B14 Process Piping Investigation

Attachment 4

HpGe Gamma Spectroscopy Results

NO.	SAMPLE IDENTIFICATION	SPEC FILE ID	ANALYSIS DATE	TIME (SEC)		Uranium U-238 Result	Error	MDA	Total U pCi	dpm/100cm2 Total U	Th232 pCi	Ra226 Result	Error	MDA
1	392 A15 process piping N-BB oxygen	prx_s08	7/9/97	1665		38	108	80	<160	<355	<101	3	51	70
2	393 A4 process piping LP air	prx_s09	7/10/97	50943		-4	20	18	<37	<90	<11	11	8	6
3	394 A4 process piping cold water	prx_s10	7/10/97	3067		-11	86	93	<185	<420	<11	-2	31	32
4	395 A4 process piping HP steam	prx_s11	7/10/97	3115		-25	82	88	<175	<350	<54	-3	32	37
5	396 A4 process piping hot water	prx_s12	7/10/97	3448		25	83	80	<160	<350	<48	41	36	34
6	397 A2 process piping cold water	prx_s13	7/10/97	3172		27	81	67	<133	<300	<45	20	35	37
7	398 A2 process piping LP air	prx_s14	7/10/97	3523		49	79	64	<129	<290	<40	7	32	37
8	399 A2 process piping HP steam	prx_s15	7/10/97	1379		-6	116	105	<210	<475	<81	9	49	55
9	400 A2 process piping hot water	prx_s16	7/11/97	5000		-26	69	75	<151	<350	<38	7	23	15
10	401 A4B process piping HP steam	prx_s17	7/11/97	2364		35	91	63	<126	<300	<71	-13	28	9
11	402 A4B process piping cold water	prx_s18	7/11/97	5000		16	67	64	<129	<300	<48	-13	25	31
12	403 A4B process iping hot water	prx_s19	7/11/97	3196		-53	79	87	<174	<400	<51	10	28	7
13	404 A4B process piping LP air	prx_s20	7/11/97	1890		14	100	76	<153	<350	<18	23	40	12
14	405 A3 process piping LP air	prx_s21	7/11/97	2300		5	101	109	<218	<500	<62	11	37	34
15	406 A3 process piping natural gas	prx_s22	7/11/97	2192		-4	102	112	<223	<500	<50	5	40	45
16	407 A4 process piping natural gas	prx_s23	7/11/97	3471		26	80	74	<148	<350	<54	-7	28	29
17	408 A4 process piping nitrogen	prx_s24	7/11/97	4172		9	73	72	<145	<350	<27	2	30	34
18	409 A4B process piping nitrogen	prx_s25	7/11/97	2329		-61	93	108	<216	<500	<48	-18	36	50
19	410 A4B process piping natural gas	prx_s26	7/12/97	52430		-1	20	18	<36	<100	<11	1	8	7

Samples represent large area wipes and/or debris of the internals of the identified process piping.
All results in pCi.

S.E. Miller
Ion Technology, Inc.

Process Piping

Report #19

NO.	SAMPLE IDENTIFICATION	NET WT Grams	SPEC FILE ID	ANALYSIS DATE	TIME (SEC)	Uranium U-238 pCi/g Result	Error	MDA	Total U pCi/g		Th232 pCi/g	Ra226 pCi/g Result	Error	MDA
1	500A A2 process piping HP steam	23.0	prx_s27	7/23/97	5106	-0.7	2.7	2.3	< 4.6		< 1.4	0.2	1.1	1.0
2	500B A3 process piping HVAC condensate	3.1	prx_s28	7/23/97	4568	26.2	22.2	14.9	< 30		< 11.7	-1.0	9.0	11.0
3	500C A3 process piping steam	10.9	prx_s29	7/23/97	4303	1.7	6.7	6.7	< 14		< 4.7	-0.9	2.6	3.3
4	500D A2 process piping HVAC condensate	8.0	prx_s30	7/23/97	12590	0.3	5.2	4.7	< 10		< 2.7	0.5	2.0	2.0
5	526 A4 process piping steam	17.6	prx_s36	7/25/97	1993	1.3	5.9	5.8	< 12		< 3.1	0.2	2.2	2.2
6	528 A4 process piping HVAC heater	7.1	prx_s38	7/26/97	3346	-0.03	12.1	13.6	< 28		< 7	3.6	4.5	3.2
7	529 A4A process piping steam	11.3	prx_s35	7/25/97	3981	1.3	6.4	6.1	< 12		< 4.2	1.8	2.5	1.7
8	530 A4A process piping condensate	9.8	prx_s34	7/25/97	1674	4.0	10.7	2.0	< 4		< 2.0	5.4	5.0	1.3
9	531 A4A process piping HVAC intake	4.6	prx_s33	7/25/97	5373	-16.8	13.9	16.2	< 34		< 8.2	7.7	6.0	4.7
10	533 A12 process piping steam	18.9	prx_s37	7/26/97	70681	1.5	0.9	0.7	4.0		< 0.5	0.1	0.4	0.3
11	534 A12 process piping HVAC condensate	4.4	prx_s32	7/25/97	4469	0.8	16.6	16.8	< 34		< 1.7	-1.0	6.2	7.3
12	535 A12 process piping air intake	25.2	prx_s31	7/25/97	49660	43.0	1.7	1.2	87.7		< 0.5	2.9	0.4	0.4

