

US EPA ARCHIVE DOCUMENT

	B	C
1	<b>Source Description</b>	
2		
3	Phase II ID No.	912
4	EPA ID No.	OHD005108477
5	Facility Name	Sunoco Inc. (R&M) Haverhill Plant
6	Facility Location	
7	City	Haverhill
8	State	OH
9	Unit ID Name/No.	Unit 2001-UE
10	Other Sister Facilities	None
11	Number of Sister Facilities	0
12	Combustor Class	Liquid-fired boiler
13	Combustor Type	Liquid-fired
14	Combustor Characteristics	Watertube boiler. Babcock and Wilcox Model FM-117-97C, 150,000 lb/hr steam, 183 MMBtu/hr
15	Capacity (MMBtu/hr)	183
16	Soot Blowing	Yes
17	APCS Detailed Acronym	None
18	APCS General Class	
19	APCS Characteristics	NA
20	Hazardous Wastes	Liq
21	Haz Waste Description	Liquid organic wastes (benzene, waste lubricating oil, phenol waste water, AMS distillation bottoms, etc.) D001, D018 and D035
22	Supplemental Fuel	Natural gas, oil
23		fuel oil
24		
25	Stack Characteristics	
26	Diameter (ft)	6.30
27	Height (ft)	50.00
28	Gas Velocity (ft/sec)	41.3
29	Gas Temperature (°F)	480
30		
31	Permitting Status	Adjusted tier I for metals and chlorine
	HWC Burn Status (Date if	
32	Terminated)	

	B	C
1	<b>Cond Description</b>	
2		
3	<b>912C1</b>	
4		
5	Report Name/Date	Revised Certification of Compliance, November 1996
6	Report Prepare	Radian International LLC
7	Testing Firm	ENSR Consulting and Engineering
8	Testing Dates	May 20-21, 1995
9	Cond Dates	May-95
10	Condition Descr	CoC; LHC waste fuel
11	Content	PM, CO, HCl/Cl <sub>2</sub> , Cr/Cr+6
12		
13	<b>912C2</b>	
14		
15	Report Name/Date	Revised Certification of Compliance, January 1999
16	Report Prepare	Radian International LLC
17	Testing Firm	ENSR Consulting and Engineering
18	Testing Dates	July 9, 1998
19	Cond Dates	July-98
20	Condition Descr	CoC; LHC waste fuel
21	Content	PM, CO
22		
23	<b>912C3</b>	
24		
25	Report Name/Date	Revised Certification of Compliance, January 1999
26	Report Prepare	Radian International LLC
27	Testing Firm	ENSR Consulting and Engineering
28	Testing Dates	October 8, 1998
29	Cond Dates	October-98
30	Condition Descr	CoC; LHC waste fuel
31	Content	CO
32		
33	<b>912C4</b>	
34		
35	Report Name/Date	Trial Burn Report, February 2002
36	Report Prepare	URS Corp.
37	Testing Firm	URS Corp.
38	Testing Dates	10/30-31/2001
39	Cond Dates	October-01
40	Condition Descr	CoC; LHC waste fuel high range
41	Content	PM, metals, Cr+6, CO
42		
43	<b>912C5</b>	
44		
45	Report Name/Date	Trial Burn Report, February 2002
46	Report Prepare	URS Corp.
47	Testing Firm	URS Corp.
48	Testing Dates	10/31-11/1/2001
49	Cond Dates	October-01
50	Condition Descr	CoC; LHC waste fuel high range
51	Content	CO, DRE
52		
53	<b>912C6</b>	
54		
55	Report Name/Date	Trial Burn Report, February 2002
56	Report Prepare	URS Corp.
57	Testing Firm	URS Corp.
58	Testing Dates	11/3-4/2001
59	Cond Dates	November-01
60	Condition Descr	CoC; LHC waste fuel low range
61	Content	CO, DRE

