

# Sodium Reactor Experiment Fuel Meltdown—July 1959

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<b>SRE Core Inventory, Curies</b>				
<b>Isotope</b>	<b>Half-Li fe</b>	<b>Inventory (Hart)</b>	<b>Inventory (Daniel)</b>	<b>Inventory (Sandia)</b>
Cs-134	2.062 y	200	Not computed	80
Cs-137	30.0 y	8,700	7,890	7,754
Sr-89	50.5 d	160,000	129,000	148,100
Sr-90	29.12 y	8,150	7,800	7,512
I-131	8.04 d	16,800	19,200	21,390
Ce-141	32.50 d	127,000	122,000	136,200
Ce-144	284.3 d	169,000	154,000	159,800
Ru-103	39.28 d	75,200	71,800	83,620
Ba(La)- 140	12.74 d	56,100	55,400	62,640
Zr(Nb)- 95	63.98 d	553,000	197,000	295,800
Kr-85	10.72 y	1,100	982	934
Xe-133	5.245 d	50,800	92,200	48,930
Xe-131M	11.9 d	Not computed	715	408
I-133	20.8 h	Not computed	92,200	62,420
I-135	6.61 h	Not computed	2,350	58,350
<b>Totals:</b>		<b>1,226,050</b>	<b>952,537</b>	<b>1,093,937</b>

**Table 1. Estimates of the inventory of selected radioisotopes in the SRE core after 2,426.4 MWd, i.e., on July 26, 1959.**

<b>SRE Radioactivity</b>				
<b>Potentially Released from the Fuel, Curies</b>				
<b>Isotope</b>	<b>Half-Life</b>	<b>Low Estimate</b>	<b>Mid Estimate</b>	<b>High Estimate</b>
Cs-134	2.062 y	1	5	8
Cs-137	30.0 y	116	465	775
Sr-89	50.5 d	2,222	8,886	14,810
Sr-90	29.12 y	113	451	751
I-131	8.04 d	321	1,283	2,139
Kr-85	10.72 y		56	93
Xe-133	5.245 d		2,936	4,893
Xe-131M	11.9 d		24	41
I-133	20.8 h	936	3,745	6,242
I-135	6.61 h	875	3,501	5,835
<b>Totals:</b>		<b>4,584</b>	<b>21,353</b>	<b>35,588</b>

**Table 2. Estimates of the inventory of selected radioisotopes potentially released from the fuel.**

<b>SRE Radioactivity, Curies</b>		
<b>Isotope</b>	<b>Half-Life</b>	<b>Hart Estimate</b>
<b>Estimated in the Coolant</b>		
Cs-134	2.062 y	0.4
Cs-137	30.0 y	27.7
Sr-89	50.5 d	444
Sr-90	29.12 y	21.4
I-131	8.04 d	16.3
<b>Estimated in the Cover Gas</b>		
Kr-85	10.72 y	0.2
Xe-133	5.245 d	47
<b>Totals:</b>		<b>538</b>

**Table 3. Estimates cited by Hart of the inventory of selected radioisotopes in the coolant and cover gas as of July 26, 1959, based on measurements taken later.**