NO.	SAMPLE IDENTIFICATION	NET WT Grams	SPEC FILE ID	ANALYSIS DATE	TIME (SEC)	Uranium U-238 pCi Result	Error	MDA	Total U pCi	dpm/100cm2 Total U	Th232 pCi	Ra226 pCi Result	Error	MDA
13	522 L Hall process piping condensate	na	prx_s44	7/28/97	55819	13.3	20.0	17.6	< 35	<100	< 10	1.4	7.9	7.9
14	523 L Hall process piping w htr steam	na	prx_s43	7/27/97	24443	-3.5	30.4	28.9	< 60	<150	< 15	15.6	12.1	10.4
15	524 L Hall process piping e htr condensate	na	prx_s42	7/27/97	51449	12.4	20.2	17.2	< 35	<100	< 11	-0.1	7.9	7.7
16	525 L Hall process piping steam	na	prx_s41	7/26/97	20493	-18.9	32.4	30.5	< 61	<150	< 15	-1.0	12.7	13.0
17	527 A4 process piping condensate	na	prx_s40	7/26/97	2698	-6.1	88.7	90.6	< 180	<400	< 62	0.2	33.9	37.1
18	532 A4B process piping water drain	na	prx_s39	7/26/97	2791	40.0	84.5	52.2	< 105	<250	< 12	-0.3	32.9	35.5

Samples represent large area wipes and/or debris of the internals of the identified process piping.

Results in pCi/g or total pCi as stated.

S.E. Miller

Ion Technology, Inc.

