed molysieve sample	2.3	1.0		~ 2 x 10^{8}
1145, 2/5 to 1135, 2/7/71	Grand Valley, ≈ 300°, ≈ 7.0 miles	Fixed molysieve sample	2.4	1.6		~ 1 x 10^{8}
D - 1100, 2/5 to 1120, 2/7/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	1.1	1.0		~ 2 x 10^{8}
D - 1212, 2/5 to 1210, 2/7/71	Duplice Ranch, ≈ 320°, ≈ 4.0 miles	Fixed molysieve sample	1.0	1.0		~ 2 x 10^{8}
D - 0945, 2/5 to 1015, 2/7/71	Rifle, ≈ 40°, ≈ 13 miles	Fixed molysieve sample	0.8	1.2		~ 2 x 10^{8}
D - 0900, 2/5 to 0930, 2/7/71	Jackett Ranch, ≈ 90°, ≈ 17 miles	Fixed molysieve sample	1.2	1.1		~ 2 x 10^{8}
D - 0905, 2/5 to 0920, 2/7/71	Griffith Ranch, ≈ 170°, ≈ 11 miles	Fixed molysieve sample	1.3	1.2		~ 2 x 10^{8}
	(2/5 - 2/7/71) Total Samples Collected: 7 (None were background)					

TABLE V.

(Page 2 of 10)

OFF-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND

Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Type of Sample	Radioactivity Concentrations Net ^{3}H (pCi/ml) (moisture)	Net ^{3}H (pCi/m^3) (air)	Net ^{85}Kr (pCi/m^3) (air)	Atmospheric Dilution Factor
D - 1150, 2/7 to 1105, 2/9/71	Grand Valley, ≈ 300°, ≈ 7.0 miles	Fixed molysieve sample	0.7	0.8		~ 3×10^8
D - 1130, 2/7 to 1215, 2/9/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	0.8	1.4		~ 1×10^8
D - 0945, 2/7 to 0935, 2/9/71	Jackett Ranch, ≈ 90°, ≈ 17 miles	Fixed molysieve sample	0.8	1.1		~ 2×10^8
D - 0930, 2/7 to 0900, 2/9/71	Griffith Ranch, ≈ 170°, ≈ 11 miles	Fixed molysieve sample	0.7	1.0		~ 2×10^8
2105 to 2305, 2/8/71	C.P. Pad, ≈ 340°, ≈ 2.5 miles	Portable molysieve sample	4.3	7.0		~ 3×10^7
2050 to 2240, 2/8/71	Station D-11, ≈ 340°, ≈ 4.3 miles	Portable molysieve sample	2.1	4.0		~ 5×10^7
2128 to 2200, 2/8/71	C.P. Pad, ≈ 340°, ≈ 2.5 miles	Portable compressed air sample	-	-	15	~ 4×10^6
	(2/7 - 2/9/71) Total Samples Collected: 10 (2 were background, 1 had insufficient moisture for analysis)					
D - 1115, 2/9 to 1020, 2/11/71	Grand Valley, ≈ 300°, ≈ 7.0 miles	Fixed molysieve sample	1.0	1.4		~ 1×10^8
D - 1220, 2/9 to 1145, 2/11/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	1.2	1.6		~ 1×10^8
D - 1222, 2/9 to 1100, 2/11/71	Duplice Ranch, ≈ 320°, ≈ 4.0 miles	Fixed molysieve sample	2.0	3.5		~ 5×10^7

TABLE V.

(Page 3 of 10)

