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THE REACTION OF GLASS IN A GAMMA IRRADIATED
SATURATED TUFF ENVIRONMENT, PART II
DATA PACKAGE FOR ATM-1c AND ATM-8 GLASSES

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INTRODUCTION

A series of experiments have been performed in support of the Nevada Nuclear Waste Storage Investigations (NNWSI) project that investigate the effects of gamma radiation on groundwater and glass reaction. Experiments have been done in a gamma radiation field at exposure rates ranging between 2×10^5 and 0 R/h, and have been performed over a period of four years. The results of these experiments using ATM-1c and ATM-8 glasses have been described in an article published in the Journal of Materials Research [BATES-1]. A thorough discussion of the experimental procedures has been presented previously [BATES-2].

In this report, all the data that have been generated during these experiments and which were used in writing the article are presented. The report consists of a series of Tables that provide the

- 1) groundwater compositions
- 2) glass compositions
- 3) experimental matrices and selected results
- 4) cation analyses
- 5) anion analyses
- 6) Np and Pu analyses
- 7) SEM/EDS analyses
- 8) SIMS analyses

Each Table is preceded by a cover sheet that describes the contents of the Table and explains the column annotations. Experiments were conducted at exposure rates of 2×10^5 (2R), 1×10^3 (1R), and 0 (0R) R/h.

TABLE A-1

Composition of EJ-13 Leachants Used in Gamma Experiments

Water was equilibrated prior to the initiation of a matrix and was used throughout the matrix unless the composition changed significantly. The water was made according to procedures given in [BATES-2].

Table A-1. Composition of EJ-13 Leachants Used in Gamma Experiments

Species	Composition (ppm)			
	1R ^a	1R ^b , OR ^b	2R ^c	OR ^d
Na	44.4	49.3	46.5	51.1
Si	34.5	35.7	34.4	35.9
Ca	8.10	7.10	9.08	6.78
K (estimated)	6.0	6.0	6.0	6.0
Mg	0.34	0.25	0.96	0.15
Al	0.30	0.43	0.63	0.71
B	0.14	0.17	0.16	0.15
Sr	0.044	0.036	0.045	0.037
Li	0.044	0.041	0.044	NA
Fe	<0.01	<0.01	0.01	<0.01
U	<0.001	<0.001	0.0024	<0.001
HCO ₃ ^{-d}	117	140	122 (estimated)	94
SO ₄ ⁻	18.0	18.0	17.3	20.3
NO ₃ ⁻	6.1	7.6	7.6	7.9
Cl ⁻	7.0	8.2	7.15	7.8
F ⁻	2.5	2.6	2.4	2.4
NO ₂ ⁻	<0.3	<0.3	<0.3	<0.3
pH	7.6	8.1	8.1	8.5

^aLeachant used for 56-, 91-, 181-, and 278-day 1R and OR experiments.

^bLeachant used for 14- and 28-day 1R experiments and all OR silicone gasket experiments.

^cLeachant used in 2R experiments.

^dLeachant used in all OR Teflon gasket experiments.

TABLE A-2
Analyses of ATM-1c and ATM-8 Glasses

The ATM-1c and ATM-8 glasses used in these experiments were supplied by the Materials Characterization Center (MCC). For the 2R experiments, the disks were supplied as-cut by the MCC. In the 1R and OR experiments glass bars supplied by the MCC were cored and sectioned at ANL [BATES-2]. The glasses were analyzed by the MCC, LLNL, and ANL. These oxide analyses are given in the Table together with an element fraction (f_i) in the glass that was subsequently used in all normalized mass loss calculations.

At ANL the analyses were done by acid dissolution of the glass followed by ICP analysis of everything except Si, B, Cs, and the transuranic elements. Si was analyzed by colorimetry (after alkali carbonate fusion), B by isotopic dilution mass spectrometry (after alkali carbonate fusion), Cs by atomic absorption, and transuranic elements by alpha or gamma spectroscopy.

The LLNL values were obtained from F. Bazan, and the MCC values were taken from reports PNL-5577-1 (ATM-1c) and PNL-5577-8 (ATM-8). If a value is not reported, then no analysis was done. The f_i values are the element weight percent in the glass.

Table A-2. Analysis of ATM-1c and ATM-8 Glasses (oxide wt %)

	ATM-1c					ATM-8				
	ANL	LLNL	MCC	avg	f_i	ANL	LLNL	MCC	avg	f_i
Al ₂ O ₃	0.68	0.77	0.58	0.68	0.36		1.13	1.06	1.10	0.58
B ₂ O ₃	9.04	9.31	9.07	9.14	2.84		8.53	8.18	8.36	2.60
BaO	0.51	0.45	0.54	0.50	0.45		0.54	0.61	0.58	0.52
CaO	2.18	2.72	2.23	2.38	1.70		2.58	2.13	2.36	1.69
CdO			0.04	0.04						
CeO ₂	0.86	0.96	0.90	0.91	0.74			0.11	0.11	
Cr ₂ O ₃	0.41		0.42	0.42				0.48	0.48	
Cs ₂ O	0.86	1.07	0.78	0.90	0.85		0.97		0.97	0.91
Dy ₂ O ₃								0.01	0.01	
FeO	<0.04			<0.04						
Fe ₂ O ₃	8.59	9.87	8.70	9.05	6.33		8.95	8.18	8.57	
Gd ₂ O ₃										
K ₂ O			0.73	0.73	0.61					
La ₂ O ₃	3.93	4.25	4.39	4.19	3.74		4.88	4.87	4.88	4.16
MgO	0.12	0.12	0.24	0.16	0.10		0.14	0.16	0.15	0.09
MnO ₂	<0.01		0.03	0.02			0.03	0.06	0.05	
MoO ₃	1.76	2.09	1.82	1.89	1.26		2.24	1.98	2.11	1.41
Na ₂ O	12.73	13.97	10.51	12.40	9.20		13.04	12.2	12.62	9.36
Nd ₂ O ₃	1.32	1.44	1.42	1.39	1.19		1.55	1.66	1.61	
NiO	0.20	0.23	0.20	0.21	0.17		0.26		0.26	
P ₂ O ₅			0.60	0.60	0.26			0.57	0.57	
PdO								0.37	0.37	
RuO ₂								0.58	0.58	
SiO ₂	40.83		41.2	41.02	19.18			37.8	37.8	17.67
SrO	0.41	0.46	0.41	0.43	0.36		0.50	0.47	0.49	0.41
TiO ₂	2.73	3.08	2.82	2.88	1.73		2.79	2.61	2.70	1.62
UO ₂	3.63	4.23	4.02	3.96	3.49		4.15	4.24	4.20	3.70
ZnO	4.43	4.67	4.46	4.52	3.63		4.46	4.37	4.42	3.55
ZrO ₂	1.66	2.15	1.54	1.78	1.32		2.70	1.99	2.35	
NpO ₂						0.57	0.38	0.38	0.38	
PuO ₂						0.097	0.097	0.11	0.10	
Tc ₂ O ₇							0.1-0.2	0.18	0.18	
				100.20					98.36	

TABLE A-3a,b,c
Experimental Matrix and Component Weight Changes,
ATM-1c (3a), ATM-8 (3b), and Blank (3c), 2R Experiments

The experimental matrix and selected measurements used in the 2R experiments are presented in this Table. The LPE liquid weight is the weight of the liquid submitted for cation analysis.

Table A-3a. Experimental Matrix and Component Weight Changes, ATM-1c Glass, 2R Experiments

Expt. Type	Expt. no.	Length Days	Sample no.	Vessel No.	Date In	Date Out	Time	Length mm	Dia. mm
	G 51	7	85	41	7/02/84	1207	7/09/84 915	2.96	10.21
			86					2.98	10.23
	G 52	7	87	42	7/02/84	1207	7/09/84 915	3.04	10.23
			88					2.90	10.20
	G 49	14	81	41	7/11/84	1130	7/25/84 910	3.04	10.20
			82					2.99	10.20
PNLU	G 50	14	83	42	7/11/84	1130	7/25/84 910	3.01	10.20
+			84					3.00	10.20
J-13	G 53	28	89	41	7/27/84	1110	8/24/84 845	3.09	10.19
			90					3.03	10.19
	G 54	28	91	42	7/27/84	1110	8/24/84 845	3.02	10.21
			92					3.03	10.20
	G 55	56	93	13	7/02/84	1207	8/27/84 845	2.98	10.20
			94					2.98	10.23
	G 56	56	95	14	7/02/84	1207	8/27/84 845	3.01	10.18
			96					3.01	10.23
	G 59	7	101	43	7/02/84	1207	7/09/84 915	2.97	10.20
			102					3.05	10.24
	G 60	7	103	44	7/02/84	1207	7/09/84 915	2.94	10.23
			104					2.97	10.23
	G 57	14	97	43	7/11/84	1130	7/25/84 910	3.00	10.20
PNL U			98					3.03	10.21
+	G 58	14	99	44	7/11/84	1130	7/25/84 910	3.00	10.23
J-13			100					3.02	10.20
+	G 61	28	105	43	7/27/84	1110	8/24/84 845	3.06	10.23
TUFF			106					2.98	10.20
	G 62	28	107	44	7/27/84	1110	8/24/84 845	3.01	10.21
			108					3.03	10.20
	G 63	56	109	15	7/02/84	1207	8/27/84 845	2.99	10.21
			110					3.24	10.20
	G 64	56	111	16	7/02/84	1207	8/27/84 845	3.04	10.24
			112					3.04	10.20
	G 67	7	115	45	7/02/84	1207	7/09/84 915	-	-
	G 68	7	116	46	7/02/84	1207	7/09/84 915	-	-
CRUSH ^a	G 65	14	113	45	7/11/84	1130	7/25/84 910	-	-
PNL U	G 66	14	114	46	7/11/84	1130	7/25/84 910	-	-
+	G 69	28	117	45	7/27/84	1110	8/24/84 845	-	-
J-13	G 70	28	118	46	7/27/84	1110	8/24/84 845	-	-
	G 71	56	119	17	7/02/84	1207	8/27/84 845	-	-
	G 72	56	120	18	7/02/84	1207	8/27/84 845	-	-

^aCrushed Glass is 66.9 g/m².

Table A-3a (Cont'd)

SA	Glass Mass	Glass Mass	Glass Wt.Diff.	pH	Tuff Mass	Support Mass	Support Mass	Support Wt.Diff.	Volume
sq.mm	In	Out	(xE+5)	Out	g	In	Out	(x100)	J-13 g
258.7	0.72732	0.72717	- 15	7.33	-	4.72356	4.72340	-16	16.74
260.2	0.73762	0.73749	- 13						
262.1	0.75041	0.75034	- 7	7.23	-	4.80428	4.80408	-20	16.77
256.4	0.71456	0.71440	- 16						
260.8	0.74756	0.74687	- 69	7.74	-	4.80822	4.80787	-35	16.79
259.2	0.73727	0.73654	- 73						
259.9	0.73778	0.73718	- 60	7.76	-	4.82015	4.81973	-42	16.76
259.6	0.73622	0.73564	- 56						
262.0	0.75341	0.75213	-128	7.66	-	4.80780	4.80782	+ 2	16.90
260.1	0.74203	0.74076	-127						
260.6	0.74353	0.74225	-128	7.53	-	4.72535	4.72538	+ 3	17.09
260.5	0.74573	0.74451	-122						
258.9	0.73235	0.73084	-151	7.20	-	4.85268	4.85238	-30	16.73
260.2	0.73606	0.73439	-167						
259.0	0.73586	0.73410	-176	7.26	-	4.82183	4.82149	-34	16.81
261.1	0.74450	0.74292	-158						
258.6	0.73036	0.73027	- 9	7.22	0.2056	4.82733	4.82717	-16	16.82
262.8	0.75341	0.75339	- 2						
258.9	0.72661	0.72659	- 2	7.30	0.2049	4.83555	4.83542	-13	16.89
259.8	0.73284	0.73281	- 3						
259.6	0.73632	0.73592	- 40	7.43	0.2057	4.79590	4.79537	-53	16.79
260.9	0.74416	0.74375	- 41						
260.3	0.74000	0.73965	- 35	7.36	0.2037	4.80315	4.80280	-35	17.10
260.2	0.74002	0.73951	- 51						
260.8	0.74194	0.74093	-101	7.47	0.2059	4.81971	4.81986	+15	16.81
258.9	0.73219	0.73120	- 99						
260.3	0.73891	0.73776	-115	7.33	0.2021	4.82952	4.82966	+14	16.85
260.5	0.74409	0.74255	-154						
259.7	0.73690	0.73583	-107	7.18	0.2033	4.78437	4.78413	-24	16.99
267.3	0.79839	0.79743	- 96						
262.5	0.75099	0.74973	-126	7.50	0.2014	4.83427	4.83404	-23	16.93
260.8	0.74891	0.74767	-124						
1124	0.1974			7.01	-	-			16.79
1119	0.1965			6.95	-	-			16.77
1124	0.1974			7.89	-	-			16.86
1172	0.2059			7.91	-	-			17.35
1151	0.2022			7.34	-	-			17.12
1157	0.2033			7.20	-	-			17.00
2534	0.1992			7.38	-	-			17.02
1116	0.1961			7.28	-	-			16.70

Table A-3a (Cont'd)

Complete Assembly In	Complete Assembly Out	Assembly Wt.Diff. (x100)	LPE Liquid wt
135.67	135.67	0	12.41
135.92	135.91	-1	12.36
135.87	135.86	-1	12.47
135.71	135.70	-1	12.50
135.96	135.90	-6	13.02
136.12	136.09	-3	14.65
135.96	135.93	-3	14.07
135.99	135.94	-5	14.25
136.87	136.86	-1	11.94
137.27	137.27	0	11.10
136.92	136.90	-2	11.46
137.58	137.56	-2	11.88
136.95	136.92	-3	13.75
137.43	137.39	-4	13.46
135.69	135.65	-4	13.71
137.71	137.68	-3	13.46
131.64	131.64	0	11.44
130.95	130.94	-1	11.07
131.75	131.69	-6	12.08
131.39	130.84	-55	11.61
132.01	131.97	-4	14.20
131.06	130.97	-9	14.12
130.37	130.34	-3	14.08
129.99	129.95	-4	13.79

Table A-3b. Experimental Matrix and Component Weight Changes,
ATM-8 Glasses

Expt. Type	Expt. no.	Length Days	Sample no.	Vessel No.	Date In	Date Out	Time	Length mm	Dia. mm
	G 75	7	125	47	7/02/84	1207	7/09/84 915	2.87	10.16
			126					3.00	10.18
	G 76	7	127	48	7/02/84	1207	7/09/84 915	2.94	10.17
			128					2.99	10.17
	G 73	14	121	47	7/11/84	1130	7/25/84 910	3.12	10.18
			122					3.10	10.16
PNL A	G 74	14	123	48	7/11/84	1130	7/25/84 910	2.87	10.18
+			124					2.84	10.17
J-13	G 77	28	129	47	7/27/84	1110	8/24/84 845	2.92	10.16
			130					2.95	10.18
	G 78	28	131	48	7/27/84	1110	8/24/84 845	2.80	10.18
			132					2.90	10.18
	G 79	56	133	19	7/02/84	1207	8/27/84 845	2.97	10.16
			134					2.90	10.15
	G 80	56	135	20	7/02/84	1207	8/27/84 845	3.08	10.18
			136					3.00	10.16
	G 83	7	141	49	7/02/84	1207	7/09/84 915	2.9	10.17
			142					2.99	10.19
	G 84	7	143	50	7/02/84	1207	7/09/84 915	2.89	10.18
			144					3.01	10.18
	G 81	14	137	49	7/11/84	1130	7/25/84 910	2.98	10.16
			138					2.92	10.18
PNL A	G 82	14	139	50	7/11/84	1130	7/25/84 910	2.93	10.18
+			140					2.90	10.17
J-13	G 85	28	145	49	7/27/84	1110	8/24/84 845	2.90	10.16
+			146					2.86	10.17
TUFF	G 86	28	147	50	7/27/84	1110	8/24/84 845	2.91	10.18
			148					2.88	10.20
	G 87	56	149	21	7/02/84	1207	8/27/84 845	2.90	10.19
			150					2.88	10.18
	G 88	56	151	22	7/02/84	1207	8/27/84 845	3.00	10.19
			152					3.04	10.15
	G 91	7	155	55	7/02/84	1207	7/09/84 915	-	-
	G 92	7	156	52	7/02/84	1207	7/09/84 915	-	-
CRUSH ^a	G 89	14	153	51	7/11/84	1130	7/25/84 910	-	-
PNL A	G 90	14	154	52	7/11/84	1130	7/25/84 910	-	-
+	G 93	28	157	55	7/27/84	1110	8/24/84 845	-	-
J-13	G 94	28	158	52	7/27/84	1110	8/24/84 845	-	-
	G 95	56	159	23	7/02/84	1207	8/27/84 845	-	-
	G 96	56	160	24	7/02/84	1207	8/27/84 845	-	-

^aCrushed glass is 66.9 g/m².

Table A-3b (Cont'd)

SA sq.mm	Glass Mass In	Glass Mass Out	Glass Wt.Diff. (x10 ⁻⁵)	pH Out	Tuff Mass g	Support Mass In	Support Mass Out	Support Wt.Diff. (x100)	Volume J-13 g
253.8	0.71138	0.71132	- 6	6.86	-	4.76892	4.76874	-18	16.53
258.7	0.74209	0.74203	- 6		-				
256.4	0.72981	0.72979	- 2	7.00	-	4.84537	4.84521	-16	16.70
258.0	0.74543	0.74537	- 6		-				
262.6	0.73298	0.73232	- 66	6.80	-	4.84417	4.84389	-28	16.96
261.1	0.72766	0.72705	- 61		-				
254.6	0.71349	0.71280	- 69	7.18	-	4.83869	4.83828	-41	16.42
253.2	0.69200	0.69157	- 43		-				
255.3	0.72739	0.72624	-115	6.92	-	4.85357	4.85351	- 6	16.52
257.1	0.72175	0.72059	-116		-				
252.3	0.70003	0.69876	-127	7.01	-	4.87142	4.87143	+ 1	16.36
255.5	0.72346	0.72228	-118		-				
256.9	0.73377	0.73280	- 97	7.50	-	4.80308	4.80278	-30	16.49
254.3	0.71530	0.71429	-101		-				
261.3	0.75716	0.75602	-114	7.37	-	4.82385	4.82352	-33	16.77
257.9	0.74592	0.74479	-113		-				
257.7	0.74229	0.74225	- 4	7.05	0.2030	4.84312	4.84313	+ 1	16.70
258.8	0.74360	0.74367	+ 7						
255.2	0.72328	0.72323	- 5	7.02	0.2029	4.86238	4.86239	+ 1	16.59
259.0	0.70757	0.70744	- 13						
257.3	0.73352	0.73320	- 32	7.20	0.2020	4.85391	4.85353	-38	16.73
256.2	0.72434	0.72394	- 40						
256.5	0.73116	0.73068	- 48	7.23	0.2040	4.71270	4.71238	-32	16.51
255.1	0.72600	0.72558	- 42						
254.7	0.70415	0.70393	- 22	7.20	0.2028	4.88467	4.88463	- 4	16.43
253.8	0.69068	0.69035	- 33						
255.9	0.71261	0.71169	- 92	7.09	0.2071	4.71234	4.71231	- 3	16.53
255.7	0.69871	0.69740	-131						
255.9	0.72063	0.72009	- 54	7.48	0.2030	4.82051	4.82018	-33	16.54
254.9	0.71194	0.71141	- 53						
259.1	0.73457	0.73437	- 20	7.61	0.2028	4.82446	4.82418	-28	16.71
258.8	0.74094	0.74088	- 6						
1078	0.1894			6.80	-	-			16.12
1147	0.2015			6.95	-	-			17.22
1033	0.1815			7.16	-	-			15.53
1042	0.1831			7.04	-	-			15.60
1064	0.1868			7.37	-	-			15.82
1096	0.1925			7.42	-	-			16.18
1089	0.1912			7.74	-	-			16.29
1129	0.1983			7.68	-	-			16.88

Table A-3b (Cont'd)

Complete Assembly In	Complete Assembly Out	Assembly Wt.Diff. (x100)	LPE Liquid wt
136.59	136.58	-1	11.76
136.91	136.90	-1	12.06
137.13	137.10	-3	13.20
136.52	136.51	-1	12.89
136.61	136.58	-3	13.37
136.52	136.47	-5	13.63
134.72	134.56	-12	13.17
133.90	133.84	-6	13.93
138.58	138.57	-1	9.77
138.20	138.20	0	10.30
138.48	138.47	-1	12.21
137.89	137.84	-5	12.12
138.15	138.13	-2	13.03
137.91	137.88	-3	11.93
135.00	134.89	-11	13.02
136.26	136.14	-12	13.16
130.67	130.66	-1	10.90
131.33	131.32	-1	12.09
130.35	130.33	-2	11.64
129.65	129.62	-3	11.64
130.39	130.35	-4	12.55
130.26	130.22	-4	12.89
129.38	129.32	-6	12.94
130.09	130.04	-5	13.74

Table A-3c. Test Matrix and Component Weight Changes, Blanks, 2R Experiments

Test Type	Test no.	Length Days	Sample no.	Vessel No.	Date In	Date Out	Date Time	Length mm	Dia. mm
BLANKS	G 99	7	-	35	7/02/84	1207	7/09/84 915	-	-
	G 100	7	-	54	7/02/84	1207	7/09/84 915	-	-
	G 97	14	-	53	7/11/84	1130	7/25/84 910	-	-
VESSEL	G 98	14	-	54	7/11/84	1130	7/25/84 910	-	-
+	G 101	28	-	35	7/27/84	1110	8/24/84 845	-	-
J-13	G 102	28	-	54	7/27/84	1110	8/24/84 845	-	-
	G 103	56	-	25	7/02/84	1207	8/27/84 845	-	-
	G 104	56	-	26	7/02/84	1207	8/27/84 845	-	-
BLANKS	G 107	7	-	51	7/02/84	1207	7/09/84 915	-	-
	G 108	7	-	56	7/02/84	1207	7/09/84 915	-	-
VESSEL	G 105	14	-	55	7/11/84	1130	7/25/84 910	-	-
+	G 106	14	-	56	7/11/84	1130	7/25/84 910	-	-
J-13	G 109	28	-	51	7/27/84	1110	8/24/84 845	-	-
+	G 110	28	-	56	7/27/84	1110	8/24/84 845	-	-
TUFF	G 111	56	-	27	7/02/84	1207	8/27/84 845	-	-
	G 112	56	-	28	7/02/84	1207	8/27/84 845	-	-

Table A-3c (Cont'd)

SA sq.mm	Glass Mass In	Glass Mass Out	Glass Wt.Diff. (x10 ⁻⁵)	pH Out	Tuff Mass g	Support Mass In	Support Mass Out	Support Wt.Diff. (x100)	Volume J-13 g
-	-			6.76	-	-			16.02
-	-			6.66	-	-			16.04
-	-			6.31	-	-			16.03
-	-			6.48	-	-			16.04
-	-			6.10	-	-			15.94
-	-			6.22	-	-			15.98
-	-			6.56	-	-			16.04
-	-			6.81	-	-			16.05
-	-			6.88	0.2014	-			16.06
-	-			6.94	0.2058	-			16.01
-	-			6.60	0.2020	-			16.05
-	-			6.84	0.2012	-			16.01
-	-			6.50	0.2001	-			16.09
-	-			6.70	0.2043	-			13.52
-	-			6.71	0.2015	-			16.00
-	-			6.61	0.2031	-			16.02

Table A-3c (Cont'd)

Complete Assembly In	Complete Assembly Out	Assembly Wt. Diff. (x100)	LPE Liquid wt
128.65	128.65	0	11.74
129.47	129.46	-1	11.78
130.50	130.51	+1	11.94
129.57	129.55	-2	11.96
128.57	128.56	-1	10.70
129.44	129.40	-4	12.16
128.39	128.34	-5	13.72
129.46	129.38	-8	13.75
130.92	130.92	0	10.70
130.29	130.25	0	11.74
130.62	130.60	-2	11.35
130.29	130.27	-2	11.48
131.02	131.00	-2	11.87
127.90	127.89	-1	8.86
128.48	128.45	-3	12.84
129.12	129.08	-4	12.62

TABLE A-4
FY 1986 Gamma Irradiation Experiments Matrix

This Table presents the matrix and selected results for the 1R experiments. Included in this matrix are OR blank experiments done in conjunction with the 1R experiments. OR blank experiments were also done in conjunction with the OR experiments. The difference between the two sets of blank experiments is the experiments listed in this Table used silicone rubber gaskets whereas the other blanks used Teflon gaskets. LPE refers to the weight of the sample submitted for cation analysis.

Table A-4. FY 1986 Gamma Irradiation Experiments Matrix

EXP'T TYPE	EXP'T NUMBER	SAMPLE NUMBER	EXP'T DURATION (days)	DATE IN	DATE OUT	VESSEL NUMBER	GLASS THICKNESS (mm)	GLASS DIAMETER (mm)	GLASS SURFACE AREA (mm ²)	GLASS MASS IN (g)	GLASS MASS OUT (g)	GLASS MASS CHANGE (g)
ATM-1c	G-388	477	28	7/24	8/21	18	1.73	10.73	239	0.46552	0.46480	-0.00072
		478					1.85	10.72	243	0.46581	0.46544	-0.00037
	G-389	479	28	7/24	8/21	107	1.94	10.95	255	0.51474	0.51403	-0.00071
		480					1.82	10.69	241	0.48081	0.48039	-0.00042
	G-390	481	56	7/8	9/2	147	1.88	10.84	249	0.48543	0.48435	-0.00108
		482					1.83	10.78	245	0.48553	0.48363	-0.00090
	G-391	483	56	7/8	9/2	52	1.82	10.81	245	0.48554	0.48824	-0.00120
		484					1.82	10.71	241	0.48843	0.48765	-0.00078
	G-392	485	91	12/18	3/19	74	1.80	10.81	245	0.48096	0.47949	-0.00147
		486					1.76	10.71	239	0.47039	0.46921	-0.00118
	G-393	487	91	12/18	3/19	76	1.72	10.75	246	0.50832	0.50656	-0.00136
		488					1.78	10.71	240	0.47327	0.47203	-0.00124
	G-394	489	182	12/18	6/18	80	1.87	10.90	251	0.51640	0.51496	-0.00152
		490					1.78	10.77	242	0.47424	0.47289	-0.00135
	G-395	491	182	12/18	6/18	70	1.92	10.70	244	0.51721	0.51576	-0.00145
		492					1.74	10.67	237	0.43583	0.43471	-0.00112
	G-396	493	280	12/18	9/24	71	1.90	10.73	245	0.49373	0.49235	-0.00138
		494					1.85	10.74	244	0.49518	0.49390	-0.00128
	G-397	495	280	12/18	9/24	75	1.89	10.72	244	0.49488	0.49326	-0.00162
		496					1.80	10.71	241	0.47994	0.47857	-0.00137
ATM-1c + TUFF	G-398	497	28	7/24	8/21	122	1.88	10.75	245	0.50198	0.50106	-0.00092
		498					1.81	10.71	241	0.49277	0.49190	-0.00087
	G-399	499	28	7/24	8/21	106	1.99	10.70	247	0.49500	0.49396	-0.00104
		500					1.84	10.69	241	0.46796	0.46710	-0.00086
	G-400	501	56	7/8	9/2	134	1.92	10.75	246	0.48411	0.48240	-0.00171
		502					1.87	10.58	226	0.39927	0.39795	-0.00132
	G-401	503	56	7/8	9/2	39	1.83	10.70	244	0.48522	0.48352	-0.00170
		504					1.83	10.77	244	0.48791	0.48668	-0.00123
	G-402	505	91	12/18	3/19	90	1.84	10.84	247	0.49206	0.48978	-0.00228
		506					1.68	11.08	251	0.45328	0.45151	-0.00177
	G-403	507	91	12/18	3/19	77	1.84	10.74	243	0.49154	0.48953	-0.00201
		508					1.82	10.93	250	0.49571	0.49382	-0.00189
	G-404	509	182	12/18	6/18	78	1.80	10.81	245	0.48781	0.48545	-0.00236
		510					1.84	10.84	247	0.49931	0.49719	-0.00212
	G-405	511	182	12/18	6/18	88	1.81	10.70	241	0.48439	0.48235	-0.00204
		512					1.75	10.71	239	0.46692	0.46496	-0.00196
ATM-8	G-406	513	280	12/18	9/24	81	1.80	10.73	242	0.48024	0.47767	-0.00257
		514					1.92	10.77	247	0.47665	0.47426	-0.00239
	G-407	515	280	12/18	9/24	82	1.88	10.72	244	0.49738	0.49512	-0.00226
		516					1.69	10.89	244	0.46470	0.46263	-0.00207
	G-408	517	28	7/24	8/21	127	1.79	10.82	245	0.49337	0.49312	-0.00025
		518					1.78	10.83	245	0.48970	0.48840	-0.00130
	G-409	519	28	7/24	8/21	166	1.76	10.82	244	0.48670	0.49427	0.00757
		520					1.70	10.94	240	0.40408	0.40374	-0.00034
	G-410	521	56	7/8	9/2	77	1.92	10.82	253	0.52999	0.52922	-0.00077
		522					1.94	10.88	252	0.53954	0.53879	-0.00075

Table A-4 (Cont'd)

EXP'T TYPE	EXP'T NUMBER	SAMPLE NUMBER	LEACHATE PH OUT	SUPPORT MASS IN (g)	SUPPORT MASS OUT (g)	SUPPORT MASS CHANGE (g)	MASS EJ-13 IN (g)	ASSEMBLY MASS IN (g)	ASSEMBLY MASS OUT (g)	ASSEMBLY MASS CHANGE (g)	LPE NET LOSS (g)	NORMALIZED GLASS MASS LOSS (g/m ² ·2)
ATM-1c	G-388	477	8.84	4.9439	4.9438	-0.0001	14.89	303.15	303.10	-0.05	12.28	2.26
	G-389	478	8.92	4.9266	4.9265	-0.0001	14.90	300.92	300.90	-0.02	12.35	2.28
	G-390	480	8.12	4.8950	4.9854	0.0904	14.87	303.18	303.12	-0.06	12.26	4.02
	G-391	481	8.38	4.9615	4.9617	0.0002	14.90	302.38	302.35	-0.03	12.30	4.07
	G-392	482	7.95	4.9198	4.9195	-0.0003	14.91	305.05	304.98	-0.07	12.70	5.47
	G-393	484	8.08	4.8923	4.8926	-0.0002	14.88	300.89	300.82	-0.07	12.63	5.34
	G-394	485	7.96	4.8649	4.8649	0.0000	14.89	308.89	308.84	-0.05	12.24	5.82
	G-395	486	7.81	4.9339	4.9336	-0.0003	14.89	302.61	302.44	-0.17	12.15	5.34
	G-396	487	7.05	4.9300	4.9299	-0.0001	14.91	303.82	303.63	-0.19	12.20	9.44
	G-397	488	7.72	4.9370	4.9372	0.0002	14.91	308.62	308.52	-0.10	11.99	6.17
	G-398	489	8.42	4.9973	4.9973	0.0000	14.63	304.19	304.18	-0.01	11.95	3.68
	G-399	490	8.22	4.8517	4.8516	-0.0001	14.59	303.84	303.81	-0.03	11.81	5.94
	G-400	491	8.20	5.1235	5.0235	-0.1000	14.49	302.61	302.55	-0.06	11.72	6.42
	G-401	492	8.20	4.8916	4.8916	0.0000	14.49	304.09	304.04	-0.05	11.70	6.00
	G-402	493	8.09	4.9605	4.9601	-0.0004	14.62	304.38	304.30	-0.08	12.26	8.12
ATM-1c TUFF	G-403	494	8.24	4.9603	4.9603	0.0000	14.57	304.50	304.46	-0.04	12.27	7.90
	G-404	495	8.12	4.9905	4.9904	-0.0001	14.60	306.71	306.64	-0.05	11.89	9.11
	G-405	496	7.88	4.8719	4.8718	-0.0001	14.58	305.51	305.41	-0.10	11.33	8.34
	G-406	500	7.87	4.9420	4.9520	0.0100	14.58	309.30	309.17	-0.13	11.82	10.15
	G-407	501	6.86	4.9561	4.9460	-0.0101	14.59	308.89	308.75	-0.14	11.99	8.87
	G-408	502	8.67	4.9383	4.8468	-0.0915	14.94	307.52	307.48	-0.04	11.99	1.10
	G-409	503	8.54	4.8626	4.9138	0.0512	14.91	304.31	304.27	-0.04	12.20	1.41
	G-410	504	7.92	4.8970	4.8972	0.0002	14.88	302.30	302.24	-0.06	11.72	3.01
		505										
		506										
		507										
		508										
		509										
		510										
		511										
		512										
		513										
		514										
		515										
		516										
ATM-8	G-408	517	8.67	4.9383	4.8468	-0.0915	14.94	307.52	307.48	-0.04	11.99	1.10
	G-409	518	8.54	4.8626	4.9138	0.0512	14.91	304.31	304.27	-0.04	12.20	1.41
	G-410	519	7.92	4.8970	4.8972	0.0002	14.88	302.30	302.24	-0.06	11.72	3.01
		520										
		521										