NO.	SAMPLE IDENTIFICATION	NET WT Grams	SPEC FILE ID	ANALYSIS DATE	TIME (SEC)	Result	Uranium U-238 pCi Error	MDA	Total pCi Total Uranium		Total Uranium Equivalent dpm/100cm2	
1	736-10 A9 HVAC #12906 steam cond	1.0	prx_736-10	9/19/97	600	7.7	16.2	65.1	<	130.2	<	289
2	736-11 A9 HVAC #12906 steam	1.0	prx_736-11	9/19/97	600	12.2	17.4	13.5	<	27.1	<	60
3	736-9 A9 HVAC #12906 exhaust	1.0	prx_736-9	9/19/97	685	-17.6	313.0	68.2	<	136.4	<	303
4	737-14 A9 HVAC #60157 steam	1.0	prx_737-14	9/18/97	900	-6.9	178.0	46.2	<	92.4	<	205
5	737-16 A9 HVAC #60157 air exhaust	1.0	prx_737-16	9/18/97	943	2.9	25.6	48.0	<	96.0	<	213
6	738-5 A9 HVAC #12908 exhaust duct	1.0	prx_738-5	9/18/97	1019	-17.8	38.8	54.4	<	108.8	<	241
7	738-7 A9 HVAC #12908 steam	1.0	prx_738-7	9/18/97	1323	-6.5	28.4	28.8	<	57.5	<	128
8	738-8 A9 HVAC #12908 steam cond	1.0	prx_738-8	9/18/97	1104	8.6	37.9	45.7	<	91.3	<	203
9	739-3 A9 HVAC #12907 steam	1.0	prx_739-3	9/19/97	700	-31.8	731.0	85.3	<	170.7	<	379
10	739-4 A9 HVAC #12907 exhaust	1.0	prx_739-4	9/19/97	700	-0.9	1.4	60.8	<	121.6	<	270
11	740-2 A14S HVAC #12921 steam cond	1.0	prx_740-2	9/17/97	1000	9.4	41.0	50.4	<	100.9	<	224
12	742-7 A14S HVAC #12919 steam cond	1.0	prx_742-7	9/19/97	600	1.6	27.0	56.0	<	112.0	<	249
13	743-16 A14S HVAC #12918 ne steam con	1.0	prx_743-16	9/19/97	1090	11.3	28.8	51.9	<	103.9	<	231
14	745-17 A14S HVAC #12916 e steam cond	1.0	prx_745-17	9/19/97	1913	-16.2	362.0	43.9	<	87.8	<	195
15	746-1 A15 HP air	1.0	prx_746-1	9/19/97	500	30.2	26.8	16.2	<	32.4	<	72
16	746-2 A15 LP air	1.0	prx_746-2	9/20/97	48824	18.9	3.9	5.4		37.9		84
17	746-3 A15 argon	1.0	prx_746-3	9/20/97	795	0.0	30.2	51.0	<	102.0	<	226
18	746-4 A15 LN2	1.0	prx_746-4	9/20/97	742	-14.2	331.0	64.5	<	129.0	<	286
19	746-5 A15 HP N2	1.0	prx_746-5	9/20/97	775	5.9	32.0	61.7	<	123.4	<	274
20	746-6 A15 HP hot water	1.0	prx_746-6	9/20/97	780	10.5	13.3	10.4	<	20.8	<	46
