

US EPA ARCHIVE DOCUMENT

	B	C
1	Source Description	
2		
3	Phase I ID No.	3011
4	EPA ID No.	MOD9857988164
5	Facility Name	ICI Explosives Environmental Company
6	Facility Location	
7	City	Joplin
8	State	Missouri
9	Unit ID Name/No.	ICIEEC Rotary Kiln KI-101
10	Other Sister Facilities	APE 1236
11	Number of Sister Facilities	1
12	Combustor Class	Onsite incinerator, munitions popping
13	Combustor Type	Rotary hearth
14	Combustor Characteristics	Designed to incinerate a max processing rate of 2080 lb/hr of obsolete and ammunition and bulk explosives. Single burner assembly.
15	Capacity (MMBtu/hr)	4
16	Soot Blowing	
17	APCS Detailed Acronym	SD/BH/ABS
18	APCS General Class	LEWS, FF
19	APCS Characteristics	Spray dryer (ME-104) and baghouse (ME-105 A,B,C), absorber
20	Hazardous Wastes	Liq, solid
21	Haz Waste Description	Explosive munitions (M96), M30 propellant, inert materials
22	Supplemental Fuel	Natural gas
23		
24	Stack Characteristics	
25	Diameter (ft)	2.00
26	Height (ft)	65
27	Gas Velocity (ft/sec)	45.0
28	Gas Temperature (°F)	310
29		
30	Permitting Status	Tier II for all metals
31	HWC Burn Status (Date if Terminated)	

	B	C
1	Condition Description	
2		
3	3011C1	
4		
5	Report Name/Date	Test Report for Trial Burn, Vol. 1, February 1996
6	Report Prepare	Midwest Research Institute
7	Testing Firm	ICI Explosives Environmental Company
8	Testing Dates	April 27-30, 1995
9	Cond Dates	Apr-95
10	Condition Descr	Trial burn, max pressure wave, max feedrate
11	Content	PM, HCl/Cl ₂ , DRE
12		
13	3011C2	
14		
15	Report Name/Date	Test Report for Trial Burn, Vol. 1, February 1996
16	Report Prepare	Midwest Research Institute
17	Testing Firm	ICI Explosives Environmental Company
18	Testing Dates	May 1-9, 1995
19	Cond Dates	May-95
20	Condition Descr	Trial burn, max chlorine feed, max heat content
21	Content	PM, HCl/Cl ₂ , DRE, metals
22		
23	3011C3	
24		
25	Report Name/Date	Test Report for Trial Burn, Vol. 1, February 1996
26	Report Prepare	Midwest Research Institute
27	Testing Firm	ICI Explosives Environmental Company
28	Testing Dates	May 11-12, 1995
29	Cond Dates	May-95
30	Condition Descr	Trial burn, max feedrate
31	Content	PM, HCl/Cl ₂ , DRE, lead