Table A-4 (Cont'd)

EXP'T TYPE	EXP'T NUMBER	SAMPLE NUMBER	EXP'T DURATION (days)	DATE IN	DATE OUT	VESSEL NUMBER	GLASS THICKNESS (mm)	GLASS DIAMETER (mm)	GLASS SURFACE AREA (mm ²)	GLASS MASS IN (g)	GLASS MASS OUT (g)	GLASS MASS CHANGE (g)
	G-411	523		7/8	9/2	83	1.83	10.90	249	0.50555	0.50565	-0.00090
		524					1.79	10.88	247	0.49435	0.49370	-0.00065
	G-412	525	91	12/18	3/19	50	1.82	10.92	250	0.50130	0.50017	-0.00113
		526					2.21	10.88	261	0.52598	0.52828	0.00230
	G-413	527	91	12/18	3/19	52	1.85	10.87	249	0.51293	0.51181	-0.00112
		528					1.88	10.82	248	0.50917	0.50813	-0.00104
	G-414	529	182	12/18	6/18	53	1.84	10.86	248	0.51408	0.51291	-0.00117
		530					1.77	10.83	244	0.50213	0.50119	-0.00094
	G-415	531	182	12/18	6/18	40	1.71	10.91	246	0.48090	0.47974	-0.00116
		532					1.77	10.90	247	0.48761	0.48656	-0.00105
	G-416	533	280	12/18	9/24	47	1.76	10.88	246	0.47729	0.47616	-0.00113
		534					1.90	10.85	250	0.50482	0.50335	-0.00147
	G-417	535	280	12/18	9/24	48	1.88	10.83	248	0.51359	0.51145	-0.00214
		536					2.22	10.85	261	0.59592	0.59493	-0.00099
ATH-8 TUFF	G-418	537	28	7/24	8/21	73	1.85	10.86	248	0.49310	0.49253	-0.00057
		538					1.90	10.84	249	0.53059	0.53007	-0.00052
	G-419	539	28	7/24	8/21	37	1.83	11.06	256	0.51845	0.51768	-0.00077
		540					1.80	10.86	247	0.49808	0.49782	-0.00026
	G-420	541	56	7/8	9/2	70	1.92	10.89	252	0.50659	0.50533	-0.00126
		542					1.87	11.03	256	0.53085	0.52971	-0.00114
		543	56	7/8	9/2	126	1.92	10.82	249	0.49474	0.49346	-0.00128
		544					1.82	10.92	250	0.50993	0.50880	-0.00113
	G-422	545	91	12/18	3/19	79	2.35	10.82	257	0.57458	0.57275	-0.00183
		546					1.74	10.83	247	0.48267	0.48122	-0.00145
	G-423	547	91	12/18	3/19	49	1.78	10.83	245	0.49169	0.48992	-0.00177
		548					1.82	11.00	253	0.49924	0.49772	-0.00152
	G-424	549	182	12/18	6/18	39	1.78	10.96	250	0.50761	0.50557	-0.00204
		550					1.72	10.97	248	0.48345	0.48170	-0.00175
	G-425	551	182	12/18	6/18	92	1.79	10.93	249	0.48809	0.48619	-0.00190
		552					1.77	11.10	255	0.51165	0.50981	-0.00183
	G-426	553	280	12/18	9/24	93	1.89	11.00	255	0.53146	0.52918	-0.00228
		554					1.84	10.91	250	0.51365	0.51079	-0.00286
	G-427	555	280	12/18	9/24	94	1.94	10.88	252	0.50571	0.50375	-0.00196
		556					1.83	10.83	247	0.49782	0.49630	-0.00152
EJ-13	G-428		28	7/24	8/21	74						
	G-429		28	7/24	8/21	32						
	G-430		56	7/8	9/2	92						
	G-431		56	7/8	9/2	86						
	G-432		91	12/18	3/19	89						
	G-433		91	12/18	3/19	91						
	G-434		182	12/18	6/18	138						
	G-435		182	12/18	6/18	139						
	G-436		280	12/18	9/24	140						
	G-437		280	12/18	9/24	141						
EJ-13 TUFF	G-438		28	7/24	8/21	142						
	G-439		28	7/24	8/21	34						

Table A-4 (Cont'd)

EXP'T TYPE	EXP'T NUMBER	SAMPLE NUMBER	LEACHATE pH OUT	SUPPORT MASS IN (g)	SUPPORT MASS OUT (g)	SUPPORT MASS CHANGE (g)	MASS EJ-13 IN (g)	ASSEMBLY MASS IN (g)	ASSEMBLY MASS OUT (g)	ASSEMBLY MASS CHANGE (g)	LPE NET MASS LOSS (g)	NORMALIZED GLASS MASS LOSS (g/m ²)
	G-411	523	7.05	5.0158	5.0158	0.0000	14.90	302.12	302.07	-0.05	12.90	3.12
	G-412	524	7.61	4.9150	4.9150	0.0000	14.09	308.58	308.48	-0.10	11.99	4.42
	G-413	526	7.68	4.9188	4.9186	-0.0002	14.92	302.45	302.38	-0.07	12.37	4.35
	G-414	528	7.70	4.9130	4.9126	-0.0004	14.86	303.28	303.12	-0.16	11.80	4.28
	G-415	529	7.54	4.9192	4.9187	-0.0006	14.87	303.94	303.79	-0.15	12.21	4.48
	G-416	530	7.78	4.5845	4.5843	-0.0002	14.87	301.81	301.63	-0.18	11.67	4.86
	G-417	531	5.82	4.9144	4.9131	-0.0013	14.89	303.45	303.17	-0.28	12.12	4.19
		532										
		533										
		534										
		535										
		536										
ATM-8 + TUFF	G-418	537	8.36	4.9220	4.9464	0.0244	14.61	310.76	310.70	-0.06	11.40	2.19
	G-419	538	8.05	5.0393	4.9113	-0.1280	14.61	306.88	304.84	-0.04	12.07	2.45
	G-420	539	7.59	4.8762	4.8756	-0.0006	14.47	305.84	305.77	-0.07	11.05	4.73
	G-421	540	7.48	5.0126	5.0121	-0.0005	14.52	304.11	304.04	-0.07	4.18	4.83
	G-422	541	7.95	4.8971	4.8969	-0.0002	14.63	312.39	312.31	-0.08	11.46	6.55
	G-423	542	7.70	4.9677	4.9278	-0.0399	14.65	311.21	311.12	-0.09	11.86	6.61
	G-424	543	7.51	4.9007	4.9606	-0.0001	14.59	304.22	304.13	-0.09	11.20	7.61
	G-425	544	7.74	4.8776	4.8723	-0.0003	14.64	308.88	308.74	-0.14	11.88	7.40
	G-426	545	8.81	4.8296	4.8297	0.0001	14.58	305.92	305.80	-0.12	11.29	8.19
	G-427	546	7.92	4.9541	4.9537	-0.0004	14.59	312.52	312.32	-0.20	11.68	6.98
		547										
		548										
		549										
		550										
		551										
		552										
		553										
		554										
		555										
		556										
EJ-13	G-428		7.44				15.48	303.69	303.62	-0.07	13.49	
	G-429		7.39				15.47	296.78	296.74	-0.04	12.91	
	G-430		6.57				16.20	302.26	302.20	-0.06	13.82	
	G-431		6.75				16.20	298.85	298.76	-0.09	13.83	
	G-432		6.26				16.19	304.05	303.97	-0.08	14.03	
	G-433		5.54				16.19	304.07	304.00	-0.07	14.06	
	G-434		6.51				16.22	298.98	298.81	-0.17	13.69	
	G-435		6.79				16.23	297.94	297.76	-0.18	13.70	
	G-436		6.91				16.16	302.66	302.44	-0.22	13.63	
	G-437		6.58				16.19	300.57	300.35	-0.22	13.72	
										0.00		
EJ-13 + TUFF	G-438		7.03				15.53	299.04	299.00	-0.04	13.00	
	G-439		7.05				15.51	305.28	305.14	-0.14	13.00	

Table A-4 (Cont'd)

EXP'T TYPE	EXP'T NUMBER	SAMPLE NUMBER	EXP'T DURATION (days)	DATE IN	DATE OUT	VESSEL NUMBER	GLASS THICKNESS (mm)	GLASS DIAMETER (mm)	GLASS SURFACE AREA (cm ² x 2)	GLASS MASS IN (g)	GLASS MASS OUT (g)	GLASS MASS CHANGE (g)
	G-440		56	7/8	9/2	40						
	G-441		56	7/8	9/2	53						
	G-442		91	12/18	3/19	37						
	G-443		91	12/18	3/19	38						
	G-444		181	12/18	6/18	142						
	G-445		182	12/18	6/18	143						
	G-446		280	12/18	9/24	144						
	G-447		280	12/18	9/24	145						
EJ-13 NO GAMMA	G-448		14	9/4	9/18	74						
	G-449		14	9/4	9/18	139						
	G-450		18	7/24	8/21	43						
	G-451		28	7/24	8/21	84						
	G-452		56	7/8	9/2	80						
	G-453		56	7/8	9/2	49						
	G-454		91	3/21	6/19	83						
	G-455		91	3/21	6/19	68						
	G-456		182	12/18	6/18	146						
	G-457		182	12/18	6/18	147						
	G-458		280	12/18	9/24	148						
	G-459		280	12/18	9/24	149						
EJ-13 + TUBE NO GAMMA	G-460		14	9/4	9/18	107						
	G-461		14	9/4	9/18	122						
	G-462		18	7/24	8/21	119						
	G-463		28	7/24	8/21	79						
	G-464		56	7/8	9/2	65						
	G-465		56	7/8	9/2	76						
	G-466		91	3/21	6/19	18						
	G-467		91	3/21	6/19	37						
	G-468		182	12/18	6/18	95						
	G-469		182	12/18	6/18	84						
	G-470		280	12/18	9/24	85						
	G-471		280	12/18	9/24	72						
EJ-13 ONLY TEFLON GASKET NO GAMMA	G-472		91	12/18	3/19	73						
	G-473		182	12/18	6/18	86						
	G-474		280	12/18	9/24	150						

Table A-4 (Cont'd)

EXP'T TYPE	EXP'T NUMBER	SAMPLE NUMBER	LEACHATE pH OUT	SUPPORT MASS IN (g)	SUPPORT MASS OUT (g)	SUPPORT MASS CHANGE (g)	MASS EJ-13 IN (g)	ASSEMBLY MASS IN (g)	ASSEMBLY MASS OUT (g)	ASSEMBLY MASS CHANGE (g)	LPE NET MASS (g)	NORMALIZED GLASS MASS LOSS (g/m ² ±2)
	G-440		6.41				15.51	300.47	300.43	-0.04	12.90	
	G-441		6.37				15.50	300.42	300.37	-0.05	13.04	
	G-442		6.70				15.50	300.30	300.22	-0.08	13.14	
	G-443		6.71				15.49	302.66	302.56	-0.10	13.08	
	G-444		6.63				15.51	301.48	301.34	-0.14	12.75	
	G-445		6.84				15.47	300.08	299.89	-0.19	12.61	
	G-446		6.81				15.48	305.16	304.93	-0.23	12.74	
	G-447		6.80				15.50	298.47	298.29	-0.18	12.79	
EJ-13 NO GAMMA	G-448		7.98				16.21	300.01	299.99	-0.02	13.20	
	G-449		7.87				16.18	296.83	298.80	1.97	13.16	
	G-450		8.36				15.47	304.35	304.29	-0.06	13.20	
	G-451		8.24				15.47	296.26	296.23	-0.03	13.07	
	G-452		7.48				16.20	298.62	298.58	-0.04	13.79	
	G-453		8.23				16.22	305.87	305.82	-0.05	13.72	
	G-454		8.75				16.23	298.76	298.71	-0.05	13.80	
	G-455		8.87				16.13	304.47	304.38	-0.09	13.68	
	G-456		4.73				16.23	301.29	301.11	-0.18	13.70	
	G-457		8.65				16.16	303.23	303.04	-0.19	13.56	
	G-458		7.87				16.17	297.63	297.31	-0.32	13.37	
	G-459		8.23				16.18	303.88	303.58	-0.30	13.56	
EJ-13 + TUFF NO GAMMA	G-460		7.27				15.47	298.89	298.87	-0.02	13.20	
	G-461		7.34				15.47	304.80	304.77	-0.03	13.16	
	G-462		8.06				15.49	302.96	302.91	-0.05	13.01	
	G-463		7.90				15.48	301.07	301.03	-0.04	12.87	
	G-464		7.40				15.48	303.50	303.46	-0.04	12.88	
	G-465		7.62				15.49	299.98	299.91	-0.07	12.86	
	G-466		8.35				15.45	298.07	297.99	-0.08	12.64	
	G-467		8.17				15.50	297.41	297.34	-0.07	12.84	
	G-468		7.98				15.45	300.57	300.50	-0.07	12.92	
	G-469		8.12				15.50	304.90	304.78	-0.12	12.83	
	G-470		8.04				15.47	299.68	299.49	-0.19	12.66	
	G-471		8.02				15.51	307.02	306.87	-0.15	12.88	
EJ-13 ONLY TEFLON CASSET NO GAMMA	G-472		7.66				16.16	305.32	305.31	-0.02	13.54	
	G-473		7.19				16.18	301.62	301.63	0.01	13.83	
	G-474		7.45				16.17	298.00	298.02	0.02	13.68	

TABLE A-5a
Experimental Matrix and Component Weights for the
OR (Teflon) Gasket Experiments

This Table presents the matrix and selected results from the OR experiments done with Teflon gaskets.

Table A-5a. Experimental Matrix and Component Weights for the OR (Teflon) Gasket Experiments

TEST TYPE	TEST NUMBER	SAMPLE NUMBER	VESSEL NUMBER	TEST LENGTH (DAYS)	DATE IN	DATE OUT	SAMPLE THICKNESS	SAMPLE DIAMETER	SAMPLE SA INDIVID	SAMPLE SA TOTAL/VESSEL	SAMPLE MASS IN (G)	SAMPLE MASS OUT (G)	DELTA SAMPLE MASS	(NL)WT
ATM-1C	G-483	565	37	14	2/11/87	2/25/87	1.48	10.72	230	463.00	.40143	.40140	3.00	.11
		566					1.44	10.82	233		.40054	.40052	2.00	
	G-484	567	38	14	2/11/87	2/25/87	1.42	10.77	230	460.00	.39240	.39216	24.00	.98
		568					1.36	10.81	230		.37130	.37109	21.00	
	G-485	569	39	28	2/4/87	3/4/87	1.40	10.81	231	457.00	.38590	.38572	18.00	.68
		570					1.36	10.72	226		.36572	.36559	13.00	
	G-486	571	40	28	2/4/87	3/4/87	1.38	10.94	235	476.00	.39148	.39117	31.00	1.13
		572					1.34	11.13	241		.37105	.37082	23.00	
	G-487	573	41	56	2/4/87	4/1/87	1.93	10.89	252	486.00	.52419	.52356	63.00	2.18
		574					1.34	10.93	234		.37431	.37388	43.00	
	G-488	575	47	56	2/4/87	4/1/87	1.42	10.98	238	465.00	.39900	.39854	46.00	2.04
		576					1.33	10.77	227		.36700	.36651	49.00	
	G-489	577	48	91	2/11/87	5/13/87	1.41	10.70	227	455.00	.38064	.37988	76.00	3.45
		578					1.39	10.74	228		.37265	.37184	81.00	
	G-490	579	49	91	2/11/87	5/13/87	1.38	10.77	229	464.00	.37742	.37679	63.00	2.89
		580					1.46	10.85	235		.40484	.40413	71.00	
	G-491	581	50	182	2/11/87	8/26/87	1.42	10.83	232	456.00	.39462	.39357	105.00	4.61
		582					1.38	10.64	224		.37048	.36943	105.00	
	G-492	583	52	182	2/11/87	8/26/87	1.41	10.84	232	463.00	.38973	.38859	114.00	4.82
		584					1.40	10.82	231		.38053	.37944	109.00	
	G-493	585	53		2/4/87		1.42	10.84	233	463.00	.39147			
		586					1.34	10.83	230		.36765			
	G-494	587	55		2/4/87		1.37	10.76	228	461.00	.37485			
		588					1.38	10.87	233		.37777			
	G-495	589	65		2/11/87		1.40	10.77	229	458.00	.37968			
		590					1.40	10.77	229		.38009			
	G-496	591	66		2/11/87		1.41	10.73	228	458.00	.38589			
		592					1.38	10.79	230		.37568			

Table A-5a (Cont'd)

ATH-1C + TURF	G-497	593	67	14	2/11/87	2/25/87	1.45	10.95	238	469.00	.40395	.40379	16.00	.90
		594					1.42	10.80	231		.39032	.39006	26.00	
	G-498	595	68	14	2/11/87	2/25/87	1.42	10.99	239	467.00	.39937	.39897	40.00	1.50
		596					1.40	10.72	228		.37729	.37699	30.00	
	G-499	597	69	28	2/4/87	3/4/87	1.36	10.83	230	457.00	.37681	.37642	39.00	1.60
		598					1.38	10.73	227		.37248	.37214	34.00	
	G-500	599	70	28	2/4/87	3/4/87	1.68	10.81	240	477.00	.45978	.45941	37.00	1.72
		600					1.42	10.96	237		.40272	.40227	45.00	
	G-501	601	71	56	2/4/87	4/1/87	1.89	10.79	247	475.00	.50739	.50666	73.00	2.34
		602					1.42	10.71	228		.38493	.38455	38.00	
	G-502	603	72	56	2/4/87	4/1/87	1.41	10.80	231	472.00	.39010	.38956	54.00	1.91
		604					1.38	11.09	241		.38926	.38890	36.00	
	G-503	605	73	91	2/11/87	5/13/87	1.42	10.83	232	462.00	.38156	.38113	43.00	1.80
		606					1.38	10.79	230		.37620	.37580	40.00	
	G-504	607	74	91	2/11/87	5/13/87	1.47	10.73	230	457.00	.39921	.39872	49.00	2.54
		608					1.38	10.73	227		.37482	.37415	67.00	
	G-505	609	75	182	2/11/87	8/26/87	1.40	10.85	233	463.00	.38998	.38933	65.00	2.42
		610					1.38	10.81	230		.37696	.37649	47.00	
	G-506	611	76	182	2/11/87	8/26/87	1.42	10.78	231	459.00	.39126	.39067	59.00	2.53
		612					1.41	10.73	228		.37592	.37535	57.00	
	G-507	613	77	260	2/4/87		1.41	10.75	229	475.00	.38551			
		614					1.34	11.24	246		.38600			
	G-508	615	78	260	2/4/87		1.43	10.87	234	466.00	.39564			
		616					1.53	10.73	232		.42440			
	G-509	617	79		2/11/87		1.48	10.79	233	460.00	.40929			
		618					1.38	10.72	227		.37124			
	G-510	619	80		2/11/87		1.79	10.76	242	472.00	.48183			
		620					1.36	10.82	230		.37586			

Table A-5a (Cont'd)

ATH-8C	G-511	621	81	14	2/11/87	2/25/87	1.59	10.88	240	485.00	.44879	.44870	9.00	.25
		622					1.70	10.91	245		.47185	.47182	3.00	
	G-512	623	82	14	2/11/87	2/25/87	1.58	10.83	238	477.00	.44662	.44664	-2.00	-.06
		624					1.58	10.87	239		.43108	.43109	-1.00	
	G-513	625	83	28	2/4/87	3/4/87	1.36	10.89	233	470.00	.38016	.38015	1.00	.23
		626					1.50	10.87	237		.42254	.42244	10.00	
	G-514	627	84	28	2/4/87	3/4/87	1.55	10.93	241	492.00	.43122	.43126	-4.00	.02
		628					1.68	11.07	251		.46546	.46541	5.00	
	G-515	629	85	56	2/4/87	4/1/87	1.45	10.89	236	472.00	.40278	.40255	23.00	1.14
		630					1.56	10.87	239		.42787	.42756	31.00	
	G-516	631	86	56	2/4/87	4/1/87	1.71	11.05	251	489.00	.48761	.48739	22.00	1.10
		632					1.54	10.88	238		.42508	.42476	32.00	
	G-517	633	87	91	2/11/87	5/13/87	1.45	10.95	238	484.00	.41169	.41143	26.00	1.10
		634					1.82	10.82	246		.50706	.50679	27.00	
	G-518	635	88	91	2/11/87	5/13/87	1.58	10.98	244	479.00	.44586	.44566	20.00	.96
		636					1.45	10.86	235		.40335	.40309	26.00	
	G-519	637	89	182	2/11/87	8/26/87	1.56	10.88	239	485.00	.44081	.44051	30.00	1.42
		638					1.57	11.05	246		.42033	.41994	39.00	
	G-520	639	91	182	2/11/87	8/26/87	1.49	10.82	234	475.00	.39394	.39364	30.00	1.43
		640					1.64	10.85	241		.45910	.45872	38.00	
	G-521	641	92	260	2/4/87		1.33	10.86	231	464.00	.37646			
		642					1.39	10.87	233		.38826			
	G-522	643	93	260	2/4/87		1.53	10.81	235	466.00	.42972			
		644					1.34	10.86	231		.37269			
	G-523	645	94		2/11/87		1.56	10.87	239	486.00	.44673			
		646					1.76	10.91	247		.44908			
	G-524	647	95		2/11/87		1.55	11.00	244	481.00	.43757			
		648					1.51	10.86	237		.34738			

Table A-5a. (Cont'd)

ATH-8 + TUFF	G-525	649	106	14	2/11/87	2/25/87	1.74	10.85	244	487.00	.47856	.47847	9.00	.33
		650					1.64	10.92	243		.43536	.43529	7.00	
	G-526	651	107	14	2/11/87	2/25/87	1.92	11.02	257	492.00	.53109	.53097	12.00	.39
		652					1.46	10.87	235		.41001	.40994	7.00	
	G-527	653	108	28	2/4/87	3/4/87	1.37	10.85	231	465.00	.36384	.36369	15.00	1.03
		654					1.39	10.91	234		.38042	.38009	33.00	
	G-528	655	109	28	2/4/87	3/4/87	1.63	10.86	241	466.00	.43449	.43421	28.00	1.23
		656					1.49	11.08	245		.42858	.42826	32.00	
	G-529	657	110	56	2/4/87	4/1/87	1.59	10.85	239	481.00	.44978	.44954	44.00	1.75
		658					1.61	10.92	242		.41995	.41955	40.00	
	G-530	659	111	56	2/4/87	4/1/87	1.50	10.91	238	484.00	.42078	.42033	45.00	1.88
		660					1.81	10.85	246		.47820	.47774	46.00	
	G-531	661	112	91	2/11/87	5/13/87	1.95	10.89	253	506.00	.54419	.54392	27.00	1.13
		662					1.92	10.93	253		.54544	.54514	30.00	
	G-532	663	113	91	2/11/87	5/13/87	1.81	10.90	248	490.00	.46958	.46928	30.00	1.43
		664					1.54	10.98	242		.43836	.43796	40.00	
	G-533	665	114	182	2/11/87	8/26/87	1.52	10.98	242	493.00	.42518	.42475	43.00	1.87
		666					1.58	11.15	251		.45530	.45481	49.00	
	G-534	667	115	182	2/11/87	8/26/87	1.26	10.84	227	471.00	.33052	.33016	36.00	1.70
		668					1.71	10.88	244		.46344	.46300	44.00	
	G-535	669	116	260	2/4/87		1.59	10.88	240	477.00	.46854			
		670					1.50	10.89	237		.42457			
	G-536	671	117	260	2/4/87		1.60	10.89	241	477.00	.43613			
		672					1.50	10.85	236		.42131			
	G-537	673	118		2/11/87		1.43	11.26	250	488.00	.39989			
		674					1.50	10.91	238		.40878			
	G-538	675	119		2/11/87		1.72	10.83	243	485.00	.45384			
		676					1.34	11.14	242		.36075			

Table A-5a (Cont'd)

TEST TYPE #	TEST #	VESSEL #	TEST LENGTH (DAYS)	DATE IN	DATE OUT	H ₂ O VOLUME IN	COMPLETE ASSEMBLY IN	COMPLETE ASSEMBLY OUT	OUT	pH	LPE TARE	LPE WEIGHT	SOLUTION VOLUME	TOTAL CARBON PPM
BLANK	G-539	120	14	2/11/87	2/25/87	16.22	300.62	300.64		8.36	24.21	36.37000	12.16	31.63
EJ-13	G-540	121	14	2/11/87	2/25/87	16.20	303.22	303.23		8.33	24.26	36.81000	12.17	31.50
ONLY	G-541	122	28	2/4/87	3/4/87	16.18	295.41	295.43		8.25	23.66	35.82000	12.16	32.93
	G-542	123	28	2/4/87	3/4/87	16.20	297.88	297.91		8.22	24.34	36.51000	12.17	32.81
	G-543	124	56	2/4/87	4/1/87	16.19	300.95	300.97		7.98	24.51	36.73000	12.22	36.68
	G-544	125	56	2/4/87	4/1/87	16.25	300.28	300.30		8.13	23.68	35.80000	12.12	35.70
	G-545	126	91	2/11/87	5/13/87	16.14	298.65	298.65		8.23	23.12	35.18000	12.06	31.58
	G-546	127	91	2/11/87	5/13/87	16.20	299.18	299.19		8.13	23.69	35.85000	12.16	30.20
	G-547	128	182	2/11/87	8/26/87	16.19	298.59							
	G-548	129	182	2/11/87	8/26/87	16.20	303.37							
	G-549	130	260	2/4/87		16.16	297.36							
	G-550	131	260	2/4/87		16.23	299.20							
	G-551	132	LONG	2/11/87		16.21	299.23							
	G-552	133	LONG	2/11/87		16.21	304.92							
BLANK	G-553	134	14	2/11/87	2/25/87	15.45	306.11	306.12		7.71	24.54	27.27000	2.73	32.79
EJ-13	G-554	135	14	2/11/87	2/25/87	15.45	300.21	300.22		7.62	24.05	35.39000	11.34	33.50
+ TUFF	G-555	136	28	2/4/87	3/4/87	15.44	305.65	305.68		7.43	23.70	34.84000	11.14	35.89
	G-556	137	28	2/4/87	3/4/87	15.49	305.82	305.85		7.23	24.48	35.85000	11.37	42.35
	G-557	138	56	2/4/87	4/1/87	15.46	300.01	300.03		7.33	24.55	35.71000	11.16	38.33
	G-558	139	56	2/4/87	4/1/87	15.49	298.91	298.94		7.35	23.95	35.23000	11.28	39.43
	G-559	140	91	2/11/87	5/13/87	15.46	304.71	304.72		7.50	24.25	35.56000	11.31	37.68
	G-560	141	91	2/11/87	5/13/87	15.54	300.40	300.42		7.43	23.99	35.33000	11.34	34.82
	G-561	142	182	2/11/87	8/26/87	15.46	303.74							
	G-562	143	182	2/11/87	8/26/87	15.53	298.22							
	G-563	144	260	2/4/87		15.48	299.26							
	G-564	145	260	2/4/87		15.54	301.01							
	G-565	146	LONG	2/11/87		15.47	300.91							
	G-566	147	LONG	2/11/87		15.57	301.50							

Table A-5a (Cont'd)

TEST TYPE	TEST NUMBER	H ₂ O COMPLETE VOLUME ASSEMBLY IN	COMPLETE ASSEMBLY IN	COMPLETE ASSEMBLY OUT	MASS	PH OUT	LPE TARE	LPE WEIGHT	SOL/H VOLUME	TOTAL CARBON PPM	ORGANIC CARBON PPM	SURFACE ANALYSIS
ATM-1C	G-483	14.87	301.59	301.60		8.72	23.64	34.32	10.68	31.44	11.87	SEM 3/1/87
	G-484	14.87	301.37	301.38		8.77	24.63	35.30	10.67	31.81	11.83	
	G-485	14.91	308.27	308.27		8.81	24.52	35.17	10.65	33.91	12.35	SEM 3/27/87 SIMS
	G-486	14.93	302.78	302.79		8.78	23.58	35.03	11.45	33.95	13.31	
	G-487	14.90	301.66	301.68		9.09	24.23	34.91	10.68	35.44	13.83	SEM 4/17/87 SIMS 4/17/87
	G-488	14.90	308.99	309.00		9.11	23.81	32.50	8.69	35.96	14.15	
	G-489	14.91	303.27	303.29		9.50	22.69	33.33	10.64	35.03	15.46	
	G-490	14.87	305.05	305.07		9.47	22.74	33.28	10.54	32.57	12.58	
	G-491	14.94	306.48	306.50		10.07	23.89	34.60	10.71	45.45	19.31	SEM 10/21/87
	G-492	14.84	304.59	304.58		10.08	24.63	35.15	10.52	44.84	19.19	
	G-493	14.91	303.91						0.00			
	G-494	14.94	304.07						0.00			
	G-495	14.93	303.35						0.00			
	G-496	14.90	302.97						0.00			

Table A-5a (Cont'd)

ATM-1C + TUFF	G-497	14.46	311.43	311.43	8.45	24.62	34.60	9.98	32.46	11.48	SEM 3/1/87
	G-498	14.47	335.70	335.71	8.56	24.52	34.38	9.86	40.85	20.80	
	G-499	14.49	303.68	303.69	8.62	24.46	34.47	10.01	39.69	16.42	SEM 3/22/87
	G-500	14.49	304.76	304.78	8.55	23.98	34.14	10.16	44.51	21.36	SIMS 4/17/87
	G-501	14.49	310.53	310.54	8.71	23.93	32.14	8.21	44.73	21.59	SEM 4/17/87
	G-502	14.48	307.71	307.73	8.68	24.45	34.61	10.16	47.53	23.79	
	G-503	14.49	304.89	304.90	8.83	23.42	33.60	10.18	33.18	13.64	
	G-504	14.46	306.62	306.63	8.76	24.22	34.35	10.13	40.59	20.39	
	G-505	14.53	338.19	338.19	9.07	24.55	34.70	10.15	57.19	32.91	
	G-506	14.53	306.89	306.90	9.06	24.67	34.71	10.04	53.39	27.99	
	G-507	14.47	304.62					0.00			SEM 10/21/87
	G-508	14.54	307.64					0.00			
	G-509	14.48	305.53					0.00			
	G-510	14.51	306.60					0.00			

Table A-5a (Cont'd)

ATH-6C	G-511	14.87	309.98	309.99	8.64	23.64	35.52	11.88
	G-512	14.90	304.79	304.80	8.62	24.19	36.58	12.39
	G-513	14.87	302.45	302.46	8.56	24.63	36.58	11.95
	G-514	14.95	304.55	304.57	8.60	24.56	37.05	12.49
	G-515	14.90	310.77	310.79	8.98	23.72	35.57	11.85
	G-516	14.87	303.28	303.29	8.92	24.42	36.43	12.01
	G-517	14.91	305.48	305.51	9.16	24.58	36.20	11.62
	G-518	14.91	306.82	306.83	9.16	24.45	36.66	12.21
	G-519	14.91	307.24	307.23	9.54	24.36	36.21	11.85
	G-520	14.87	310.24	310.26	9.52	23.81	36.16	12.35
	G-521	14.94	302.53					0.00
	G-522	14.91	305.73					0.00
	G-523	14.89	302.65					0.00
	G-524	14.89	309.23					0.00

Table A-5a (Cont'd)

ATN-D + TUFF	G-525	14.49	303.61	303.62	8.06	23.87	35.27	11.40
	G-526	14.48	302.66	302.68	8.21	24.42	36.28	11.86
	G-527	14.53	312.52	312.52	8.40	24.53	35.99	11.46
	G-528	14.47	305.30	305.31	8.43	23.67	35.68	12.01
	G-529	14.47	304.98	305.00	8.62	24.25	36.11	11.86
	G-530	14.50	309.23	309.25	8.66	23.61	35.59	11.98
	G-531	14.50	309.58	309.59	8.77	23.58	34.77	11.19
	G-532	14.52	306.62	306.64	8.65	22.82	34.52	11.70
	G-533	14.50	304.46	304.46	8.95	22.46	35.76	13.30
	G-534	14.51	308.25	308.27	8.87	24.46	36.47	12.01
	G-535	14.55	304.36					0.00
	G-536	14.55	304.40					0.00
	G-537	14.54	307.85					0.00
	G-538	14.47	306.67					0.00

Table A-5a (Cont'd)

TEST TYPE #	TEST	ORGANIC
		CARBON PPM
BLANK EJ-13 ONLY	G-539	11.64
	G-540	11.65
	G-541	12.87
	G-542	12.68
	G-543	15.76
	G-544	15.54
	G-545	13.28
	G-546	11.40
	G-547	
	G-548	
	G-549	
	G-550	
	G-551	
	G-552	
BLANK EJ-13 + TUFF	G-553	13.79
	G-554	14.43
	G-555	15.97
	G-556	20.70
	G-557	17.67
	G-558	17.82
	G-559	17.88
	G-560	14.44
	G-561	
	G-562	
	G-563	
	G-564	
	G-565	
	G-566	

TABLE A-5b

The matrix and selected results for the OR experiments done with silicone rubber gaskets.