	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	<b>Stack Gas Emissions</b>													
2														
3		Comments	Units	7% O2										
4														
5														
6	<b>912C1</b>					R1	R2	R3		Cond Avg				
7														
8	PM	E1	gr/dscf	y		0.0195	0.0194	0.0303		0.0222				
9	CO (RA)	E1	ppmv	y		32.5	35.9	27.7		32.0				
10	CO (MHRA)	E1	ppmv	y		37.8	31.7	36.6		35.4				
11	HCl		g/hr	n		912	980.1	972.8		952.8				
12	Cl2		g/hr	n		11.2 nd	8.1	8.9		9.4				
13	Chromium (Hex)		g/hr	n		2.11	0.17	0.12		0.16				
14	Chromium		g/hr	n		0.42	0.24	0.46		0.3				
15														
16														
17	Sampling Train	PM, HCl/Cl2	E1											
18	Stack Gas Flowrate		dscfm			32628	32386	32339		32451.0				
19	O2		%			3.2	3.57	3.43		3.4				
20	Moisture		%			11.7	12.4	12.5		12.2				
21	Temperature		°F			466	471	472		469.7				
22														
23	Sampling Train	Cr (+6)	E2											
24	Stack Gas Flowrate		dscfm			30209	32612	34050		32290.3				
25	O2		%			3.2	3.57	3.43		3.4				
26	Moisture		%			10.1	10	8		9.4				
27	Temperature		°F			469	473	472		471.3				
28														
29	Sampling Train	Cr	E3											
30	Stack Gas Flowrate		dscfm			32628	32386	32339		32451.0				
31	O2		%			3.2	3.57	3.43		3.4				
32	Moisture		%			11.7	12.4	12.5		12.2				
33	Temperature		°F			466	471	472		469.7				
34														
35	HCl	E1	ppmv	y		8.65	9.56	9.43		9.19				
36	Cl2	E1	ppmv	y		0.05 nd	0.04	0.04	29	0.05				
37	Total Chlorine	E1	ppmv	y		8.76	9.64	9.52		9.28				
38	Chromium (Hex)	E2	µg/dscm	y		32.4	2.5	1.7		2.3				
39	Chromium	E3	µg/dscm	y		6.0	3.5	6.7		4.3				
40	LVM	E3	µg/dscm	y		6.0	3.5	6.7		4.3				Cr only
41														
42	<b>912C2</b>					R1	R2	R3		Cond Avg				
43								sootblow						
44	PM	E1	gr/dscf	y		0.0042	0.004	0.01		0.0063				
45	CO (RA)	E1	ppmv	y		3	2	2		2.3				
46	CO (MHRA)	E1	ppmv	y		3	2	3		2.7				
47														
48	Sampling Train	PM	E1											
49	Stack Gas Flowrate		dscfm			34031	33423	34701		34051.7				
50	O2		%			4.7	4.76	4.67		4.7				
51	Moisture		%			14.2	13.9	14.3		14.1				
52	Temperature		°F			447	444	442		444.3				
53														
54														
55	<b>912C3</b>					R1	R2	R3		Cond Avg				
56														
57	CO (RA)		ppmv	y		10.5	9.2	9.2		9.6				
58	CO (MHRA)		ppmv	y		11	9.8	10		10.3				
59														
60														
61	<b>912C4</b>					R1	R2	R3		Cond Avg				
62														
63	PM	E1	gr/dscf	y		0.0014	0.0018	0.0014		0.0016				
64	CO (RA)	E1	ppmv	y		4.9	3.7	11.2		6.6				
65														
66	Sampling Train	PM	E1											
67	Stack Gas Flowrate		dscfm			33887	32990	30394		32424				
68	O2		%			5.6	9.2	6.8		7.2				
69	Moisture		%			12.2	12.8	13.2		12.7				
70	Temperature		°F			421	420	406		416				
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			33655		33480		33801		33645.3		
74	O2		%			3.8		4.17		3.3		3.8		
75	Moisture		%			13.7		14.4		13.1		13.7		
76	Temperature		°F			507		502		505		504.7		
77														
78	Antimony	E2	ug/dscm	y	nd	0.91	nd	1.17	nd	1.82		0.7		
79	Arsenic	E2	ug/dscm	y	nd	2.36	nd	1.72	nd	2.39		1.1		
80	Barium	E2	ug/dscm	y		55.3		78.22		75.19		69.6		
81	Beryllium	E2	ug/dscm	y	nd	0.08	nd	0.11	nd	0.08		0.0		
82	Cadmium	E2	ug/dscm	y	nd	0.42		0.51	nd	0.12		0.3		
83	Chromium	E2	ug/dscm	y		2.2		3.02		2.61		2.6		
84	Lead	E2	ug/dscm	y	nd	26.02		28.31	nd	38.79		15.5		
85	Mercury	E2	ug/dscm	y	nd	0.31	nd	0.39	nd	0.42		0.2		
86	Silver	E2	ug/dscm	y	nd	0.32	nd	0.45	nd	0.69		0.2		
87	Thallium	E2	ug/dscm	y	nd	1.82	nd	0.78	nd	1.24		0.6		
88	SVM	E2	ug/dscm	y		26.4		28.8		38.9		31.4		
89	LVM	E2	ug/dscm	y		4.6		4.9		5.1		4.9		
90														
91	Chromium (Hex)	E3	ug/dscm	y		0.98		1.45		1.04		1.2		
92														
93														
94	<b>912C5</b>													
95														
96	CO (RA)	E1	ppmv	y		25.5		56.5		20.3		34		
97														
98	Stack Gas Flowrate	E1	dscfm			33950		33574		33454		33659		
99	O2		%			4		4.5		4		4.2		
100	Moisture		%			12.3		12.1		12.7		12.4		
101	Temperature		°F			423		416		415		418		
102														
103														
104	<b>912C6</b>													
105														
106	CO (RA)	E1	ppmv	y		0.1		0.1		0.7		0.3		
107														
108	Stack Gas Flowrate	E1	dscfm			23997		26520		23191		24569		
109	O2		%			7.7		7.7		10		8.5		
110	Moisture		%			9.1		8.7		8.9		8.9		
111	Temperature		°F			364		362		359		362		