	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Stack Gas Emissions													
2														
3		Comm Units		7% O2										
4														
5														
6	3011C1					R1		R2		R3		R4		Cond Avg
7														
8	PM	E1	gr/dscf	y		0.0011		0.0007		0.0009		0.0003		0.0008
9	CO (RA)	E1	ppmv	y		2.8		2.8		2.7		3.2		2.8750
10														
11														
12	HC (RA)		ppm	n		0.7		0.7		0.8		0.7		
13	HCl		lb/hr	n	nd	0.009 nd		0.01 nd		0.01 nd		0.01		
14	Cl2		lb/hr	n	nd	0.006 nd		0.01 nd		0.007 nd		0.007		
15														
16	POHC		Nitroglycerin											
17	POHC Feedrate		lb/hr			13.43		13.5		13.5		13.50		
18	Emission Rate	E2	lb/hr			1.20E-06		1.60E-06		1.50E-06 nd		1.40E-06		
19	DRE	E2	%			99.999991		99.999988		99.999989		99.99999		
20														
21	Sampling Train		PM, HCE1											
22	Stack Gas Flowrate		dscfm			5348		5359		5366		5611		5421.0
23	O2		%			12.6		12.4		12.2		12.2		12.4
24	Moisture		%			38.3		38.6		39.9		40		39.2
25	Temperature		°F			309		310		310		316		311.3
26														
27	Sampling Train	DRE	E2											
28	Stack Gas Flowrate		dscfm			5371.0		5371.0		5371.0		5618.375		5432.9
29	O2		%											
30	Moisture		%											
31	Temperature		°F											
32														
33	HC (RA)	E1	ppmv	y		0.72		0.70		0.76		0.67		0.7
34														
35	HCl	E1	ppmv	y	nd	0.50 nd		0.54 nd		0.53 nd		0.51	100	0.5
36	Cl2	E1	ppmv	y	nd	0.17 nd		0.28 nd		0.19 nd		0.18	100	0.2
37	Total Chlorine	E1	ppmv	y	100	0.84 100		1.10 100		0.91 100		0.87	100	0.9
38														
39	3011C2					R1		R2		R3		R4		Cond Avg
40														
41	PM	E1	gr/dscf	y		0.0002		0.0009		0.0008		0.0024		0.0011
42	CO (RA)	E1	ppmv	y		4.6		1.6		1.6		4.8		3.15
43														
44	HC (RA)		ppmv	n		1.4		0.8		0.7		0.8		
45	HCl		lb/hr	n	nd	0.022 nd		0.011 nd		0.01 nd		0.011		
46	Cl2		lb/hr	n	nd	0.006 nd		0.007 nd		0.007 nd		0.007		
47														
48	POHC		HCE											
49	POHC Feedrate		lb/hr			96.1		96.56		96.35		96.56		
50	Emission Rate	E2	lb/hr		nd	3.22E-05 nd		1.00E-06		2.26E-05 nd		1.00E-06		
51	DRE	E2	%			99.999996		99.9999953		99.9999953		100		
52														
53	POHC		Naph											
54	POHC Feedrate		lb/hr			29.6		29.78		29.7		29.78		
55	Emission Rate	E2	lb/hr		nd	1.00E-06 nd		1.00E-06 nd		1.00E-06 nd		1.00E-06		
56	DRE	E2	%			99.999991		99.999988		99.999989		99.99999		
57														
58	Arsenic		g/hr		nd	0.0506 nd		0.0508 nd		0.0542 nd		0.054		
59	Beryllium		g/hr		nd	0.001 nd		0.001 nd		0.001 nd		0.001		
60	Cadmium		g/hr			0.032		0.038		0.027		0.024		
61	Chromium		g/hr			0.02		0.022		0.023		0.019		
62	Chromium (Hex)		g/hr		nd	0.0088 nd		0.0083 nd		0.0084 nd		0.0082		
63	Lead		g/hr			0.12 nd		0.054 nd		0.115 nd		0.087		0.1
64	Antimony		g/hr			0.115		0.118		0.129		0.11		
65														
66	Sampling Train		PM, HCE1											
67	Stack Gas Flowrate		dscfm			5329		5245		5057		5487		5279.5
68	O2		%			12.1		12.1		12.2		12.3		12.2
69	Moisture		%			40.9		40.9		41		40.4		40.8
70	Temperature		°F			314		312		308		315		312.3
71														