OFF-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND

Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Type of Sample	Radioactivity Concentrations Net ^{3}H (pCi/ml) (moisture)	Net ^{3}H (pCi/m^{3}) (air)	Net ^{85}Kr (pCi/m^{3}) (air)	Atmospheric Dilution Factor
D - 0940, 2/9 to 1015, 2/11/71	Jackett Ranch, ≈ 90°, ≈ 17 miles	Fixed molysieve sample	0.8	1.2		~ 1 x 10^{8}
D - 0915, 2/9 to 1030, 2/11/71	Griffith Ranch, ≈ 170°, ≈ 11 miles	Fixed molysieve sample	0.8	1.6		~ 1 x 10^{8}
2250 to 2320, 2/10/71	C.P. Pad, ≈ 340°, ≈ 2.5 miles	Portable compressed air sample	-	-	5	~ 1 x 10^{7}
	(2/9 - 2/11/71) Total Samples Collected: 10 (4 were background)					
D - 1310, 2/11 to 1125, 2/13/71	Latham Ranch, ≈ 250°, ≈ 15 miles	Fixed molysieve sample	1.2	0.8		~ 2 x 10^{8}
D - 1050, 2/11 to 1100, 2/13/71	Grand Valley, ≈ 300°, ≈ 7.0 miles	Fixed molysieve sample	0.8	0.9		~ 2 x 10^{8}
1155, 2/11 to 1100, 2/13/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	2.4	4.5		~ 4 x 10^{7}
D - 1110, 2/11 to 1040, 2/13/71	Duplice Ranch, ≈ 320°, ≈ 4.0 miles	Fixed molysieve sample	1.0	1.6		~ 1 x 10^{8}
0415 to 0600 2/12/71	C.P. Pad, ≈ 340°, ≈ 2.5 miles	Portable molysieve sample	11	17		~ 1 x 10^{7}
0453 to 0522, 2/12/71	C.P. Pad, ≈ 340°, ≈ 2.5 miles	Portable compressed air sample	-	-	11	~ 5 x 10^{6}
	(2/11 - 2/13/71) Total Samples Collected: 10 (4 were background)					

TABLE V.

(Page 4 of 10)

OFF-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND

Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Type of Sample	Radioactivity Concentrations: Net ^{3}H (pCi/ml) (moisture)	Net ^{3}H (pCi/m^{3}) (air)	Net ^{85}Kr (pCi/m^{3}) (air)	Atmospheric Dilution Factor
1130, 2/13 to 1040, 2/15/71	Latham Ranch, ≈ 250°, ≈ 15 miles	Fixed molysieve sample	1.8	1.2		~ 1 x 10^{8}
D - 1105, 2/13 to 1055, 2/15/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	0.6	1.3		~ 1 x 10^{8}
	(2/13 - 2/15/71) Total Samples Collected: 7 (5 were background)					
D - 1050, 2/15 to 0905, 2/17/71	Latham Ranch, ≈ 250°, ≈ 15 miles	Fixed molysieve sample	0.9	0.4		~ 4 x 10^{8}
	(2/15 - 2/17/71) Total Samples Collected: 7 (6 were background)					
	(2/17 - 2/21/71) Total Samples Collected: 14 (12 were background, 1 had insufficient moisture for analysis)					
1235, 2/21 to 1140, 2/23/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	3.4	2.2		~ 9 x 10^{7}
D - 1300, 2/21 to 1200, 2/23/71	Duplice Ranch, ≈ 320°, ≈ 4.0 miles	Fixed molysieve sample	0.9	0.7		~ 3 x 10^{8}
D - 1500, 2/21 to 1435, 2/23/71	Griffith Ranch, ≈ 170°, ≈ 11 miles	Fixed molysieve sample	1.2	0.9		~ 2 x 10^{8}
	(2/21 - 2/23/71) Total Samples Collected: 7 (3 were background, 1 had insufficient moisture for analysis)					
D - 1145, 2/23 to 1130, 2/25/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	1.4	2.2		~ 8 x 10^{7}

TABLE V.

(Page 5 of 10)