21	746-7 A15 HP natural gas	1.0	prx_746-7	9/20/97	600	38.5	35.7	52.2	<	104.4	<	232
22	746-8 A15 HP cold water	1.0	prx_746-8	9/20/97	2378	34.8	17.3	22.7	<	45.4	<	101
23	747-1 A20 a-w hp steam	1.0	prx_747-1	9/17/97	1000	-6.9	31.9	30.7	<	61.4	<	136
24	747-2 A20 a-w lp steam	1.0	prx_747-2	9/17/97	1000	0.4	32.1	28.0	<	55.9	<	124
25	747-5 A20 a-w lp air	1.0	prx_747-5	9/17/97	1000	12.0	37.1	38.0	<	76.0	<	169
26	747-6 A20 a-w lp N2	1.0	prx_747-6	9/17/97	1000	-20.83	40.5	60.2	<	120.4	<	267
27	747-7 A20 a-w cold water	1.0	prx_747-7	9/17/97	1000	4.7	33.8	28.1	<	56.3	<	125
28	747-8 A20 a-w hot water	1.0	prx_747-8	9/17/97	1000	8.6	34.6	30.7	<	61.4	<	136
29	748-1 A14S cold water	1.0	prx_748-1	9/18/97	5354	1.7	14.9	13.3	<	26.6	<	59
30	748-2 A14S O2	1.0	prx_748-2	9/18/97	1010	2.8	38.5	45.1	<	90.1	<	200
31	748-3 A14S N2	1.0	prx_748-3	9/18/97	1112	9.4	32.5	27.6	<	55.2	<	123
32	748-5 A14S lp air	1.0	prx_748-5	9/18/97	1022	15.5	35.5	30.0	<	59.9	<	133
33	748-6 A14S hot water	1.0	prx_748-6	9/18/97	1206	-9.6	31.9	38.9	<	77.7	<	172
34	748-7 A14S natural gas	1.0	prx_748-7	9/18/97	1229	-16.6	34.7	48.7	<	97.4	<	216
35	749-1 A14N roof drain	1.0	prx_749-1	9/19/97	600	3.2	35.8	69.6	<	139.2	<	309
36	749-2 A14N N2	1.0	prx_749-2	9/19/97	600	-4.8	159.0	58.0	<	115.9	<	257
37	749-3 A14N LP air	1.0	prx_749-3	9/19/97	659	-40.0	936.0	89.9	<	179.8	<	399
38	749-4 A14N cold water	1.0	prx_749-4	9/19/97	400	2.3	17.1	83.2	<	166.4	<	369
39	749-5 A14N cooling water	1.0	prx_749-5	9/19/97	300	42.1	34.8	27.2	<	54.4	<	121
40	750-1 A9 O2	1.0	prx_750-1	9/19/97	367	-5.6	124.0	85.1	<	170.2	<	378
41	750-2 A9 cold water	1.0	prx_750-2	9/19/97	400	5.7	50.6	101.4	<	202.8	<	450
42	750-3 A9 LP air	1.0	prx_750-3	9/19/97	400	13.6	50.6	101.4	<	202.8	<	450
43	750-4 A9 natural gas	1.0	prx_750-4	9/19/97	400	19.0	44.3	77.6	<	155.2	<	345
44	750-5 A9 N2	1.0	prx_750-5	9/19/97	400	0.4	339.0	120.6	<	241.2	<	535
45	750-6 A9 hot water	1.0	prx_750-6	9/19/97	600	41.3	35.6	51.8	<	103.6	<	230