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	
1	<b>Feedstreams</b>																										
2																											
3																											
4	<b>912C1</b>																										
5	Feedstream Number																										
6	Feed Class																										
7	Feed Class 2																										
8	Feedstream Description																										
9	Feed Rate	lb/hr																									
10	Feed Rate	ft3/hr																									
11	Heating Value	Btu/lb																									
12	Density	g/cc																									
13	Ash	g/hr																									
14	Chlorine	ppmw																									
15	Antimony	ppmw																									
16	Arsenic	ppmw																									
17	Barium	ppmw																									
18	Beryllium	ppmw																									
19	Cadmium	ppmw																									
20	Chromium	ppmw																									
21	Lead	ppmw																									
22	Mercury	ppmw																									
23	Silver	ppmw																									
24	Thallium	ppmw																									
25	Thallium	ppmw																									
26	Stack Gas Flowrate	dscfm																									
27	Oxygen	%																									
28	Thermal Feedrate	MMBtu/hr																									
29	Estimated Firing Rate	MMBtu/hr																									
30																											
31																											
32																											
33	<b>Feedrate /MTEC Calculations</b>																										
34	Ash	mg/dscm																									
35	Chlorine	ug/dscm																									
36	Antimony	ug/dscm																									
37	Arsenic	ug/dscm																									
38	Barium	ug/dscm																									
39	Beryllium	ug/dscm																									
40	Cadmium	ug/dscm																									
41	Chromium	ug/dscm																									
42	Lead	ug/dscm																									
43	Mercury	ug/dscm																									
44	Silver	ug/dscm																									
45	Thallium	ug/dscm																									
46																											
47	SVM	ug/dscm																									
48	LVM	ug/dscm																									
49																											
50																											
51	<b>912C2</b>																										
52	Feedstream Number																										
53	Feed Class																										
54	Feed Class 2																										
55	Feedstream Description																										
56	Feed Rate	lb/hr																									
57	Feed Rate	ft3/hr																									
58	Heating Value	Btu/lb																									
59	Density	g/cc																									
60																											