OFF-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND

Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Type of Sample	Radioactivity Concentrations: Net ^{3}H (pCi/ml) (moisture)	Net ^{3}H (pCi/m^{3}) (air)	Net ^{85}Kr (pCi/m^{3}) (air)	Atmospheric Dilution Factor
	(2/23 - 2/25/71) Total Samples Collected: 7 (5 were background, 1 had insufficient moisture for analysis)					
D - 1132, 2/25 to 1320, 2/27/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	0.9	1.0		~ 2 x 10^{8}
0610 to 0810, 2/27/71	C.P. Pad, ≈ 340°, ≈ 2.5 miles	Portable molysieve sample	31	23		~ 1 x 10^{7}
0625 to 0825, 2/27/71	Station D-11, ≈ 340°, ≈ 4.3 miles	Portable molysieve sample	1.2	1.2		~ 2 x 10^{8}
0652 to 0725, 2/27/71	C. P. Pad, ≈ 340°, ≈ 2.5 miles	Portable compressed air sample	-	-	6	~ 5 x 10^{6}
	(2/25 - 2/27/71) Total Samples Collected: 10 (5 were background, 1 had insufficient moisture for analysis)					
1325, 2/27 to 1235, 3/1/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	1.7	1.4		~ 2 x 10^{8}
	(2/27 - 3/1/71) Total Samples Collected: 7 (5 were background, 1 had insufficient moisture for analysis)					
D - 1310, 3/1 to 1015, 3/3/71	Grand Valley, ≈ 300°, ≈ 7.0 miles	Fixed molysieve sample	0.8	0.4		~ 5 x 10^{8}
1240, 3/1 to 0920, 3/3/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	2.6	2.3		~ 9 x 10^{7}
D - 0730, 3/1 to 0750, 3/3/71	Jackett Ranch, ≈ 90°, ≈ 17 miles	Fixed molysieve sample	0.8	0.8		~ 3 x 10^{8}

TABLE V.

(Page 6 of 10)

OFF-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND

Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Type of Sample	Radioactivity Concentrations Net ^{3}H (pCi/ml) (moisture)	Net ^{3}H (pCi/m^3) (air)	Net ^{85}Kr (pCi/m^3) (air)	Atmospheric Dilution Factor
D - 1435, 3/1 to 1140, 3/3/71	Griffith Ranch, ≈ 170°, ≈ 11 miles	Fixed molysieve sample	0.6	0.5		~ 4 x 10^8
	(3/1 - 3/3/71) Total Samples Collected: 7 (2 were background, 1 had insufficient moisture for analysis)					
D - 0945, 3/3 to 1305, 3/5/71	Duplice Ranch, ≈ 320°, ≈ 4.0 miles	Fixed molysieve sample	0.6	0.6		~ 4 x 10^8
D - 0830, 3/3 to 0850, 3/5/71	Rifle, ≈ 40°, ≈ 13 miles	Fixed molysieve sample	0.8	1.7		~ 1 x 10^8
D - 1145, 3/3 to 1500, 3/5/71	Griffith Ranch, ≈ 170°, ≈ 11 miles	Fixed molysieve sample	0.6	0.6		~ 4 x 10^8
	(3/3 - 3/5/71) Total Samples Collected: 7 (3 were background, 1 had insufficient moisture for analysis)					
1255, 3/5 to 1035, 3/7/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	2.3	2.2		~ 1 x 10^8
D - 1315, 3/5 to 1055, 3/7/71	Duplice Ranch, ≈ 320°, ≈ 4.0 miles	Fixed molysieve sample	0.7	0.5		~ 6 x 10^8
D - 1510, 3/5 to 1400, 3/7/71	Griffith Ranch, ≈170°, ≈ 11 miles	Fixed molysieve sample	1.1	0.6		~ 5 x 10^8
	(3/5 - 3/7/71) Total Samples Collected: 7 (3 were background, 1 had insufficient moisture for analysis)					
D - 1040, 3/7 to 1230, 3/9/71	Clem Ranch, ≈340°, ≈3.5 miles	Fixed molysieve sample	1.2	1.7		~ 2 x 10^8
	(3/7 - 3/9/71) Total Samples Collected: 7 (5 were background, 1 had insufficient moisture for analysis)					

TABLE V.

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OFF-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND

Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Type of Sample	Radioactivity Concentrations Net ^{3}H (pCi/ml) (moisture)	Net ^{3}H (pCi/m^3) (air)	Net ^{85}Kr (pCi/m^3) (air)	Atmospheric Dilution Factor
D - 0745, 3/9 to 1345, 3/11/71	Griffith Ranch, ≈ 170°, ≈ 11 miles	Fixed molysieve sample	0.9	1.1		~ 3×10^8
	(3/9 - 3/11/71) Total Samples Collected: 7 (6 were background)					
D - 0500 to 0700, 3/13/71	C.P. Pad, ≈ 340°, ≈ 2.5 miles	Portable molysieve sample	0.8	1.9		~ 1×10^8
	(3/11 - 3/13/71) Total Samples Collected: 10 (9 were background)					
1155, 3/17 to 1240, 3/19/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	1.8	1.0		~ 4×10^8
0712 to 0912, 3/19/71	C.P. Pad, ≈ 340°, ≈ 2.5 miles	Portable molysieve sample	12	15		~ 3×10^7
0750 to 0950, 3/19/71	Reese Residence, ≈ 340°, ≈ 3.5 miles	Portable molysieve sample	2.9	4.4		~ 1×10^8
0814 to 1014, 3/19/71	Station D-5, ≈ 303°, ≈ 4 miles	Portable molysieve sample	1.3	1.9		~ 3×10^8
D - 0807 to 1007, 3/19/71	Station D-14, ≈ 345°, ≈ 4 miles	Portable molysieve sample	0.6	1.2		~ 4×10^8
D - 0730 to 0930, 3/19/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Portable molysieve sample	0.8	1.2		~ 4×10^8
1545 to 1745, 3/19/71	Station D-35, ≈ 110°, ≈ 16 miles	Portable molysieve sample	1.7	2.3		~ 2×10^8
1522 to 1722, 3/19/71	Station D-37, ≈ 120°, ≈ 15 miles	Portable molysieve sample	1.2	1.7		~ 3×10^8

TABLE V.

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OFF-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND

Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Type of Sample	Radioactivity Concentrations Net ^{3}H (pCi/ml) (moisture)	Net ^{3}H (pCi/m^3) (air)	Net ^{85}Kr (pCi/m^3) (air)	Atmospheric Dilution Factor
1502 to 1702, 3/19/71	Station D-39, ≈ 130°, ≈ 14 miles	Portable molysieve sample	1.6	2.3		~ 2×10^8
0840 to 0915, 3/19/71	Reese Residence, ≈ 340°, ≈ 3.5 miles	Portable compressed air sample	3.2	18	9	~ 3×10^7
0703, 3/19/71	≈ NE of flare, ≈ 1 mile (10,700' MSL)	Aircraft "grab" sample	-	-	6	-
	3/13 - 3/19/71) Total Samples Collected: 38 (27 were background)					
1300, 3/19 to 1205, 3/21/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	5.3	4.0		~ 8×10^7
D - 1225, 3/19/71 1140, 3/21/71	Duplice Ranch, ≈ 320°, ≈ 4.0 miles	Fixed molysieve sample	0.7	0.4		~ 8×10^8
	(3/19 - 3/21/71) Total Samples Collected: 7 (5 were background)					
	(3/21 - 3/27/71) Total Samples Collected: 17 (All were background)					
1115, 3/27 to 1130, 3/29/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	2.4	1.9		~ 2×10^8
D - 1105, 3/29 to 1200, 3/31/71	Grand Valley, ≈ 300°, ≈ 7.0 miles	Fixed molysieve sample	0.9	0.7		~ 5×10^8
1135, 3/29 to 1050, 3/31/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	1.8	1.3		~ 2×10^8
D - 1120, 3/29 to 1125, 3/31/71	Duplice Ranch, ≈ 320°, ≈ 4.0 miles	Fixed molysieve sample	1.1	0.9		~ 3×10^8

TABLE V. OFF-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND

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Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Type of Sample	Radioactivity Concentrations Net ^{3}H (pCi/ml) (moisture)	Net ^{3}H (pCi/m^{3}) (air)	Net ^{85}Kr (pCi/m^{3}) (air)	Atmospheric Dilution Factor
D - 0900, 3/29 to 1035, 3/31/71	Rifle, ≈ 40°, 13 miles	Fixed molysieve sample	0.6	0.6		~ 5 x 10^{8}
	(3/27 - 3/31/71) Total Samples: 8 (3 were background)					
1110, 3/31 to 1055, 4/2/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	3.2	1.8		~ 2 x 10^{8}
1105, 4/2 to 1040, 4/4/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	2.8	1.6		~ 2 x 10^{8}
1125, 4/2 to 1100, 4/4/71	Duplice Ranch, ≈ 320°, ≈ 4.0 miles	Fixed molysieve sample	1.9	1.4		~ 3 x 10^{8}
	(3/31 - 4/4/71) Total Samples Collected: 8 (5 were background)					
1120, 4/4 to 1125, 4/6/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	3.1	1.2		~ 2 x 10^{8}
1130, 4/6 to 1130, 4/8/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	2.9	1.7		~ 2 x 10^{8}
	(4/4 - 4/8/71) Total Samples Collected: 8 (6 were background)					
1130, 4/10 to 1030, 4/12/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	1.7	0.8		~ 4 x 10^{8}
1040, 4/12 to 1040, 4/14/71	Clem Ranch, ≈ 340°, ≈ 3.5 miles	Fixed molysieve sample	1.8	1.2		~ 3 x 10^{8}
	(4/8 - 4/23/71) Total Samples Collected: 32 (30 were background)					

