Leaching Environmental Assessment Framework (LEAF) How-To Guide

Understanding the LEAF Approach and How and When to Use It

APPENDICES

Table of Contents

Appendix A: Leaching Methods in the U.S. and European Union

Table A-1. U.S. and European Leaching Tests

Test Type	U.S. EPA Method	Analogous European Methods			
		Soil, sediments, compost and sludge	Waste	Mining waste	Construction products
pH dependence test	1313	ISO/TS 21268-4[a]	EN 14429[b]		
		-	EN 14997		-
Percolation test	1314	ISO/TS 21268-3[a]	CEN/TS 14405		FprCEN/TS 16637-3[a]
		-	NEN 7373	-	NEN 7373
		NEN 7374[a]		-	NEN 7374[a]
Monolith test	1315	-	EN 15863	-	CEN/TS 16637-2[a]
		-	NEN 7375	-	NEN 7375
		-	NVN 7376[a]	-	NVN 7376[a]
Compacted granular test	1315	-	NEN 7347	-	CEN/TS 16637-2[a]
L/S dependence test	1316	EN 12457-1 (L/S=2) and EN 12457-2 (L/S=10)			
Redox capacity	N/A	-	CEN/TS 16660	-	-
Acid rock drainage	N/A			EN 15875	
Reactive surfaces	N/A	EN ISO 12782 pts 1-5	Vienna	-	-

Source: van der Sloot et al. (2015)

[a] Test is applicable to organic constituents

[b] Not yet adopted in the CEN/TC 351 working group for construction products, but highly relevant for the European Construction Products Regulation (CPR).

CEN – European Committee for Standardization; *www.cen.eu* (accessed 25 Nov. 2016)

EN – validated European standard

FprCEN/TS – European standard, preliminary technical specification that needs to undergo validation

ISO/TS – International standard

NEN – Dutch standard (validated)

NVN – Dutch preliminary standard (standard without validation)

PrEN – European standard, preliminary full EN test method that has undergone validation, in voting for acceptance by member states (minimal changes anticipated).

TS – Technical specification

Vienna – Vienna Agreement; ISO standards can be adopted as European standards with the EN-ISO reference

Table A-2. Online References for Various Leaching Test Methods

Method	URL	Last Access
U.S. EPA Methods 1313, 1314, 1315 and 1316	http://www3.epa.gov/epawaste/hazard/testmethods/sw846/new_meth.htm	20-Nov-2016
EN 14997	*http://standards.cen.eu/dyn/www/f?p=204:110:0::::FSP_PROJECT,FSP_ORG_ID:39446,6273&cs=1DF6C4C988FB5E443807EE81C2F0B1229*	20-Nov-2016
FprCEN/TS 16637-3	*http://standards.cen.eu/dyn/www/f?p=CENWEB:110:0::::FSP_ORG_ID,FSP_PROJECT:510793,34858&cs=19FA1DFBB93378D5502AB79E8A707343E*	20-Nov-2016
CEN/TS 16637-2	*http://standards.cen.eu/dyn/www/f?p=CENWEB:110:0::::FSP_ORG_ID,FSP_PROJECT:510793,34857&cs=1FC07D076AA7B4CAFA674FA865A0A7F4C*	20-Nov-2016
ISO/TS 21268-4	*http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=39105*	20-Nov-2016
ISO/TS 21268-3	*http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=44147*	20-Nov-2016
NEN 7373	*https://www.nen.nl/NEN-Shop-2/Standard/NEN-73732004-nl.htm*	20-Nov-2016
NEN 7375	*https://www.nen.nl/NEN-Shop-2/Standard/NEN-73752004-nl.htm*	20-Nov-2016
NVN 7376	*https://www.nen.nl/NEN-Shop-2/Standard/NVN-73762004-nl.htm*	20-Nov-2016
NEN 7347	*https://www.nen.nl/NEN-Shop-2/Standard/NEN-73472006-en.htm*	20-Nov-2016
EN 14405	*https://standards.cen.eu/dyn/www/f?p=204:110:0::::FSP_PROJECT,FSP_ORG_ID:39353,2046877&cs=1059433662EBF10E5DBF062E454F6B4EA*	02-Nov-2018
EN 15863	*http://infostore.saiglobal.com/store/details.aspx?ProductID=1678717*	20-Nov-2016
EN ISO 12782-1	*http://www.iso.org/iso/catalogue_tc/catalogue_detail.htm?csnumber=51697*	20-Nov-2016
EN ISO 12782-2	*http://www.iso.org/iso/catalogue_tc/catalogue_detail.htm?csnumber=51698*	20-Nov-2016
EN ISO 12782-3	*http://www.iso.org/iso/catalogue_tc/catalogue_detail.htm?csnumber=51699*	20-Nov-2016
EN ISO 12782-4	*http://www.iso.org/iso/catalogue_tc/catalogue_detail.htm?csnumber=51700*	20-Nov-2016
EN ISO 12782-5	*http://www.iso.org/iso/catalogue_tc/catalogue_detail.htm?csnumber=51701*	20-Nov-2016
CEN/TS 16660	*http://standards.cen.eu/dyn/www/f?p=204:110:0::::FSP_PROJECT:39665&cs=137E16928DF0300D78675778C7955F973*	20-Nov-2016
EN 12457	*https://standards.cen.eu/dyn/www/f?p=204:110:0::::FSP_PROJECT,FSP_ORG_ID:14486,2046877&cs=13604EB5109EFF1F1C575A037AD9EED7A*	02-Nov-2018
EN 15875	*http://shop.bsigroup.com/ProductDetail/?pid=000000000030271066*	20-Nov-2016
EN 14429	*http://infostore.saiglobal.com/store/details.aspx?ProductID=1678643*	20-Nov-2016