Table A-5b. Experimental Matrix and Selected Results for Preliminary Experiments Done Without Gamma Radiation

Test Type	Test #	Sample #	Vessel #	Test Length (Days)	Date In	Date Out	Sample Thickness (mm)	Sample Diameter (mm)	Sample SA Individual (mm ²)	Sample SA Total/Vessel	
ATM-1c + EJ-13 No radiation	G-475	540	127	7	9/26/86	10/03/86	1.32	10.90	234.9	474.7	
		550					1.83	10.66	239.6		
	G-476	551	73	7	9/26/86	10/03/86	1.77	10.72	240.1	485.2	
		552					1.94	10.70	245.1		
	G-479	557	68	14	9/26/86	10/10/86	1.50	10.92	238.7	491.5	
		558					1.02	10.91	252.0		
	G-480	559	146	14	9/26/86	10/10/86	1.74	10.81	242.6	492.6	
		560					1.76	10.66	256.0		
	G-478	555	50	28	9/26/86	10/24/86	1.70	11.10	252.8	496.9	
		556					1.84	10.76	244.1		
	G-482	553	37	28	9/26/86	10/24/86	1.80	10.63	237.6	485.8	
		564					2.00	10.74	240.2		
G-477	553	41	63	9/26/86	11/20/86	1.64	10.80	236.9	479.6		
	554					1.76	10.74	240.6			
G-481	561	66	63	9/26/86	11/20/86	1.77	10.74	240.9	490.1		
	562					1.84	10.80	240.2			
Sample Mass In (gm)	Sample Mass Out (gm)	Δ Sample Mass	(NL) _{wt}	EJ-13 Volume In (mL)	Complete Assembly In (gm)	Complete Assembly Out (gm)	Δ Mass	pH Out	LPE Tare (gm)	LPE Weight (gm)	Solution Volume
0.36002	0.36873	29	1.0	14.88	305.25	305.25	0	9.75	23.66	37.49	13.08
0.48942	0.48913	29									
0.47415	0.47877	80	1.05	14.90	301.37	301.37	0	9.82	24.56	38.40	13.84
0.51778	0.51752	26									
0.41615	0.41407	49	1.76	14.90	301.26	301.23	0.03	9.84	24.47	38.02	14.30
0.53613	0.53554	59									
0.40935	0.40878	57	1.78	14.94	302.30	302.35	0.01	9.81	24.31	38.03	14.57
0.50355	0.50306	49									
0.40890	0.40800	a		14.91	304.20	304.22	+0.02	9.83	24.02	38.12	13.92
0.49898	0.51109	a									
0.47042	0.46822	220		14.90	300.19	300.23	+0.04	9.99	24.45	38.73	14.26
0.51228	0.49733	a									
0.43024	0.43718	160	3.07	14.95	305.32	305.24	0.08	9.17	23.91	38.31	14.18
0.47002	0.47738	124									
0.47200	0.47177	113	3.54	14.92	307.09	307.01	0.08	9.16	24.63	38.91	14.20
0.49334	0.49238	104									

*Samples were used for purposes which excluded taking weight loss measurements.

TABLE A-6a,b,c
Cation Analyses ATM-1c (6a), ATM-8 (6b), and Blanks (6c), 2R

The cation results for the 2R experiments are presented in this Table. The final liquid volume is the volume of liquid in the vessel at the end of the experiment. LPE weight represents the volume of solution submitted for cation analysis. ACL is the reported concentration (ppm) of the analyzed solution. ppm is the elemental concentration in the submitted leachate that has been blank corrected. Note the solutions were diluted with 20.0 mL of DIW prior to analysis. Blank corrections were made according to elemental trends observed in the blank results (Table A-6c). $(NL)_i$ is the normalized elemental mass loss for element i. Note the $(NL)_i$ values listed for the experiments done using crushed glass are too large by a factor of 1.50.

Table A-6a. Cation Analyses, ATM-1c Glass

Test	Test #	Length	Final Liquid Vol.	Total SA	pH	LPH wt	ACL	Al			S		
								ppm	(ML) 1		ACL	ppm	(ML) 1
PNL U + J-13	G 51	7	16.74	518.9	7.33	12.41	0.28	0.00	0.02		1.05	2.56	2.93
	G 52	7	16.76	518.4	7.23	12.36	0.30	0.06	0.52		0.74	1.76	2.02
	G 49	14	16.78	520.1	7.74	12.47	0.21	-0.15	-1.36		3.34	8.53	9.75
	G 50	14	16.75	519.4	7.76	12.50	0.23	-0.10	-0.69		3.12	7.94	9.08
	G 53	28	16.84	522.1	7.64	13.02	0.22	-0.20	-1.83		6.15	15.31	17.51
	G 54	28	17.06	521.1	7.53	14.65	0.20	-0.28	-2.65		6.44	14.94	17.35
	G 55	56	16.70	519.1	7.20	14.07	0.31	-0.05	-0.43		9.33	22.84	26.05
	G 56	56	16.74	520.2	7.24	14.25	0.32	-0.03	-0.27		9.89	23.53	26.88
PNL U + J-13 + TUWE	G 59	7	16.81	521.4	7.22	11.94	0.83	1.66	14.9		0.74	1.80	2.05
	G 60	7	16.89	518.7	7.30	11.10	0.54	0.96	8.7		0.57	1.41	1.63
	G 57	14	16.77	520.5	7.43	11.46	1.19	2.11	18.9		2.21	5.87	6.71
	G 58	14	17.08	521.0	7.38	11.88	0.46	0.08	0.7		2.43	6.32	7.35
	G 61	28	16.78	519.7	7.47	13.75	0.49	0.36	3.2		5.92	14.40	16.49
	G 62	28	16.81	520.8	7.33	13.46	0.44	0.25	2.2		6.15	15.01	17.18
	G 63	56	16.95	526.9	7.18	13.71	0.55	0.89	8.0		9.48	23.03	26.27
	G 64	56	16.90	523.3	7.50	13.46	0.41	0.56	5.0		8.47	20.77	23.79
CRUSHED PNL U + J-13	G 67	7	16.78	1124	7.01	11.44	0.16	-0.29	-0.82		0.40	0.92	0.33
	G 68	7	16.76	1119	4.95	11.07	0.16	-0.28	-0.81		0.41	0.97	0.35
	G 65	14	16.80	1124	7.89	12.08	0.13	-0.35	-1.00		4.22	11.04	3.91
	G 66	14	16.80	1124	7.91	11.61	0.17	-0.23	-0.64		4.09	10.98	3.73
	G 69	28	17.08	1172	7.34	14.20	0.15	-0.40	-1.12		7.97	18.91	6.65
	G 70	28	16.91	1151	7.20	14.12	0.17	-0.35	-0.97		8.62	20.54	7.12
	G 71	56	16.99	1157	7.38	14.08	0.17	-0.39	-1.11		10.60	21.90	9.21
	G 72	56	16.66	1116	7.28	13.79	0.17	-0.38	-1.10		11.40	27.69	9.80

Table A-6a (Cont'd)

Ba			Ca			Ce		Nd	
ACL	ppm	(ML) 1	ACL	ppm	(ML) 1	ACL	ppm	ACL	ppm
0.066	0.090	0.61	3.50	0.280	0.57	<0.15		<0.100	
0.054	0.060	0.41	3.44	0.150	0.30	<0.15		<0.100	
0.070	0.100	0.69	3.30	0.020	0.05	<0.15		<0.100	
0.076	0.120	0.79	3.32	0.060	0.13	<0.15		<0.100	
0.640	1.540	10.33	3.95	1.360	2.76	<0.15		<0.100	
0.650	1.450	9.92	3.84	0.430	0.88	<0.15		<0.100	
0.420	0.970	6.49	4.10	0.990	2.00	<0.15		0.100	0.26
0.380	0.860	5.80	4.33	1.470	2.97	<0.15		0.100	0.24
0.039	0.020	0.14	6.13	-2.930		<0.15		<0.100	
<0.030			5.12	-4.980		<0.15		<0.100	
0.061	0.080	0.53	5.47	-9.010		<0.15		<0.100	
0.068	0.090	0.65	6.21	-7.370		<0.15		<0.100	
0.160	0.300	2.03	5.72	-16.130		<0.15		<0.100	
0.110	0.160	1.24	6.05	-13.140		<0.15		<0.100	
0.130	0.270	1.80	6.18	-20.050		<0.15		<0.100	
0.110	0.220	1.49	3.88	-25.600		<0.15		<0.100	
0.037	0.020	0.04	3.12	-0.280	-0.17	<0.15		<0.100	
0.037	0.020	0.05	3.15	-0.010	-0.01	<0.15		<0.100	
0.060	0.060	0.17	2.80	-0.870	-0.55	<0.15		0.100	0.27
0.056	0.070	0.14	2.77	-1.030	-0.62	<0.15		0.100	0.27
0.072	0.090	0.19	3.85	0.620	0.39	<0.15		<0.100	
0.086	0.130	0.25	4.34	1.830	1.13	<0.15		0.100	0.24
0.091	0.170	0.36	3.33	-0.880	-0.55	<0.15		<0.100	
0.080	0.150	0.31	3.62	-0.070	-0.04	<0.15		<0.100	

Table A-6a (Cont'd)

Li		Mg		Fe	
ACL	PPM	ACL	PPM	ACL	PPM
0.020	0.05	0.41	1.65	0.42	1.04
0.020	0.05	0.41	1.72	0.28	0.60
0.021	0.05	0.36	-0.04	1.45	3.73
0.026	0.07	0.36	-0.04	1.38	3.53
0.046	0.12	0.37	-0.04	2.69	6.74
0.040	0.09	0.36	-0.13	2.85	6.66
0.048	0.12	0.39	-0.06	4.29	10.31
0.063	0.16	0.42	0.00	4.45	10.42
0.020	0.05	0.50	-0.01	0.27	0.67
<0.020		0.44	-0.12	0.20	0.50
<0.020		0.48	-0.20	0.95	2.35
<0.020		0.50	-0.17	1.06	2.79
0.035	0.08	0.44	-0.52	2.64	6.44
0.037	0.08	0.50	-0.36	2.73	6.70
0.055	0.13	0.53	-0.48	4.28	10.45
0.028	0.07	0.33	-0.97	3.84	9.47
0.024	0.09	0.35	0.04	0.14	0.33
0.033	0.09	0.33	-0.02	0.14	0.33
0.120	0.40	0.38	-0.13	1.92	4.17
0.140	0.42	0.31	-0.12	1.64	3.64
0.130	0.31	0.38	-0.12	2.07	5.01
0.047	0.11	0.38	-0.06	3.64	9.24
0.048	0.11	0.16	-0.02	4.93	11.66
0.048	0.11	0.19	-0.54	5.19	13.64
			-0.21		10.43
			-0.13		0.27
			-1.64		4.17
			-0.12		3.64
			-0.12		5.01
			-0.06		9.24
			-0.02		11.66
			-0.54		13.64

Table A-6a (Cont'd)

Na			Si			Sr		
ACL	ppm	(NL) 1	ACL	ppm	(NL) 1	ACL	ppm	(NL) 1
31.8	9.63	3.37	20.3	9.40	1.57	0.120	0.25	3.38
20.4	6.11	2.14	18.1	3.77	0.63	0.091	0.18	1.67
30.3	32.00	11.23	32.3	32.64	5.47	0.220	0.52	4.95
29.4	29.54	10.35	31.3	29.91	5.01	0.220	0.52	4.84
41.5	58.60	20.54	40.6	51.09	8.56	0.340	0.79	7.52
44.1	57.65	20.52	41.0	45.10	7.67	0.320	0.69	6.62
52.7	83.91	29.00	47.4	67.86	11.34	0.480	1.09	10.36
53.8	84.61	29.63	48.9	70.62	11.81	0.470	1.06	10.07
20.8	8.21	2.87	20.1	9.91	1.66	0.085	0.13	1.34
18.4	4.65	1.64	17.7	5.73	0.97	0.046	0.09	0.86
25.5	22.50	7.88	24.5	19.64	3.29	0.170	0.36	3.43
26.5	23.61	8.41	26.8	24.30	4.14	0.190	0.40	3.90
42.2	56.85	19.95	39.3	43.29	7.26	0.300	0.61	5.73
42.2	58.17	20.41	40.4	47.26	7.92	0.360	0.76	7.15
51.9	81.97	28.66	47.8	63.53	10.61	0.430	0.90	8.52
47.9	73.43	25.77	43.2	53.39	8.95	0.260	0.49	4.65
18.1	2.44	0.26	16.9	2.83	0.15	0.058	0.10	0.28
18.2	3.50	0.38	16.4	3.42	0.13	0.059	0.10	0.30
33.3	41.53	4.51	30.8	30.32	1.57	0.120	0.25	1.27
33.1	43.22	4.50	28.7	26.67	1.33	0.100	0.49	1.39
49.3	72.09	7.27	43.6	53.13	2.74	0.340	0.75	2.19
51.7	78.28	8.32	45.4	57.83	2.93	0.410	0.92	2.65
56.1	91.05	9.92	45.4	62.98	3.26	0.310	0.68	2.01
57.9	97.17	10.55	45.9	65.56	3.40	0.350	0.79	2.32

Table A-6a (Cont'd)

Ti			Zn			Cu			U		
ACL	ppm	(ML) 1	ACL	ppm	(ML) 1	ACL	ppm	(ML) 1	ACL	ppm	(ML) 1
0.200	0.04	0.07	0.23	0.55	0.49	0.38	0.99	3.76	0.243	0.63	0.57
0.019	0.04	0.07	0.18	0.42	0.38	0.25	0.65	2.47	0.143	0.37	0.34
0.024	0.05	0.09	0.61	1.60	1.44	1.15	2.99	11.35	0.716	1.86	1.70
0.026	0.05	0.10	0.55	1.41	1.27	1.02	3.83	10.74	0.657	1.71	1.56
0.017	0.03	0.06	1.17	2.93	2.64	1.98	5.02	19.05	3.066	7.77	7.08
0.020	0.03	0.06	0.99	2.30	2.11	2.06	4.87	18.76	3.069	7.26	6.71
0.033	0.07	0.12	1.75	4.20	3.77	2.84	6.88	26.04	3.219	7.79	7.08
0.035	0.07	0.13	2.13	5.08	4.57	2.92	7.02	26.61	3.118	7.49	6.82
0.020	0.04	0.08	0.14	0.33	0.30	0.19	0.51	1.98	0.183	0.49	0.45
0.017	0.03	0.06	0.12	0.29	0.27	0.13	0.36	1.38	0.117	0.32	0.29
0.019	0.04	0.07	0.25	0.63	0.57	0.38	1.35	5.89	0.636	1.74	1.58
0.023	0.05	0.09	0.32	0.80	0.73	0.45	1.74	6.71	0.781	2.03	1.88
0.019	0.03	0.06	0.79	1.90	1.71	1.51	3.71	14.09	1.364	3.34	3.05
0.019	0.03	0.06	0.73	1.78	1.60	1.55	3.85	14.41	1.623	4.02	3.51
0.036	0.07	0.13	1.36	3.32	2.98	2.24	5.51	20.76	2.054	5.02	4.56
0.033	0.06	0.12	1.03	2.53	2.29	1.91	4.75	17.71	1.094	2.69	2.45
0.009	-0.01	-0.01	0.14	0.33	0.09	0.13	0.36	0.42	0.132	0.36	0.10
0.008	-0.01	-0.01	0.31	0.82	0.23	0.13	0.36	0.43	0.133	0.37	0.10
0.048	0.11	0.07	0.43	1.13	0.31	1.38	3.66	4.31	0.772	2.05	0.57
0.070	0.18	0.10	0.72	1.94	0.52	1.34	3.65	4.12	0.796	2.17	0.58
0.024	0.04	0.03	0.77	1.82	0.50	2.33	5.61	6.55	0.962	2.32	0.64
0.022	0.04	0.02	0.79	1.87	0.51	2.47	5.97	6.86	1.247	3.01	0.82
0.021	0.04	0.02	0.61	1.44	0.40	2.65	6.41	7.56	0.978	2.37	0.66
0.036	0.07	0.04	0.78	1.87	0.52	2.78	6.81	8.00	1.099	2.69	0.75

Table A-6b. Cation Analyses, ATM-8 Glass

Test	Test #	Length	Final Liquid Vol	Total SA	pH	LPR wt	ACL	Al		B		
								ppm	(ML) 1	ppm	(ML) 1	(ML) 1
PML A + J-13	G 75	7	16.52	512.5	6.86	11.76	0.31	0.11	0.60	0.55	1.31	1.62
	G 76	7	16.69	514.4	7.00	12.06	0.31	0.10	0.53	0.55	1.28	1.60
	G 73	14	16.93	523.7	6.80	13.20	0.28	0.01	0.05	2.03	4.93	6.14
	G 74	14	16.41	507.8	7.18	12.89	0.29	0.04	0.25	2.10	5.19	6.45
	G 77	28	16.69	512.5	6.92	13.37	0.23	-0.18	-1.01	4.85	11.82	14.62
	G 78	28	16.31	507.9	7.01	13.63	0.19	-0.29	-1.59	4.94	11.90	14.70
	G 79	56	16.37	511.2	7.50	13.17	0.32	0.01	0.05	5.86	14.52	17.88
	G 80	56	16.71	519.2	7.37	13.93	0.34	0.03	0.17	6.52	15.64	19.54
	G 83	7	16.69	516.5	7.05	9.77	1.16	2.98	16.6	0.43	1.13	1.40
	G 84	7	16.59	514.3	7.02	10.30	1.02	2.44	13.6	0.41	1.02	1.27
PML A + J-13 + TUFF	G 81	14	16.72	513.4	7.20	12.21	0.55	0.29	1.6	1.62	4.08	5.10
	G 82	14	16.44	511.6	7.23	12.12	0.44	0.06	0.3	2.06	5.26	6.31
	G 85	28	16.41	508.6	7.20	13.03	0.63	0.75	4.2	4.01	9.89	12.27
	G 86	28	16.50	511.6	7.09	11.93	0.45	0.36	2.00	4.35	11.36	14.10
	G 87	56	16.43	510.8	7.48	13.02	0.58	1.01	5.60	6.01	14.94	18.51
	G 88	56	16.59	517.5	7.61	13.16	0.61	1.58	8.7	5.58	13.78	16.98
CRUSHED PML A + J-13	G 91	7	16.11	1078	6.80	10.90	0.20	-0.16	-0.28	0.24	0.50	0.20
	G 92	7	17.21	1147	6.95	12.09	0.20	-0.20	-0.34	0.22	0.41	0.16
	G 89	14	15.51	1033	7.16	11.64	0.14	-0.31	-0.55	1.65	4.31	5.47
	G 90	14	15.57	1033	7.04	11.64	0.14	-0.31	-0.54	1.54	4.02	5.14
	G 93	28	15.78	1042	7.37	12.55				4.67	11.82	4.51
	G 94	28	16.14	1064	7.42	12.89				4.68	11.65	4.42
	G 95	56	16.73	1096	7.74	12.94	0.18	-0.34	-0.58	6.76	16.97	6.51
	G 96	56	16.83	1089	7.68	13.74	0.16	-0.41	-0.70	7.21	17.49	6.70
				1129								

Table A-6b (Cont'd)

Ba			Ca			Ce		Nd	
ACL	ppm	(ML) 1	ACL	ppm	(ML) 1	ACL	ppm	ACL	ppm
0.060	0.080	0.47	3.39	0.310	0.60	<0.15		<0.100	
0.070	0.110	0.61	3.39	0.160	0.32	<0.15		<0.100	
0.170	0.350	2.01	4.27	2.170	4.28	<0.15		<0.100	
0.140	0.280	1.60	3.96	1.540	3.03	<0.15		<0.100	
0.450	1.040	5.98	4.77	3.250	6.38	<0.15		0.110	0.27
0.450	1.030	5.89	4.53	2.520	4.94	<0.15		<0.100	
0.160	0.350	2.02	3.26	-0.730	-1.42	<0.15		<0.100	
0.150	0.320	1.82	3.82	0.360	0.71	<0.15		<0.100	
<0.030			6.44	0.290		<0.15		<0.100	
<0.030			7.19	1.820		<0.15		<0.100	
0.068	0.090	0.33	7.16	-5.140		<0.15		<0.100	
0.078	0.120	0.68	7.27	-4.760		<0.15		<0.100	
0.180	0.370	2.12	7.65	-10.770		<0.15		<0.100	
0.140	0.290	1.64	7.96	-8.860		<0.15		<0.100	
0.120	0.250	1.45	5.53	-21.220		<0.15		<0.100	
0.097	0.190	1.10	4.93	-22.820		<0.15		<0.100	
<0.030			3.10	-0.060	-0.04	<0.15		<0.100	
0.034	0.010	0.02	3.25	-0.220	-0.14	<0.15		<0.100	
0.091	0.170	0.30	3.20	0.130	0.08	<0.15		<0.100	
0.110	0.220	0.39	3.37	0.590	0.36	<0.15		<0.100	
0.100	0.180	0.31	3.54	0.430	0.32	<0.15		<0.100	
0.078	0.120	0.20	3.57	0.450	0.27	<0.15		<0.100	
0.067	0.120	0.21	2.34	-2.980	-1.81	<0.15		<0.100	
0.053	0.080	0.14	2.48	-2.850	-1.73	<0.15		<0.100	

Table A-6b (Cont'd)

La			Hg			Mo		
ACL	ppm	(ML) 1	ACL	ppm	(ML) 1	ACL	ppm	(ML) 1
0.020	0.05	0.05	0.40	0.08	2.38	0.21	0.51	1.17
0.021	0.05	0.05	0.40	0.06	1.90	0.22	0.53	1.23
0.035	0.14	0.11	0.71	0.81	23.80	1.04	2.56	5.91
0.040	0.10	0.08	0.54	0.40	11.81	1.07	2.68	6.19
0.085	0.21	0.16	0.47	0.20	5.73	2.52	6.21	14.27
0.044	0.15	0.12	0.45	0.13	3.89	2.56	6.23	14.29
0.081	0.20	0.16	0.35	-0.13	-3.65	3.12	7.78	17.80
0.089	0.22	0.17	0.40	-0.03	-0.96	3.48	8.40	19.31
0.021	0.06	0.05	0.49	0.14		0.18	0.49	1.13
<0.020			0.52	0.18		0.17	0.44	1.01
0.029	0.07	0.06	0.64	0.17		0.79	2.03	4.72
0.039	0.07	0.06	0.55	-0.06		1.51	3.62	6.02
0.050	0.12	0.09	0.53	-0.26		2.10	5.23	12.05
0.064	0.16	0.13	0.55	-0.13		2.25	5.93	13.66
0.070	0.18	0.14	0.42	-0.72		3.20	8.04	18.47
0.073	0.18	0.14	0.40	-0.78		2.92	7.28	16.66
0.039	0.11	0.03	0.35	-0.01	-0.06	0.09	0.19	0.14
<0.020			0.37	-0.02	-0.15	0.07	0.14	0.10
0.020	0.05	0.01	0.35	-0.02	-0.22	0.85	2.26	1.62
0.020	0.05	0.01	0.36	0.00	0.02	0.80	2.12	1.51
0.030	0.07	0.03	0.33	-0.12	-1.09	2.41	6.17	4.37
0.035	0.08	0.03	0.33	-0.14	-1.21	2.45	6.17	4.34
0.051	0.13	0.04	0.12	-0.70	-6.36	3.65	9.22	6.56
0.041	0.10	0.03	0.10	-0.76	-6.90	3.88	9.45	6.73

Table A-6b (Cont'd)

Na			Si			Sr		
ACL	ppm	(NL) 1	ACL	ppm	(NL) 1	ACL	ppm	(NL) 1
20.2	7.23	2.50	19.7	9.59	1.64	0.089	0.18	1.39
20.6	7.44	2.89	18.6	5.83	1.00	0.087	0.17	1.33
27.3	21.74	7.51	27.3	17.20	2.95	0.280	0.65	3.15
28.5	20.72	7.15	28.0	19.98	3.43	0.250	0.59	4.63
39.1	50.84	17.49	39.7	47.21	8.06	0.500	1.18	9.25
39.0	49.58	16.99	39.6	45.83	7.81	0.470	1.09	8.54
39.3	54.28	18.55	37.6	47.79	8.12	0.033	0.02	0.12
42.0	57.60	19.79	43.6	59.28	10.12	0.040	0.03	0.23
19.2	8.54	2.96	19.0	14.04	2.41	0.071	0.12	0.94
18.4	7.23	2.49	18.9	11.74	2.01	0.073	0.12	0.93
24.4	16.87	5.86	24.3	16.49	2.85	0.195	0.40	3.15
26.0	21.40	7.35	26.2	21.82	3.72	0.220	0.48	3.75
35.4	43.01	14.81	35.4	36.57	6.26	0.360	0.78	6.15
35.1	47.21	16.25	34.9	40.24	6.89	0.400	0.94	7.39
39.7	55.04	18.90	39.5	46.18	7.88	0.340	0.71	5.53
38.6	51.62	17.65	39.1	44.51	7.57	0.310	0.62	4.88
17.8	3.16	0.34	16.4	2.88	0.15	0.048	0.07	0.18
19.1	3.40	0.37	15.3	-3.00	-0.16	0.047	0.05	0.13
22.7	14.80	1.59	21.7	7.52	0.40	0.170	0.41	2.01
22.7	14.80	1.58	22.6	9.96	0.53	0.180	0.44	2.07
26.8	48.80	5.17	25.7	40.72	1.14	0.340	0.81	1.97
37.3	48.27	5.05	34.8	36.92	1.93	0.340	0.80	1.92
41.5	50.94	6.49	37.5	48.55	2.57	0.210	0.47	1.14
44.0	63.34	8.75	39.1	49.10	2.60	0.230	0.50	1.21

Table A-6b (Cont'd)

Ti			Zn			Cu			U		
ACL	ppm	(NL) 1	ACL	ppm	(NL) 1	ACL	ppm	(NL) 1	ACL	ppm	(NL) 1
0.016	0.03	0.06	0.19	0.46	0.42	0.20	0.56	1.91	0.115	0.31	0.28
0.019	0.03	0.06	0.17	0.40	0.37	0.20	0.53	1.89	0.107	0.29	0.26
0.025	0.05	0.10	0.63	1.57	1.43	0.73	1.86	6.54	0.679	1.71	1.56
0.028	0.05	0.09	0.50	1.26	1.16	0.73	1.86	6.61	0.641	1.63	1.49
0.019	0.03	0.06	1.69	4.18	3.52	1.65	4.12	14.57	2.428	6.06	5.51
0.016	0.03	0.05	1.14	3.27	2.75	1.64	4.05	14.75	2.362	5.83	5.29
0.036	0.08	0.14	1.46	3.64	3.05	1.72	4.33	15.19	1.263	3.16	2.88
0.037	0.08	0.14	1.60	3.86	3.25	1.90	4.63	16.89	1.233	3.24	2.95
0.025	0.06	0.12	0.11	0.29	0.25	0.10	0.30	1.07	0.094	0.28	0.26
0.023	0.05	0.10	0.11	0.28	0.24	0.09	0.26	0.92	0.090	0.27	0.25
0.023	0.04	0.09	0.30	0.73	0.63	0.44	1.16	4.15	0.592	1.55	1.43
0.023	0.04	0.08	0.25	0.60	0.51	0.34	1.43	3.06	0.719	1.90	1.73
0.018	0.03	0.06	0.49	1.20	1.02	1.07	2.71	9.61	1.309	3.31	3.02
0.017	0.03	0.06	0.60	1.57	1.32	1.14	3.05	9.86	1.681	4.51	4.11
0.035	0.07	0.13	0.82	2.05	1.73	1.33	3.37	11.88	1.090	2.73	2.48
0.039	0.08	0.15	0.97	2.42	2.03	1.26	3.17	11.17	1.132	2.82	2.55
0.014	0.03	0.02	0.09	0.21	0.06	0.08	0.23	0.25	0.083	0.24	0.07
0.0025	-0.01	-0.01	0.08	0.17	0.04	0.07	0.19	0.20	0.063	0.17	0.02
0.009	-0.01	-0.01	0.17	0.44	0.12	0.27	1.55	1.71	0.423	1.18	0.33
0.008	-0.01	-0.01	0.18	0.47	0.12	0.53	1.44	1.58	0.480	1.20	0.34
0.012	0.02	0.01	0.32	0.79	0.21	1.50	3.89	4.24	0.770	2.00	0.56
0.013	0.02	0.01	0.35	0.85	0.22	1.51	3.85	4.20	0.706	1.80	0.50
0.031	0.06	0.04	0.70	1.74	0.45	1.75	4.45	4.91	0.473	1.20	0.34
0.025	0.05	0.03	0.54	1.29	0.34	1.90	4.67	5.25	0.472	1.16	0.38