	B	AB	AC	AD	AE	AF	AG	AH	AI	AJ
1	<b>Feedstreams</b>									
2										
3										
4	<b>912C1</b>	Cond Avg	R1	R2	R3	Cond Avg				
5	Feedstream Number	F3	F4	F4	F4	F4				
6	Feed Class	NG	Total	Total	Total	Total				
7	Feed Class 2	MF	Total	Total	Total	Total				
8	Feedstream Description	Natural Gas	Total	Total	Total	Total				
9	Feed Rate									
10	Feed Rate	31700								
11	Heating Value									
12	Density									
13	Ash									
14	Chlorine									
15	Antimony									
16	Arsenic									
17	Barium									
18	Beryllium									
19	Cadmium									
20	Chromium									
21	Lead									
22	Mercury									
23	Silver									
24	Thallium									
25										
26										
27	Stack Gas Flowrate		32628	32386	32339	32451				
28	Oxygen		3.2	3.57	3.43	3.4				
29										
30	Thermal Feedrate	31.7	165.3	166.2	167.4	166.4				
31	Estimated Firing Rate		184.4	179.2	180.4	181.3				
32										
33	<i>Feedrate MTEC Calculatic</i>									
34	Ash	0	136.8	0	140.7	0	139.8	0	139.1	
35	Chlorine	0	21933.5	0	33287.4	0	28789.5	0	28001.6	
36	Antimony	100	52.4	100	53.8	100	53.3	100	53.2	
37	Arsenic	100	26.2	100	26.9	100	26.7	100	26.6	
38	Barium	100	52.4	100	53.8	100	53.3	100	53.2	
39	Beryllium	100	15.7	100	16.1	100	16.0	100	16.0	
40	Cadmium	100	5.2	100	5.4	100	5.3	100	5.3	
41	Chromium	0	5.2	0	5.4	0	5.3	0	5.3	
42	Lead	100	52.4	100	53.8	100	53.3	100	53.2	
43	Mercury	100	5.2	100	5.4	100	5.3	100	5.3	
44	Silver	100	52.4	100	53.8	100	53.3	100	53.2	
45	Thallium	100	52.4	100	53.8	100	53.3	100	53.2	
46										
47	SVM	100	57.7	100	59.1	100	58.7	100	58.5	
48	LVM	89	47.2	89	48.4	89	48.0	89	47.9	
49										
50										
51	<b>912C2</b>									
52										
53	Feedstream Number									
54	Feed Class									
55	Feed Class 2									
56	Feedstream Description									
57	Feed Rate									
58	Feed Rate									
59	Heating Value									
60	Density									

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA		
61	Ash		g/hr	nd	2,265	nd	2,265	nd	2,265	nd																		
62	Chlorine		g/hr	502	2.06	nd	564	nd	589																			
63	Antimony		g/hr	nd	2.06	nd	2.06	nd	2.06																			
64	Arsenic		g/hr	nd	1.03	nd	1.03	nd	1.03																			
65	Barium		g/hr	nd	2.06	nd	2.06	nd	2.06																			
66	Beryllium		g/hr	nd	2.06	nd	2.06	nd	2.06																			
67	Cadmium		g/hr	nd	2.06	nd	2.06	nd	2.06																			
68	Chromium		g/hr	nd	2.06	nd	2.06	nd	2.06																			
69	Lead		g/hr	nd	2.06	nd	2.06	nd	2.06																			
70	Mercury		g/hr	nd	2.06	nd	2.06	nd	2.06																			
71	Silver		g/hr	nd	2.06	nd	2.06	nd	2.06																			
72	Thallium		g/hr	nd	2.06	nd	2.06	nd	2.06																			
73																												
74	Stack Gas Flowrate		dscfm	34031	74.2		33423		34701		34052																	
75	Oxygen		%	4.7			4.76		4.67		4.7																	
76																												
77	Thermal Feedrate		MMBtu/hr	74.2			74.8		74.0		74.3																	
78																												
79	Feedrate MTEC Calculations																											
80	Ash		mg/dscm	0.034			0.034		0.033		0.034																	
81	Chlorine		ug/dscm	7462			8567		8570		8200																	
82	Antimony		ug/dscm	31	nd		31	nd	30		15																	
83	Arsenic		ug/dscm	15	nd		16	nd	15		8																	
84	Barium		ug/dscm	31	nd		31	nd	30		15																	
85	Beryllium		ug/dscm	31	nd		31	nd	30		15																	
86	Cadmium		ug/dscm	31	nd		31	nd	30		15																	
87	Chromium		ug/dscm	31	nd		31	nd	30		15																	
88	Lead		ug/dscm	31	nd		31	nd	30		15																	
89	Mercury		ug/dscm	31	nd		31	nd	30		15																	
90	Silver		ug/dscm	31	nd		31	nd	30		15																	
91	Thallium		ug/dscm	31	nd		31	nd	30		15																	
92	SVM		ug/dscm	45.9			46.9		45.0		46																	
93	LVM		ug/dscm	38.3			39.1		37.5		38																	
94																												
95																												
96																												
97	<b>912C3</b>			R1			R2		R3		Cond Avg																	
98				F1			F1		F1		F1																	
99	Feedstream Number			Liq HW			Liq HW		Liq HW		Liq HW																	
100	Feed Class			HW			HW		HW		HW																	
101	Feed Class 2			LHC waste			LHC waste		LHC waste		LHC waste																	
102	Feedstream Description			2267			2267		2267		2267																	
103	Feed Rate		lb/hr	2267			2267		2267		2267																	
104																												
105	Thermal Feedrate		MMBtu/hr	37			37		37		37																	
106																												
107																												
108	<b>912C4</b>			R1			R2		R3		Cond Avg																	
109				F1			F1		F1		F1																	
110	Feedstream Number			Liq HW			Liq HW		Liq HW		Liq HW																	
111	Feed Class			HW			HW		HW		HW																	
112	Feed Class 2			LHC waste			LHC waste		LHC waste		LHC waste																	
113	Feedstream Description			4374			4374		4380		4376																	
114	Feed Rate		lb/hr	4374			4374		4380		4376																	
115																												
116	Ash		g/hr	595			992		397		662																	
117																												
118	Stack Gas Flowrate		dscfm	33887			32990		30394		32424																	
119	Oxygen		%	5.6			9.2		6.8		7.2																	
120																												