NO.	SAMPLE IDENTIFICATION	NET WT Grams	SPEC FILE ID	ANALYSIS DATE	TIME (SEC)	Uranium U-238 pCi Result	Uranium U-238 pCi Error	MDA	Total pCi Total Uranium		Total Uranium Equivalent dpm/100cm2		
NO.	SAMPLE IDENTIFICATION	NET WT Grams	SPEC FILE ID	ANALYSIS DATE	TIME (SEC)	Uranium U-238 pCi/g Result	Uranium U-238 pCi/g Error	MDA	Total pCi/g Total Uranium		Ra226 pCi/g Result	Ra226 pCi/g Error	Ra226 pCi/g MDA
46	740-4 A14S HVAC #12921 air exhaust	3.7	prx_740-4	9/18/97	48415	5.4	2.6	2.6		10.7	0.4	1.0	0.9
47	740-1 A14S HVAC #12921 air intake	4.4	prx_740-1	9/17/97	1000	-0.9	16.8	23.9	<	47.9	-1.2	5.2	7.4
48	741-9 A14S HVAC #12920 nw air intake	5.1	prx_741-9	9/19/97	51052	2.0	1.2	1.3	<	2.6	0.2	0.5	0.5
49	738-6 A9 HVAC #12908 air intake	5.9	prx_738-6	9/18/97	1008	-4.1	84.2	12.9	<	25.9	1.0	2.6	1.0
50	743-15 A14S HVAC #12918 ne steam	6.3	prx_743-15	9/19/97	1622	-1.6	5.2	7.0	<	14.0	-0.9	2.3	3.6
51	736-12 A9 HVAC #12906 air intake	7.5	prx_736-12	9/19/97	1000	2.3	3.2	5.7	<	11.4	-2.0	2.6	4.9
52	737-15 A9 HVAC #60157 air intake	8.8	prx_737-15	9/18/97	2204	1.5	2.6	4.5	<	9.0	0.5	1.4	1.6
53	745-19 A14S HVAC #12916 e air exhaust	8.8	prx_745-19	9/19/97	1734	-1.2	27.5	5.8	<	11.6	0.5	1.8	2.4
54	743-13 A14S HVAC #12918 ne air intake	9.4	prx_743-13	9/19/97	3353	4.7	3.5	4.4	<	8.8	1.0	1.2	1.3
55	740-3 A14S HVAC #12921 steam	9.7	prx_740-3	9/17/97	1330	3.3	5.6	4.8	<	9.6	-1.2	2.3	3.8
56	739-2 A9 HVAC #12907 air intake	10.6	prx_739-2	9/19/97	1023	-1.4	19.5	6.0	<	12.0	-0.7	1.4	2.2
57	743-14 A14S HVAC #12918 ne exhaust	10.6	prx_743-14	9/19/97	1467	-1.5	3.8	5.4	<	10.8	-0.8	1.6	2.7
58	741-11 A14S HVAC #12920 nw steam	11.2	prx_741-11	9/19/97	1173	-2.6	4.0	6.3	<	12.7	-0.7	1.6	2.8
59	741-10 A14S HVAC #12920 nw air exhaust	12.0	prx_741-10	9/19/97	2224	5.5	2.8	2.8	<	5.6	0.3	1.0	1.2
60	744-2 A14S HVAC #12917 exhaust duct	12.9	prx_744-2	9/18/97	2078	10.3	4.6	4.3		20.6	0.2	1.5	1.8
61	744-1 A14S HVAC #12917 air intake	14.6	prx_744-1	9/18/97	1340	-0.5	3.8	4.6	<	9.2	-0.1	1.5	2.1
62	737-13 A9 HVAC #60157 steam cond	14.8	prx_737-13	9/18/97	1578	0.6	1.2	2.1	<	4.1	-0.6	1.0	1.6
63	745-18 A14S HVAC #12916 e air intake	14.9	prx_745-18	9/19/97	1831	-0.5	9.4	3.4	<	6.7	0.3	0.9	1.1
64	741-12 A14S HVAC #12920 nw steam con	16.2	prx_741-12	9/19/97	2128	1.2	1.9	2.2	<	4.3	-0.6	0.7	1.2
65	742-8 A14S HVAC #12919 exhaust	16.6	prx_742-8	9/19/97	600	-0.4	11.3	4.8	<	9.5	0.4	1.7	3.1
66	747-4 A20 a-w condensate	17.1	prx_747-4	9/17/97	1000	-1.9	3.7	4.7	<	9.4	0.5	1.3	0.5
67	742-5 A14S HVAC #12919 air intake	17.7	prx_742-5	9/19/97	600	-1.2	26.7	4.9	<	9.8	1.2	1.4	0.6
68	739-1 A9 HVAC #12907 steam cond	18.1	prx_739-1	9/19/97	600	0.6	1.9	3.7	<	7.4	0.7	1.2	0.6
69	744-4 A14S HVAC #12917 steam cond	18.8	prx_744-4	9/18/97	2300	2.2	2.0	0.9	<	2.0	0.5	0.9	1.0
70	742-6 A14S HVAC #12919 steam	21.6	prx_742-6	9/19/97	600	0.3	3.3	2.9	<	5.8	0.1	0.8	0.5
71	748-4 A14S roof drain	23.3	prx_748-4	9/18/97	5003	-1.2	1.3	1.6	<	3.1	-0.2	0.4	0.5
72	745-20 A14S HVAC #12916 e steam	25.9	prx_745-20	9/19/97	1000	-1.2	24.9	6.8	<	13.5	0.0	0.7	0.9
73	747-3 A20 a-w condensate	26.2	prx_747-3	9/17/97	1000	1.2	2.5	2.6	<	5.1	0.1	0.8	0.4
74	744-3 A14S HVAC #12917 steam	26.6	prx_744-3	9/18/97	2066	-1.4	1.7	1.9	<	3.8	-0.1	0.6	0.8