Table A-6c. Cation Analyses, Blanks

Test	Test #	Length	Final Liquid Vol	Total SA	pH	LPH wt	Al			B		
							ACL	ppm	(NL) 1	ACL	ppm	(NL) 1
BLANKS	G 99	7	16.03		6.76	11.74	0.26	0.70		0.07	0.16	
	G 100	7	16.03		6.66	11.78	0.28	0.76		0.07	0.18	
	G 97	14	16.04		6.31	11.84	0.36	0.70		0.06	0.17	
	VESSEL	14	16.02		6.43	11.96	0.26	0.70		0.07	0.18	
	G 101	14	15.93		7.05	10.70	0.26	0.75		0.11	0.31	
J-13	G 102	28	15.94		7.15	12.16	0.29	0.77		0.10	0.26	
	G 103	56	15.99		6.54	13.72	0.33	0.81		0.10	0.25	
	G 104	56	15.97		6.81	13.75	0.31	0.79		0.10	0.24	
BLANKS	G 107	7	16.06		6.88	10.70	0.19	0.54		0.07	0.19	
	G 108	7	16.01		6.94	11.74	0.21	0.57		0.07	0.18	
	G 105	14	16.03		6.94	11.35	0.53	1.44		0.07	0.20	
	VESSEL	14	15.99		6.84	11.48	0.31	0.85		0.07	0.20	
	G 106	28	16.07		7.27	11.87	0.18	0.48		0.11	0.30	
J-13	G 109	28	15.61		7.45	8.86	0.37	1.20		0.08	0.26	
	G 110	56	15.97		6.71	12.84	0.20	0.51		0.11	0.28	
TUFF	G 111	56	15.98		6.61	12.62	0.16	0.41		0.11	0.28	
	G 112	56	15.98									
Ba			Ca			Cu			Mg			
ACL	ppm	(NL) 1	ACL	ppm	(NL) 1	ACL	ppm		ACL	ppm		
<0.030			3.30	8.922		<0.15			<0.100			
<0.030			3.26	8.785		<0.15			<0.100			
<0.030			3.19	8.533		<0.15			<0.100			
<0.030			3.22	8.605		<0.15			<0.100			
<0.030			3.01	6.636		<0.15			<0.100			
<0.030			3.18	6.675		<0.15			<0.100			
<0.020			3.65	8.971		<0.15			<0.100			
<0.020			3.63	8.910		<0.15			<0.100			
<0.030			6.89	19.769		<0.15			<0.100			
<0.030			6.99	18.898		<0.15			<0.100			
<0.030			8.82	24.362		<0.15			<0.100			
0.034	0.093		8.64	23.692		<0.15			<0.100			
<0.030			11.60	31.145		<0.15			<0.100			
<0.030			8.96	29.186		<0.15			<0.100			
<0.020			12.30	31.459		<0.15			<0.100			
<0.020			15.10	39.030		<0.15			<0.100			

Table A-6c (Cont'd)

La			Hg			Mo		
ACL	ppm	(NL) 1	ACL	ppm	(NL) 1	ACL	ppm	(NL) 1
<0.020			0.37	1.00		<0.020		
<0.020			0.37	1.00		<0.020		
<0.020			0.36	0.96		<0.020		
<0.020			0.37	0.99		<0.020		
<0.020			0.34	0.98		<0.020		
<0.020			0.37	0.98		<0.020		
<0.020			0.41	1.01		<0.020		
<0.020			0.41	1.01		<0.020		
<0.020								
<0.020			0.48	1.38		<0.020		
<0.020			0.49	1.32		<0.020		
<0.020			0.55	1.52		<0.020		
<0.020			0.55	1.51		<0.020		
<0.020			0.60	1.61		<0.020		
<0.020			0.49	1.60		<0.020		
<0.020			0.67	1.71		<0.020		
<0.020			0.72	1.86		<0.020		
Na			Si			Sr		
ACL	ppm	(NL) 1	ACL	ppm	(NL) 1	ACL	ppm	(NL) 1
17.5	47.30		15.5	41.91		0.024	0.06	
17.5	47.20		16.0	43.32		0.023	0.06	
17.6	47.10		16.0	50.29		0.019	0.03	
17.5	46.80		17.7	52.64		0.019	0.03	
16.2	46.50		17.2	55.09		0.024	0.07	
17.7	46.80		16.4	48.66		0.024	0.06	
18.2	44.70		17.4	48.66		0.027	0.07	
18.2	44.70		20.4	45.16		0.028	0.07	
16.6	47.60		15.6	44.76		0.034	0.10	
17.1	46.20		15.9	45.99		0.036	0.10	
17.2	47.50		17.0	49.17		0.037	0.10	
17.3	47.40		16.0	46.07		0.039	0.11	
17.7	47.50		19.1	51.76		0.048	0.13	
14.1	45.90		16.9	55.03		0.041	0.13	
18.0	46.00		20.5	52.43		0.037	0.13	
17.5	45.20		21.5	55.57		0.065	0.17	

Table A-6c (Cont'd)

Ti			Zn			U		
ACL	F ₉₅	(ML) 1	ACL	F ₉₅	(ML) 1	ACL	F ₉₅	(ML) 1
<0.005			0.02	0.06		0.00	0.00	
<0.005			0.02	0.05		0.00	0.00	
<0.005			0.01	0.04		0.00	0.00	
<0.005			0.03	0.05		0.00	0.00	
<0.005			<0.010	0.05		0.00	0.00	
0.004			<0.010	0.05		0.00	0.00	
<0.005			0.01	0.03		0.00	0.00	
<0.005			0.02	0.04		0.00	0.00	
0.007			0.03	0.04		0.00	0.00	
<0.005			0.01	0.05		0.00	0.00	
0.003			0.01	0.05		0.00	0.00	
0.007			<0.010	0.05		0.00	0.00	
0.007			0.01	0.03		0.00	0.00	
<0.02			0.00	0.00		0.00	0.00	
<0.02			1.100	0.00		0.00	0.00	
<0.02			1.200	0.00		0.00	0.00	
<0.02			0.00	0.00		0.00	0.00	
<0.01			1.200	0.00		0.00	0.00	
<0.01			1.200	0.00		0.00	0.00	
<0.01			1.200	0.00		0.00	0.00	
<0.02			1.200	0.01		0.01	0.01	
<0.02			1.200	0.01		0.00	0.01	
<0.02			1.200	0.01		0.00	0.01	
<0.01			1.200	0.01		0.00	0.01	
<0.01			1.200	0.01		0.00	0.01	
<0.01			10.100	0.04		0.00	0.04	

TABLE A-7
FY 1986 Gamma Cations

This Table presents the results of cation analyses for the IR and OR (blanks, Si gaskets) experiments. The column annotations are presented at the end of the Table. The numbers in parenthesis are the elemental weight percent concentrations for each glass type. Numbers in the Tables written as "L100" mean less than 100.

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Table A-7. FY 1986 Gamma Cations

TEST TYPE	TEST NUMBER	TOTAL SOLUTION MASS (g)	MASS SOLUTION SUBMITTED (g)	GLASS SUREACR AREA (mm ² * 2)	pH	A1 (ng/ml)	ML(A1) (g/m ² * 2)	B (ng/ml)	ML(B) (g/m ² * 2)
ATM-1c	G-388	14.84	12.38	482	8.84	350	493 118 (0.36)	5440	7660 7490 (2.84)
	G-389	14.88	12.35	496	8.92	200	281 -94 -0.79	6710	9430 9360
	G-390	14.81	12.26	493	8.12	180	253 -122 -1.02	11700	16500 16330
	G-391	14.87	12.30	487	8.38	1430	2010 1635 13.90	12300	17300 17130
	G-392	14.84	12.70	484	7.95	130	232 -143 -1.22	11000	19600 19430
	G-393	14.81	12.63	486	8.08	110	197 -178 -1.21	10700	19200 19030
	G-394	14.84	12.24	493	7.96	170	309 -86 -0.55	14200	25800 25630
	G-395	14.72	12.15	482	7.81	170	310 -65 -0.55	12600	23000 22830
	G-396	14.72	12.20	489	7.05	170	240 -135 -1.13	16800	23700 23530
	G-397	14.61	11.99	485	7.72	180	255 -120 -1.02	16800	26600 26430
ATM-1c + TUFF	G-398	14.62	11.95	486	8.42	230	326 126 1.05	9840	14000 13795
	G-399	14.56	11.82	488	8.22	290	413 213 1.77	9800	13900 13695
	G-400	14.43	11.72	472	8.30	320	742 542 4.61	17500	25000 24795
	G-401	14.44	11.70	488	8.20	470	671 471 3.88	17200	24600 24395
	G-402	14.54	12.16	499	8.09	230	417 217 1.76	16100	29200 28995
	G-403	14.53	12.17	493	8.24	180	326 126 1.03	15800	28700 28495
	G-404	14.56	11.89	492	8.12	260	478 278 2.29	21900	40300 40095
	G-405	14.48	11.35	480	7.88	250	470 270 2.27	19500	36700 36495
	G-406	14.45	11.82	489	7.87	230	327 127 1.05	33500	47700 47495
	G-407	14.45	11.99	488	8.84	210	298 98 0.81	29000	41100 40895
ATM-B	G-408	14.90	11.99	499	8.67	300	425 50 (0.58)	4100	5950 5780 (2.60)
	G-409	14.87	12.20	483	8.54	240	338 -37 -0.20	4530	6390 6220
	G-410	14.82	11.72	505	7.92	320	457 82 0.42	8480	12100 11930
	G-411	14.85	12.30	496	7.85	240	338 37 -0.19	9290	13500 13330
	G-412	14.79	11.99	511	7.51	170	312 -63 -0.31	8950	15700 15530
	G-413	14.85	12.37	497	7.68	160	289 -86 -0.44	8290	15000 14830
	G-414	14.70	11.80	493	7.70	200	369 6 -0.03	10200	18800 18630
	G-415	14.72	12.21	493	7.54	210	382 7 0.04	10000	18200 18030
	G-416	14.69	11.99	496	7.87	320	371 -4 -0.07	13900	23900 23730
	G-417	14.61	12.12	509	5.82	240	339 -36 -0.18	13000	18400 18230
ATM-B + TUFF	G-418	14.55	11.40	498	8.36	360	360 160 0.81	6200	8930 8715
	G-419	14.57	11.07	502	8.05	269	369 69 0.35	6910	9770 9545
	G-420	14.40	11.05	508	7.59	349	349 149 0.73	13200	19200 18995
	G-421	14.45	4.18	499	7.48	1410	5520 5320 26.62	4660	18300 18095
	G-422	14.55	11.46	500	7.95	220	412 212 1.06	11400	21300 21095
	G-423	14.56	11.86	498	7.70	170	313 113 0.57	11600	21400 21195
	G-424	14.50	11.20	498	7.51	340	343 143 0.72	14800	28000 27795
	G-425	14.50	11.88	504	7.74	290	534 334 1.66	14800	27200 26995
	G-426	14.46	11.29	505	8.01	270	396 196 0.97	24100	34800 34595
	G-427	14.39	11.68	499	7.92	260	371 171 0.85	20900	29300 29095

Table A-7 (Cont'd)

TEST NUMBER	Ba (ng/ml)			Ca (ug/ml)			Ce (ng/ml)			Cr (ng/ml)		
	NL(Ba) (g/m ³)			NL(Ca) (g/m ³)			NL(Ce) (g/m ³)			NL(Cr) (g/m ³)		
	(0.41)			(1.70)			(0.74)			(0.29)		
G-388	110	155	155	2.82	3.97	-2.90	-5.27	L100		1180	1660	1499
G-389	83	117	117	2.44	3.43	-3.44	-6.71	L100		1240	1740	1579
G-390	98	138	138	2.57	3.62	-4.92	-8.71	L100		1160	1630	1469
G-391	130	183	183	2.90	4.08	-4.46	-8.03	L100		1310	1840	1679
G-392	59	105	105	2.28	4.07	-4.05	-7.32	L100		570	1018	857
G-393	47	84	84	1.85	3.31	-4.81	-8.63	L100		510	913	753
G-394	60	109	109	2.54	4.61	-4.05	-7.18	L100		460	835	674
G-395	60	109	109	2.54	4.63	-4.03	-7.26	L100		470	856	695
G-396	93	131	131	3.81	5.37	-2.61	-4.63	L100		790	1110	949
G-397	102	144	144	4.27	6.05	-1.93	-3.47	L100		670	949	788
G-398	80	113	113	2.96	4.20	-0.67	-1.19	L100		1290	1830	1671
G-399	85	121	121	3.55	5.05	0.18	0.32	L100		1330	1890	1731
G-400	120	171	171	3.48	4.96	0.04	0.07	L100		1690	2410	2251
G-401	110	157	157	3.29	4.70	-0.22	-0.38	L100		1700	2430	2271
G-402	58	105	105	2.68	4.86	-1.40	-2.41	L100		400	726	567
G-403	37	67	67	2.39	4.33	-1.93	-3.35	L100		430	780	621
G-404	50	92	92	2.22	4.08	-3.92	-6.84	L100		390	717	558
G-405	57	107	107	3.41	6.41	-1.59	-2.83	L100		470	884	725
G-406	80	114	114	4.60	6.55	1.12	1.95	L100		560	797	638
G-407	59	84	84	3.77	5.34	-0.09	-0.16	L100		640	907	748
G-408	110	156	156	3.81	5.40	-1.47	-2.60	L100		1360	1930	1769
G-409	109	154	154	3.84	5.41	-1.46	-2.66	L100		1230	1730	1569
G-410	140	197	197	4.11	5.86	-2.68	-4.66	L100		1260	1800	1639
G-411	140	197	197	4.29	6.03	-2.51	-4.45	L100		1190	1670	1509
G-412	90	165	165	3.35	6.14	-1.98	-3.40	L100		550	1008	847
G-413	65	154	154	2.98	5.38	-2.74	-4.86	L100		590	1066	905
G-414	87	161	161	3.27	6.04	-2.62	-4.64	L100		600	1107	946
G-415	93	169	169	3.65	6.53	-2.03	-3.59	L100		540	981	820
G-416	124	174	174	4.73	6.76	-1.14	-2.14	L100		880	1250	1099
G-417	106	150	150	6.96	9.83	1.85	3.15	L100		790	1120	959
G-418	78	112	112	2.98	4.29	-0.58	-1.01	L100		1280	1860	1681
G-419	76	106	106	2.70	4.23	0.66	0.62	L100		1200	1700	1541
G-420	100	145	145	3.91	5.68	0.76	1.28	L100		1400	2030	1871
G-421	110	431	431	1.82	7.13	2.22	3.81	L100		1880	7360	7201
G-422	52	97	97	2.86	5.35	-0.91	-1.57	L100		490	917	758
G-423	44	81	81	2.51	4.62	-1.64	-2.84	L100		530	954	799
G-424	67	127	127	4.57	6.64	0.64	1.10	L100		490	927	768
G-425	62	114	114	3.84	7.07	-0.93	-1.59	L100		530	975	816
G-426	190	274	274	5.29	7.63	2.20	3.73	L100		880	1270	1111
G-427	69	99	99	4.05	5.79	0.36	0.62	L100		870	1240	1081

Table A-7 (Cont'd)

TEST NUMBER		C _m (ng/ml)	NL(C _m) (g/m ³ ±2)		F _m (ug/ml)	NL(F _m) (g/m ³ ±2)		L _a (ng/ml)	NL(L _a) (g/m ³ ±2)		L _i (ng/ml)	NL(L _i) (g/m ³ ±2)
			(0.85)			(6.33)			(3.76)			(0)
Q-388	1.8	2.5	2.5	9.66	13.6	12.9	6.29	35	35	35	-	-
Q-389	2.2	3.1	3.1	10.97	13.9	13.2	6.26	29	41	41	-	-
Q-390	4.9	4.9	4.9	17.35	9.45	13.3	5.87	27	38	38	-	-
Q-391	9.6	5.1	2.1	18.37	10.1	14.2	6.41	26	37	37	-	-
Q-392	9.1	5.5	5.5	19.88	3.20	5.71	4.46	30	54	54	40	71
Q-393	9.1	5.6	5.6	20.10	2.82	5.05	3.80	1.83	24	43	42	75
Q-394	9.5	6.3	6.4	22.71	2.60	4.72	2.92	1.39	29	53	44	80
Q-395	9.2	5.8	5.8	20.90	2.43	4.43	0.00	0.00	33	60	40	73
Q-396	4.4	6.2	6.2	22.02	4.15	5.85	3.65	1.74	100	141	-	-
Q-397	4.9	6.9	6.9	24.84	3.91	5.54	3.34	1.61	59	84	-	-
Q-398	0.35	0.5	0.5	1.77	10.1	14.3	14.0	6.66	40	54	-	-
Q-399	0.38	0.5	0.5	1.76	10.7	15.2	14.9	7.03	32	46	-	-
Q-400	0.7	1.0	1.0	3.60	14.0	20.0	19.3	9.32	45	64	-	-
Q-401	0.7	0.9	0.9	3.34	13.2	18.8	18.1	8.50	36	51	-	-
Q-402	0.5	0.9	0.9	3.09	2.13	3.85	3.01	1.39	38	69	50	91
Q-403	0.5	0.9	0.9	3.12	2.07	3.75	2.90	1.35	33	60	57	103
Q-404	0.7	1.3	1.3	4.54	3.36	6.18	4.98	2.33	66	121	68	125
Q-405	0.7	1.3	1.3	4.63	2.46	4.63	3.43	1.64	54	102	45	85
Q-406	1.2	1.7	1.7	5.93	3.11	4.43	2.93	1.37	68	97	-	-
Q-407	1.0	1.4	1.4	4.89	3.23	4.58	3.08	1.44	50	71	-	-
Q-408	1.4	2.0	2.0	6.81	10.5	14.9	14.2	7.09	33	47	-	-
Q-409	1.5	2.1	2.1	6.98	9.36	13.2	12.5	6.83	44	62	-	-
Q-410	2.7	3.9	3.9	12.91	10.1	14.4	13.5	6.61	50	71	-	-
Q-411	3.0	4.2	4.2	14.11	9.50	13.4	12.4	6.23	50	70	-	-
Q-412	2.6	4.8	4.8	16.15	2.26	4.1	2.9	1.40	60	110	31.0	57.0
Q-413	2.6	4.7	4.7	15.80	2.47	4.5	3.2	1.61	53	96	29.0	52.0
Q-414	2.7	5.0	5.0	16.41	2.35	4.3	2.5	1.27	64	118	22.0	41.0
Q-415	2.8	5.1	5.1	17.17	1.91	3.5	1.7	0.83	73	133	28.0	51.0
Q-416	3.7	5.3	5.3	17.55	3.39	4.8	2.6	1.31	120	171	-	-
Q-417	5.7	8.1	8.1	26.87	3.11	4.4	2.2	1.05	110	155	-	-
Q-418	0.2	0.3	0.3	0.99	9.78	14.1	13.7	6.71	33	47	-	-
Q-419	0.2	0.3	0.3	0.99	9.10	12.9	12.5	6.07	37	52	-	-
Q-420	0.1	0.1	0.1	0.34	10.1	14.7	14.0	6.61	63	90	-	-
Q-421	0.0	0.1	0.1	0.33	15.7	61.5	60.8	29.45	64	251	-	-
Q-422	0.4	0.8	0.8	2.57	2.29	4.28	3.43	1.67	51	95	38	71
Q-423	0.4	0.7	0.7	2.27	2.06	3.79	2.94	1.44	53	98	39	72
Q-424	0.5	1.0	1.0	3.25	2.03	3.84	2.64	1.28	75	142	43	81
Q-425	0.5	0.9	0.9	3.00	2.37	4.36	3.16	1.52	75	138	49	90
Q-426	1.1	1.6	1.6	5.21	9.68	14.00	12.50	5.98	250	361	-	-
Q-427	0.8	1.1	1.1	3.57	3.66	5.23	3.73	1.80	88	126	-	-

Table A-7 (Cont'd)

TEST NUMBER	Hg (ng/ml)			NL (Hg) (g/m ³)			Mn (ng/ml)			NL (Mn) (g/m ³)			Mo (ng/ml)			NL (Mo) (g/m ³)			Na (ug/ml)			NL (Na) (g/m ³)		
				(0.10)						(0.01)						(1.26)						(9.20)		
C-388	220	310	-35	-1.08	210	296	216	66.68	2490	3500	3500	10.58	56.0	78.8	34.0	11.41								
C-389	200	351	7	0.18	250	351	271	81.51	3010	4230	4230	10.10	61.0	85.7	40.9	13.47								
C-390	250	351	7	0.21	230	334	244	73.43	5320	7490	7490	17.89	76.5	108	59.3	19.40								
C-391	240	338	-7	-0.21	250	352	272	83.26	5730	8060	8060	19.58	79.0	111	61.3	20.73								
C-392	270	482	137	4.21	110	196	116	35.63	5090	9090	9060	22.09	65.5	117	73.4	24.51								
C-393	210	376	31	0.95	69	122	42	12.81	4880	8740	8700	21.06	63.6	114	70.4	23.34								
C-394	240	436	91	2.74	86	156	76	22.92	6550	11900	11900	28.48	82.0	139	103.4	33.89								
C-395	210	382	37	1.13	73	133	53	16.23	5750	10500	10500	25.52	75.5	138	92.4	30.76								
C-396	220	310	-35	-1.06	110	155	75	22.64	7660	10800	10800	25.87	93.4	132.0	85.3	27.99								
C-397	360	510	165	5.05	140	198	118	36.11	8520	12100	12100	29.39	102.0	145.0	98.3	32.70								
C-398	490	695	-325	-9.79	250	355	230	69.31	4510	6400	6400	15.31	65.4	92.8	44.4	14.54								
C-399	600	854	-166	-4.96	250	356	231	69.05	4550	6480	6480	15.37	66.6	94.8	46.4	15.08								
C-400	1240	1770	750	22.97	350	499	186	56.97	8090	11500	11500	27.94	85.0	121	64.3	21.41								
C-401	880	1260	240	7.12	390	557	187	114.74	8010	11400	11400	26.83	86.3	123	66.3	21.37								
C-402	520	943	-77	-2.25	120	218	18	5.26	6950	12600	12600	25.21	74.6	139	90.1	28.62								
C-403	450	816	-204	-6.02	82	149	-51	-15.05	7430	13500	13400	31.38	71.5	130	81.1	26.01								
C-404	740	1360	340	10.08	84	155	-125	-37.07	10400	19100	19100	44.94	101	186	133.8	43.13								
C-405	670	1260	240	7.26	99	186	-94	-28.43	9200	17300	17300	41.52	89.2	168	115.8	38.07								
C-406	1090	1550	530	15.70	150	213	-137	-40.59	15600	22200	22200	51.20	133.0	189.0	134.3	43.25								
C-407	720	1020	0	0.00	100	142	-208	-61.72	13400	19000	19000	44.75	120.0	170.0	115.3	37.19								
C-408	250	354	9	0.30	280	397	317	31.81	2220	3150	3150	6.49	48.1	68.2	23.4	7.36								
C-409	240.0	338.0	-7	-0.24	230.0	324.0	244	25.08	2370	3340	3340	7.30	49.6	69.9	25.1	8.27								
C-410	340.0	485.0	140	4.58	210.0	300.0	220	21.57	4480	6390	6390	13.33	66.0	94.2	45.5	14.30								
C-411	320.0	450.0	105	3.50	220.0	309.0	229	22.88	5120	7200	7200	15.31	71.0	100.0	51.3	16.43								
C-412	270.0	495.0	150	4.83	79.0	145.0	65	6.28	4550	8340	8340	17.15	60.1	110.0	66.4	20.54								
C-413	260.0	470.0	125	4.16	120.0	217.0	137	13.68	4400	7950	7950	16.89	59.6	108.0	64.4	20.62								
C-414	250.0	461.0	116	3.85	62.0	114.0	34	3.39	5520	10200	10200	21.64	68.0	126.0	80.4	25.69								
C-415	240.0	436.0	91	3.01	58.0	105.0	25	2.49	5420	9850	9850	20.91	66.9	122.0	76.4	24.43								
C-416	360.0	514.0	150	5.57	98.0	140.0	60	5.99	7260	10400	10400	21.90	89.6	130.0	96.3	30.23								
C-417	320.0	452.0	107	3.42	82.0	116.0	35	3.45	6840	9660	9660	19.71	86.2	132.0	75.3	23.15								
C-418	540	777	-243	-7.91	220	316	191	18.65	3310	4760	4760	9.89	51.8	74.5	26.1	8.17								
C-419	620	877	-143	-4.62	250	354	229	22.15	3680	5200	5200	10.77	59.0	83.4	35.0	10.87								
C-420	590	857	-163	-5.15	250	363	193	18.28	7130	10400	10400	20.96	77.3	112	55.3	16.79								
C-421	410	1610	590	19.02	430	1680	1510	146.07	2390	9360	9360	19.27	30.6	120	63.3	19.63								
C-422	510	954	-66	-2.14	170	318	118	11.46	6320	11800	11800	24.38	64.4	120	71.1	22.13								
C-423	380	700	-320	-10.42	72	133	-67	-6.55	6300	11600	11600	24.11	64.6	119	70.1	21.95								
C-424	790	1490	470	15.23	87	165	-280	-27.21	8180	15500	15500	32.05	78.5	148	95.8	29.84								
C-425	700	1290	270	8.64	137	252	-28	-2.69	8170	15033	15033	30.71	77.7	143	90.8	27.94								
C-426	1260	1820	800	25.48	280	404	54	5.16	13000	18800	18800	38.27	83.4	120	65.3	20.00								
C-427	830	1186	166	5.33	120	171	-179	-17.25	11200	16000	16000	32.81	115	164	109.3	33.76								

Table A-7 (Cont'd)

TEST NUMBER		Nd (ng/ml)	NL(Nd) (g/m ³ ±2) ...	Ni (ng/ml)	NL(Ni) (g/m ³ ±2) ...	Si (ug/ml)	NL(Si) (g/m ³ ±2) ...	Sr (ng/ml)	NL(Sr) (g/m ³ ±2) ...
			(1.19)		(0.17)		(19.18)		(0.36)
G-388	L100	760	1070	960	17.43	43.2	60.8	17.8	2.87
G-389	L100	760	1070	960	16.98	47.2	66.3	23.3	3.65
G-390	L100	750	1060	950	16.82	58.6	82.5	36.5	5.73
G-391	L100	940	1320	1210	21.79	60.1	84.5	38.5	6.14
G-392	L100	390	696	586	10.59	57.0	102	52.8	8.45
G-393	L100	350	644	534	9.58	49.4	89.4	39.4	6.27
G-394	L100	340	617	507	8.99	59.3	108	49.7	7.81
G-395	L100	280	510	400	7.21	59.6	109	50.6	8.07
G-396	L100	520	733	623	11.06	81.2	114	50.0	7.87
G-397	L100	580	822	712	12.82	87.4	124	60.0	9.57
								430	609
G-398	L100	800	1140	1075	19.06	51.3	72.8	2.80	66
G-399	L100	850	1210	1145	20.13	53.0	75.4	20.4	3.18
G-400	L100	1300	1860	1795	32.34	68.7	98.0	40.0	6.39
G-401	L100	1520	2170	2105	36.71	63.2	90.2	32.2	4.98
G-402	L100	340	617	552	9.49	50.3	91.2	28.2	4.30
G-403	L100	320	580	515	8.94	52.1	94.5	31.5	4.84
G-404	L100	390	717	652	11.37	56.5	104	29.9	4.63
G-405	L100	410	771	706	12.56	58.0	109	35.1	5.53
G-406	L100	620	882	817	14.24	73.8	105	17.0	2.63
G-407	L100	500	709	644	11.24	77.0	109	21.0	3.25
								126	179
G-408	L100	850	1200	1090	16.32	42.6	60.4	17.4	2.95
G-409	L100	770	1090	980	15.11	46	64.9	21.4	2.90
G-410	L100	900	1280	1170	17.21	55	78.5	32.5	5.41
G-411	L100	820	1150	1040	15.59	58.2	81.9	35.9	6.09
G-412	L100	430	788	678	9.83	49.5	90.7	41.7	6.84
G-413	L100	170	469	559	8.38	47.8	86.4	37.4	6.37
G-414	L100	350	646	536	8.02	53.6	98.9	40.9	6.93
G-415	L100	300	545	435	6.51	61.5	112	53.8	9.11
G-416	L100	600	857	747	11.09	85.3	123	58.0	9.75
G-417	L100	490	692	582	8.37	73.8	104.0	40.0	6.51
								410	739
G-418	L100	810	1170	1105	16.19	49.4	71.1	16.1	2.67
G-419	L100	730	1030	965	14.02	51.4	72.7	17.7	2.91
G-420	L100	850	1240	1175	16.58	60.8	88.7	38.7	6.18
G-421	L100	1240	1860	1795	32.34	68.7	98.0	40.0	6.39
G-422	L100	360	674	609	8.87	45.9	85.9	22.9	3.77
G-423	L100	300	552	487	7.14	47.9	88.2	25.2	4.18
G-424	L100	440	832	767	11.16	57.6	102	34.9	5.76
G-425	L100	380	651	634	9.13	53.7	98.8	24.8	4.04
G-426	L100	670	967	902	12.93	100	144	56.0	9.09
G-427	L100	570	814	719	10.83	70.9	101	13.0	2.13
								220	317
								135	193

Table A-7 (Cont'd)