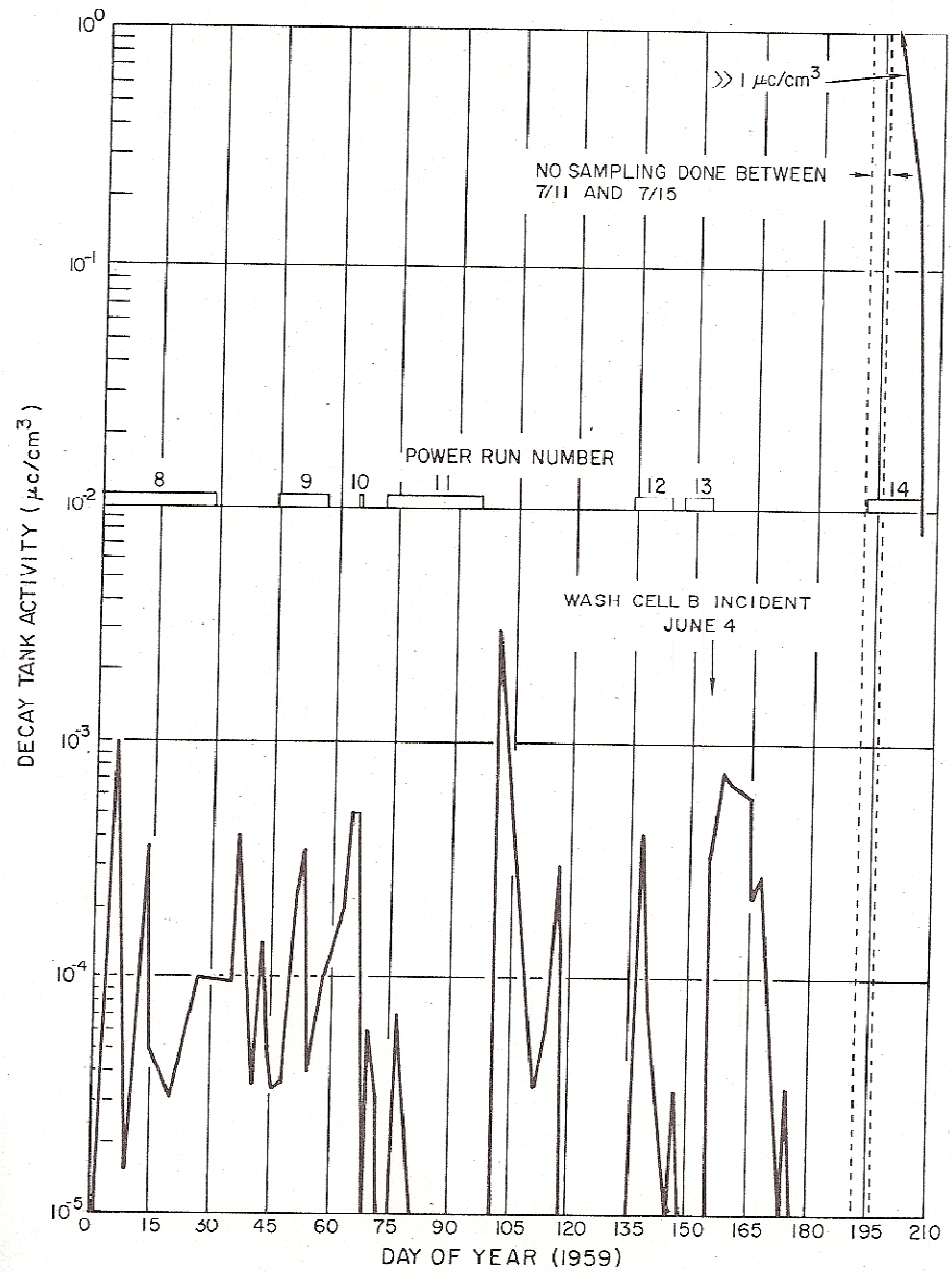
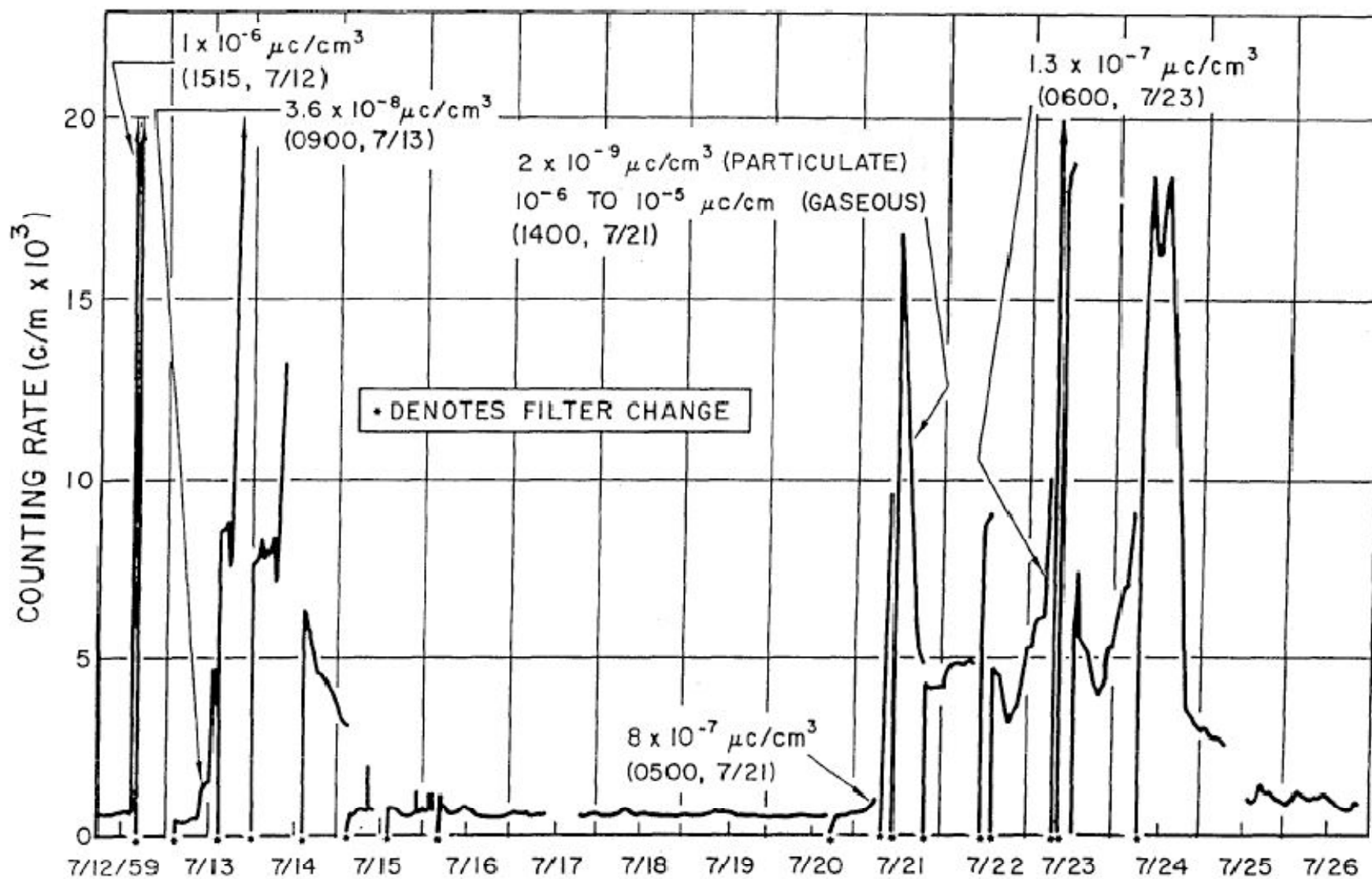