Samples 1-45 represent wipes of the internals of the identified process piping.
Results for wipes alternately expressed as total Uranium pCi and equivalent dpm/100cm2.
Results for samples 46-74 expressed as pCi/g for material samples.

S.E. Miller
Ion Technology, Inc.

B14 Process Piping Investigation

Attachment 5

Radiation Detection Instrumentation

ION Technology Inc.

Radiological Instrumentation Inventory with ID Codes
Praxair / Bldg 14

	Inst Code	Inst. Type	Model Number	S/N	Detector Model Number	S/N	Calibration Date	Onsite Date	Offsite Date	Comments
1	A	gm scaler	L-2221	86314	L44-9	91748	2/7/97	2/14/97		
2	B	gm scaler	L-2221	86308	L44-9	48267	2/7/97	2/14/97		
3	C	gm scaler	L-2221	89646	L44-9	33041	2/7/97	2/14/97		
4	D	gm scaler	L-2221	86313	L44-9	91749	8/12/97	8/19/97		
5	E	2x2 NaI	L-2221	81328	44-10	74140	2/10/97	2/17/97		
6	F	α scaler	ESP-1	3027	43-5	88097	2/10/97	2/17/97		
7	G	ur/hr	M-19	M-19	1x1 NaI	109994	2/10/97	2/17/97		
8	X	gm scaler	L-2221	91935	44-9	91747	3/4/97	3/11/97		
9	I	α β Scaler	L2929	91234	43-10-1	85270	2/7/97	2/14/97		
10	J	Floor	L-2221	78163	43-37	89382	2/7/97	2/14/97		
11	V	M2	gm rate	50150	44-9	37680	3/14/97	3/21/97		
12	M	M2	L-2221	86330	43-37	124940	12/27/96	1/4/97		
13	N	frisker	L-177	29243	44-9	91746	2/7/97	2/14/97		
14	O	frisker	L-177	45628	44-9	37681	2/7/97	2/14/97		
15	P	frisker	L-177	46727	44-9	48266	2/7/97	2/14/97		
16	Q	frisker	L-177	46776	44-9	37683	2/7/97	2/14/97		
17	Y	frisker	L-177	46744	44-9	37682	4/14/97	4/21/97		
18	W	RAS	LV-2	1700	N/A	N/A	3/26/97	4/2/97		56.64 LPM
19	R	RAS	LV-1	1274	N/A	N/A	2/6/97	2/13/97		56.64 LPM
20	S	RAS	LV-1	1209	N/A	N/A	2/6/97	2/13/97		56.64 LPM
21	T	RAS	LV-2	1699	N/A	N/A	2/6/97	2/13/97		56.64 LPM
22	U	H/V	HV-1T	430	N/A	N/A	2/6/97	2/13/97		Variable & High @ 3.5 cfm
23	Z	RAS	RAP-1	180	N/A	N/A	8/12/97	8/19/97		56.64 LPM
24	AA	RAS	LV-1	1901	N/A	N/A	8/12/97	8/19/97		56.64 LPM
25	BB	RAS	LV-1	1900	N/A	N/A	4/17/97	4/24/97		56.64 LPM
26	CC	M3	gm rate	40378	44-9		10/9/97	10/11/97		
27	DD	M3	gm rate	49892	44-9	48271	10/9/97	10/11/97		
28										
29										
30										

B14 Process Piping Investigation

Attachment 6

Estimate of B14 Process Piping

PRAXAIR BUILDING 14
PROCESS PIPE ESTIMATED QUANTITIES

Estimated Quantities (LF) for Building Areas

PROCESS PIPING DESCRIPTION	12, 13	11	10	8	Corr	Large Hall	2,3	4, 4A, 4B	14	15	2nd Flr HVAC	20 West	20 East	Total (Feet)
LP STEAM 15 LBS Insulated 4", 4"	80					100	55	120		160		120		635
HP STEAM 150 LBS Insulated 2", 3", 1.5"	255	75	100	212	100	100	55	10	430	160		10	80	1587
CONDENSATE Insulated 2.5"	80													80
HOT WATER Insulated 1", 1.5"	95	45	100	112	100	100	55	120				120	100	947
COLD WATER Insulated 2", 1.5", 4"	330	75	100	112	100	100		120	430	160		120	130	1777
COLD WATER RETURN 2"									120	160				280
GAS 6 LBS 1.5", 2", 1"	260	75	100	112	100	100	55		430	160			170	1562
LP AIR 125 LBS 1", 2", 2.5"	255	75	100	112	100	100	110	120	430			120	290	1812
NITROGEN 125 LBS 1"									430	160				590
NITROGEN 90 LBS 1"	255							120		160		120	110	765
NITROGEN 2000 LBS 1"	40			80				120	60			120	140	560
NITROGEN 2500 LBS 1"						100	110							210
OXYGEN 1", 1.5"	295								430	160			40	925
Miscellaneous Insulated 2", 2.5"		40	40	20	40		200		200		100		200	840
Miscellaneous Insulated 6"	100	78				10	75		260				60	583
Miscellaneous Insulated 4"	100	70		40		100							200	510
Miscellaneous 2.5"	100													100
Miscellaneous 3"	30			60										90
Miscellaneous 6"	30		40		40				180					290
Miscellaneous 18"	120													120
Miscellaneous 1.5", 2"	160	60	80	60	80	200	200	200	1000	160	150	200		2550
TOTAL LINEAR FEET	2585	593	660	920	660	1010	915	930	4400	1440	250	930	1520	16813