	B	AB	AC	AD	AE	AF	AG	AH	AI	AJ
61	Ash									
62	Chlorine									
63	Antimony									
64	Arsenic									
65	Barium									
66	Beryllium									
67	Cadmium									
68	Chromium									
69	Lead									
70	Mercury									
71	Silver									
72	Thallium									
73										
74	Stack Gas Flowrate									
75	Oxygen									
76										
77	Thermal Feedrate									
78										
79	<i>Feedrate MTEC Calculatic</i>									
80	Ash									
81	Chlorine									
82	Antimony									
83	Arsenic									
84	Barium									
85	Beryllium									
86	Cadmium									
87	Chromium									
88	Lead									
89	Mercury									
90	Silver									
91	Thallium									
92	SVM									
93	LVM									
94										
95										
96										
97	<b>912C3</b>									
98										
99	Feedstream Number									
100	Feed Class									
101	Feed Class 2									
102	Feedstream Description									
103	Feed Rate									
104										
105	Thermal Feedrate									
106										
107										
108	<b>912C4</b>									
109									Cond Avg	
110	Feedstream Number								F3	
111	Feed Class								Total	
112	Feed Class 2								Total	
113	Feedstream Description								Total	
114	Feed Rate									
115										
116	Ash									
117										
118	Stack Gas Flowrate									
119	Oxygen									
120										