TEST NUMBER	Ti (ng/ml)			NL(Ti) (g/m ³ ±2)			U (ng/ml)			NL(U) (g/m ³ ±2)			Zn (ng/ml)			NL(Zn) (g/m ³ ±2)			Zr (ng/ml)			NL(Zr) (g/m ³ ±2)		
C-388	47	66	66	0.12	616	867	867	0.13	890	1250	1250	1.06	L20											
C-389	48	67	67	0.12	633	889	889	0.64	780	1100	1100	0.91	L20											
C-390	49	69	69	0.12	805	1131	1131	0.81	1400	1970	1970	1.63	L20											
C-391	35	49	49	0.09	712	1001	1001	0.73	1410	1980	1980	1.67	L20											
C-392	50	89	89	0.16	919	1641	1641	1.24	1850	3300	3280	2.78	L20											
C-393	41	73	73	0.13	755	1351	1351	1.01	1480	2650	2620	2.20	L20	41	41	0.10								
C-394	38	69	69	0.12	1246	2262	2262	1.61	2800	5080	5050	4.20	L20											
C-395	38	69	69	0.12	1125	2049	2049	1.48	2030	3700	3670	3.10	L20											
C-396	79	111	111	0.19	2110	2990	2990	2.14	3970	5600	5600	4.66	L20	55	55	0.13								
C-397	77	109	109	0.19	2540	3600	3600	2.56	5170	7330	7330	6.18	L20	40	40	0.09								
C-398	46	65	65	0.11	840	1191	1191	0.84	730	1040	1040	0.86	L20											
C-399	42	60	60	0.10	880	1252	1252	0.87	770	1100	1100	0.91	L20											
C-400	60	86	86	0.15	1210	1726	1726	1.23	3000	4280	4280	3.61	L20											
C-401	58	83	83	0.14	1140	1627	1627	1.12	2140	3060	3060	2.50	L20											
C-402	44	80	80	0.14	1106	2006	2006	1.42	2100	3810	3810	3.07	L20											
C-403	33	60	60	0.10	917	1663	1663	1.18	1640	2970	2970	2.41	L20											
C-404	46	85	85	0.15	1192	2376	2376	1.65	2810	5170	5170	4.22	L20	44	44	0.10								
C-405	41	77	77	0.13	1362	2562	2562	1.74	2560	4820	4820	4.03	L20											
C-406	56	80	80	0.14	2880	4100	4100	2.85	4530	6450	6450	5.26	L20	38	38	0.09								
C-407	39	55	55	0.09	2310	3270	3270	2.31	3450	4890	4890	4.00	L20											
C-408	45	64	64	0.12	706	1000	1000	0.65	1070	1520	1520	1.28	L20											
C-409	46	65	65	0.12	765	1079	1079	0.74	970	1370	1370	1.19	L20											
C-410	59	83	83	0.15	765	1378	1378	0.87	1760	2510	2510	2.08	L20											
C-411	56	73	73	0.14	1070	1505	1505	1.01	1670	2350	2350	1.98	L20											
C-412	38	70	70	0.13	912	1671	1671	1.06	2060	3775	3752	3.06	L20											
C-413	40	72	72	0.13	827	1494	1494	1.01	1850	3343	3320	2.80	L20											
C-414	37	68	68	0.13	1170	2344	2344	1.52	2490	4596	4567	3.85	L20											
C-415	34	62	62	0.12	1085	2135	2135	1.57	2210	4035	4006	3.39	L20											
C-416	62	89	89	0.17	1730	2710	2710	1.73	4410	6300	6300	5.27	L20	47	47	0.08								
C-417	66	88	88	0.16	1630	2300	2300	1.48	3820	5410	5410	4.38	L20	51	51	0.08								
C-418	42	60	60	0.11	671	965	965	0.60	790	1136	1136	0.94	L20											
C-419	43	61	61	0.11	635	1181	1181	0.77	650	919	919	0.75	L20											
C-420	51	74	74	0.13	1190	1728	1728	1.02	980	1423	1423	1.14	L20											
C-421	51	200	200	0.36	534	2092	2092	0.47	1300	5092	5092	4.16	L20											
C-422	30	56	56	0.10	956	1789	1789	1.31	1700	3162	3162	2.59	L20											
C-423	32	59	59	0.11	982	1808	1808	1.17	1260	2357	2339	1.93	L20											
C-424	41	78	78	0.14	1665	3149	3149	1.92	2450	4652	4652	3.82	L20	42	42	0.07								
C-425	44	81	81	0.14	1448	2664	2664	1.70	2400	4416	4416	3.58	L20	50	50	0.08								
C-426	44	63	63	0.11	2390	3300	3300	2.60	4850	7010	4416	3.67	L20	33	33	0.05								
C-427	47	67	67	0.12	2140	3060	3060	1.94	3510	5010	5010	4.08	L20	34	34	0.06								

Table A-7 (Cont'd)

TEST TYPE	TEST NUMBER	TOTAL SOLUTION MASS (g)	MASS SOLUTION SUBMITTED (g)	ACL DILUTION	pH	A1 (ng/ml)		B (ng/ml)	
EJ-13	C-428	15.41	13.49	5	7.44	300	411	120	164
	C-429	15.43	12.91	5	7.39	370	513 (375)	160	222 (170)
	C-430	16.14	13.82	5	6.57	280	381	115	157
	C-431	16.11	13.83	5	6.75	240	327 (375)	121	165 (170)
	C-432	16.11	14.03	10	6.26	200	342	51	87
	C-433	16.12	14.06	10	5.54	190	325 (375)	110	185 (170)
	C-434	16.05	13.69	10	6.51	210	363	85	147
	C-435	16.05	13.70	10	6.79	220	380 (375)	86	149 (170)
	C-436	15.94	13.63	5	6.91	290	396	400	547
	C-437	15.97	13.72	5	6.98	300	409 (375)	104	142 (170)
EJ-13 + TUFF	C-438	15.49	13.00	5	7.03	110	166	150	208
	C-439	15.37	13.00	5	7.05	690	455 (200)	190	263 (205)
	C-440	15.47	12.90	5	6.41	190	264	160	222
	C-441	15.45	13.04	5	6.37	L100	- (200)	150	208 (205)
	C-442	15.42	13.14	10	6.70	100	176	97	171
	C-443	15.39	13.08	10	6.70	100	176 (200)	95	167 (205)
	C-444	15.37	12.75	10	6.63	170	303	110	196
	C-445	15.28	12.61	10	6.84	280	502 (200)	115	206 (205)
	C-446	15.35	12.74	5	6.81	L100		143	199
	C-447	15.32	12.79	5	6.80	L100	(200)	139	193 (205)
EJ-13 NO GAMMA	C-448	16.19	14.16	5	7.98	300	406	130	176
	C-449	16.15	14.39	5	7.87	320	433	140	189
	C-450	15.41	13.30	5	8.36	350	483 (360)	190	262 (150)
	C-451	15.44	13.07	5	8.24	320	442 (360)	130	180 (150)
	C-452	16.16	13.79	5	7.48	240	327	110	150
	C-453	16.17	13.72	5	6.23	230	314 (360)	114	156 (150)
	C-454	16.18	13.80	10	8.75	180	310	80	138
	C-455	16.10	13.68	10	8.87	170	294 (360)	86	149 (150)
	C-456	16.05	13.70	10	4.73	180	311	85	147
	C-457	15.97	13.56	10	8.65	210	365 (360)	86	149 (150)
EJ-13 + TUFF NO GAMMA	C-458	15.15	13.37	5	7.87	280	345	118	162
	C-459	15.88	13.56	5	8.12	250	342 (360)	99	136 (150)
	C-460	15.45	13.20	5	7.27	130	179	190	262
	C-461	15.44	13.16	5	7.34	130	179 (210)	160	221 (205)
	C-462	15.44	13.01	5	8.06	100	138	170	235
	C-463	15.44	12.87	5	7.90	140	194 (210)	150	208 (205)
	C-464	15.44	12.88	5	7.40	100	139	140	194
	C-465	15.42	12.86	5	7.62	L100	(210)	140	194 (205)
	C-466	15.37	12.64	10	8.35	160	285	123	220
	C-467	15.43	12.84	10	8.17	140	249 (210)	170	302 (205)
EJ-13 + TUFF NO GAMMA	C-468	15.38	12.92	10	7.98	260	461	124	210
	C-469	15.38	12.83	10	8.12	190	338 (210)	108	192 (205)
	C-470	15.29	12.66	5	8.04	L100		117	163
	C-471	15.39	12.88	5	8.02	L100	(210)	142	197 (205)

Table A-7 (Cont'd)

TEST NUMBER	Ba (ng/ml)	Ca (ug/ml)	Ca (ng/ml)	Cr (ng/ml)
C-428		4.86	6.66	
C-429	(0)	4.97	6.89	
C-430		6.30	8.58	(161)
C-431	(0)	6.24	8.50	(161)
C-432	L20	4.74	8.11	94 161
C-433	L20	4.75	8.12	68 116
C-434	L20	5.04	8.71	(161)
C-435	(0)	4.98	8.61	(161)
C-436		5.86	8.01	
C-437	(0)	5.82	7.94	(161)
C-438		3.34	4.62	
C-439	(0)	3.70	5.12	(159)
C-440		3.35	4.65	
C-441	(0)	3.75	5.19	(159)
C-442	L20	3.71	6.04	90 158
C-443	L20	3.67	6.47	90 159
C-444	L20	4.79	8.54	(159)
C-445	(0)	4.16	7.45	(159)
C-446		3.98	5.54	
C-447	(0)	3.82	5.31	(159)
C-448		4.96	6.71	
C-449	(0)	5.05	6.83	(0)
C-450		5.16	7.11	
C-451	(0)	5.09	7.00	(0)
C-452		6.31	8.60	(0)
C-453	(0)	6.24	8.51	(0)
C-454	L20	5.02	8.65	(0)
C-455	L20	5.06	8.77	(0)
C-456	L20	5.07	8.76	(0)
C-457	(0)	5.04	8.75	(0)
C-458		6.02	8.17	
C-459	(0)	5.84	7.99	(0)
C-460		4.20	5.79	
C-461	(0)	3.52	4.86	(0)
C-462		2.15	2.98	
C-463	(0)	2.41	3.35	(0)
C-464		2.17	3.01	
C-465	(0)	1.74	2.42	(0)
C-466	L20	1.44	2.58	(0)
C-467	L20	1.60	2.84	(0)
C-468	L20	1.80	3.19	(0)
C-469	(0)	1.56	2.77	(0)
C-470		0.74	1.03	
C-471	(0)	1.39	1.93	(0)

TEST NUMBER	$\frac{1}{C_0} \left(\frac{mg}{ml} \right)$
Q-426	(c)
Q-429	(c)
Q-430	(c)
Q-431	(c)
Q-432	(c)
Q-433	(c)
Q-441	(c)
Q-442	(c)
Q-443	(c)
Q-445	(c)
Q-446	(c)
Q-447	(c)
Q-448	(c)
Q-450	(c)
Q-451	(c)
Q-452	(c)
Q-453	(c)
Q-454	(c)
Q-455	(c)
Q-456	(c)
Q-457	(c)
Q-458	(c)
Q-459	(c)
Q-460	(c)
Q-461	(c)
Q-462	(c)
Q-463	(c)
Q-465	(c)
Q-466	(c)
Q-467	(c)
Q-468	(c)
Q-470	(c)
Q-471	(c)

	$\frac{F_{\text{eff}}}{F_{\text{eff}}^0}$	$\frac{F_{\text{eff}}}{F_{\text{eff}}^0}$
(a)	0.45	0.62
(b)	0.45	0.70
(c)	0.44	0.82
(d)	0.44	0.94
(e)	0.43	1.00
(f)	0.42	1.05
(g)	0.41	1.10
(h)	0.40	1.15
(i)	0.39	1.20
(j)	0.38	1.25
(k)	0.37	1.30
(l)	0.36	1.35
(m)	0.35	1.40
(n)	0.34	1.45
(o)	0.33	1.50
(p)	0.32	1.55
(q)	0.31	1.60
(r)	0.30	1.65
(s)	0.29	1.70
(t)	0.28	1.75
(u)	0.27	1.80
(v)	0.26	1.85
(w)	0.25	1.90
(x)	0.24	1.95
(y)	0.23	2.00
(z)	0.22	2.05

[illegible]

Table A-7 (Cont'd)

Table A-7 (Cont'd)

TEST NUMBER		Hg (ng/ml)		Mn (ng/ml)		Mo (ng/ml)		Na (ug/ml)	
G-428	170	233		13	18	-		32.7	44.8
G-429	170	236	(345)	52	72 (80)	-	(O)	32.3	44.8 (44.8)
G-430	270	368		97	132	-		35.8	48.8
G-431	160	359		12	16 (80)	-	(O)	35.6	48.5 (48.7)
G-432	200	342	(345)	18	11	L20		25.6	43.8
G-433	200	342	(345)	11	19 (80)	L20	(O)	25.4	43.4 (43.6)
G-434	210	363		95	164	-		26.5	45.8
G-435	210	363	(345)	49	85 (80)	-	(O)	26.2	45.3 (45.6)
G-436	250	341		64	87	-		34.4	47.0
G-437	250	341	(345)	63	86 (80)	-	(O)	33.9	46.3 (46.7)
G-438	580	803		63	87	-		34.8	48.2
G-439	620	858	(1020)	550	762 (125)	-	(O)	35.1	48.6 (48.4)
G-440	600	833		170	236	-		41.7	57.9
G-441	660	913	(1020)	180	249 (170)	-	(O)	40.1	55.5 (56.7)
G-442	600	1060		78	137	L7		27.9	49.1
G-443	620	1090	(1020)	71	125 (200)	L2	(O)	27.6	48.7 (48.9)
G-444	840	1500		300	535	-		29.6	52.8
G-445	720	1290	(1020)	150	269 (280)	-	(O)	28.8	51.6 (52.2)
G-446	710	988		240	334	-		38.2	53.2
G-447	700	974	(1020)	410	570 (350)	-	(O)	40.5	56.3 (54.7)
G-448	180	244		12	16	-		35.0	47.4
G-449	190	257	(345)	31	42 (80)	-	(O)	35.3	47.7 (47.6)
G-450	180	249		21	29	-		32.2	44.8
G-451	180	249	(345)	10	14 (80)	-	(O)	32.6	45.1 (45.0)
G-452	270	368		18	25	-		34.1	49.2
G-453	260	355	(345)	23	31 (80)	-	(O)	35.7	48.7 (49.0)
G-454	210	362		12	21	-		24.1	45.0
G-455	220	380	(345)	15	26 (80)	-	(O)	26.5	45.8 (45.4)
G-456	220	380		180	311	-		26.0	44.9
G-457	210	365	(345)	75	130 (80)	-	(O)	26.1	45.3 (45.1)
G-458	260	357		120	165	-		34.3	47.1
G-459	260	356	(345)	130	178 (80)	-	(O)	34.7	47.5 (47.3)
G-460	720	993		23	32	-		33.7	46.5
G-461	590	814	(345)	21	29 (25)	-	(O)	33.3	46.0 (46.3)
G-462	330	458		20	28	-		32.8	45.4
G-463	380	528	(345)	11	15 (25)	-	(O)	33.4	46.4 (45.9)
G-464	340	472		51	71	-		37.1	51.5
G-465	280	389	(345)	14	19 (25)	-	(O)	36.5	50.7 (51.1)
G-466	220	394		43	77	-		25.7	46.0
G-467	230	409	(345)	7	12 (25)	-	(O)	25.5	45.3 (45.7)
G-468	260	461		14	25	-		26.5	47.0
G-469	730	809	(345)	8	14 (25)	-	(O)	25.5	45.3 (46.4)
G-470	120	167		8	11	-		34.1	48.5
G-471	210	292	(345)	13	18 (25)	-	(O)	34.0	47.2 (47.8)

Table A-7 (Cont'd)

TEST NUMBER	Nd (ng/ml)	Ni (ng/ml)	Si (ug/ml)	Sr (ng/ml)
C-428	-	43 59	30.9 52.4	26 36
C-429	(O)	350 486 (110)	30.1 41.8 (43)	27 37 (44)
C-430	-	390 531	30.1 45.1	34 46
C-431	(O)	25 34 (110)	41.6 56.6 (46)	34 46 (44)
C-432	L100	45 77	26.2 44.8	26 44
C-433	L100	29 50 (110)	49.8 51.0 (49)	26 44 (44)
C-434	-	120 207	35.8 63.6	27 47
C-435	(O)	45 78 (110)	38.8 49.8 (58)	27 47 (44)
C-436	-	130 178	52.1 71.2	33 45
C-437	(O)	94 128 (110)	44.1 60.2 (64)	33 45 (44)
C-438	-	52 72	35.4 49	49 68
C-439	(O)	3240 4490 (65)	38.9 53.9 (55)	62 86 (82)
C-440	-	450 624	40.0 55.5	47 65
C-441	(O)	45 62 (65)	43.7 60.5 (58)	54 73 (82)
C-442	L100	120 135	35.3 63.9	49 86
C-443	L100	22 39 (65)	38.3 67.5 (63)	51 90 (82)
C-444	-	44 78	41.9 74.7	68 121
C-445	(O)	70 125 (65)	39.2 70.2 (74)	58 104 (82)
C-446	-	56 78	35.5 77.3	61 85
C-447	(O)	40 56 (65)	64.7 90.0 (88)	57 79 (82)
C-448	-	44 60	27.1 36.7	27 37
C-449	(O)	120 162 (160)	25.7 35.1	28 38
C-450	-	200 276	27.9 38.5	27 37
C-451	(O)	26 36 (160)	25.6 35.4 (38)	27 37 (44)
C-452	-	56 76	28.8 39.2	35 48
C-453	(O)	47 64 (160)	29.6 40.4 (39)	34 46
C-454	-	25 43	27.4 47.2	27 47
C-455	(O)	26 45 (160)	36.2 62.6 (41)	27 47 (44)
C-456	-	220 380	28.7 49.6	27 47
C-457	(O)	85 148 (160)	28.6 49.6 (51)	27 47 (44)
C-458	-	120 165	64.7 88.9	34 47
C-459	(O)	150 205 (160)	57.9 79.3 (59)	33 45 (44)
C-460	-	42 58	33.4 46.1	63 87
C-461	(O)	44 61 (50)	35.1 48.4 (52)	62 72 (38)
C-462	-	32 44	38.0 51.6	31 43
C-463	(O)	42 58 (50)	38.2 53.0 (55)	34 47 (38)
C-464	-	65 90	41.9 58.7	31 43
C-465	(O)	38 53 (50)	46.2 64.7 (59)	24 33 (38)
C-466	-	106 190	36.1 64.6	21 38
C-467	(O)	L20 129 (50)	38.0 67.5 (62)	22 39 (38)
C-468	-	73 129	39.9 70.7	25 44
C-469	(O)	L20 129 (50)	38.2 67.9 (69)	22 39 (38)
C-470	-	L20 129	49.7 69.3	11 15
C-471	(O)	42 58 (50)	52.3 72.6 (75)	21 29 (38)

Table A-7 (Cont'd)

TEST NUMBER	Tl (ng/g)	U (ng/g)	Zn (ng/g)	Zr (ng/g)
G-428	L10	(0)	(0)	L20
G-429	L10	(0)	(0)	L20
G-430	L10	(0)	(0)	L20
G-431	L10	(0)	(0)	L20
G-432	L10	(0)	(0)	L20
G-433	L10	(0)	(0)	L20
G-434	L10	(0)	(0)	L20
G-435	L10	(0)	(0)	L20
G-436	L10	(0)	(0)	L20
G-437	L10	(0)	(0)	L20
G-438	L10	(0)	(0)	L20
G-439	L10	(0)	(0)	L20
G-440	L10	(0)	(0)	L20
G-441	L10	(0)	(0)	L20
G-442	L10	(0)	(0)	L20
G-443	L10	(0)	(0)	L20
G-444	L10	(0)	(0)	L20
G-445	L10	(0)	(0)	L20
G-446	L10	(0)	(0)	L20
G-447	L10	(0)	(0)	L20
G-448	L10	(0)	(0)	L20
G-449	L10	(0)	(0)	L20
G-450	L10	(0)	(0)	L20
G-451	L10	(0)	(0)	L20
G-452	L10	(0)	(0)	L20
G-453	L10	(0)	(0)	L20
G-454	L10	(0)	(0)	L20
G-455	L10	(0)	(0)	L20
G-456	L10	(0)	(0)	L20
G-457	L10	(0)	(0)	L20
G-458	L10	(0)	(0)	L20
G-459	L10	(0)	(0)	L20
G-460	L10	(0)	(0)	L20
G-461	L10	(0)	(0)	L20
G-462	L10	(0)	(0)	L20
G-463	L10	(0)	(0)	L20
G-464	L10	(0)	(0)	L20
G-465	L10	(0)	(0)	L20
G-466	L10	(0)	(0)	L20
G-467	L10	(0)	(0)	L20
G-468	L10	(0)	(0)	L20
G-469	L10	(0)	(0)	L20
G-470	L10	(0)	(0)	L20
G-471	L10	(0)	(0)	L20

Table A-7 (Cont'd)

TYPE	NUMBER	MASS (g)	SUBMITTED (g)	DILUTION	pH	Al (ng/ml) ...			B (ng/ml) ...		
TEFLON	G-472	16.15	13.54	10.00	7.66	210	365	63	84	146	3
NO GAMMA	G-473	16.17	13.83	10.00	7.19	220	379	41	84	145	3
	G-474	16.17	13.68	5.00	7.45	190	259		82	112	
EJ-13	91.181.278			0.00	7.58		300		137		
LEACHATE	56			0.00	8.23		L100		74		
	14.28			0.00			430		170		

TEST NUMBER	Ba (ng/ml) ...	Cs (ug/ml) ...	Ce (ng/ml)	Cr (ng/ml)
G-472	L20	4.78 8.30 -0.40	L100	130 226
G-473	L20	4.96 8.54 -0.22		
G-474	-	5.58 7.62		
91.181.278	L20	8.10	L100	L20
56	-	4.89	-	-
14.28	-	7.10	-	-

TEST NUMBER	Cs (ng/ml)	Fe (ug/ml) ...	La (ng/ml) ...	Li (ng/ml) ...
G-472	-	0.63 1.09 0.43	L20	29 50 39
G-473	-	0.86 1.48 -0.03	-	21 36 6
G-474	-	1.69 2.31	-	32 44
91.181.278		L0.01	L20	44
56		L0.01	-	26
14.28		L0.01	-	41

* ACL RESULT
 ** DILUTION CORRECTED
 *** BACKGROUND CORRECTED
 **** NORMALIZED ELEMENTAL MASS LOSS

Table A-7 (Cont'd)

TEST NUMBER	Mg (ng/ml)	...	Mn (ng/ml)	...	Mo (ng/ml)	...	Na (ug/ml)	...		
G-472	210	765	-6	38	66	42	L20	25.6	44.5	0.9
G-473	210	362	-10	48	83	-47	-	25.5	43.9	-1.3
G-474	250	341		110	150		-	34.1	46.6	
91,181,278		340		L10			L20		44.4	
56		210		L5			-		27.6	
14,28		250		L5			-		49.3	

TEST NUMBER	Na (ug/ml)	...	Mi (ng/ml)	...	Si (ug/ml)	...	Sr (ng/ml)	...			
G-472	L100		64	111	67	21.4	37.2	-17.7	26	45	-2
G-473	-		160	275	127	21.3	36.7	-12.9	27	46	-1
G-474	-		89	122		23.3	31.3		32	44	
91,181,278		L100		L20			34.5			44	
56		-		L20			20.1			24	
14,28		-		L20			35.7			36	

TEST NUMBER	Ti (ng/ml)	...	U (ng/ml)	...	Zr (ng/ml)	...	Zn (ng/ml)	...
G-472	L10		-		11	19	L20	
G-473	L10		-		-		L20	
G-474	L10		-		-		L20	
91,181,278		L10		L1		L10		L20
56		L10		L1		-		L20
14,28		L10		L1		-		L20

TABLE A-8a

Cation analyses from the OR (Teflon gasket) experiments are presented in this Table. The columns are as follows:

- * raw data reported by the Analytical Chemistry Laboratory (ACL)
- ** concentration corrected for 5 mL dilution with DIW
- *** background corrected concentration
- **** normalized mass loss

Table A-8a. Cation Analyses from the OR (Teflon Gasket) Experiments

TEST TYPE	TEST NUMBER	SAMPLE SA TOTAL/ VESSEL	H2O VOLUME IN	SOL'N VOLUME	A1		NL(A1)		B		NL(B)	
					(ng/ml)		(g/m2)		(ng/ml)		(g/m2)	
					*	**	***	****	*	**	***	****
ATM-1C	G-483	463	14.87	10.68	440	646	-79	-.7	550	807	658	.7
	G-484	460	14.87	10.67	430	631	-94	-.8	620	911	762	.9
	G-485	457	14.91	10.65	330	485	-240	-2.2	1420	2087	1938	2.2
	G-486	476	14.93	11.45	270	388	-337	-2.9	1580	2270	2121	2.3
	G-487	486	14.90	10.68	240	352	-373	-3.2	5190	7620	7471	8.1
	G-488	465	14.90	8.69	260	410	-315	-2.8	5200	8192	8043	9.1
	G-489	455	14.91	10.64	210	309	-361	-3.3	8980	13200	13051	15.1
	G-490	464	14.87	10.54	200	295	-375	-3.3	8200	12090	11941	13.5
	G-491	457	14.94	10.71	260	381	-325	-2.9	13800	20243	20094	23.1
	G-492	464	14.84	10.52	230	339	-367	-3.3	15000	22129	21980	24.8
	G-493	463	14.91									
	G-494	461	14.94									
	G-495	460	14.93									
	G-496	458	14.90									
ATM-1C TUFF	G-497	469	14.46	9.98	180	270	382	3.3	1800	2702	2525	2.7
	G-498	467	14.47	9.86	210	316	367	3.2	2960	4461	4284	4.7
	G-499	458	14.49	10.01	240	360	221	1.9	3950	5923	5746	6.4
	G-500	479	14.49	10.16	170	254	124	1.0	4370	6521	6344	6.8
	G-501	475	14.49	8.21	230	370	88	.7	5900	9493	9316	10.0
	G-502	472	14.48	10.16	170	254	146	1.2	6180	9221	9044	9.8
	G-503	463	14.49	10.18	170	253	144	1.2	6400	9543	9366	10.3
	G-504	457	14.46	10.13	200	299	130	1.1	7320	10933	10756	12.0
	G-505	463	14.53	10.15	250	373	237	2.1	7260	10836	10659	11.8
	G-506	459	14.53	10.04	290	434	195	1.7	7770	11640	11463	12.8
	G-507	475	14.47									
	G-508	466	14.54									
	G-509	460	14.48									
	G-510	472	14.51									

Table A-8a (Cont'd)

TEST TYPE	TEST NUMBER	Ba (ng/ml)		NL(Ba) (g/m2)		Ca (ng/ml)		NL(Ca) (g/m2)		La (ng/ml)		NL(La) (g/m2)	
		■	■	■	■	■	■	■	■	■	■	■	■
ATM-1C	G-483	39	57	37	.3	4340	6372	-313	-.6	20			0
	G-484	32	47	27	.2	4220	6198	-487	-.9	20			0
	G-485	47	69	49	.4	3590	5275	-1410	-2.7	20			0
	G-486	43	62	42	.3	3470	4985	-1700	-3.1	20			0
	G-487	40	59	39	.3	1500	2202	-5071	-9.1	50			0
	G-488	44	69	49	.4	1190	1875	-5398	-10.2	50			0
	G-489	38	56	36	.3	670	985	-6215	-12.0	50			0
	G-490	43	63	43	.3	750	1106	-6094	-11.5	50			0
	G-491	48	70	50	.4	490	719	-6307	-12.1	31			0
	G-492	49	72	52	.4	470	693	-6333	-11.9	30			0
	G-493												
	G-494												
	G-495												
	G-496												
ATM-1C TUFF	G-497	20	30	10	.1	3160	4743	-463	-.8	20			0
	G-498	20	30	10	.1	2850	4295	-911	-1.7	37			0
	G-499	20	30	10	.1	2430	3644	-1562	-2.9	21			0
	G-500	20	30	10	.1	2680	3999	-1207	-2.1	21			0
	G-501	20	32	12	.1	2520	4055	-2205	-4.0	50			0
	G-502	20	30	10	.1	2540	3790	-2470	-4.5	50			0
	G-503	20	30	10	.1	2370	3534	-2636	-4.9	50			0
	G-504	20	30	10	.1	2380	3555	-2615	-4.9	50			0
	G-505	20	30	10	.1	2400	3582	-2588	-4.8	20			0
	G-506	20	30	10	.1	2620	3925	-2245	-4.2	27			0
	G-507												
	G-508												
	G-509												
	G-510												

Table A-8a (Cont'd)

TEST TYPE	TEST NUMBER	Hg				Mo				Na			
			(ng/ml)		NL(Hg) (g/m2)		(ng/ml)		NL(Mo) (g/m2)		(ug/ml)		NL(Na) (g/m2)
			***	***	****		***	***	****		***	***	****
ATM-1C	G-483	130	191	35	.7	210	308	258	.7	37.8	55.5	5.2	1.8
	G-484	110	162	6	.1	200	294	244	.6	38.0	55.8	5.5	1.9
	G-485	140	206	50	1.0	580	852	802	2.1	41.5	61.0	10.7	3.8
	G-486	130	187	31	.6	640	919	869	2.2	42.0	60.3	10.0	3.4
	G-487	220	323	167	3.2	2240	3289	3239	7.9	55.3	81.2	30.9	10.3
	G-488	210	331	175	3.5	2300	3623	3573	9.1	53.1	83.7	33.4	11.6
	G-489	220	323	153	3.1	3980	5850	5800	15.1	66.5	97.8	47.5	16.9
	G-490	200	295	125	2.5	3600	5308	5258	13.4	63.3	93.3	43.0	15.0
	G-491	330	484	328	6.7	6170	9050	9000	23.4	83.8	122.9	72.6	25.8
	G-492	300	443	287	5.7	6730	9929	9879	25.1	89.4	131.9	81.6	28.4
	G-493												
	G-494												
	G-495												
	G-496												
ATM-1C TUFF	G-497	130	195	-79	-1.5	720	1081	1031	2.5	39.4	59.1	8.2	2.8
	G-498	110	166	-108	-2.1	1300	1959	1909	4.7	41.6	62.7	11.8	4.0
	G-499	110	165	-109	-2.2	1760	2639	2589	6.5	44.9	67.3	16.4	5.6
	G-500	120	179	-95	-1.8	1980	2954	2904	7.0	45.0	67.1	16.2	5.3
	G-501	90	145	-129	-2.5	2650	4264	4214	10.2	46.3	74.5	23.6	7.8
	G-502	120	179	-95	-1.8	2770	4133	4083	9.9	50.1	74.8	23.9	8.0
	G-503	200	298	24	.5	2850	4250	4200	10.4	66.5	99.2	49.9	17.0
	G-504	110	164	-110	-2.2	3280	4899	4849	12.2	63.3	94.5	45.2	15.6
	G-505	230	343	69	1.4	3190	4761	4711	11.7	50.8	75.8	26.3	9.0
	G-506	330	494	220	4.4	3440	5153	5103	12.8	51.5	77.1	27.6	9.5
	G-507												
	G-508												
	G-509												
	G-510												

Table A-8a (Cont'd)

TEST TYPE	TEST NUMBER	SI (ug/ml)		NL(SI) (g/m2)		Sr (ng/ml)		Sr (g/m2)		Ti (ng/ml)		NL(Ti) (g/m2)	
ATH-1C	G-483	27.7	40.7	1.8	.3	67	98	62	.6	5	7	2	.0
	G-484	27.3	40.1	1.2	.2	74	109	73	.7	5	7	2	.0
	G-485	30.6	45.0	6.1	1.0	112	165	129	1.2	13	19	14	.0
	G-486	31.2	44.0	5.9	1.0	118	170	134	1.2	13	19	14	.0
	G-487	41.6	61.1	16.9	2.7	92	135	99	.8	36	53	48	.1
	G-488	40.3	63.5	19.3	3.2	76	120	84	.7	36	57	52	.1
	G-489	52.3	76.9	35.5	6.1	56	82	46	.4	52	76	71	.1
	G-490	49	72.2	30.8	5.2	61	90	54	.5	52	77	72	.1
	G-491	70.4	103.3	48.3	8.2	53	78	42	.4	100	147	142	.3
	G-492	73.9	109.0	54.0	9.0	51	75	39	.3	98	145	140	.3
	G-493												
	G-494												
	G-495												
	G-496												
ATH-1C TUFF	G-497	34.4	51.6	4.0	.6	52	78	2	.0	5	8	3	.0
	G-498	36.3	54.7	7.1	1.1	47	71	-5	-.0	15	23	18	.0
	G-499	41.6	62.4	12.0	2.0	43	64	-12	-.1	24	36	31	.1
	G-500	42.3	63.1	12.7	2.0	44	66	-10	-.1	17	25	20	.0
	G-501	45.0	72.4	16.4	2.6	42	68	-8	-.1	43	69	64	.1
	G-502	47.7	71.2	15.2	2.4	42	63	-13	-.1	41	61	56	.1
	G-503	48.7	72.6	11.9	1.9	42	63	-21	-.2	43	64	59	.1
	G-504	50.5	75.4	14.7	2.4	41	61	-23	-.2	33	49	44	.1
	G-505	63.6	94.9	28.0	4.6	45	67	-17	-.1	83	124	119	.2
	G-506	55.7	83.4	16.5	2.7	47	70	-14	-.1	86	129	124	.2
	G-507												
	G-508												
	G-509												
	G-510												