	B	C	D	E	F	G	H	I	J	K	L	M	N	O
72	Sampling Train	Metals, E2												
73	Stack Gas Flowrate	dscfm				5329.3		5244.5		5056.5		5487.0		5279.3
74	O2	%				15.3		11.8		12		12.1		12.8
75	Moisture	%												
76	Temperature	°F												
77														
78	HC (RA)	E1	ppmv	y		1.30		0.75		0.67		0.75		0.9
79														
80	HCl	E1	ppmv	y	nd	1.160	nd	0.596	nd	0.568	nd	0.568	100	0.72
81	Cl2	E1	ppmv	y	nd	0.163	nd	0.195	nd	0.205	nd	0.186	100	0.19
82	Total Chlorine	E1	ppmv	y	100	1.48	100	0.99	100	0.98	100	0.94	100	1.10
83														
84	Arsenic	E2	ug/dscm	y	nd	13.7	nd	8.7	nd	9.8	nd	9.1	100	10.34
85	Beryllium	E2	ug/dscm	y	nd	0.3	nd	0.2	nd	0.2	nd	0.2	100	0.20
86	Cadmium	E2	ug/dscm	y		8.7		6.5		4.9		4.1		6.03
87	Chromium	E2	ug/dscm	y		5.4		3.8		4.2		3.2		4.14
88	Chromium (Hex)	E2	ug/dscm	y	nd	2.4	nd	1.4	nd	1.5	nd	1.4	100	1.68
89	Lead	E2	ug/dscm	y		32.6	nd	9.2	nd	20.8	nd	14.7	58	19.33
90	Antimony	E2	ug/dscm	y		31.2		20.2		23.4		18.6		23.33
91														
92	SVM	E2	ug/dscm	y		41.3	59	15.7	81	25.7	78	18.7	76	25.36
93	LVM	E2	ug/dscm	y		19.4		12.6		14.2		12.5		14.68
94														
95	3011C3					R1		R2		R3		R4		Cond Avg
96														
97	PM	E1	gr/dscf	y		0.0002		0.0005		0.0008				0.0005
98	CO (RA)	E1	ppmv	y		0.1		2.6		2.6				1.77
99														
100														
101	HC (RA)		ppm	n		0.7		0.7		0.8				
102	HCl		lb/hr	n	nd	0.01	nd	0.01	nd	0.011				
103	Cl2		lb/hr	n	nd	0.007	nd	0.007	nd	0.006				
104														
105	Lead		g/hr		nd	0.0667		0.1307		0.0843				
106														
107	POHC	HCE												
108	POHC Feedrate		lb/hr			87.12		95.47		95.28				
109	Emission Rate	E2	lb/hr		nd	1.00E-06		2.12E-05		2.39E-05				
110	DRE	E2	%			99.999998		99.999978		99.999975				
111														
112	POHC	Naph												
113	POHC Feedrate		lb/hr			26.87		29.45		29.38				
114	Emission Rate	E2	lb/hr		nd	1.00E-06	nd	1.00E-06	nd	1.00E-06				
115	DRE	E2	%			99.999995		99.9999954		99.9999954				
116														
117	Sampling Train	PM, HCE1												
118	Stack Gas Flowrate	dscfm				5316		5576		5584				5580.0
119	O2	%				12.2		13.2		13.1				13.2
120	Moisture	%				39.3		39.6		39.8				39.7
121	Temperature	°F				313		314		318				316.0
122														
123	Sampling Train	Metals, E2												
124	Stack Gas Flowrate	dscfm				5249.7		5125.3		4981.3				5118.8
125	O2	%				13.2		13.2		13				13.1
126	Moisture	%												
127	Temperature	°F												
128														
129	HC (RA)	E1	ppmv	y		0.76		0.75		0.53				0.7
130														
131	HCl	E1	ppmv	y	nd	0.53	nd	0.57	nd	0.62			100	0.6
132	Cl2	E1	ppmv	y	nd	0.19	nd	0.21	nd	0.17			100	0.2
133	Total Chlorine	E1	ppmv	y	100	0.92	100	0.99	100	0.97			100	1.0
134														
135	Lead	E2	ug/dscm	y	nd	13.4		27.0		17.4			23	19.3
136	SVM	E2	ug/dscm	y	100	13.4		27.0		17.4			23	19.3