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	
121	Thermal Feedrate		MMBtu/hr		75.4		75			76		75		72		68		70		70		147		143		145	
122	Feedrate MTEC Calculations																										
123	124	Ash	mg/dscm	y	9		21		8		13										9		21		8		
125																											
126																											
127	<b>912C5</b>				R1		R2		R3		Cond Avg		R1		R2		R3		Cond Avg		R1		R2		R3		
128	Feedstream Number				F1		F1		F1		F1		F2		F2		F2		F2		F3		F3		F3		
129	Feed Class				Liq HW		Liq HW		Liq HW		Liq HW		NG		NG		NG		NG		Total		Total		Total		
130	Feed Class 2				HW		HW		HW		HW		MF		MF		MF		MF		Total		Total		Total		
131	Feedstream Description				LHC waste		LHC waste		LHC waste		LHC waste		Natural Gas		Natural Gas		Natural Gas		Natural Gas		Total		Total		Total		
132	Feed Rate		lb/hr		4380		4380		4380		4380		4380		4380		4380		4380		Total		Total		Total		
134																											
135	Ash		g/hr		993		397		1192		861																
136																											
137	Stack Gas Flowrate		dscfm		33950		33574		33454		33659																
138	Oxygen		%		4		4.5		4		4.2																
139																											
140	Thermal Feedrate		MMBtu/hr		76		76		76		76		70		65		67		67		145		141		143		
141																											
142	Feedrate MTEC Calculations																										
143	Ash		mg/dscm	y	14		6		17		12																
144																											
145																											
146	<b>912C6</b>				R1		R2		R3		Cond Avg		R1		R2		R3		Cond Avg		R1		R2		R3		
147	Feedstream Number				F1		F1		F1		F1		F2		F2		F2		F2		F3		F3		F3		
148	Feed Class				Liq HW		Liq HW		Liq HW		Liq HW		NG		NG		NG		NG		Total		Total		Total		
149	Feed Class 2				HW		HW		HW		HW		MF		MF		MF		MF		Total		Total		Total		
150	Feedstream Description				LHC waste		LHC waste		LHC waste		LHC waste		Natural Gas		Natural Gas		Natural Gas		Natural Gas		Total		Total		Total		
151	Feed Rate		lb/hr		4380		4380		4374		4378		4378		4378		4378		4378		Total		Total		Total		
152																											
153																											
154	Ash		g/hr		2781		1093		198		1358																
155																											
156	Stack Gas Flowrate		dscfm		23997		26520		23191		24569																
157	Oxygen		%		7.7		7.7		10		8.5																
158																											
159	Thermal Feedrate		MMBtu/hr		76		76		75		75		18		18		18		18		94		94		93		
160																											
161	Feedrate MTEC Calculations																										
162	Ash		mg/dscm	y	72		26		6		35																
163																											
164																											
165																											
166																											
167																											
168	<b>BIF Feedrate Limits</b>				Units No. 911 and 912 separately																						
169																											
170	Arsenic		g/hr																								
171	Beryllium		g/hr																								
172	Cadmium		g/hr																								
173	Chromium		g/hr																								
174	Chromium		g/hr																								
175	Antimony		g/hr																								
176	Barium		g/hr																								
177	Lead		g/hr																								
178	Mercury		g/hr																								
179	Silver		g/hr																								
180	Thallium		g/hr																								

	B	AB	AC	AD	AE	AF	AG	AH	AI	AJ
121	Thermal Feedrate	145								
122										
123	Feedrate MTEC Calculatic									
124	Ash	13								
125										
126										
127	<b>912C5</b>	Cond Avg								
128										
129	Feedstream Number	F3								
130	Feed Class	Total								
131	Feed Class 2	Total								
132	Feedstream Description	Total								
133	Feed Rate									
134										
135	Ash									
136										
137	Stack Gas Flowrate									
138	Oxygen									
139										
140	Thermal Feedrate	143								
141										
142	Feedrate MTEC Calculatic									
143	Ash	12								
144										
145										
146	<b>912C6</b>	Cond Avg								
147										
148	Feedstream Number	F3								
149	Feed Class	Total								
150	Feed Class 2	Total								
151	Feedstream Description	Total								
152	Feed Rate									
153										
154	Ash									
155										
156	Stack Gas Flowrate									
157	Oxygen									
158										
159	Thermal Feedrate	94								
160										
161	Feedrate MTEC Calculatic									
162	Ash	35								
163										
164										
165										
166										
167										
168	<b>BIF Feedrate Limits</b>	LLC Feed								
169										
170	Arsenic	0.31								
171	Beryllium	0.122								
172	Cadmium	0.07								
173	Chromium	0.06								
174	Antimony	964								
175	Barium	160714								
176	Lead	289								
177	Mercury	257								
178	Silver	9643								
179	Thallium	964								
180										



	B	AB	AC	AD	AE	AF	AG	AH	AI	AJ
181										
182	<b>BIF Feedrate Limits</b>	LLC Feed								
183										
184	Ash									
185	Chlorine	0.31								
186	Arsenic	0.122								
187	Beryllium	0.07								
188	Cadmium	0.06								
189	Chromium	964								
190	Antimony	160714								
191	Barium	289								
192	Lead	257								
193	Mercury	9643								
194	Silver	964								
195	Thallium									