Figure IV-C-1. Radioactive Gas Decay Tank Activities  
 (Lines between points do not represent decay)



High Bay Area Airborne Activity  
 (Concentrations shown made with spot sampler.)

	<b>micro-ci/cm<sup>3</sup></b>	<b>ft<sup>3</sup>/hr</b>	<b>micro-Ci</b>
7/1/1959	5.00E-06	145	3.80E+02
7/1/1959	7.00E-06	145	5.32E+02
7/3/1959	2.50E-06	145	1.90E+02
7/9/1959	2.00E-06	145	1.52E+02
7/10/1950	1.80E-06	145	1.37E+02
7/11/1959	2.20E-06	145	1.67E+02
<b>7/20/1959</b>	<b>5.00E-02</b>	<b>4</b>	<b>3.80E+06</b>
<b>7/25/1959</b>	<b>1.40E-02</b>	<b>27</b>	<b>1.06E+06</b>
<b>7/25/1959</b>	<b>8.00E-02</b>	<b>6</b>	<b>6.08E+06</b>
8/22/1959	7.00E-02	4	5.32E+06
9/16/1959	6.50E-02	4	4.94E+06
9/17/1959	7.00E-02	12	5.32E+06
9/18/1959	2.00E-03	145	1.52E+05
9/20/1959	5.00E-03	145	3.80E+05
9/21/1959	1.30E-03	65	9.88E+04
9/21/1959	1.30E-03	145	9.88E+04
9/21/1959	1.10E-03	145	8.36E+04
9/22/1959	2.00E-03	145	1.52E+05
9/27/1959	1.80E-03	145	1.37E+05
9/27/1959	1.80E-03	145	1.37E+05
9/28/1959	1.80E-03	145	1.37E+05
9/30/1959	7.80E-06	15	5.93E+02
9/30/1959	6.00E-06	15	4.56E+02
		<b>&lt;Run #14</b>	<b>0.0016 Ci</b>
		<b>Run # 14</b>	<b>10.94 Ci</b>
		<b>&gt; Run #14</b>	<b>16.96 Ci</b>
		<b>Total</b>	<b>27.90 Ci</b>

**Estimates of the decay tank releases into the stack  
by Atomics International, Nov. 20, 1959.**