Note: most methods are available to download for a publication fee.

Appendix B: Graphical and Tabular LEAF Results for Case Study (Section 5)

This appendix provides LEAF testing data in graphical and tabular form for the material and constituents discussed in the hypothetical case study (**Section 5**). Graphical data is presented "as produced" from LeachXS™ Lite with minor modifications to provide consistency in formatting for the data series. Tabular data, including interpolated pH-dependent concentrations, availability determination and leaching assessment over a user-defined pH domain from Method 1313, is "as produced" directly from the reporting features of the LeachXS™ program.

B.1 Case Study: Evaluating Coal Combustion Fly Ash for Use as Construction Fill Material

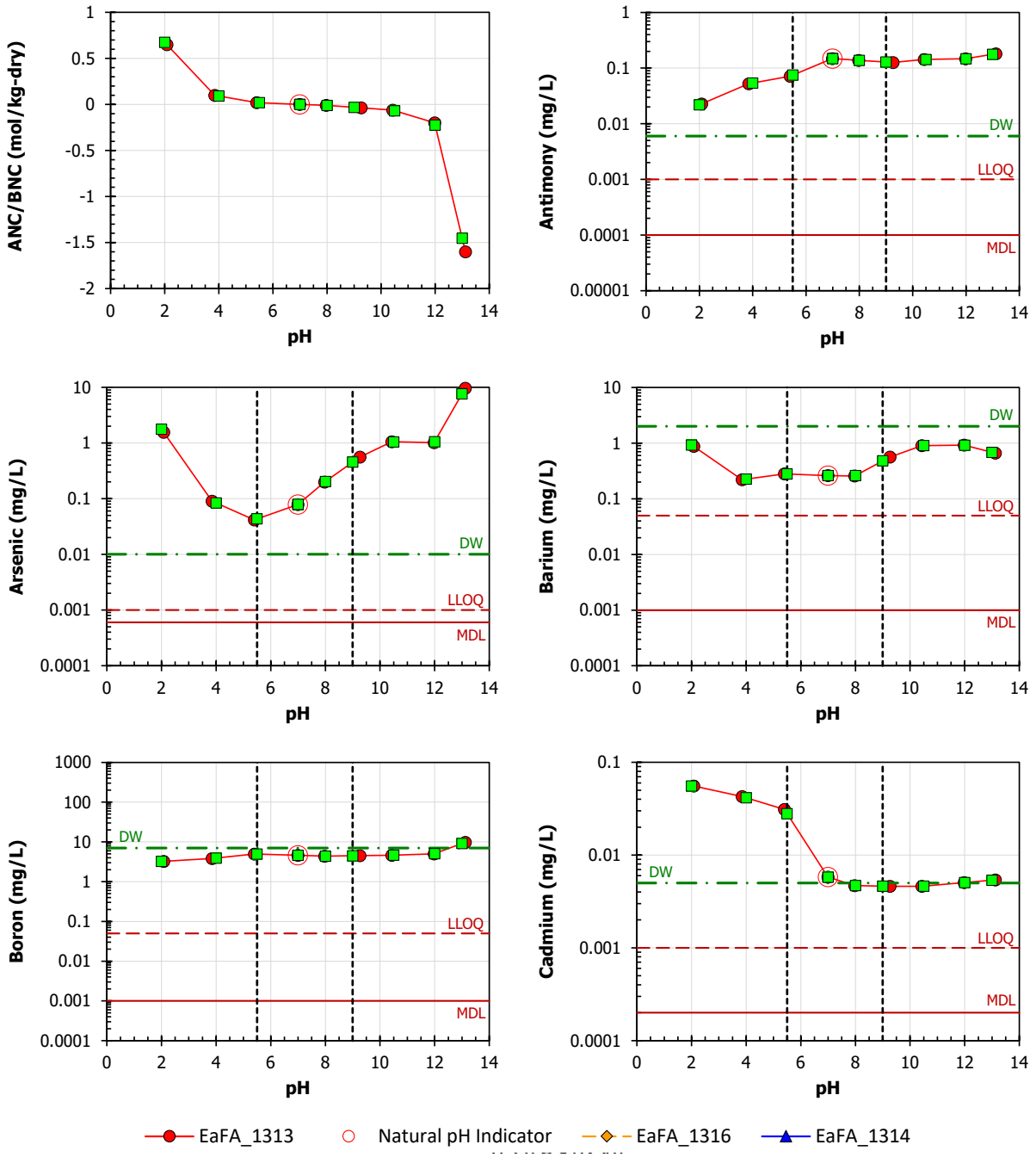

Figure B-1. Method 1313 results for a low-carbon coal fly ash (EaFA):
Titration curve, antimony, arsenic, barium, boron and cadmium.