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
1	Feedstream																							
2																								
3																								
4	3011C1	Trial burn			R1		R2		R3		R4		Cond Avg		R1		R2		R3		R4		Cond Avg	
5	Feedstream Number				F1		F1		F1		F1		F1		F2		F2		F2		F2		F2	
6	Feed Class				Solid HW		Solid HW		Solid HW		Solid HW		Solid HW		Solid HW		Solid HW		Solid HW		Solid HW		Solid HW	
7	Feed Class 2																							
8	Feedstream Description				M96		M96		M96		M96		M96		M30 Propellant		M30 Propellant		M30 Propellant		M30 Propellant		M30 Propellant	
9	Feed Rate	lb/hr			505.3		505.3		506.40		506		506		59.67		60		60.2		60		60	
10	Heating Value	Btu/lb																						
11	Chlorine	lb/hr																						
12	Ash	lb/hr																						
13																								
14	Stack Gas Flowrate	dscfm																						
15	Oxygen	%																						
16																								
17																								
18	Thermal Feedrate	MMBtu/hr																						
19	Estimated Firing Rate	MMBtu/hr																						
20																								
21	Feedrate MTEC Calculations	ug/dscm																						
22	Chlorine	ug/dscm																						
23																								
24																								
25																								
26																								
27	3011C2	Trial burn			R1		R2		R3		R4		Cond Avg		R1		R2		R3		R4		Cond Avg	
28	Feedstream Number				F1		F1		F1		F1		F1		F2		F2		F2		F2		F2	
29	Feed Class				Liq HW		Liq HW		Liq HW		Liq HW		Liq HW		Solid HW		Solid HW		Solid HW		Solid HW		Solid HW	
30	Feed Class 2																							
31	Feedstream Description				Superfrac 6000P		Superfrac 6000P		Superfrac 6000P		Superfrac 6000P		Superfrac 6000P		Inert Materials		Inert Materials		Inert Materials		Inert Materials		Inert Materials	
32	Feed Rate	lb/hr			588.5		596		593.00		602		595		1329.40		1347.2		1329.5		1341.8		1337	
33	Heating Value	Btu/lb																						
34	Chlorine	lb/hr																						
35	Arsenic	lb/hr																						
36	Beryllium	lb/hr																						
37	Cadmium	lb/hr																						
38	Chromium	lb/hr																						
39	Lead	lb/hr																						
40	Antimony	lb/hr																						
41																								
42																								
43																								
44	Stack Gas Flowrate	dscfm			5279.3																			
45	Oxygen	%			12.8																			
46																								
47	Thermal Feedrate	MMBtu/hr																						
48	Estimated Firing Rate	MMBtu/hr																						
49																								
50	Feedrate MTEC Calculations	ug/dscm																						
51	Chlorine	ug/dscm																						
52	Arsenic	ug/dscm																						
53	Beryllium	ug/dscm																						
54	Cadmium	ug/dscm																						
55	Chromium	ug/dscm																						
56	Lead	ug/dscm																						
57	Antimony	ug/dscm																						
58																								
59	SVM	ug/dscm																						
60	LVM	ug/dscm																						

	B	Z	A	AB	AC	AD	AE	AF	A	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR
1	Feedstream																			
2																				
3																				
4	3011C1	R1	R2	R3	R4	Cond Avg	R1	R2	R3	R4	Cond Avg	R1	R2	R3	R4	Cond Avg				
5	Feedstream Number	F3	F3	F3	F3	F3	F4	F4	F4	F4	F4	F4	F4	F4	F4	F4	F4	F4	F4	F4
6	Feed Class	Solid HW	Solid HW	Solid HW	Solid HW	Solid HW	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
7	Feed Class 2	Inert Materials	Inert Materials	Inert Materials	Inert Materials	Inert Materials	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
8	Feed Rate	19.43	18.2	18.1	15.7	18	584	585	582	582	582	582	582	582	582	582	582	582	582	584
9	Heating Value						2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84
10	Chlorine																			
11	Ash																			
12	Stack Gas Flowrate						5348	5359	5366	5611	5421									
13	Oxygen						12.6	12.4	12.2	12.2	12.35									
14	Thermal Feedrate																			
15	Estimated Firing Rate																			
16																				
17																				
18																				
19																				
20																				
21	Feedrate MTEC Calculat																			
22	Chlorine						236643.1	230665.3	225128.9	215298.8	226934.0									
23																				
24																				
25																				
26																				
27	3011C2	R1	R2	R3	R4	Cond Avg	R1	R2	R3	R4	Cond Avg	R1	R2	R3	R4	Cond Avg				
28	Feedstream Number	F3	F3	F3	F3	F3	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
29	Feed Class	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
30	Feed Class 2	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
31	Feed Rate	1943	1923	1944	1932	1935	103.62	103.3	103.3	103.3	103.3	103.3	103.3	103.3	103.3	103.3	103.3	103.3	103.3	103.3
32	Heating Value						0.217	0.217	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
33	Chlorine						9.98	9.98	9.98	9.98	9.98	9.98	9.98	9.98	9.98	9.98	9.98	9.98	9.98	9.98
34	Arsenic						1.16	1.16	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
35	Beryllium						8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
36	Cadmium						19.01	19	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
37	Chromium						20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1
38	Lead																			
39	Antimony																			
40																				
41																				
42																				
43																				
44	Stack Gas Flowrate						5329	5245	5077	5487	5279.5									
45	Oxygen						12.1	12.1	12.2	12.3	12.175									
46	Thermal Feedrate																			
47	Estimated Firing Rate																			
48																				
49																				
50	Feedrate MTEC Calculat																			
51	Chlorine						8114991.6	8295473.8	8678087.2	8125228.4	8303445.3									
52	Arsenic						17126.6	17400.8	18252.8	17015.8	17449.0									
53	Beryllium						787664.0	800278.7	839462.1	782568.8	802493.4									
54	Cadmium						90762.9	93018.4	97572.8	90959.9	93078.5									
55	Chromium						668488.4	673581.3	704879.0	660243.4	676798.0									
56	Lead						1493246.9	1524378.5	1595651.0	1489860.4	1525784.2									
57	Antimony						1579274.3	1611783.7	1686494.6	1576115.5	1613417.0									
58																				
59	SVM						1584009.7	1617396.9	1693223.8	1580820.3	1618862.7									
60	LVM						1473279.0	1491260.8	1562594.0	1459828.0	1496740.5									