Table A-8a (Cont'd)

TEST TYPE	TEST NUMBER	U (ng/ml)		NL(U) (g/m2)		Zn (ng/mL)		NL(Zn) (g/m2)		Cs (ng/ml)		NL(Cs) (g/m2)	
		I	II	III	IIII	I	II	III	IIII	I	II	III	IIII
ATH-IC	G-483	72	106	106	.10	200	294	271	.2	170	250	250	.9
	G-484	57	84	84	.08	160	235	212	.2	200	294	294	1.1
	G-485	166	244	244	.24	430	632	609	.6	530	779	779	3.0
	G-486	226	325	325	.30	460	661	638	.6	680	862	862	3.2
	G-487	480	705	705	.64	1210	1776	1753	1.5		0	0	0.0
	G-488	472	744	744	.71	1390	2190	2167	2.0		0	0	0.0
	G-489	520	764	764	.75	1760	2587	2564	2.4		0	0	0.0
	G-490	534	787	787	.75	1580	2330	2307	2.1		0	0	0.0
	G-491	937	1374	1374	1.34	3600	5281	5258	4.8		0	0	0.0
	G-492	945	1394	1394	1.33	3430	5060	5037	4.5		0	0	0.0
	G-493												
	G-494												
	G-495												
	G-496												
ATH-IC TUFP	G-497	193	290	290	.27	170	255	214	.2	100	150	150	.5
	G-498	288	434	434	.40	200	301	260	.2	120	181	181	.7
	G-499	313	469	469	.44	410	615	574	.5	180	270	270	1.0
	G-500	333	497	497	.45	420	627	586	.5	130	194	194	.7
	G-501	390	628	628	.57	550	885	844	.7				
	G-502	427	637	637	.58	650	970	929	.8				
	G-503	427	637	637	.59	1170	1745	1715	1.5				
	G-504	433	647	647	.61	720	1075	1045	.9				
	G-505	472	705	705	.66	1560	2328	2287	2.0				
	G-506	499	748	748	.70	2110	3161	3120	2.8				
	G-507												
	G-508												
	G-509												
	G-510												

Table A-8a (Cont'd)

TEST TYPE	TEST NUMBER	P (ng/ml)		NL(P) (g/m2)	
		•	••	•••	••••
ATH-1C	G-483				
	G-484				
	G-485				
	G-486				
	G-487				
	G-488				
	G-489				
	G-490				
	G-491		460		
	G-492		420		
	G-493				
	G-494				
	G-495				
	G-496				
ATH-1C	G-497				
TUFF	G-498				
	G-499				
	G-500				
	G-501				
	G-502				
	G-503				
	G-504				
	G-505				
	G-506				
	G-507				
	G-508				
	G-509				
	G-510				

Table A-8a (Cont'd)

TEST TYPE	TEST NUMBER	SAMPLE SA TOTAL/ VESSEL	H2O VOLUME IN	SOL'N VOLUME	AI		HL(AI)		B		HL(B)	
					(ng/ml)		(g/m2)		(ng/ml)		(g/m2)	
ATH-8C	G-511	485	14.87	11.88	480	682	-43	-.2	420	597	448	.5
	G-512	477	14.90	12.39	480	674	-51	-.3	470	660	511	.6
	G-513	470	14.87	11.95	430	610	-115	-.6	610	865	716	.9
	G-514	492	14.95	12.49	430	602	-123	-.6	700	980	831	1.0
	G-515	472	14.90	11.85	240	341	-384	-2.1	2760	3925	3776	4.6
	G-516	489	14.87	12.01	230	326	-399	-2.1	2130	3017	2868	3.4
	G-517	484	14.91	11.62	260	372	-298	-1.6	3620	5178	5029	6.0
	G-518	479	14.91	12.21	220	310	-360	-1.9	3660	5159	5010	6.0
	G-519	485	14.91	11.85	260	370	-355	-1.9	4070	5787	5638	6.7
	G-520	475	14.87	12.35	270	379	-346	-1.9	3940	5535	5386	6.5
	G-521	464	14.94									
ATH-8 + TUFF	G-525	487	14.49	11.40	240	345	81	.4	940	1352	1175	1.3
	G-526	492	14.48	11.86	220	313	49	.2	920	1308	1131	1.3
	G-527	465	14.53	11.46	130	187	-77	-.4	2890	4151	3974	4.8
	G-528	486	14.47	12.01	270	382	118	.6	4320	6119	5942	6.8
	G-529	484	14.47	11.86	210	297	35	.2	4450	6326	6149	7.1
	G-530	506	14.50	11.98	190	269	5	.0	4680	6633	6456	7.1
	G-531	490	14.50	11.19	190	275	110	.6	4780	6916	6739	7.7
	G-532	493	14.52	11.70	160	228	63	.3	5020	7165	6988	7.9
	G-533	471	14.50	11.3	190	274	10	.1	6110	8814	8637	10.2
	G-534	477	14.51	12.01	150	212	-52	-.3	5880	8328	8151	9.5
	G-535	477	14.55									
	G-536	488	14.55									
	G-537	485	14.54									
	G-538		14.47									

Table A-8a (Cont'd)

TEST TYPE	TEST NUMBER	Ca (ng/ml)		NL(Ca) (g/m2)		La (ng/ml)		NL(La) (g/m2)		Mg (ng/ml)		NL(Mg) (g/m2)	
		g	mg	mg	mg	g	mg	mg	mg	g	mg	mg	mg
ATN-8C	G-511	4580	6508	-177	-.3	20				110	156	0	.0
	G-512	4650	6527	-158	-.3	20				130	182	26	.9
	G-513	4480	6354	-331	-.6	20				130	184	28	1.0
	G-514	4400	6161	-524	-.9	24				130	182	26	.9
	G-515	3240	4607	-2666	-5.0	55				150	213	57	2.0
	G-516	3700	5240	-2033	-3.7	50				140	198	42	1.4
	G-517	2540	3633	-3567	-6.5	50				180	257	87	3.0
	G-518	2570	3622	-3578	-6.6	54				160	226	56	1.9
	G-519	2560	3640	-3045	-5.5	96				210	299	143	4.9
	G-520	2550	3682	-3103	-5.7	68				190	267	111	3.9
	G-521												
ATN-8 + TUFF	G-525	3780	5438	232	.4	23				180	259	-15	-.5
	G-526	3640	5175	-31	-.1	20				170	242	-32	-1.1
	G-527	2950	4237	-969	-1.8	25				120	172	-102	-3.5
	G-528	2580	3654	-1552	-2.7	20				110	156	-118	-3.9
	G-529	3090	4393	-1867	-3.3	50				140	199	-75	-2.5
	G-530	2860	4054	-2206	-3.7	50				95	135	-139	-4.4
	G-531	2800	4051	-1917	-3.4	50				130	188	-86	-2.8
	G-532	2880	4111	-1857	-3.2	53				140	200	-74	-2.4
	G-533	2620	3779	-1427	-2.6	49				220	317	43	1.5
	G-534	3030	4291	-915	-1.6	23				180	255	-19	-.6
	G-535												
	G-536												
	G-537												
	G-538												

Table A-8a (Cont'd)

TEST TYPE	TEST NUMBER	Mo (ng/ml)			NL(Mo) (g/m2)		Na (ug/ml)		NL(Na) (g/m2)		SI (ug/ml)		NL(SI) (g/m2)	
		1	2	3	4	5	6	7	8	9	10	11	12	13
ATM-8C	G-511	150	213	163	.4	38.70	55.0	4.4	1.4	28.9	41.1	2.2	.4	
	G-512	220	309	259	.6	39.50	54.0	3.4	1.1	29.6	41.5	2.6	.5	
	G-513	280	397	347	.8	39.20	55.6	5.0	1.7	29.8	42.3	3.4	.6	
	G-514	300	420	370	.8	39.60	55.5	4.9	1.6	30.5	42.7	3.8	.7	
	G-515	1420	2019	1969	4.4	47.40	67.4	16.8	5.7	38.0	54.0	9.8	1.8	
	G-516	1880	1530	1480	3.2	45.00	63.7	13.1	4.3	35.6	50.4	6.2	1.1	
	G-517	1830	2617	2567	5.5	49.80	71.2	20.6	6.9	39.8	56.9	16.0	2.8	
	G-518	1870	2636	2586	5.7	49.80	70.2	19.6	6.5	40.3	56.8	15.9	2.8	
	G-519	2080	2958	2908	6.3	53.10	75.5	24.9	8.2	48.3	68.7	27.8	4.8	
	G-520	1980	2782	2732	6.1	51.70	72.6	22.0	7.4	45.4	63.8	22.9	4.1	
	G-521													
ATM-8 + TUFF	G-525	420	604	554	1.2	37.30	53.7	2.8	.9	34.6	49.8	2.2	.4	
	G-526	480	569	519	1.1	38.30	54.4	3.5	1.1	36.9	52.5	4.9	.8	
	G-527	1470	2111	2061	4.6	42.40	60.9	10.0	3.3	42.4	60.9	10.5	1.9	
	G-528	2280	3229	3179	6.7	46.60	66.0	15.1	4.8	44.4	62.9	12.5	2.1	
	G-529	2400	3412	3362	7.1	48.50	68.9	18.0	5.8	48.9	69.5	13.5	2.3	
	G-530	2440	3458	3408	6.9	49.20	69.7	18.8	5.8	47.9	67.9	11.9	1.9	
	G-531	2460	3559	3509	7.4	47.90	69.3	19.9	6.3	51.0	73.8	13.0	2.2	
	G-532	2620	3740	3690	7.7	48.00	68.5	19.1	6.0	51.7	73.8	13.0	2.2	
	G-533	3180	4587	4537	9.9	49.90	72.0	21.1	6.9	55.3	79.5	19.0	3.3	
	G-534	3070	4348	4298	9.3	50.00	70.8	19.9	6.5	59.8	84.7	23.9	4.1	
	G-535													
	G-536													
	G-537													
	G-538													

Table A-8a (Cont'd)

TEST TYPE	TEST NUMBER	Sr (ng/ml)		NL(Sr) (g/m2)		Tl (ng/ml)		NL(Tl) (g/m2)		U (ng/ml)		NL(U) (g/m2)	
		±	±	±±	±±±	±	±±	±±±	±±±±	±	±±	±±±	±±±±
ATM-8C	G-511	67	95	59	.4	5				62	88	68	.08
	G-512	74	104	68	.5	5				60	84	84	.07
	G-513	87	123	87	.7	5				103	146	146	.13
	G-514	93	130	94	.7	11				117	164	164	.14
	G-515	160	228	192	1.5	26				457	650	650	.58
	G-516	160	227	191	1.4	24				380	538	538	.46
	G-517	151	216	180	1.4	39				650	930	930	.80
	G-518	154	217	181	1.4	32				621	875	875	.77
	G-519	170	242	206	1.5	77				598	850	850	.73
	G-520	166	233	197	1.5	66				564	792	792	.70
	G-521												
ATM-8 + TUFF	G-525	59	85	9	.1	7				156	224	224	.19
	G-526	57	81	5	.0	7				151	215	215	.18
	G-527	49	70	-6	-.0	16				385	553	553	.49
	G-528	47	67	-9	-.1	15				413	585	585	.49
	G-529	52	74	-2	-.0	30				434	617	617	.52
	G-530	52	74	-2	-.0	40				478	677	677	.55
	G-531	50	72	-12	-.1					442	639	639	.53
	G-532	49	70	-14	-.1					433	625	625	.52
	G-533	49	71	-5	-.0	66				533	769	769	.66
	G-534	56	79	3	.0	60				485	687	687	.59
	G-535												
	G-536												
	G-537												
	G-538												

Table A-8a (Cont'd)

TEST TYPE	TEST NUMBER	Zn (ng/ml)		NL(Zn) (g/m2)		Cs (ng/ml)		NL(Cs) (g/m2)	
		•	••	•••	••••	•	••	•••	••••
ATH-8C	G-511	140	199	176	.1	130	185	185	.6
	G-512	160	225	202	.2	140	196	196	.7
	G-513	240	340	317	.3	190	269	269	.9
	G-514	300	420	397	.3	220	308	308	1.0
	G-515	730	1038	1015	.9		0	0	0.0
	G-516	570	807	784	.7		0	0	0.0
	G-517	1210	1731	1708	1.4		0	0	0.0
	G-518	1110	1565	1542	1.3		0	0	0.0
	G-519	1890	2687	2664	2.3		0	0	0.0
	G-520	1800	2529	2506	2.2		0	0	0.0
	G-521								
	G-525	170	245	204	.2	160	230	230	.8
ATH-8 + TUPE	G-526	160	227	186	.2	40	57	57	.2
	G-527	310	445	404	.3	110	158	158	.5
	G-528	280	397	356	.3	130	184	184	.6
	G-529	580	825	784	.6				
	G-530	830	1176	1135	.9				
	G-531	690	998	957	.8				
	G-532	730	1042	1001	.8				
	G-533	1420	2048	2007	1.7				
	G-534	1150	1629	1588	1.3				
	G-535								
	G-536								
	G-537								
	G-538								

Table A-8a (Cont'd)

TEST TYPE	TEST NUMBER	VESSEL NUMBER	TEST LENGTH (DAYS)	DATE IN	DATE OUT	H2O VOLUME IN	COMPLETE ASSEMBLY IN	COMPLETE ASSEMBLY OUT	DELTA MASS	PH OUT	LPE TARE	LPE WEIGHT	SG/L'H VOLUME	TOTAL CARBON PPM
BLANK EJ-13 ONLY	G-539	120	14	2/11/87	2/25/87	16.22	300.62	300.64	-.02	8.36	24.21	36.37	12.16	31.63
	G-540	121	14	2/11/87	2/25/87	16.20	303.22	303.23	-.01	8.33	24.26	36.81	12.17	31.50
	G-541	122	28	2/4/87	3/4/87	16.18	295.41	295.43	-.02	8.25	23.66	35.82	12.16	32.93
	G-542	123	28	2/4/87	3/4/87	16.20	297.88	297.91	-.03	8.22	24.34	36.51	12.17	32.81
	G-543	124	56	2/4/87	4/1/87	16.19	300.95	300.97	-.02	7.98	24.51	36.73	12.22	36.68
	G-544	125	56	2/4/87	4/1/87	16.25	300.28	300.30	-.02	8.13	23.68	35.8	12.12	35.7
	G-545	126	91	2/11/87	5/13/87	16.14	298.65	298.65	0.00	8.32	23.12	53.18	12.06	31.58
	G-546	127	91	2/11/87	5/13/87	16.20	299.18	299.19	-.01	8.13	23.69	35.85	12.16	30.2
	G-547	128	182	2/11/87	8/28/87	16.19	298.59	298.61	-.02	7.35	24.57	36.74	12.17	43.63
	G-548	129	182	2/11/87	8/26/87	16.20	303.37	303.37	0.00	8.01	23.65	35.73	12.08	45.76
	G-549	130	260	2/4/87		16.16	297.36							
	G-550	131	260	2/4/87		16.23	299.20							
	G-551	132	LONG	2/11/87		16.21	299.23							
	G-552	133	LONG	2/11/87		16.21	304.92							
BLANK EJ-13 + TUFF	G-553	134	14	2/11/87	2/25/87	15.45	306.11	306.12	-.01	7.71	24.54	27.27	2.73	32.79
	G-554	135	14	2/11/87	2/25/87	15.45	300.21	300.22	-.01	7.62	24.05	35.39	11.34	33.50
	G-555	136	28	2/4/87	3/4/87	15.44	305.65	305.68	-.03	7.43	23.70	34.84	11.14	36.89
	G-556	137	28	2/4/87	3/4/87	15.49	305.82	305.86	-.04	7.23	24.48	35.85	11.37	42.35
	G-557	138	56	2/4/87	4/1/87	15.46	300.01	300.03	-.02	7.33	24.55	35.71	11.16	38.33
	G-558	139	56	2/4/87	4/1/87	15.49	298.91	298.94	-.03	7.35	23.95	35.23	11.28	39.43
	G-559	140	91	2/11/87	5/13/87	15.46	304.71	304.72	-.01	7.5	24.25	35.56	11.31	37.68
	G-560	141	91	2/11/87	5/13/87	15.54	300.40	300.42	-.02	7.43	23.99	35.33	11.34	34.82
	G-561	142	182	2/11/87	8/26/87	15.46	303.74	303.75	-.01	7.49	24.21	35.49	11.28	43.86
	G-562	143	182	2/11/87	8/26/87	15.53	298.22	298.24	-.02	7.37	24.52	35.93	11.41	43.41
	G-563	144	260	2/4/87		15.48	299.26		299.26					
	G-564	145	260	2/4/87		15.5	301.01		301.01					
	G-565	146	LONG	2/11/87		15.47	300.91		300.91					
	G-566	147	LONG	2/11/87		15.57	301.50		301.50					

Table A-8a (Cont'd)

TEST TYPE	TEST NUMBER	Al	B		Ba		Ca	La		Mg		..
		(ng/ml)		(ng/ml)		(ng/ml)		(ng/ml)		(ng/ml)		
BLANK BJ-13 ONLY	G-539	730	730	141	141	20	6690		20		150	
	G-540	730	730	146	146	20	6750		20		150	
	G-541	700	700	148	148	20	6640		20		150	
	G-542	720	720	150	150	20	6660		20		160	
	G-543	510	719	110	155	20	5140	7243	20		110	155
	G-544	530	749	110	155	20	5170	7303	20		120	170
	G-545	480	679	113	160	20	5070	7172	20		120	170
	G-546	470	663	100	141	20	5120	7225	20		120	169
	G-547	510	720	100	140	20	4980	7026	20		110	155
	G-548	490	693	100	142	20	4970	7027	20		110	156
	G-549											
	G-550											
	G-551											
G-552												
BLANK BJ-13 + TUFF	G-553	540	2518	34	657	20	1260		20		77	
	G-554	280	280	172	172	20	5230		20		250	
	G-555	270	270	163	163	20	5130		20		240	
	G-556	350	350	172	172	20	5260		20		300	
	G-557	110	159	140	203		4410	6386	20		210	304
	G-558	180	260	120	173		4250	6134	20		190	274
	G-559	120	173	130	187	20	3980	5740	20		190	274
	G-560	110	159	130	187	20	4300	6196	20		180	259
	G-561	100	144	120	173	20	4300	6206	20		190	274
	G-562	100	144	140	201	20	4300	6184	20		190	273
	G-563											
	G-564											
	G-565											
	G-566											

Table A-8a (Cont'd)

TEST TYPE	TEST NUMBER	Mo (ng/ml)			Na (ug/ml)			Si (ug/ml)			Sr (ng/ml)			Ti (ng/ml)			Zn (ng/ml)			Zr (ng/ml)
		h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h		
BLANK EJ-13 ONLY	G-539	50			50.20			38.5			36			5			23			20
	G-540	50			50.10			38.9			36			5			29			20
	G-541	50			50.20			39.7			36			5			24			20
	G-542	50			50.50			38.5			36			5			28			20
	G-543	50			36.00	50.7		31.5	44.4		26	37		5			16	23		20
	G-544	50			36.80	52.0		31.1	43.9		26	37		5			16	23		20
	G-545	50			35.40	50.1		30.1	42.6		27	38		5			21	30		20
	G-546	50			35.70	50.4		27.8	39.2		27	38		5			15	21		20
	G-547	50			34.9	49.2		38.3	54.0		26	37		5			12	17		20
	G-548	50			34.9	49.3		39.6	56.0		26	37		5			12	17		20
	G-549																			
	G-550																			
G-551																				
G-552																				
BLANK EJ-13 + TUFF	G-553	50			10.90			11.3			18			5			80			20
	G-554	50			50.50			47.6			74			5			45			20
	G-555	50			50.70			49.3			73			5			48			20
	G-556	50			50.60			51.5			73			5			52			20
	G-557	50			35.30	51.1		38.8	56.2		59	85		5			33	48		20
	G-558	50			35.80	51.7		38.6	55.7		58	84		5			27	39		20
	G-559	50			34.20	49.3		41.5	59.8		55	79		5			31	45		20
	G-560	50			34.30	49.4		42.8	61.7		61	88		5			30	43		20
	G-561	50			34.3	49.5		46	66.4		60	87		5			18	26		20
	G-562	50			34.4	49.5		46.8	67.3		57	82		5			22	32		20
	G-563																			
	G-564																			
	G-565																			
	G-566																			

TABLE A-8b

Cation analyses from the OR (silicone gasket) experiments.

Table A-8b. Solution Results for Preliminary ATM-1c Experiments Done Without Radiation

Test #	Length Days	SA	Solution Volume	Al		B			Ca		Mg	
				EJ-13 ppm	Solution ppm	EJ-13 ppm	Solution ^a ppm	NL	EJ-13 ppm	Solution ppm	EJ-13 ppm	Solution ppm
G-475	7	474.7		0.25	0.13	0.15	7.64	7.7	7.12	6.2	0.27	0.22
G-4	7	485.2		0.25	0.13	0.15	7.28	7.2	7.12	6.4	0.27	0.21
G-4	14	491.5		0.25	0.15	0.15	12.92	13.2	7.12	3.1	0.27	0.17
G-480	14	492.0		0.25	2.10	0.15	12.86	12.6	7.12	3.1	0.27	0.23
G-479	28	495.9		0.25	0.14	0.15	17.22	17.0	7.12	1.7	0.27	0.24
G-482	28	488.3		0.25	0.19	0.15	16.75	17.3	7.12	1.9	0.27	0.25
G-477	63	479.5		0.25	0.16	0.15	29.75	32.0	7.12	0.7	0.27	0.32
G-481	63	490.1		0.25	0.20	0.15	29.75	30.5	7.12	0.8	0.27	0.31

Na			Si			Sr			U		
EJ-13 ppm	Solution ppm	NL	EJ-13 ppm	Solution ppm	NL	EJ-13 ppm	Solution ppm	NL	EJ-13 ppm	Solution ppm	NL
0.4	85.8	0.6	35.3	48.2	1.6	0.035	0.24	1.4	0	0.53	0.48
0.4	67.2	0.9	35.3	49.3	1.0	0.035	0.24	1.4	0	0.60	0.48
0.4	79.0	11.4	35.3	69.1	3.0	0.035	0.10	1.0	0	0.63	0.52
0.4	77.0	10.9	35.3	67.1	2.7	0.035	0.10	1.0	0	0.61	0.51
0.4	85.4	13.7	35.3	62.5	3.2	0.035	0.12	0.0	0	0.71	0.50
0.4	86.9	14.5	35.3	65.5	3.0	0.035	0.13	0.0	0	0.67	0.55
0.4	114.0	24.9	35.3	82.0	5.9	0.035	0.05	0.2	0	1.11	0.93
0.4	113.0	24.0	35.3	88.9	6.5	0.035	0.05	0.2	0	1.04	0.85

^aThe reported values appeared to be low, based on intuition, and the solutions are being reanalyzed.

TABLE A-9
pH and Anion Analyses for the 2R Experiments

This Table presents the pH and anion results for the 2R experiments. For each anion, the concentration in the undiluted leachate in ppm is given together with a blank corrected value. The blank correction is made by subtracting the values obtained in the blank experiments from the analogous experiments containing glass. If this subtraction results in a negative number, the results are given in parenthesis.

Table A-9. pH and Anion Analyses - Blank Samples

Concentration (ppm, $\mu\text{g/mL}$)													
Test Type	Test #	Length (Days)	pH Out	F ⁻		Cl ⁻		SO ₄ ⁼		NO ₃ ⁻	NO ₂ ⁻	Total Fixed Nitrogen ($\mu\text{moles/mL}$)	Blank Corrected ($\mu\text{moles/mL}$)
				Blank Corrected		Blank Corrected		Blank Corrected					
ATM-1c + J-13	61	7	7.33	2.65	(0.10)	7.00	0.55	21.0	1.0	4.14	3.30	0.14	(0.05)
	52	7	7.23	2.60	(0.15)	7.50	0.25	10.0	(0.3)	3.95	3.10	0.14	(0.05)
	49	14	7.74	2.40	(0.75)	7.55	0.95	19.3	(1.2)	3.05	6.00	0.10	(0.01)
	50	14	7.70	2.40	(0.25)	7.60	0	19.0	(0.7)	3.00	5.50	0.10	(0.01)
	63	28	7.60	2.65	(0.15)	7.40	0	10.0	(0.4)	2.00	7.30	0.20	(0.05)
	64	28	7.63	2.75	(0.05)	7.45	0.05	20.1	0.0	2.95	0.00	0.22	(0.03)
	65	56	7.20	2.75	(0.35)	0.05	(0.15)	17.6	(3.0)	4.00	0.45	0.25	(0.30)
	66	56	7.20	2.75	(0.35)	0.05	(0.15)	10.0	(2.5)	5.00	7.00	0.20	(0.07)
ATM-1c + J-13 + Tuff	59	7	7.22	2.60	0	7.00	0.00	21.0	2.5	3.65	3.70	0.14	(0.03)
	60	7	7.30	2.40	(0.2)	7.00	(0.10)	19.0	(0.30)	0.15	3.35	0.17	0.0
	67	14	7.43	2.20	(0.4)	0.05	(0.05)	10.3	(2.60)	4.70	4.05	0.16	(0.02)
	58	14	7.30	2.55	(0.05)	7.95	0.40	22.0	1.10	6.15	4.05	0.19	0.01
	61	28	7.47	2.55	(0.20)	7.25	(0.30)	20.0	1.20	2.65	0.00	0.10	(0.04)
	62	28	7.33	2.70	(0.05)	7.45	(0.10)	20.0	1.20	3.70	7.10	0.21	(0.02)
	63	56	7.10	2.90	(0.15)	7.95	0.30	22.4	1.00	5.10	0.05	0.20	(0.07)
	64	56	7.50	2.75	(0.30)	0.15	0.50	20.0	0.20	3.75	0.00	0.23	(0.10)
Crushed ATM-1c + J-13	67	7	7.01	2.45	(0.20)	7.05	(0.20)	19.3	0.1	0.15	3.35	0.17	(0.02)
	68	7	6.95	2.45	(0.20)	7.05	(0.20)	19.0	0.4	4.05	4.10	0.10	(0.03)
	66	14	7.09	2.65	(0.10)	7.90	0.40	21.1	0.0	2.15	0.90	0.19	0.0
	60	14	7.01	2.05	0	0.15	0.05	21.0	1.4	2.15	0.25	0.17	(0.02)
	69	28	7.34	2.75	(0.05)	7.40	0	20.4	1.2	2.15	7.05	0.21	(0.04)
	70	28	7.20	2.75	(0.05)	7.60	0.10	20.3	1.1	2.75	7.00	0.21	(0.04)
	71	56	7.30	3.00	(0.10)	0.55	0.55	21.9	1.4	3.00	10.1	0.27	(0.00)
	72	56	7.20	2.65	(0.25)	0.05	(0.15)	21.2	0.7	3.30	9.95	0.27	(0.00)

Cont'd

Table A-9 (Cont'd)

Test Type	Test #	Length (Days)	pH Out	F ⁻		Cl ⁻		SO ₄ ²⁻		NO ₃ ⁻	NO ₂ ⁻	Total Fixed Nitrogen (μmoles/mL)	Blank Corrected (μmoles/mL)
				ACL	Blank Corrected	ACL	Blank Corrected	ACL	Blank Corrected	ACL	ACL		
ATM-8	75	7	6.85	2.68	(0.05)	7.25	0	20.2	1.8	7.10	3.15	0.18	(0.01)
	76	7	7.00	2.75	0.10	7.05	(0.20)	20.2	1.8	6.55	3.30	0.18	(0.01)
J-13	73	14	6.00	2.65	0	7.00	0.40	21.9	1.4	6.95	3.35	0.18	(0.01)
	74	14	7.10	2.40	(0.25)	7.75	0.25	21.9	1.4	5.85	3.70	0.17	(0.02)
	77	20	6.92	2.90	0.10	7.50	0.10	20.5	1.3	4.10	7.15	0.22	(0.03)
	78	20	7.01	3.15	0.35	7.60	0.20	20.5	1.3	4.10	7.55	0.23	(0.02)
	79	50	7.50	3.10	0	7.55	(0.05)	20.6	0.1	4.40	9.05	0.29	(0.04)
	80	50	7.37	3.10	0	7.60	(0.70)	20.7	0.2	6.00	9.10	0.28	(0.05)
ATM-8	83	7	7.05	2.45	0.05	7.25	0.15	20.4	0.9	6.00	3.40	0.17	0.0
-	84	7	7.02	2.60	0	7.15	0.05	20.2	0.7	5.00	3.65	0.17	0.0
J-13	81	14	7.20	2.85	0.05	7.70	0.20	21.4	0.5	5.85	4.15	0.17	(0.01)
-	82	14	7.23	2.05	0.05	7.30	0.30	23.0	2.1	5.70	4.35	0.19	0.1
Tuff	85	20	7.20	2.45	0.10	7.65	0.10	20.2	0.6	2.35	7.40	0.20	(0.03)
	86	20	7.09	2.60	(0.15)	7.20	(0.35)	18.9	(0.7)	2.10	6.60	0.16	(0.05)
	87	50	7.41	3.10	0.05	7.65	0	21.0	0.4	5.55	9.00	0.20	(0.05)
	88	50	7.61	3.15	0.10	7.60	(0.05)	20.6	0	5.05	9.10	0.20	(0.04)
Crushed	91	7	6.80	2.05	0	7.10	(0.15)	19.6	0.4	5.50	3.90	0.17	(0.02)
ATM-8	92	7	6.95	2.85	0	7.10	(0.15)	19.6	0.4	4.30	4.10	0.16	(0.07)
-	89	14	7.10	2.70	0.05	7.60	(0.10)	20.0	0.1	4.90	6.75	0.20	0.1
J-13	90	14	7.04	2.70	0.05	7.5	(0.05)	20.9	0.4	7.00	4.20	0.20	0.1
	93	20	7.37	3.00	0.2	7.65	3.45	21.2	2.0	3.10	9.45	0.26	0.1
	94	20	7.42	2.95	0.15	7.60	0.60	20.3	1.1	2.40	9.60	0.26	0.0
	95	50	7.74	3.20	0.10	7.85	(0.40)	19.9	(0.6)	3.60	12.5	0.33	0.0
	96	50	7.00	3.25	0.15	0.65	(0.15)	20.3	(0.2)	3.90	11.9	0.32	(0.01)

Cont'd

Table A-9 (Cont'd)

Test Type	Test #	Length (Days)	pH Out	Concentration (ppm, µg/mL)					Total Fixed Nitrogen (µmol/mL)
				F ⁻	Cl ⁻	SO ₄ ²⁻	NO ₃ ⁻	NO ₂ ⁻	
Blank No Tuff	99	7	6.76	2.65	7.10	18.6	6.35	3.30	0.19
	100	7	6.66	2.65	7.35	19.7	7.00	3.10	0.19
	97	14	6.31	2.65	7.63	20.9	8.25	2.65	0.18
	98	14	6.48	2.60	7.48	20.1	8.70	2.65	0.20
	101	28	7.05	2.80	7.15	18.7	11.6	3.45	0.26
	102	28	7.15	2.80	7.65	19.7	9.15	4.35	0.24
	103	56	6.56	3.10	8.35	20.4	13.8	5.50	0.34
	104	56	6.61	3.65	8.05	20.6	12.6	6.65	0.35
Blank Tuff	107	7	6.88	2.60	7.10	19.4	4.65	4.45	0.17
	108	7	6.94	2.60	7.10	19.6	4.15	4.20	0.16
	105	14	6.94	2.60	7.45	20.9	5.00	5.10	0.19
	106	14	6.84	2.60	7.55	20.9	3.95	4.20	0.18
	109	28	7.27	2.75	7.40	19.4	6.15	7.60	0.22
	110	28	7.45	2.75	7.70	19.7	4.00	6.65	0.23
	111	56	6.71	3.10	7.85	21.1	8.15	9.90	0.35
	112	56	6.61	3.40	7.45	20.1	8.10	6.40	0.31
Average No Tuff		7	6.71	2.65	7.25	19.2			0.19
		14	6.48	2.65	7.60	20.5			0.19
		28	7.10	2.80	7.40	19.2			0.25
		56	6.69	3.10	8.20	20.5			0.35
Tuff		7	6.91	2.60	7.10	19.5			0.17
		14	6.80	2.60	7.60	20.9			0.18
		28	7.30	2.75	7.55	19.6			0.23
		56	6.66	3.45	7.65	20.6			0.33