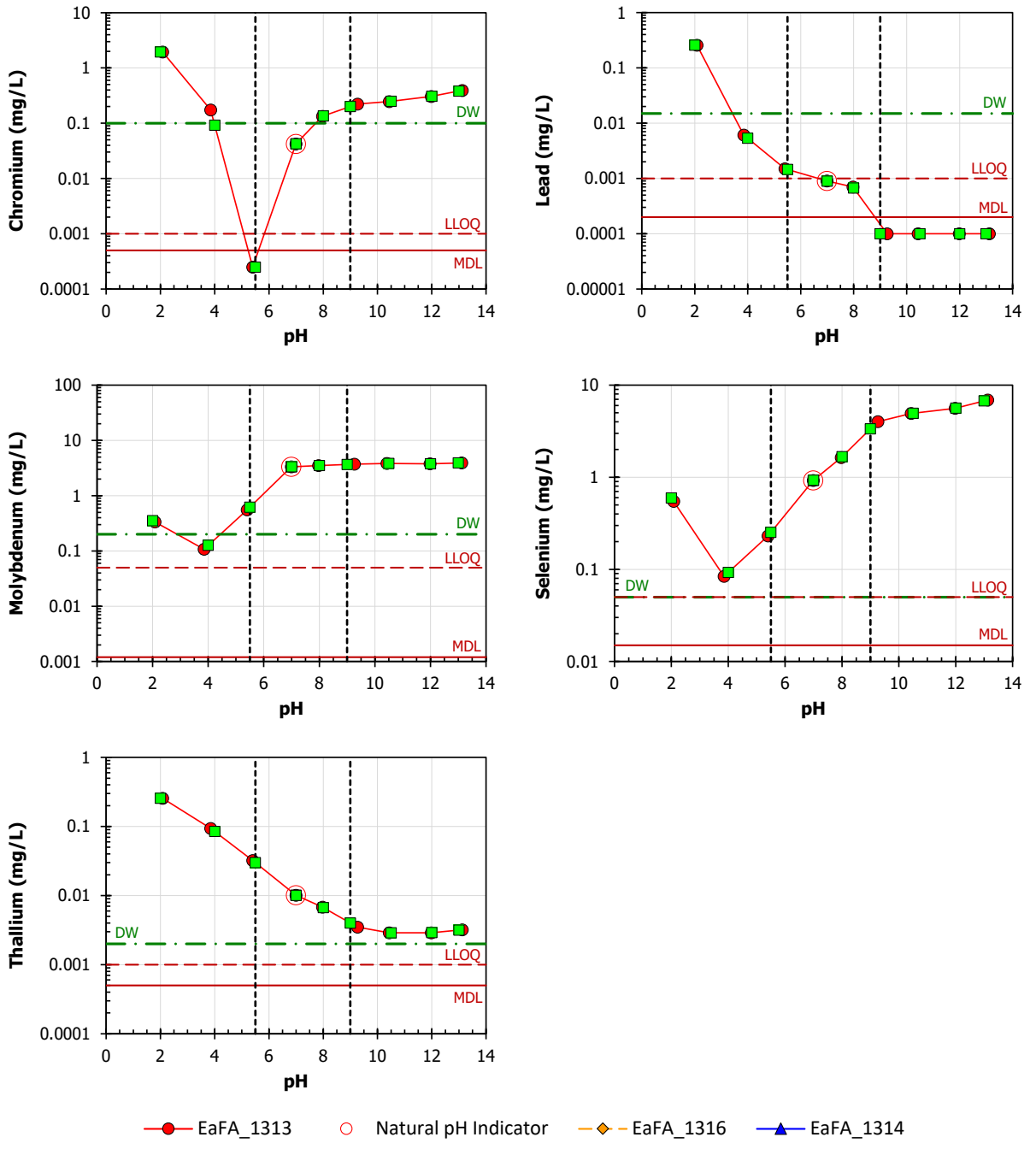

Figure B-2. Method 1313 results for a low-carbon coal fly ash (EaFA):
Chromium, lead, molybdenum, selenium and thallium.