B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
61																							
62	3011C3																						
63																							
64	Feedstream Number																						
65	Feed Class																						
66	Feed Class 2																						
67	Feedstream Description																						
68	Feed Rate																						
69	Heating Value																						
70	Chlorine																						
71	Lead																						
72																							
73	Stack Gas Flowrate																						
74	Oxygen																						
75																							
76	Thermal Feedrate																						
77	Estimated Firing Rate																						
78																							
79	Feedrate MTEC Calculations																						
80	Chlorine																						
81	Lead																						
82	SVM																						

	B	C	D	E	F	G	H
1	Process Information						
2				R1	R2	R3	R4
3	3011C1						
4							
5	Rotary Kiln Exit Temp	F		646	650	646	656
6	Rotary Kiln Burner Temp	F		1162	1155	1142	1167
7	Rotary Kiln Exit Pressure	in. W.C		-0.8	-0.9	-0.9	-0.9
8	SCC Exit Temp	F		2003	1997	2000	2050
9	SCC Exit Pressure	in. W.C		-1	-1.1	-1.1	-1.1
10	Quench Water Flow	gpm		13.4	13.6	14.1	14.8
11	Spray Dryer Exit Temp	F		378	380	380	384
12	Spray Dryer Exit Pressure	in. W.C		-5.5	-5.6	-5.9	-6.1
13	Baghouse Pressure Drop	in. W.C		5.4	5.5	5.6	5.8
14	Baghouse Outlet Temp	F		347	347	346	352
15	Soda Ash Solution Flow	gpm		0.32	0.31	0.31	0.3
16							
17	3011C2						
18							
19	Rotary Kiln Exit Temp	F		667	634	624	629
20	Rotary Kiln Burner Temp	F		1417	1252	1262	1263
21	Rotary Kiln Exit Pressure	in. W.C		-0.9	-0.8	-0.7	-0.9
22	SCC Exit Temp	F		2024	2026	2024	2024
23	SCC Exit Pressure	in. W.C		-1	-0.8	-0.8	-1.1
24	Quench Water Flow	gpm		4.4	4.7	3.6	4.7
25	Spray Dryer Exit Temp	F		379	380	384	383
26	Spray Dryer Exit Pressure	in. W.C		-5.9	-5.4	-5.1	-6.4
27	Baghouse Pressure Drop	in. W.C		5.7	5.9	5.9	6.1
28	Baghouse Outlet Temp	F		350	350	350	355
29	Soda Ash Solution Flow	gpm		10.6	10.1	10.2	10.3
30							
31	3011C3						
32							
33	Rotary Kiln Exit Temp	F		676	650	651	
34	Rotary Kiln Burner Temp	F		845	600	725	
35	Rotary Kiln Exit Pressure	in. W.C		-0.8	-1	-1	
36	SCC Exit Temp	F		2026	2029	2024	
37	SCC Exit Pressure	in. W.C		-1	-1.3	-1.2	
38	Quench Water Flow	gpm		3.33	4.4	4.5	
39	Spray Dryer Exit Temp	F		382	383	384	
40	Spray Dryer Exit Pressure	in. W.C		-5.4	-6.4	-6.5	
41	Baghouse Pressure Drop	in. W.C		5.6	5.6	5.9	
42	Baghouse Outlet Temp	F		352	353	353	
43	Soda Ash Solution Flow	gpm		10.4	10.4	10.3	