PRAXAIR HPGE SAMPLE RESULTS
Process Piping
Report #13

NO.	SAMPLE IDENTIFICATION	SPEC FILE ID	ANALYSIS DATE	TIME (SEC)		Uranium U-238 Result	Error	MDA	Total U pCi	dpm/100cm2 Total U	Th232 pCi		Ra226 Result	Error	MDA
1	371 A14 process line LP air	prx_p49	7/7/97	3130		-24	36	45	<90	<225	<7		10	14	10
2	372 A14 process line nitrogen	prx_p50	7/7/97	4400		6	30	31	<62	<150	<33		4	13	15
3	373 A14 process line O2 west side	prx_p51	7/7/97	2965		6	36	35	<70	<200	<37		12	15	11
4	374 A14 process line gas west side	prx_p52	7/7/97	1879		-19	45	56	<112	<250	<12		2	18	22
5	375 A14 process line HP air	prx_p53	7/7/97	6596		-1	24	23	<46	<150	<13		3	9	8
6	376 A14 process line cold water	prx_p54	7/7/97	7000		-4	23	24	<48	<150	<29		19	10	7
7	377 A14 process line HP steam	prx_p55	7/8/97	6000		24	57	40	<80	<200	<40		-9	21	22
8	378 A12 process line gas	prx_p62	7/8/97	5000		-12	65	65	<130	<300	<71		7	27	29
9	379 A12 process line oxygen S9	prx_p61	7/8/97	3000		-17	81	79	<158	<350	<17		1	33	39
10	380 A12 process line hot water valve	prx_p56	7/8/97	6395		-25	55	52	<102	<250	<38		34	25	20
11	381 A12 process line cold water grid H9	prx_p57	7/8/97	2500		-24	90	95	<190	<450	<96		8	37	39
12	382 A12 process line HP steam west wall	prx_p58	7/8/97	2955		29	87	83	<166	<375	<63		-13	32	39
13	383 A12 process line LP air grid S9	prx_p59	7/8/97	3125		-47	85	102	<204	<500	<91		-5	33	42
14	384 A12 process line nitrogen M-DD	prx_p60	7/8/97	4667		-32	66	70	<140	<350	<61		12	29	33
15	385 A13 process line cold water	prx_p42	7/5/97	2724		4	35	32	<64	<150	<31		-6	15	20
16	386 A13 process line nitrogen	prx_p43	7/5/97	3085		-28	35	42	<84	<200	<8		-2	13	14
17	387 A13 process line gas	prx_p44	7/5/97	3596		-3	33	35	<70	<200	<7		9	13	12
18	388 A13 process line oxygen	prx_p45	7/5/97	4531		-13	28	30	<60	<150	<28		-4	11	12
19	389 A13 process line LP air	prx_p46	7/5/97	1324		-6	56	67	<134	<350	<18		-22	23	42
20	390 A13 process line HP steam	prx_p47	7/5/97	5865		-14	24	24	<48	<150	<22		-4	10	11
21	391 A13 process line argon	prx_p48	7/7/97	60000		-1	8	7	<14	<50	<6		5	3	3

Samples represent large area wipes and/or debris of the internals of the identified process piping.
All results in pCi.

S.E. Miller
Ion Technology, Inc.

PRAXAIR HPGE SAMPLE RESULTS
Process Piping
Report #9

NO.	SAMPLE IDENTIFICATION	SPEC FILE ID	Wt. Net (g)	TIME (SEC)		Uranium U-238 Result	Error	MDA	Total U	dpm/100cm2 Total U	Th232	Ra226 Result	Error	MDA
						pCi	pCi	pCi	pCi		pCi	pCi	pCi	pCi
1	273 Internals of cold water line	prx_s001	LAW*	2000		26	107	120	<240	<533	<45	13	40	45
2	274 Internals of LP air line	prx_s002	LAW*	6000		12	60	65	<130	<289	<15	-6	18	19
3	275 Internals of HP steam line	prx_s003	LAW*	6000		14	62	65	<130	<289	<14	-1	18	20
4	276 Internals of nat gas line	prx_s004	LAW*	6000		26	63	67	<134	<298	<15	-5	18	20
5	277 Internals of hot water line	prx_s005	LAW*	6000		6	60	61	<122	<271	<16	-9	19	23
						pCi/g	pCi/g	pCi/g	pCi/g		pCi/g	pCi/g	pCi/g	pCi/g
6	278 Area 10 duct debris	prx_s006	28.8	7200		8	2	2	15.4		0.3	0.6	0.4	0.4
7	279 Area 10/11 duct debris & LAW 279	prx_s007	7.9	6000		2	8	9	<17		<2	-0.1	2.4	2.8

* Samples 1-5 are large area wipes of the internals of the identified piping; samples 6 & 7 are LAW's of identified duct internals.

J.A. McHugh
Ion Technology, Inc.