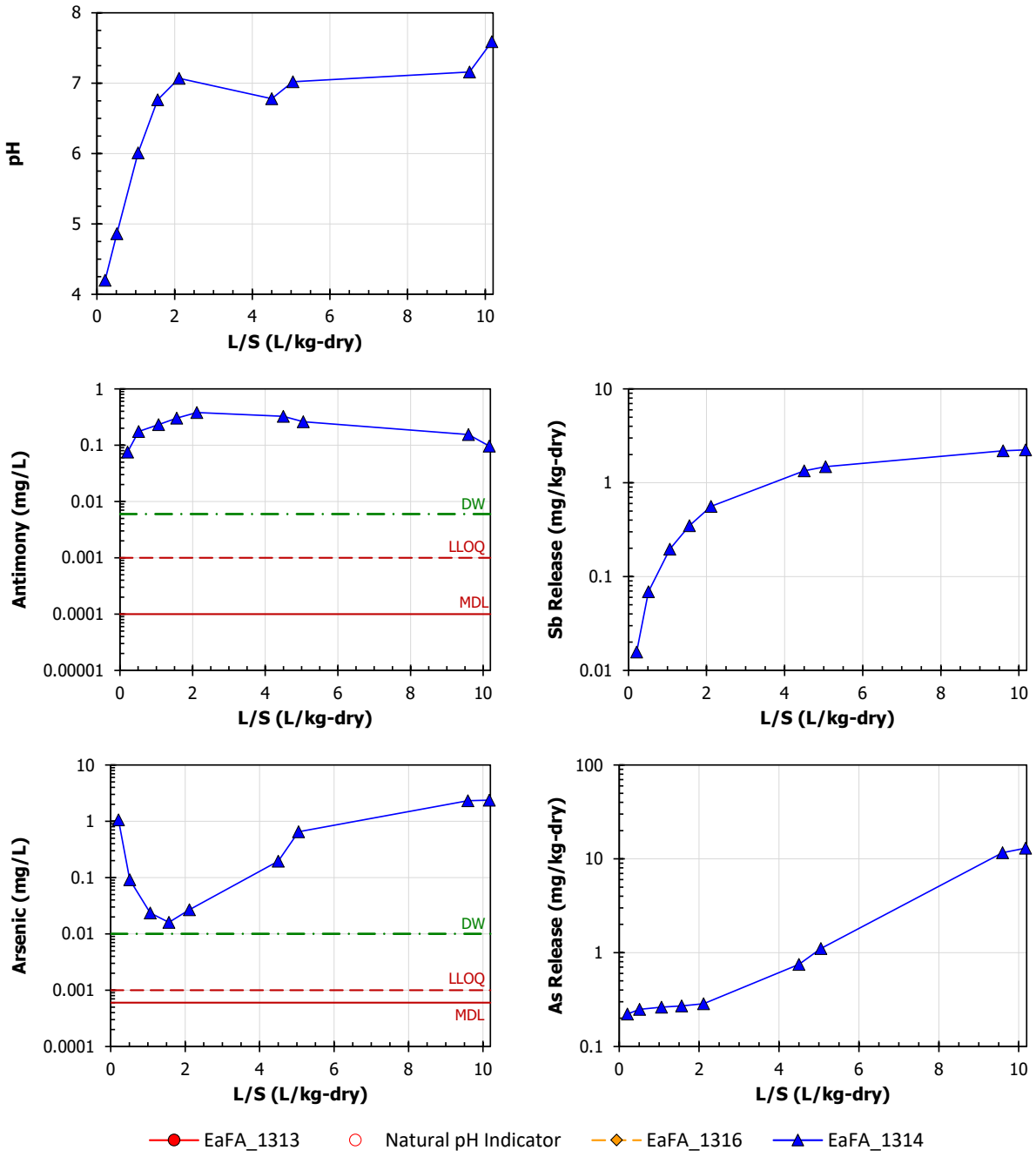

Figure B-3. Method 1314 results for a low-carbon coal fly ash (EaFA):
Eluate pH, antimony and arsenic.