TABLE A-10
FY 1986 Anion

This table presents the anion results for the 1R and 0R (Si gaskets) experiments. The column annotations are:

- * ACL reported results
- ** dilution corrected values
- *** blank corrected results

Table A-10. FY 1986 Anion

TEST TYPE	TEST NUMBER	TEST LENGTH	pH	F ⁻ (ug/ml)	Cl ⁻ (ug/ml)	NO ₂ ⁻ (ug/ml)	NO ₃ ⁻ (ug/ml)	MITROGEN (umol/m ³)
ATM-1c	C-388	28	8.84	2.4	1.0	4.4	1.6	0.00000000
	C-389	28	8.92	2.2	1.1	4.4	1.6	0.00000000
	C-390	28	8.84	2.4	1.0	4.4	1.6	0.00000000
	C-391	28	8.84	2.4	1.0	4.4	1.6	0.00000000
	C-392	28	8.84	2.4	1.0	4.4	1.6	0.00000000
	C-393	28	8.84	2.4	1.0	4.4	1.6	0.00000000
	C-394	28	8.84	2.4	1.0	4.4	1.6	0.00000000
	C-395	28	8.84	2.4	1.0	4.4	1.6	0.00000000
	C-396	28	8.84	2.4	1.0	4.4	1.6	0.00000000
	C-397	28	8.84	2.4	1.0	4.4	1.6	0.00000000
ATM-1c + TUEE	C-400	28	8.84	2.4	1.0	4.4	1.6	0.00000000
	C-401	28	8.84	2.4	1.0	4.4	1.6	0.00000000
	C-402	28	8.84	2.4	1.0	4.4	1.6	0.00000000
	C-403	28	8.84	2.4	1.0	4.4	1.6	0.00000000
	C-404	28	8.84	2.4	1.0	4.4	1.6	0.00000000
	C-405	28	8.84	2.4	1.0	4.4	1.6	0.00000000
	C-406	28	8.84	2.4	1.0	4.4	1.6	0.00000000
	C-407	28	8.84	2.4	1.0	4.4	1.6	0.00000000
	C-408	28	8.84	2.4	1.0	4.4	1.6	0.00000000
	C-409	28	8.84	2.4	1.0	4.4	1.6	0.00000000
ATM-8	C-410	28	7.92	5.6	1.1	4.4	1.6	0.00000000
	C-411	28	7.85	5.6	1.1	4.4	1.6	0.00000000
	C-412	28	7.85	5.6	1.1	4.4	1.6	0.00000000
	C-413	28	7.78	5.6	1.1	4.4	1.6	0.00000000
	C-414	28	7.78	5.6	1.1	4.4	1.6	0.00000000
	C-415	28	7.54	5.6	1.1	4.4	1.6	0.00000000
	C-416	28	7.78	5.6	1.1	4.4	1.6	0.00000000
	C-417	28	5.82	5.6	1.1	4.4	1.6	0.00000000
	C-418	28	6.26	5.6	1.1	4.4	1.6	0.00000000
	C-419	28	7.05	5.6	1.1	4.4	1.6	0.00000000
ATM-8 + TUEE	C-420	28	7.49	5.6	1.1	4.4	1.6	0.00000000
	C-421	28	7.49	5.6	1.1	4.4	1.6	0.00000000
	C-422	28	7.95	5.6	1.1	4.4	1.6	0.00000000
	C-423	28	7.70	5.6	1.1	4.4	1.6	0.00000000
	C-424	28	7.51	5.6	1.1	4.4	1.6	0.00000000
	C-425	28	7.74	5.6	1.1	4.4	1.6	0.00000000
	C-426	28	8.01	5.6	1.1	4.4	1.6	0.00000000
	C-427	28	7.92	5.6	1.1	4.4	1.6	0.00000000
	C-428	28	6.26	5.6	1.1	4.4	1.6	0.00000000
	C-429	28	7.05	5.6	1.1	4.4	1.6	0.00000000

Table A-10 (Cont'd)

TEST NUMBER	SO ₄ ²⁻ (μg/ml)	TOTAL C (μg/ml)
10	10	37.49
19	19	33.43
38	38	70.84
39	39	96.56
39A	39A	87.07
39B	39B	59.67
39C	39C	59.64
39D	39D	60.28
40	40	110.40
40A	40A	110.50
40B	40B	110.81
40C	40C	110.81
40D	40D	110.81
40E	40E	110.81
40F	40F	110.81
40G	40G	110.81
40H	40H	110.81
40I	40I	110.81
40J	40J	110.81
40K	40K	110.81
40L	40L	110.81
40M	40M	110.81
40N	40N	110.81
40O	40O	110.81
40P	40P	110.81
40Q	40Q	110.81
40R	40R	110.81
40S	40S	110.81
40T	40T	110.81
40U	40U	110.81
40V	40V	110.81
40W	40W	110.81
40X	40X	110.81
40Y	40Y	110.81
40Z	40Z	110.81
41	41	110.81
42	42	110.81
43	43	110.81
44	44	110.81
45	45	110.81
46	46	110.81
47	47	110.81
48	48	110.81
49	49	110.81
50	50	110.81
51	51	110.81
52	52	110.81
53	53	110.81
54	54	110.81
55	55	110.81
56	56	110.81
57	57	110.81
58	58	110.81
59	59	110.81
60	60	110.81
61	61	110.81
62	62	110.81
63	63	110.81
64	64	110.81
65	65	110.81
66	66	110.81
67	67	110.81
68	68	110.81
69	69	110.81
70	70	110.81
71	71	110.81
72	72	110.81
73	73	110.81
74	74	110.81
75	75	110.81
76	76	110.81
77	77	110.81
78	78	110.81
79	79	110.81
80	80	110.81
81	81	110.81
82	82	110.81
83	83	110.81
84	84	110.81
85	85	110.81
86	86	110.81
87	87	110.81
88	88	110.81
89	89	110.81
90	90	110.81
91	91	110.81
92	92	110.81
93	93	110.81
94	94	110.81
95	95	110.81
96	96	110.81
97	97	110.81
98	98	110.81
99	99	110.81
100	100	110.81

Table A-10 (Cont'd)

EXP'T TYPE	EXP'T NUMBER	EXP'T LENGTH	pH	Fe (ug/ml)		Cu (ug/ml)		NO ₂ (ug/ml)		NO ₃ (ug/ml)	
EJ-13	G-428	28	7.44	1.3	2.6	4.2	8.4	2.2	4.4	0.9	1.8
	G-429	28	7.39	1.3	2.6 (2.6)	4.2	8.4 (8.1)	2.2	4.4	0.8	1.6 (1.7)
	G-430	56	6.57	2.2	4.4	3.9	7.8	1.2	2.4	0.5	1.0
	G-431	56	6.75	2.2	4.4 (4.4)	3.8	7.6 (8.1)	1.2	2.4 (2.4)	0.5	1.0 (1.0)
	G-432	91	6.26	1.2	2.4	6.2	12.4	3.4	3.3	3.4	4.7
	G-433	91	5.54	3.6	4.9 (4.7)	16.4	22.6 (8.1)	LO.3	(3.3)	2.6	3.6 (4.2)
	G-434	182	6.51	2.8	5.6	4.0	8.0	1.7	3.4	1.1	1.1
	G-435	182	6.79	2.7	5.4 (5.5)	3.9	7.8 (8.1)	1.1	4.2 (3.8)	1.1	(0)
	G-436	278	6.91	1.6	3.0	4.1	8.2	1.0	4.0	LO.5	(0)
	G-437	278	6.98	1.5	3.0 (3.1)	4.1	8.2 (8.1)	1.0	4.0 (4.0)	LO.5	(0)
EJ-13 + TUFF	G-438	18	7.03	1.6	3.2	4.4	8.8	2.2	4.4	0.9	1.8
	G-439	18	7.05	1.6	3.2 (3.2)	4.4	8.8 (8.7)	2.2	4.4 (4.4)	1.0	2.0 (1.9)
	G-440	56	6.41	2.8	5.6	4.4	8.8	1.1	2.2	1.0	2.0
	G-441	56	6.37	2.7	5.4 (5.5)	4.3	8.6 (8.7)	1.0	3.0 (2.6)	0.8	1.6 (1.8)
	G-442	91	6.70	3.5	4.8	6.3	12.6	3.0	4.1	1.1	1.1
	G-443	91	6.71	3.3	4.5 (4.7)	5.6	11.2 (8.7)	3.2	4.4 (4.3)	0.9	1.8 (1.4)
	G-444	182	6.63	3.6	7.2	4.6	9.2	1.9	3.8	1.1	(0)
	G-445	182	6.84	3.1	6.2 (6.7)	4.3	8.6 (8.7)	2.3	4.6 (4.2)	LO.5	(0)
	G-446	278	6.81	1.3	4.6	4.2	8.4	1.4	4.8	LO.5	1.4
	G-447	278	6.80	2.5	5.0 (4.8)	4.2	8.4 (8.7)	2.2	4.4 (4.6)	0.7	1.4 (1.4)
EJ-13 NO GAMMA	G-448	14	7.98	1.2	2.4	4.0	8.0	-	-	3.8	7.6
	G-449	14	7.87	1.2	2.4 (2.4)	3.9	7.8 (8.1)	(0)	(0)	3.7	7.4 (7.5)
	G-450	28	8.36	1.3	2.6	4.2	8.4	LO.3	(0)	3.6	7.2
	G-451	28	8.24	1.2	2.6 (2.6)	4.1	8.2 (8.1)	LO.3	(0)	3.4	10.8 (8.5)
	G-452	56	7.48	1.2	2.6	3.9	7.8	LO.3	(0)	3.4	4.8
	G-453	56	8.23	1.4	2.8 (2.9)	3.8	7.6 (8.1)	LO.3	(0)	3.1	4.3 (4.6)
	G-454	91	8.75	1.3	2.6	3.8	7.6	LO.3	(0)	2.7	3.4
	G-455	91	8.87	1.2	2.6 (2.6)	3.8	7.6 (8.1)	LO.3	(0)	2.7	3.4 (5.4)
	G-456	182	4.73	1.2	2.4	3.1	6.2	LO.3	(0)	3.9	7.6
	G-457	182	6.65	1.4	2.8 (3.1)	14.7	28.2 (8.1)	LO.3	(0)	3.9	7.8 (7.7)
EJ-13 + TUFF NO GAMMA	G-458	278	7.87	1.5	3.0	26.0	52.0	LO.3	(0)	3.8	7.6
	G-459	278	8.14	1.4	2.8 (2.9)	20.8	41.6 (8.1)	LO.3	(0)	3.8	7.6 (7.6)
	G-460	14	7.27	1.2	2.4	4.6	9.2	-	-	4.0	8.0
	G-461	14	7.34	1.2	2.4 (2.4)	4.1	8.2 (8.4)	(0)	(0)	3.9	7.8 (7.9)
	G-462	28	8.06	1.4	2.8	4.3	8.6	LO.3	(0)	4.0	8.0
	G-463	28	7.90	1.4	2.8 (2.8)	4.3	8.6 (8.4)	LO.3	(0)	4.1	8.2 (8.1)
	G-464	56	7.40	1.3	2.6	4.1	8.2	LO.3	(0)	2.2	4.4
	G-465	56	7.62	1.3	2.6 (2.6)	4.1	8.2 (8.4)	LO.3	(0)	2.5	5.0 (4.7)
	G-466	91	8.35	1.4	2.8	4.3	8.6	LO.3	(0)	3.4	5.8
	G-467	91	8.17	1.2	2.4 (2.6)	4.1	8.2 (8.4)	LO.3	(0)	2.7	5.4 (5.1)
EJ-13 + TUFF NO GAMMA	G-468	182	7.98	1.2	2.4	4.1	8.2	LO.3	(0)	3.6	7.2
	G-469	182	8.12	1.2	2.4 (2.4)	4.1	8.2 (8.4)	LO.3	(0)	3.7	7.4 (7.3)
	G-470	278	8.04	1.2	2.4	4.0	8.0	LO.3	(0)	3.9	7.8
	G-471	278	8.02	1.5	3.0 (3.0)	4.5	9.0 (8.4)	LO.3	(0)	4.0	8.0 (7.9)

Table A-10 (Cont'd)

TEST NUMBER	SO ₄ ⁼ {ug/ml}	C
C-428	9.3 18.4	28.54
C-429	9.3 18.6 (19.3)	28.73
C-430	9.6 19.2	54.96
C-431	9.3 18.6 (19.3)	63.71
C-432	14.8 20.4	-
C-433	11.3 18.3 (19.3)	-
C-434	10.0 20.0	68.79
C-435	10.0 20.0 (19.3)	51.82
C-436	9.4 18.8	47.89
C-437	9.4 18.8 (19.3)	41.63
C-438	9.2 18.4	47.15
C-439	9.6 19.2 (20.1)	45.53
C-440	10.6 21.1	90.97
C-441	9.9 19.8 (20.1)	80.76
C-442	11.9 19.1	-
C-443	13.9 19.1 (20.1)	-
C-444	10.4 20.8	71.19
C-445	10.2 20.4 (20.1)	61.32
C-446	9.8 19.6	64.25
	9.8 19.6 (20.1)	79.10
C-448	9.1 18.2	-
C-449	8.9 17.8 (18.6)	-
C-450	9.4 18.8	33.54
C-451	9.1 18.2 (18.6)	31.12
C-452	9.5 19.0	65.11
C-453	9.3 18.6 (18.6)	66.34
C-454	9.4 18.8	71.48
C-455	9.4 18.8 (18.6)	83.86
C-456	9.7 19.4	73.88
C-457	9.5 19.0 (18.6)	78.73
C-458	9.4 18.8	101.20
C-459	9.1 18.2 (18.6)	97.48
C-460	9.4 18.8	-
C-461	9.1 18.2 (19.7)	-
C-462	9.4 18.8	46.18
C-463	9.4 18.8 (19.7)	47.36
C-464	9.4 18.8	86.97
C-465	9.2 18.4 (19.7)	94.15
C-466	10.3 20.6	84.00
C-467	9.7 19.4 (19.7)	81.40
C-468	9.4 18.8	95.14
C-469	9.6 19.2 (19.7)	93.15
C-470	23.1 46.2	97.46
C-471	10.9 21.8 (19.7)	105.60

Table A-10 (Cont'd)

EXP'T TYPE	EXP'T NUMBER	EXP'T LENGTH	pH	F ⁻ (ug/ml)			Cl ⁻ (ug/ml)			NO ₂ ⁻ (ug/ml)			NO ₃ ⁻ (ug/ml)		
TEELON	C-472	91	7.66	2.0	2.8	-0.1	12.0	16.5	8.4	LO.2		5.6	7.7	-0.1	0.12
	C-473	182	7.19	1.2	1.4	-0.5	7.6	15.2	7.1	LO.3		3.7	7.4	-0.2	0.12
	C-474	278	7.45	1.3	2.4	-0.5	4.0	8.0	-0.1	LO.3		3.5	7.0	-0.6	0.11
EJ-13 LEACHATE	91, 181, 278		7.58	1.8	2.5		5.1	7.0		LO.2		4.4	6.1		0.10
	56		8.23	1.2	2.4		3.7	7.4		LO.3		1.0	2.0		0.03
	14, 28 HPW	182	8.29	1.4	2.8		4.2	8.4		LO.3		3.6	7.2		0.00
				LO.1			LO.2			LO.3		L1			

EXP'T NUMBER	SO ₄ ⁼ {ug/ml}	TOTAL CARBON C {ug/ml}
C-472	13.9	19.1
C-473	9.6	19.2
C-474	8.7	17.4
91, 181, 278	13.1	18.0
56	9.2	18.4
14, 28 HPW	L1	

* ACT. RESULT
 ** DILUTION CORRECTED
 *** BACKGROUND CORRECTED

TABLE A-11
Anion Results from OR (Teflon Gasket) Experiments

This Table presents the anion results in ppm from the OR (Teflon gasket) experiments. NO_2^- was <0.3 ppm in all of these solutions.

Table A-11

Test Type	Test Number	Concentration (ppm)			
		F ⁻	Cl ⁻	NO ₃ ⁻	SO ₄ ⁼
ATM-1c	G-483	2.6	7.7	8.7	22.0
	G-484	2.7	7.8	8.7	21.7
	G-485	2.7	7.5	8.3	21.3
	G-486	2.7	7.5	8.5	21.4
	G-487	2.7	8.9	9.0	23.0
	G-488	2.6	8.8	8.8	22.5
	G-489	2.8	9.0	9.2	25.1
	G-490	2.6	8.6	9.9	25.2
	G-491				
	G-492				
	G-493				
	G-494				
	G-495				
	G-496				
ATM-1c + Tuff	G-497	2.7	8.5	9.2	23.8
	G-498	3.0	8.2	8.8	22.8
	G-499	2.8	7.6	8.3	21.3
	G-500	2.8	7.9	8.4	21.6
	G-501	2.9	19.5	8.8	22.9
	G-502	2.8	9.1	9.2	22.6
	G-503	2.9	9.0	9.9	25.2
	G-504	3.1	8.6	8.8	24.8
	G-505				
	G-506				
	G-507				
	G-508				
	G-509				
	G-510				
ATM-8	G-511	2.7	7.8	8.7	21.6
	G-512	2.7	7.8	8.6	21.7
	G-513	2.8	7.7	8.5	21.4
	G-514	2.7	7.5	8.3	21.3
	G-515	2.8	8.8	9.0	22.0
	G-516	3.0	8.3	8.5	21.2
	G-517	3.1	9.8	9.6	25.4
	G-518	3.1	9.8	9.8	25.3

Cont'd

Table A-11 (Cont'd)

Test Type	Test Number	Concentration (ppm)			
		F ⁻	Cl ⁻	NO ₃ ⁻	SO ₄ ⁼
	G-519				
	G-520				
	G-521				
	G-522				
	G-523				
	G-524				
ATM-8	G-525	3.1	8.8	9.6	24.5
+	G-526	2.9	8.4	9.1	23.1
Tuff	G-527	2.9	7.0	8.7	21.8
	G-528	2.9	8.0	8.6	21.8
	G-529	2.9	8.9	8.8	21.7
	G-530	2.9	8.6	9.3	22.7
	G-531	3.4	10.5	9.8	26.1
	G-532	3.4	10.3	10.1	25.9
	G-533				
	G-534				
	G-535				
	G-536				
	G-537				
	G-538				
Blanks	G-539	2.9	8.1	8.3	21.4
EJ-13	G-540	3.6	8.6	8.9	22.1
Only	G-541	2.6	7.9	8.6	20.9
	G-542	2.7	8.1	8.7	20.9
	G-543	2.6	8.1	8.8	21.0
	G-544	2.6	8.1	8.5	21.0
	G-545	2.8	9.3	9.2	24.1
	G-546	2.8	8.9	9.4	23.9
	G-547				
	G-548				
	G-549				
	G-550				
	G-551				
	G-552				

Cont'd

Table A-11 (Cont'd)

Test Type	Test Number	Concentration (ppm)			
		F ⁻	Cl ⁻	NO ₃ ⁻	SO ₄ ⁼
Blanks	G-553	2.8	8.5	8.9	21.5
+	G-554	2.9	8.5	9.0	21.8
Tuff	G-555	2.9	8.5	9.2	22.3
	G-556	2.7	8.1	8.5	20.7
	G-557	2.7	8.8	8.7	21.3
	G-558	3.2	9.1	8.9	21.6
	G-559	3.0	9.5	9.3	24.4
	G-560	3.0	9.8	9.6	25.5
	G-561				
	G-562				
	G-563				
	G-564				
	G-565				
	G-566				

TABLE A-12
Np and Pu Release from ATM-8 Glass, 2R Experiments

Np and Pu release is presented for the 2R experiments. The cps columns are per second normalized to 0.1 mL for nonfiltered, filtered, and acid-soak solutions. The nonfiltered aliquot was taken upon opening the vessel. The filtered aliquot was obtained by filtering through 0.1 μm filters for the 7-day solutions and through 50 Å filters for the 28- and 56-day samples.

Table A-12. Np and Pu Release from ATM-B Glass

²³⁷Np Analyses

ATM-B Disks						ATM-B Disks + Tuff						
Days	pH	cps (Nonfiltered)	cps (Filtered)	cps (Acid Soak)	Total Np Release (micro ga)	(NL) _{Np}	pH	cps (Nonfiltered)	cps (Filtered)	cps (Acid Soak)	Total Np Release (micro ga)	(NL) _{Np}
7	6.58	6.4E-2	6.4E-2	4.8E-2	1.57	0.6	7.05	5.2E-2	5.4E-2	2.2E-2	0.70	0.4
7	7.00	6.5E-2		6.6E-2	2.01	1.0	7.02	5.1E-2		4.3E-2	1.38	0.7
14	6.60	2.3E-1		3.1E-1	9.04	4.6	7.20	1.6E-1		1.6E-1	4.90	2.6
14	7.10	2.3E-1		2.6E-1	7.37	3.6	7.23	2.0E-1		2.1E-1	6.28	3.2
20	6.92	4.2E-1	2.0E-1	6.1E-1	17.6	9.1	7.20	2.7E-1	3.1E-1	3.9E-1	11.3	5.0
20	7.01	4.1E-1		7.2E-1	20.4	10.6	7.09	4.1E-1		3.6E-1	10.0	5.6
56	7.50	2.8E-1	1.9E-1	4.0E-1	11.6	6.0	7.40	3.0E-1	2.4E-1	3.6E-1	11.2	5.0
56	7.37	3.5E-1		2.6E-1	0.02	4.1	7.61	2.9E-1		4.7E-1	13.7	6.9

²³⁹Pu Analyses

ATM-8 Disks							ATM-8 Disks + Tuff						
Days	pH	cps (Nonfiltered)	cps (Filtered)	cps (Acid Soak)	Total Pu Release (micro gm)	(NL) _{Pu}	pH	cps (Nonfiltered)	cps (Filtered)	cps (Acid Soak)	Total Pu Release (micro gm)	(NL) _{Pu}	
7	6.65	4.8E-2	4.1E-2	1.0E-1	30.3	0.06	7.05	1.8E-2	1.6E-2	3.4E-2	10.6	0.02	
7	7.00	4.6E-2		1.3E-1	30.4	0.06	7.02	1.4E-2		6.0E-2	16.8	0.03	
14	6.60	3.1E-1		7.7E-1	235.4	0.46	7.20	4.0E-2		2.2E-1	62.1	0.12	
14	7.10	1.0E-1		6.9E-1	189.7	0.33	7.23	3.8E-2		2.9E-1	79.3	0.16	
20	6.92	2.4E-1	7.7E-2	1.02	503.6	0.99	7.20	6.8E-2	6.0E-2	7.9E-1	242.0	0.40	
20	7.01	2.3E-1		1.57	482.0	0.94	7.09	7.3E-2		7.0E-1	210.4	0.42	
56	7.50	6.8E-2	6.3E-2	1.07	610.1	1.00	7.40	5.9E-2	4.6E-2	7.1E-1	219.1	0.43	
56	7.37	6.3E-2		8.8E-1	273.0	0.53	7.61	4.4E-2		8.0E-1	211.0	0.41	

Cont'd

Table A-12 (Cont'd)

²³⁷Np Analyses

ATM-8 Disks Crushed

Days	pH	cps (Nonfiltered)	cps (Filtered)	cps (Acid Soak)	Total Np Release (micro ga)	(ML) _{Np}
7	6.68	2.5E-2	2.7E-2	1.4E-2	6.69	6.1
7	6.95	2.7E-2		4.2E-2	1.21	6.2
14	7.16	1.4E-1		1.3E-1	5.77	5.6
14	7.04	1.6E-1		1.6E-1	4.36	6.7
28	7.37	2.2E-1	1.1E-1	4.7E-1	12.7	2.1
28	7.42	2.3E-1		2.7E-1	7.88	1.3
56	7.74	1.4E-1	9.1E-2	ND	3.99	6.7
56	7.66	1.6E-1		ND	4.26	6.7

²³⁹Pu Analyses

ATM-8 Disks Crushed

Days	pH	cps (Nonfiltered)	cps (Filtered)	cps (Acid Soak)	Total Pu Release (micro ga)	(ML) _{Pu}
7	6.88	4.3E-2	4.2E-2	1.2E-1	34.1	6.62
7	6.95	5.2E-2		9.5E-2	36.7	6.62
14	7.16	1.6E-1		3.6E-1	97.2	6.66
14	7.04	1.7E-1		3.1E-1	69.7	6.66
28	7.37	1.1E-1	5.3E-2	7.6E-1	221.6	6.14
28	7.42	1.2E-1		9.0E-1	272.2	6.17
56	7.74	7.9E-2	6.3E-2	1.62	469.6	6.36
56	7.66	8.1E-2		1.76	534.1	6.32

TABLE A-13
FY 1986 Actinides

This Table presents the Np and Pu results for the 1R experiments. The Table is annotated at the bottom of the Table.

Table A-13. FY 1986 Actinides

EXP'T NUMBER	pH	DETECTOR EFFICIENCY	Np-237 (c/s)	Pu-239 (c/s)	Am-241 (c/s)	SURFACE AREA (mm ²)	SOLUTION VOLUME (ml)	ALIQUEOT VOLUME (ml)	LIVE TIME (sec)	Np-237 COUNTS	FRACTION MASS (ug)	TOTAL MASS* (ug)	NL (Np) (g/m ² %)
ATM-8													
408 UF	8.67	0.1894	0.00020	0.00010		499	14.90	0.10	77355	7967	3.0994	[0.399]	
408 F		0.1920	0.00020	0.00010		499	14.90	0.30	144677	18073	1.2365	[3.50E-4]	
408 AS		0.1944	0.00010	0.00020		499	12.40	0.10	10415	1193	2.7979		
408 AW		0.1940	0.00020	0.00010		499	19.00	0.50	16943	88	0.0375	3.136	1.85
409 UF	8.54	0.1944	0.00010	0.00020		483	14.87	0.10	77354	8865	3.3569		
409 AS		0.1894	0.00020	0.00010		483	12.77	0.10	11614	1346	2.9897		
409 AW		0.1950	0.00020	0.00020		483	19.00	0.50	16934	306	0.1308	3.525	2.15
410 UF	7.92	0.1894	0.00020	0.00010		505	14.82	0.10	24551	3850	4.7335	[0.285]	
410 F		0.1904	0.00020	0.00010		505	14.82	0.15	76425	2918	1.2758	[3.63E-4]	
410 AS		0.1894	0.00020	0.00010		505	12.32	0.10	7533	1351	4.4662		
410 AW		0.1940	0.00020	0.00010		505	19.00	0.50	18763	205	0.0805	5.216	3.04
411 UF	7.65	0.1944	0.00010	0.00020		496	14.85	0.10	24548	3528	4.3048		
411 AS		0.1974	0.00010	0.00020		496	13.78	0.10	12522	2537	5.0130		
411 AW		0.1990	0.00020	0.00020		496	19.00	0.50	18763	190	0.0726	5.680	3.37
412 UF	7.61	0.1456	0.00020	0.00012		511	14.45	0.10	17467	2360	5.0882	[0.492]	
412 F		0.1956	0.00015	0.00017		511	14.45	0.03	93165	2485	2.5033	[7.31E-4]	
412 AS		0.1456	0.00020	0.00012		511	11.95	0.10	8153	2500	9.6394		
412 AW		0.1958	0.00015	0.00017		511	19.00	0.50	57416	376	0.0476	10.406	5.99
413 UF	7.68	0.1956	0.00015	0.00017		497	14.55	0.10	27881	5086	5.1965		
413 AS		0.1956	0.00015	0.00017		497	12.45	0.10	8153	2954	8.8353		
413 AW		0.1456	0.00020	0.00012		497	19.00	0.50	29068	9	0.0011	9.570	5.66
414 UF	7.70	0.1926	0.00020	0.00012		493	14.70	0.10	20171	4847	7.0235	[0.456]	
414 F		0.1926	0.00020	0.00012		493	14.70	0.10	52978	5815	3.2050	[9.20E-4]	
414 AS		0.1956	0.00015	0.00017		493	12.20	0.10	10679	3594	8.0418		
414 AW		0.1929	0.00023	0.00013		493	19.00	0.50	14007	256	0.1363	9.170	5.47
415 UF	7.54	0.1926	0.00020	0.00012		493	14.72	0.10	19200	5080	7.7445		
415 AS		0.1956	0.00015	0.00017		493	12.62	0.10	7870	2437	7.6536		
415 AW		0.1999	0.00019	0.00019		493	15.00	0.50	14004	202	0.1037	8.852	5.28
416 UF	7.78	0.1931	0.00020	0.00012		496	14.69	0.10	7636	8427	8.4927	[0.223]	
416 F		0.1931	0.00020	0.00012		496	14.69	0.17	60294	6674	1.8951	[5.44E-4]	
416 AS		0.1904	0.00020	0.00012		496	12.19	0.10	7281	2703	9.1047		
416 AW		0.1940	0.00015	0.00017		496	19.00	0.50	31330	235	0.0546	10.360	6.14
417 UF	5.82	0.1957	0.00015	0.00017		509	14.61	0.10	21977	6178	6.7435		
417 AS		0.1974	0.00015	0.00017		509	12.51	0.10	7290	1750	5.8271		
417 AW		0.1925	0.00020	0.00012		509	19.00	0.50	12446	2	0.0000	6.780	3.92
ATM-8 • TUEF													
418 UF	8.36	0.1938	0.00020	0.00010		498	14.55	0.10	15173	2260	4.2802	[0.396]	
418 F		0.1965	0.00010	0.00020		498	14.55	0.30	144674	25957	1.6963	[4.92E-4]	
418 AS		0.1920	0.00020	0.00010		498	12.05	0.10	20716	3084	3.5762		
418 AW		0.1894	0.00020	0.00010		498	19.00	0.50	90229	450	0.0143	4.314	2.55
418 T		0.2014	0.00023	0.00013		498	1.00	1.00	2568	0	0.0000		
419 UF	8.05	0.1894	0.00020	0.00010		502	14.57	0.10	16744	3175	5.5849		
419 AS		0.1965	0.00010	0.00020		502	12.47	0.10	20716	4264	5.0039		
419 AW		0.1944	0.00010	0.00020		498	19.00	0.50	90231	126	0.0097	5.803	3.40
419 T		0.1955	0.00019	0.00019		502	1.00	1.00	2569	0	0.0000		
420 UF	7.59	0.1894	0.00020	0.00012		50*	14.40	0.10	76106	20924	8.0057	[0.260]	
420 F		0.1974	0.00015	0.00017		50*	14.40	0.18	75685	10149	2.0805	[6.10E-4]	
420 AS		0.1894	0.00020	0.00012		508	11.90	0.10	21981	11	7.3821		
420 AW		0.1940	0.00023	0.00013		508	19.00	0.50	10170	164	0.1193	8.756	5.07
420 T		0.2074	0.00023	0.00013		508	1.00	1.00	2132	700	0.0624		