TABLE V

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OFF-SITE RADIATION SURVEILLANCE - ATMOSPHERIC SAMPLES ABOVE BACKGROUND

Sample Collection Period	Location, Heading, and Distance from flare (degrees & miles)	Type of Sample	Radioactivity Concentrations Net ^{3}H (pCi/ml) (moisture)	Net ^{3}H (pCi/m^{3}) (air)	Net ^{85}Kr (pCi/m^{3}) (air)	Atmospheric Dilution Factor
	Total Samples Collected During Flaring: 274 (> 153 were background; 10 had insufficient moisture for analysis)					

D - prefix indicates doubtful if really above background; near upper range of background samples. Included in due to uncertainty as to practical upper limit on ^{3}H background.

* Molysieve is a colloquialism for molecular sieve.

** Dilution factors based on total ^{3}H curies released (gas + water) during each sampling. While this was not done in earlier reports, it became necessary during the third production test since the ^{3}H in the water reintroduced into the flare accounted for most of the total ^{3}H released.

TABLE VI. OFF-SITE RADIATION SURVEILLANCE - ENVIRONMENTAL SAMPLES

(Page 1 of 4)

Sample Collection Period	Location, Heading, and Distance from Flare (degrees & miles)	Type of Sample	Net Tritium Concentrations (pCi/ml moisture)
2000, 2/3/71	N.W. of Test Well ≈ 0.1 mile	Snow	4.8
1305, 2/5/71	N.W. of Test Well, ≈ 0.1 mile		1.3
1310, 2/5/71	N.W. of Test Well, ≈ 0.25 mile	Snow	2.1
1315, 2/5/71	N.W. of Test Well, ≈ 0.5 mile	Snow	1.9
1250, 2/7/71	N.W. of Test Well, ≈ 0.1 mile	Snow	4.0
1255, 2/7/71	N.W. of Test Well, ≈ 0.25 mile	Snow	2.9
1415, 2/8/71	N.W. of Test Well, ≈ 0.1 mile	Snow	6.6
2130, 2/15/71	N.W. of Test Well, ≈ 0.25 mile	Snow	2.3
1015, 2/20/71	N.W. of Test Well, ≈ 0.1 mile	Snow	9.0
1020, 2/20/71	N.W. of Test Well, ≈ 0.25 mile	Snow	2.8
1025, 2/20/71	N.W. of Test Well, ≈ 0.5 mile	Snow	1.5
1135, 2/21/71	N.W. of Test Well, ≈ 0.1 mile	Snow	20
1140, 2/21/71	N.W. of Test Well, ≈ 0.25 mile	Snow	11
1145, 2/21/71	N.W. of Test Well, ≈ 0.5 mile	Snow	2.3
1045, 2/24/71	N.W. of Test Well, ≈ 0.1 mile	Snow	46
1050, 2/24/71	N.W. of Test Well, ≈ 0.25 mile	Snow	1.7

TABLE VI. OFF-SITE RADIATION SURVEILLANCE - ENVIRONMENTAL SAMPLES

(Page 2 of 4)