Table A-12 (Cont'd)

EXP'T NUMBER	Pu-239 COUNTS (counts)	FRACTION MASS (ug)	TOTAL MASS* (ug)	ML (Pu) (g/m ² ±2)
ATM-B				
408 UF	848	0.0037	[0.143]	
408 F	700	0.0005	(1.50E-7)	
408 AS	1149	0.0839		
408 AW	132	0.0007	0.086	0.19
409 UF	582	0.0024		
409 AS	3993	0.1009		
409 AW	203	0.0010	0.102	0.23
410 UF	492	0.0068	[0.055]	
410 F	122	0.0004	(1.05E-7)	
410 AS	5427	0.2040		
410 AW	906	0.0041	0.209	0.46
411 UF	313	0.0042		
411 AS	9380	0.2106		
411 AW	1370	0.0061	0.216	0.49
412 UF	125	0.0030	[0.205]	
422 S	70	0.0006	(1.80E-7)	
412 AS	8555	0.3749		
412 AW	1530	0.0022	0.378	0.82
413 UF	220	0.0025		
413 AS	13216	0.4492		
413 AW	1005	0.0039	0.454	1.01
414 UF	146	0.0024	[0.216]	
414 F	88	0.0005	(1.46E-7)	
414 AS	24086	0.6125		
414 AW	473	0.0029	0.615	1.39
415 UF	198	0.0034		
415 AS	12710	0.4536		
415 AW	398	0.0023	0.457	1.03
416 UF	371	0.0047	[0.068]	
416 F	155	0.0003	(9.00E-7)	
416 AS	15534	0.5947		
416 AW	4603	0.0125	0.609	1.36
417 UF	308	0.0038		
417 AS	15517	0.5873		
417 AW	1296	0.0089	0.597	1.30
ATM-S + TUFF				
418 UF	71	0.0015	[0.201]	
418 F	435	0.0003	(8.67E-8)	
418 AS	6167	0.0813		
418 AW	2650	0.0026	0.084	0.19
418 T				
419 UF	104	0.0020		
419 AS	6074	0.0803		
419 AW	2228	0.0021	0.082	0.19
419 T	3004	0.0026		
420 UF	1322	0.0057	[0.029]	
420 F	86	0.0002	(4.82E-8)	
420 AS	4811	0.1373		
420 AW	552	0.0046	0.153	0.33
420 T	4554	0.0046		

Table A-13 (Cont'd)

421 UF	7.84	0.1944	0.00015	0.00017	499	14.45	0.10	76103	22979	8.5276		
421 AS		0.1944	0.00015	0.00017	499	12.35	0.10	9501	1996	9.7190		
421 AW		0.1990	0.00019	0.00019	499	19.00	0.50	10168	83	0.0584	6.730	5.15
421 T		0.1955	0.00019	0.00019	499	1.00	1.00	2132	400	0.0367		
421 UF	7.95	0.1955	0.00015	0.00017	500	12.55	0.10	64008	1157	0.5111	[0.000]	
421 F		0.1955	0.00015	0.00017	500	14.55	0.30	229871	23	0.0000	[0.00]	
422 AS		0.1957	0.00015	0.00017	500	12.05	0.10	7421	1843	3.8574		
422 AW		0.1956	0.00015	0.00017	500	19.00	0.50	29127	9	0.0012	5.946	3.50
422 T		0.1458	0.00020	0.00012	500	1.00	1.00	1332	0	0.0000		
423 UF	7.70	0.1956	0.00015	0.00017	498	14.56	0.10	17585	4558	7.5528		
423 AS		0.1956	0.00015	0.00017	498	12.46	0.10	64176	27921	10.6185		
423 AW		0.1956	0.00015	0.00017	498	19.00	0.50	77118	687	0.0652	11.651	6.88
423 T		0.1958	0.00015	0.00017	498	1.00	1.00	1426	0	0.0000		
423 UF	7.51	0.1956	0.00020	0.00012	498	14.50	0.10	9426	3233	9.8911	[0.397]	
424 F		0.1956	0.00015	0.00017	498	14.50	0.17	52979	12442	3.9225	[1.14E-4]	
424 AS		0.1916	0.00020	0.00012	498	12.00	0.10	7841	3227	9.8231		
424 AW		0.1929	0.00023	0.00013	498	19.00	0.50	20580	181	0.0650	11.286	6.67
424 T		0.2014	0.00023	0.00013	498	1.00	1.00	1294	1	0.0001		
425 UF	7.74	0.1956	0.00015	0.00017	504	14.50	0.10	9424	3179	9.5800		
425 AS		0.1926	0.00020	0.00012	504	12.80	0.10	10678	5591	13.3319		
425 AW		0.1939	0.00019	0.00019	504	19.00	0.50	20579	213	0.0740	14.760	8.61
425 T		0.1955	0.00019	0.00019	504	1.00	1.00	1293	1	0.0001		
426 UF	8.01	0.1931	0.00020	0.00012	505	14.46	0.10	185492	144	0.0162	[0.307]	
426 F		0.1957	0.00015	0.00017	505	14.46	0.10	240391	81	0.0050	[1.45E-6]	
426 AS		0.1904	0.00020	0.00012	505	11.96	0.10	4369	1512	8.3270		
426 AW		0.1909	0.00015	0.00017	505	19.00	0.50	73632	150	0.0137	9.777	5.69
426 T		0.2014	0.00023	0.00013	505	1.00	1.00	1961	7392	0.7175		
427 UF	7.92	0.1931	0.00020	0.00012	499	14.39	0.10	156050	52584	9.6187		
427 AS		0.1974	0.00015	0.00017	499	12.69	0.10	4369	1723	8.7131		
427 AW		0.2009	0.00017	0.00017	499	19.00	0.50	12446	2	0.0001	11.072	6.53
427 T		0.1955	0.00019	0.00019	499	1.00	1.00	1961	0	0.0000		

ATOMIC WEIGHT FRACTIONS OF ACTINIDES IN GLASS

[Pu] ATM = $3.4E-3$ [Pu] ATM = $9.0E-4$

UF UNFILTERED SOLUTION (DISSOLVED IN TOTAL VOLUME)

F FILTERED, 50 A (DISSOLVED IN TOTAL VOLUME)

[] MASS An(F)/An(UF)

[] SOLUBILITY IN MOLES/LITER

AS ACID SOAKED SOLUTION (DISSOLVED IN TOTAL VOLUME LESS 2.5ml REMOVED FOR OTHER ANALYSED)

AW ACID WASHED VESSEL (19.0ml HNO₃-HF soln)

T TUFF WAFER SURFACE (VALUE REPORTED REFERS TO ONLY ONE SIDE OF WAFER)

NOT ANALYSED

* TOTAL MASS REPRESENTS An(UF) + An(adsorbed on vessel) + An(adsorbed on tuff*2)

Table A-13 (Cont'd)

421 UF	1665	0.0070		
421 AS	7669	0.4257		
421 AW	2150	0.0176	0.247	0.55
421 T	2448	0.0026		
422 UF	520	0.0026	(0.000)	
422 E	41	0.0000	(1.50E-10)	
422 AS	5522	0.1994		
422 AW	4043	0.0117	0.277	0.62
422 T	14680	0.0330		
423 UF	92	0.0016		
423 AS	66574	0.2877		
423 AW	3446	0.0038	0.249	0.56
423 T	2964	0.0046		
424 UF	103	0.0035	(0.047)	
424 E	55	0.0002	(4.76E-8)	
424 AS	10533	0.3644		
424 AW	1060	0.0044	0.383	0.85
424 T	3953	0.0066		
425 UF	131	0.0044		
425 AS	13282	0.3599		
425 AW	2722	0.0109	0.392	0.86
425 T	5573	0.0096		
426 UF	142	0.0002	(0.000)	
426 E	28	0.0000	(0.00)	
426 AS	4712	0.1949		
426 AW	2541	0.0028	0.310	0.68
426 T	5024	0.0055		
427 UF	1162	0.0024		
427 AS	7254	0.4647		
427 AW	1085	0.0072	0.489	1.09
427 T	912	0.0104		

TABLE A-14

Np and Pu Results from the OR (Teflon Gasket) Experiments

This Table presents Np and Pu data from the OR (Teflon gasket) experiments. The columns are:

Effey = detector efficiency

LT = live counting time (sec)

Np, Pu, Am = background levels for these elements, Am is not used

aliquot = the volume of solution counted

sol'n = volume of the solution from which the counted aliquot was extracted

counts = raw counts for each element

c/s = counts per second

BGC = background corrected counts/sec

EC = efficiency corrected disintegrations/sec

Total d/s = total disintegrations for each element

Total μgm = total micrograms for each element

The normalized mass loss for each experiment is given in the unmarked column.

Table A-14. Np and Pu Results from the OR (Teflon Gasket) Experiments

TEST #	Eficy	LT	Np	Pu	Am	aliquot	sol'n	counts	c/s
14 day									
511*	.1938	91441	.00023	.00013	.0011	.10	14.87	1379	.0151
511**	.1938	85555	.00023	.00013	.0011	.15	14.87	743	.0087
511***	.2030	59773	.00019	.00019	.0004	.10	11.88	1005	.0168
511****	.1938	104113	.00023	.00013	.0011	.50	19.00	60	.0006
512*	.2030	91431	.00019	.00019	.0004	.10	14.90	1601	.0175
512***	.2030	23957	.00019	.00019	.0004	.10	12.39	485	.0202
512****	.2030	104121	.00019	.00019	.0004	.50	19.00	60	.0006
525*	.1938	59778	.00023	.00013	.0011	.10	14.49	2176	.0364
525**	.2030	85550	.00019	.00019	.0004	.30	14.49	3926	.0459
525***	.1938	99807	.00023	.00013	.0011	.10	11.40	4151	.0416
525****	.1938	245057	.00023	.00013	.0011	.50	19.00	87	.0004
525TUFF	.2597	10651	.00023	.00013	.0011	1.00	1.00	3	.0003
526*	.1938	80418	.00023	.00013	.0011	.10	14.48	2720	.0338
526**	.2030	80415	.00019	.00019	.0004	.10	11.86	3192	.0397
526****	.2030	245010	.00019	.00019	.0004	.50	19.00	60	.0002
526TUFF	.2720	10651	.00019	.00019	.0004	1.00	1.00	3	.0003
28 DAY									
513*	.1938	56434	.00023	.00013	.0011	.10	14.87	1290	.0229
513**	.1938	87408	.00023	.00013	.0011	.20	14.87	347	.0040
513***	.1938	160176	.00023	.00013	.0011	.10	11.95	4130	.0258
513****	.1938	182572	.00023	.00013	.0011	.50	19.00	105	.0006
514*	.2030	56433	.00019	.00019	.0004	.10	14.95	1569	.0278
514***	.2030	160180	.00019	.00019	.0004	.10	12.49	4681	.0292
514****	.2030	182580	.00019	.00019	.0004	.50	19.00	78	.0004
527*	.1938	95546	.00023	.00013	.0011	.10	14.53	6940	.0726
527**	.2030	87424	.00019	.00019	.0004	.20	14.53	813	.0093
527***	.2030	29401	.00019	.00019	.0004	.10	11.46	2446	.0832
527****									
527TUFF	.1934	18444	.00023	.00013	.0011	1.00	1.00	4	.0002
528*	.2030	95544	.00019	.00019	.0004	.10	14.47	8137	.0852
528***	.1938	29401	.00023	.00013	.0011	.10	12.01	2884	.0981
528****									
528TUFF	.2022	18444	.00019	.00019	.0004	1.00	1.00	4	.0002

Table A-14 (Cont'd)

TEST #	BGC	EC	total	total
14 day			d/s	ugm/s
	NP			
511*	.0149	.7663	11.39	.4383
511**	.0085	.2908	4.32	.1663
511***	.0166	.8189	9.73	.3742
511****	.0003	.0036	.07	.0026
				.4110
512*	.0173	.8532	12.71	.4890
512**	.0201	.9879	12.24	.4708
512***	.0004	.0038	.07	.0028
				.4920
525*	.0362	1.8664	27.04	1.0402
525**	.0457	.7504	10.87	.4182
525***	.0414	2.1342	24.33	.9358
525****	.0001	.0013	.02	.0009
525TUFF	.0001	.0002	.00	.0000
				1.0410
526*	.0336	1.7334	25.10	.9654
526**	.0395	1.9460	23.08	.8877
526***	.0001	.0005	.01	.0004
526TUFF	.0001	.0003	.00	.0000
				.9650
28 DAY				
513*	.0226	1.1676	17.36	.6678
513**	.0037	.0965	1.43	.0552
513***	.0256	1.3186	15.76	.6060
513****	.0003	.0036	.07	.0026
				.6710
514*	.0276	1.3602	20.34	.7821
514**	.0290	1.4302	17.85	.6871
514***	.0002	.0023	.04	.0017
				.7840
527*	.0724	3.7361	54.29	2.0879
527**	.0091	.2244	3.26	.1254
527***	.0830	4.0889	46.86	1.8023
527****				
527TUFF	-.0000	-.0001	-.00	-.0000
				2.0880
528*	.0330	4.1860	60.57	2.3296
528**	.0979	5.0496	60.65	2.3325
528***				
528TUFF	.0000	.0001	.00	.0000
				2.3300

Table A-14 (Cont'd)

56 DAY

515#	.1909	30599	.00021	.00015	.0011	.10	14.90	1733	.0566
515**	.1909	82007	.00021	.00015	.0011	.40	14.90	8120	.0990
515***	.1909	54233	.00021	.00015	.0011	.10	11.85	3435	.0633
515****	.1934	55608	.00021	.00015	.0011	.50	19.00	42	.0008
516#	.1973	30599	.00019	.00019	.0004	.10	14.87	1538	.0503
516**	.1973	54232	.00019	.00019	.0004	.10	12.01	3573	.0659
516***	.2022	55610	.00019	.00019	.0004	.50	19.00	62	.0011
529#	.1909	105073	.00021	.00015	.0011	.10	14.47	8537	.0812
529**	.1973	87008	.00019	.00019	.0004	.30	14.47	5498	.0632
529***	.1909	13626	.00021	.00015	.0011	.10	11.86	1301	.0955
529****	.1934	27202	.00021	.00015	.0011	.50	19.00	30	.0010
529TUFF	.1934	5827	.00021	.00015	.0011	1.00	1.00	2	.0003
530#	.1973	105069	.00019	.00019	.0004	.10	14.50	8319	.0792
530**	.1973	13625	.00019	.00019	.0004	.10	11.98	1173	.0861
530***	.2022	29193	.00019	.00019	.0004	.50	19.00	75	.0026
530TUFF	.2022	5827	.00019	.00019	.0004	1.00	1.00	2	.0003

91 DAY

517#	.1934	18317	.00022	.00013	.0011	.20	14.91	1791	.0978
517**	.1934	55572	.00022	.00013	.0011	.35	14.91	4490	.0808
517***	.1934	52820	.00022	.00013	.0011	.20	11.62	6500	.1231
517****	.1934	103124	.00022	.00013	.0011	.50	19.00	50	.0005
518#	.2022	18315	.00019	.00019	.0004	.20	14.91	1892	.1033
518**	.2022	52818	.00019	.00019	.0004	.20	12.21	6500	.1231
518***	.2022	103124	.00019	.00019	.0004	.50	19.00	50	.0005
531#	.1934	17156	.00022	.00013	.0011	.20	14.50	2770	.1615
531**	.2022	55571	.00019	.00019	.0004	.40	14.50	9602	.1728
531***	.1934	6531	.00022	.00013	.0011	.20	11.19	1200	.1837
531****	.1934	157503	.00022	.00013	.0011	.50	19.00	300	.0019
531TUFF	.1934	7231	.00022	.00013	.0011	1.00	1.00	2	.0003
532#	.2022	17156	.00019	.00019	.0004	.20	14.52	2863	.1669
532**	.2022	6531	.00019	.00019	.0004	.20	11.70	1200	.1837
532***	.2022	157502	.00019	.00019	.0004	.50	19.00	300	.0019
532TUFF	.2022	7231	.00019	.00019	.0004	1.00	1.00	2	.0003

Table A-14 (Cont'd)

56 DAY

515*					
515**	.0564	2.9558	44.04	1.6939	
515***	.0988	1.2939	19.28	.7415	
515****	.0631	3.3069	39.19	1.5872	
	.0005	.0056	.11	.0041	
				1.6980	1.03
516*	.0501	2.5379	37.74	1.4515	
516**	.0657	3.3296	39.99	1.5380	
516***	.0009	.0091	.17	.0067	
				1.5450	.91
529*	.0810	4.2451	61.43	2.3625	
529**	.0630	1.0644	15.40	.5924	
529***	.0953	4.9905	59.19	2.2764	
529****	.0008	.0085	.16	.0062	
529TUFF	.0001	.0007	.00	.0000	
				2.3690	1.41
530*	.0790	4.0034	58.05	2.2327	
530**	.0859	4.3539	52.16	2.0061	
530***	.0024	.0235	.45	.0172	
530TUFF	.0002	.0008	.00	.0000	
				2.2500	1.28

91 DAY

517*	.0976	2.5222	37.61	1.4464	
517**	.0806	1.1904	17.75	.6826	
517***	.1228	3.1758	36.90	1.4193	
517****	.0003	.0027	.05	.0020	
				1.4480	.86
518*	.1031	2.5498	38.02	1.4622	
518**	.1229	3.0384	37.10	1.4269	
518***	.0003	.0029	.06	.0021	
				1.4640	.88
531*	.1612	4.1686	60.44	2.3248	
531**	.1726	2.1340	30.94	1.1901	
531***	.1835	4.7445	53.09	2.0420	
531****	.0017	.0174	.33	.0127	
531TUFF	.0001	.0003	.00	.0000	
				2.3380	1.37
532*	.1667	4.1219	59.85	2.3019	
532**	.1835	4.5388	53.10	2.0425	
532***	.0017	.0170	.32	.0124	
532TUFF	.0001	.0004	.00	.0000	
				2.3140	1.35

Table A-14 (Cont'd)

182 DAY

519+	.0423	2.2161	33.02	1.2700	
519++	.0854	1.2376	18.44	.7092	
519+++	.0599	3.0397	36.02	1.3854	
519++++	.0000	.0003	.01	.0002	
				1.3856	.82
520+	.0479	2.4304	36.14	1.3900	
520++	.0560	2.9351	36.25	1.3942	
520+++	.0001	.0007	.01	.0005	
				.3947	.84
533+	.0817	4.2823	62.09	2.3882	
533++	.0802	1.6829	24.40	.9386	
533+++	.1053	5.5220	62.40	2.3999	
533++++	.0005	.0054	.10	.0040	
533TUFF	ERROR	ERROR	ERROR	ERROR	
534+	.0919	4.6643	67.68	2.6031	
534++	.1120	5.6825	68.25	2.6249	
534+++	.0002	.0019	.04	.0014	
534TUFF	ERROR	ERROR	ERROR	ERROR	

TEST #	BGC	PC	total	total
14 day			d/s	ngms
	AM			
511+	0.0000	0.0000	0.00	0.000
511++	0.0000	0.0000	0.00	0.000
511+++	0.0000	0.0000	0.00	0.000
511++++	0.0000	0.0000	0.00	0.000
512+	0.0000	0.0000	0.00	0.000
512++	0.0000	0.0000	0.00	0.000
512+++	0.0000	0.0000	0.00	0.000
525+	0.0000	0.0000	0.00	0.000
525++	0.0000	0.0000	0.00	0.000
525+++	0.0000	0.0000	0.00	0.000
525++++	0.0000	0.0000	0.00	0.000
525TUFF	0.0000	0.0000	0.00	0.000
526+	0.0000	0.0000	0.00	0.000
526++	0.0000	0.0000	0.00	0.000
526+++	0.0000	0.0000	0.00	0.000
526TUFF	0.0000	0.0000	0.00	0.000

Table A-14 (Cont'd)

28 DAY

513*	117	.0021	.0019	.1003	1.49	.00066		51	.0009
513**	29	.0003	.0002	.0052	.08	.00003		83	.0009
513***	6201	.0392	.0391	2.0167	24.10	.01062		593	.0037
513****	233	.0013	.0011	.0118	.22	.00010		213	.0012
						.01072	.03		
514*	98	.0017	.0015	.0762	1.14	.00050		27	.0005
514***	9619	.0601	.0599	2.9488	36.83	.01623		750	.0047
514****	265	.0015	.0013	.0124	.24	.00010		90	.0005
						.01633	.04		
527*	146	.0015	.0014	.0721	1.05	.00046		129	.0014
527**	23	.0003	.0001	.0018	.03	.00001		30	.0003
527***	3983	.1355	.1353	6.6641	76.37	.03364		266	.0090
527****									
527TUFF	7022	.3807	.3806	1.9679	1.97	.00087		235	.0127
						.03538	.09		
528*	227	.0024	.0022	.1077	1.56	.00069		46	.0005
528***	4112	.1399	.1397	7.2100	86.59	.03815		281	.0096
528****									
528TUFF	12976	.7035	.7033	3.4785	3.48	.00153		460	.0249
						.04121	.10		

56 DAY

515*	68	.0022	.0021	.1086	1.62	.00071		34	.0011
515**	228	.0028	.0026	.0344	.51	.00023		108	.0013
515***	9947	.1834	.1833	9.5999	113.76	.05011		681	.0126
515****	30	.0005	.0004	.0040	.08	.00003		44	.0008
						.05014	.12		
516*	67	.0022	.0020	.1013	1.51	.00066		17	.0006
516***	7931	.1462	.1461	7.4025	88.90	.03916		601	.0111
516****	113	.0020	.0018	.0182	.35	.00015		28	.0005
						.03931	.09		
529*	326	.0031	.0030	.1547	2.24	.00099		139	.0013
529**	138	.0016	.0014	.0236	.34	.00015		46	.0005
529***	3697	.2713	.2712	14.2048	168.47	.07422		226	.0166
529****	40	.0014	.0012	.0126	.24	.00011		32	.0011
529TUFF	5516	.9466	.9465	4.8939	4.89	.00216		189	.0324
						.07865	.18		
530*	278	.0026	.0025	.1245	1.80	.00080		51	.0005
530***	3490	.2561	.2560	12.9730	155.42	.06847		243	.0178
530****	140	.0048	.0046	.0456	.87	.00038		32	
530TUFF	5259	.9025	.9023	4.4626	4.46	.00197		179	
						.07279	.16		

Table A-14 (Cont'd)

28 DAY

513#	0.0000	0.0000	0.00	0.000
513##	0.0000	0.0000	0.00	0.000
513###	0.0000	0.0000	0.00	0.000
513####	0.0000	0.0000	0.00	0.000

514#	0.0000	0.0000	0.00	0.000
514##	0.0000	0.0000	0.00	0.000
514###	0.0000	0.0000	0.00	0.000

527#	0.0000	0.0000	0.00	0.000
527##	0.0000	0.0000	0.00	0.000
527###	0.0000	0.0000	0.00	0.000
527####				
527TUFF	0.0000	0.0000	0.00	0.000

528#	0.0000	0.0000	0.00	0.000
528##	0.0000	0.0000	0.00	0.000
528###				
528TUFF	0.0000	0.0000	0.00	0.000

56 DAY

515#	0.0000	0.0000	0.00	0.000
515##	0.0000	0.0000	0.00	0.000
515###	0.0000	0.0000	0.00	0.000
515####	0.0000	0.0000	0.00	0.000

516#	0.0000	0.0000	0.00	0.000
516##	0.0000	0.0000	0.00	0.000
516###	0.0000	0.0000	0.00	0.000

529#	0.0000	0.0000	0.00	0.000
529##	0.0000	0.0000	0.00	0.000
529###	0.0000	0.0000	0.00	0.000
529####	0.0000	0.0000	0.00	0.000
529TUFF	0.0000	0.0000	0.00	0.000

530#	0.0000	0.0000	0.00	0.000
530##	0.0000	0.0000	0.00	0.000
530###				
530TUFF				

Table A-14 (Cont'd)

91 DAY

517*	197	.0108	.0106	.2747	4.10	.00182	25
517**	81	.0015	.0013	.0196	.29	.00013	63
517***	38644	.7316	.7315	18.9112	219.75	.09681	2295
517****	1853	.0180	.0178	.1845	3.51	.00154	226
						.09835	.23
518*	90	.0049	.0047	.1168	1.74	.00077	14
518***	36151	.6844	.6843	16.9202	206.60	.09101	2248
518****	920	.0089	.0087	.0864	1.64	.00072	72
						.09173	.22
531*	156	.0091	.0090	.2317	3.36	.00148	29
531**	243	.0044	.0042	.0517	.75	.00033	42
531***	5305	.8123	.8121	20.9966	234.95	.10350	349
531****	2356	.0150	.0148	.1533	2.91	.00128	273
531TUFF	9996	1.3824	1.3823	7.1471	7.15	.00315	420
						.11108	.26
532*	151	.0088	.0086	.2129	3.09	.00136	17
532***	5335	.8169	.8167	20.1949	236.28	.10409	309
532****	2015	.0128	.0126	.1247	2.37	.00104	176
532TUFF	14047	1.9426	1.9424	9.6064	9.61	.00423	611
						.11359	.26

182 DAY

519*	493	.0066	.0065	.3388	5.05	.00222	99
519**	232	.0016	.0014	.0210	.31	.00014	25
519***	8207	.9865	.9863	50.0430	593.01	.26124	530
519****	408	.0261	.0260	.2676	5.08	.00224	25
						.25348	.62
520*	440	.0059	.0057	.2888	4.30	.00189	55
520***	8845	.9038	.9037	47.3892	585.26	.25782	562
520****	469	.0300	.0298	.2987	5.68	.00250	25
						.26032	.62
533*	826	.0089	.0087	.4578	6.64	.00292	147
533**	65	.0012	.0010	.0218	.32	.00014	51
533***	8742	.7264	.7263	38.0866	430.38	.18959	567
533****	2248	.0340	.0339	.3405	6.62	.00292	
533TUFF		ERROR	ERROR	ERROR	ERROR	ERROR	
						.19251	.44
534*	380	.0058	.0056	.2849	4.13	.00182	60
534***	7245	.6021	.6019	30.5380	366.76	.16157	497
534****	1093	.0165	.0163	.1635	3.11	.00137	
534TUFF		ERROR	ERROR	ERROR	ERROR	ERROR	
						.16294	.39

TABLE A-15
SEM/EDS Analyses Performed on ATM-1c, ATM-8 Glass

SEM/EDS analyses were performed on the samples shown in Table A-15. These analyses included profiling polished cross-sections and examining reacted. The compilation of photomicrographs, spectra, and line profile analyses is maintained by J. Bates

Table A-15. SEM/EDS Analyses Performed on ATM-1c,^a ATM-8 Glass

Sample #	Test Type	Sample #	Test Type
85	7 day, 2R, no tuff	505	91 day, 1R, tuff
81	14 day, 2R, no tuff	509	181 day, 1R, tuff
83	14 day, 2R, no tuff	513	278 day, 1R, tuff
89	28 day, 2R, no tuff	521	ATM-8, 56 day, 1R, no tuff
93	56 day, 2R, no tuff	525	ATM-8, 91 day, 1R, no tuff
95	56 day, 2R, no tuff	545	ATM-8, 91 day, 1R, no tuff
101	7 day, 2R, tuff		
97	14 day, 2R, tuff	550	7 day, OR, Si gasket
109	56 day, 2R, tuff	558	14 day, OR, Si gasket
111	56 day, 2R, tuff	557	14 day, OR, Si gasket
		556	28 day, OR, Si gasket
479	28 day, 1R, no tuff	554	63 day, OR, Si gasket
483	56 day, 1R, no tuff		
487	91 day, 1R, no tuff	565	14 day, OR, no tuff, teflon
489	181 day, 1R, no tuff	593	14 day, OR, tuff, teflon
493	278 day, 1R, no tuff	569	28 day, OR, no tuff, teflon
497	28 day, 1R, tuff	597	28 day, OR, tuff, teflon
501	56 day, 1R, tuff	573	56 day, OR, no tuff, teflon

^aAll samples were ATM-1c unless noted.

TABLE A-16
ATM-1c Glasses Profiled Using SIMS

SIMS profiles were collected for the samples listed in Table A-16. The profiles were collected using a 4 keV Ar^+ beam that was rastered over the surface. The sputtered ions were collected only from the central portion of the rastered area. The sample was charge neutralized using an electron flood gun. Spectra were collected for two mass ranges, 0-75 and 65-285 AMU. Two minutes were required to collect a spectrum. Spectra were collected with a measured delay between each spectrum depending on the anticipated thickness of the reacted layer.

The raw data were collected as real-time X-Y plots and also stored in a computer. The computer collected data were processed to obtain background corrected intensities for each peak of interest. These intensities were then ratioed to a peak whose absolute intensity remained relatively constant across the reacted layer. In reality, the concentration of no element was constant in all samples and Si ($m/e = 28$) was usually chosen as the peak for ratioing in the 0-75 AMU range and Si_2O ($m/e = 72$) was used in the 65-285 AMU range. The ratioed intensities were then plotted as a function of spectrum number, which could be correlated to depth by the use of a calculated sputtering rate. It was generally noted that the intensity of Si or Si_2O was greatest in the first several spectra ($<0.2 \mu\text{m}$) and was constant thereafter.

Examples of selected spectra and ratioed profiles are shown in Figs. A-1, A-2, and A-3. Highlighted in the spectra are those elements whose intensities show a substantial change between the reacted layer and the bulk glass.

Table A-16. ATM-1c Glasses Profiled Using SIMS

Sample #	Test Type	Data Storage	Date Collected
549	7 day, OR, Si gasket	549	12/ . /86
		549A	12/22/86
557	14 day, OR, Si gasket	557	12/30/86
		557A	12/31/86
563	28 day, OR, Si gasket	563	1/08/87
		563A	1/15/87
		563B	1/23/87
562	63 day, OR, Si gasket	562	6/11/87
		562A	6/11/87
88	7 day, 2R	88	5/21/87
		88A	5/21/87
92	28 day, 2R	92	5/21/87
		92A	5/21/87
96	56 day, 2R	96	6/12/87
		96A	6/12/87

Fig. A-1a-f. SIMS Profiles for (a) Na and (b) B, Al, K, and Fe for ATM-1c Glass Reacted for 7 Days at 0 R/h; SIMS Profiles for (c) Na, Ca; (d) B, Mg, Cs; (e) Cs, Sr, Ba, Re; and (f) Unk, Mo, U for ATM-1c Glass Reacted for 14 Days at 0 R/h.

(c)

(d)

Fig. A-1 (Cont'd)
c and d

(e)

(f)

Fig. A-1 (Cont'd)
e and f

(a)

Fig. A-2. SIMS Spectra of (a) Reacted Layer and (b) Bulk Glass of ATM-1c Glass. Those elements that change noticeably are highlighted. The mass range is 0-150 amu.

(b)

Fig. A-2 (Cont'd)

Fig. A-3. SIMS Spectra of (a) Reacted Layer and (b) Bulk Glass of ATM-1c Glass. Those elements that change noticeably are highlighted. The mass range is 65-275 amu.

(b)

Fig. A-3 (Cont'd)

REFERENCES

BATES-1

J. K. Bates, W. L. Ebert, D. F. Fischer, and T. J. Gerding, "The Reaction of Reference Commercial Nuclear Waste Glasses during Gamma Irradiation in a Saturated Tuff Environment," submitted to the Journal of Materials Research (1987).

BATES-2

J. K. Bates, D. F. Fischer, and T. J. Gerding, "The Reaction of Glass during Gamma Irradiation in a Saturated Tuff Environment, Part 1: SRL 165 Glass," Argonne National Laboratory Report ANL-85-62 (1986).