Sample Collection Period	Location, Heading and Distance from Flare (degrees & miles)	Type of Sample	Net Tritium Concentrations (pCi/ml moisture)
1055, 2/24/71	N.W. of Test Well, ≈ 0.5 mile	Snow	1.8
1155, 2/24/71	N.W. of Test Well, ≈ 2 miles (Plot 2)	Snow	1.8
2400, 2/28/71	N.W. of Test Well, ≈ 0.1 mile	Snow	9.0
2400, 2/28/71	N.W. of Test Well, ≈ 0.25 mile	Snow	2.8
2400, 2/28/71	N.W. of Test Well, ≈ 0.5 mile	Snow	2.0
2400, 2/28/71	N.W. of Test Well, ≈ 1 mile (Plot 1)	Snow	2.1
1105, 3/6/71	N.W. of Test Well, ≈ 0.1 mile	Snow	1.2
1255, 3/14/71	N.W. of Test Well, ≈ 1 mile (Plot 1)	Snow	5.0
1220, 3/16/71	N.W. of Test Well, ≈ 0.1 mile	Snow	3.7
1225, 3/16/71	N.W. of Test Well, ≈ 0.25 mile	Snow	2.2
1255, 4/18/71	N.W. of Test Well, ≈ 0.1 mile	Snow	5.7
1300, 4/18/71	N.W. of Test Well, ≈ 0.25 mile	Snow	16
1305, 4/18/71	N.W. of Test Well, ≈ 0.5 mile	Snow	4.1
1000, 4/20/71	N.W. of Test Well, ≈ 0.1 mile	Snow	3.1
1005, 4/20/71	N.W. of Test Well, ≈ 0.25 mile	Snow	2.0

TABLE VI. OFF-SITE RADIATION SURVEILLANCE - ENVIRONMENTAL SAMPLES

(Page 3 of 4)

Sample Collection Period	Location, Heading, and Distance from Flare (degrees & miles)	Type of Sample	Net Tritium Concentrations (pCi/ml moisture)
1015, 4/20/71	N.W. of Test Well, ≈ 0.5 mile	Snow	1.9
* 1315, 4/26/71	Duplice Ranch, ≈ 320°, ≈ 4 miles	Snow	1.5

(2/3 - 4/26/71) Total Precipitation Samples (Snow and Rain) Collected: 221 (188 were background)

* Collected 3 days after the end of flaring

(2/2 - 4/30/71) Total Water Samples Collected: 121 (All were background)
Battlement Creek: 69
18 Domestic water supplies surrounding Rulison (out to a distance of 15 miles): 52

(2/2 - 4/30/71) Total Milk Samples Collected: 26 (All were background)
(10 Ranches out to 18 miles from Rulison Site)

1020, 2/27/71	Silt, ≈ 60°, 19 miles	Vegetation sample	2.0 (0.9 pCi/gm wet)
1105, 4/28/71	N.W. of Test Well, ≈ 310°, ≈ 0.25 mile	Vegetation sample	5.9 (3.7 pCi/gm wet)
1140, 4/28/71	N.W. of Test Well, ≈ 310°, ≈ 0.5 mile	Vegetation sample	2.2 (0.9 pCi/gm wet)

(2/2 - 4/30/71) Total Vegetation Samples Collected: 19 (16 were background)
(Out to 19 miles from Rulison Site)

1100, 4/28/71	N.W. of Test Well, ≈ 310°, ≈ 0.25 mile	Soil Sample	5.7 (1.6 pCi/gm wet)
1125, 4/28/71	N.W. of Test Well, ≈ 310°, ≈ 0.5 mile	Soil Sample	1.6 (0.5 pCi/gm wet)
1100, 4/28/71	N.W. of Test Well, ≈ 310°, ≈ 0.25 miles (depth of 6 inches)	Soil Sample	3 3 (0.8 pCi/gm wet)

(2/2 - 4/30/71) Total Soil Samples Collected: 17 (14 were background)
(Out to 19 miles from Rulison Site)

TABLE VI. OFF-SITE RADIATION SURVEILLANCE - ENVIRONMENTAL SAMPLES

(Page 4 of 4)

Sample Collection Period	Location, Heading, and Distance from Flare (degrees & miles)	Type of Sample	Net Tritium Concentrations (pCi/ml moisture)
(2/2 - 4/30/71)	Total Urine Samples Collected: 60 (All were background)* (Collected from 20 residents out to 20 miles from Rulison Site)		

* Some elevated levels were observed but were determined to be from tritium dialed wrist watches; no increases were attributable to Rulison flaring.

(2/2 - 4/30/71)	Total Animal Samples Collected: 8 (All were background) - Blood Samples (sheep and cattle: 6 (within 5 miles of Rulison Site) - Deer Tissue (road-kills): 2 (within ≈ 10 miles of Rulison Site)		
(2/2 - 4/30/71)	Thermoluminescent Dosimetry (TLD): 36 (All were background)		

NOTE: All tritium concentrations were corrected for 1 pCi/ml moisture.