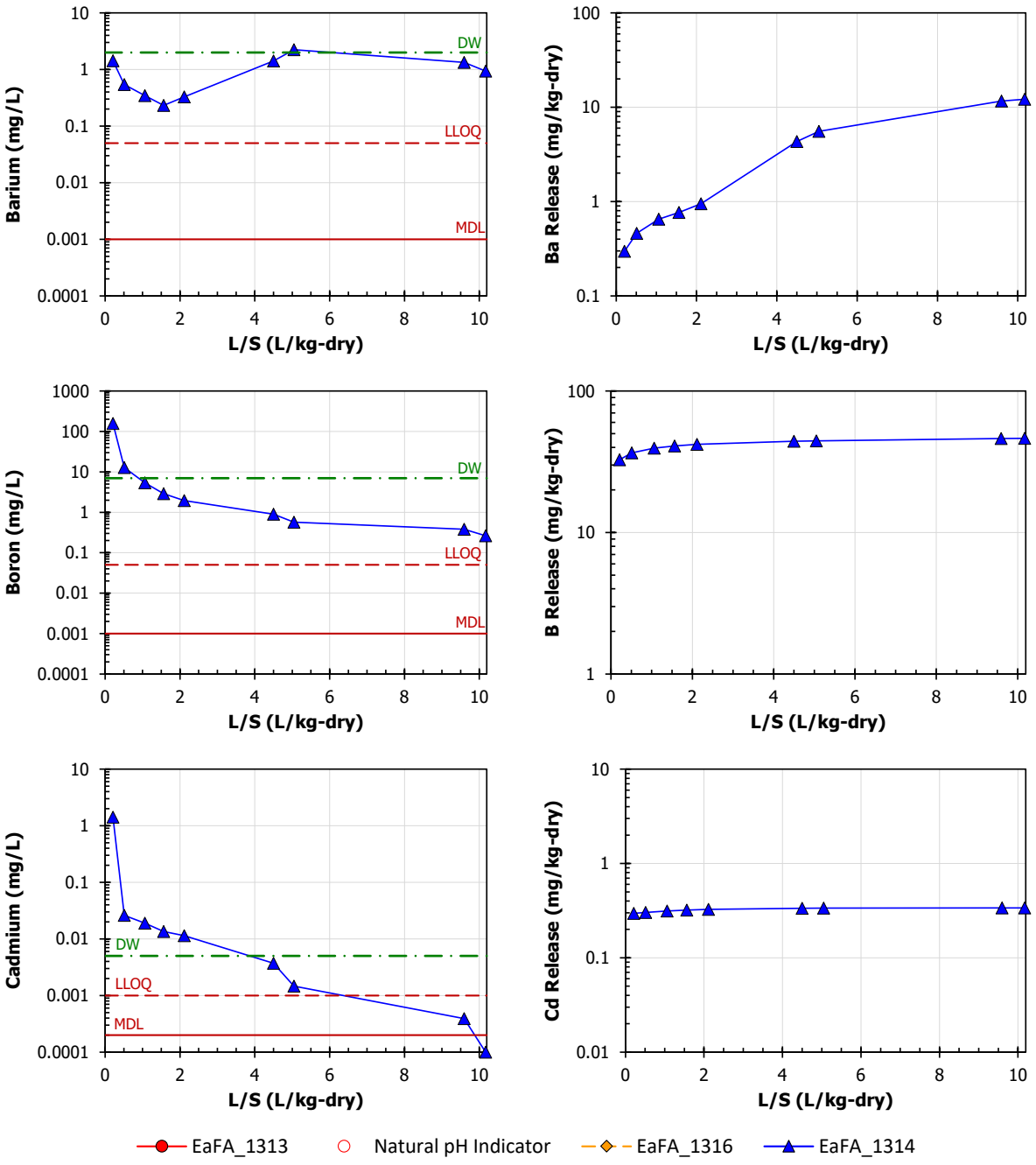

Figure B-4. Method 1314 results for a low-carbon coal fly ash (EaFA):
Barium, boron and cadmium.

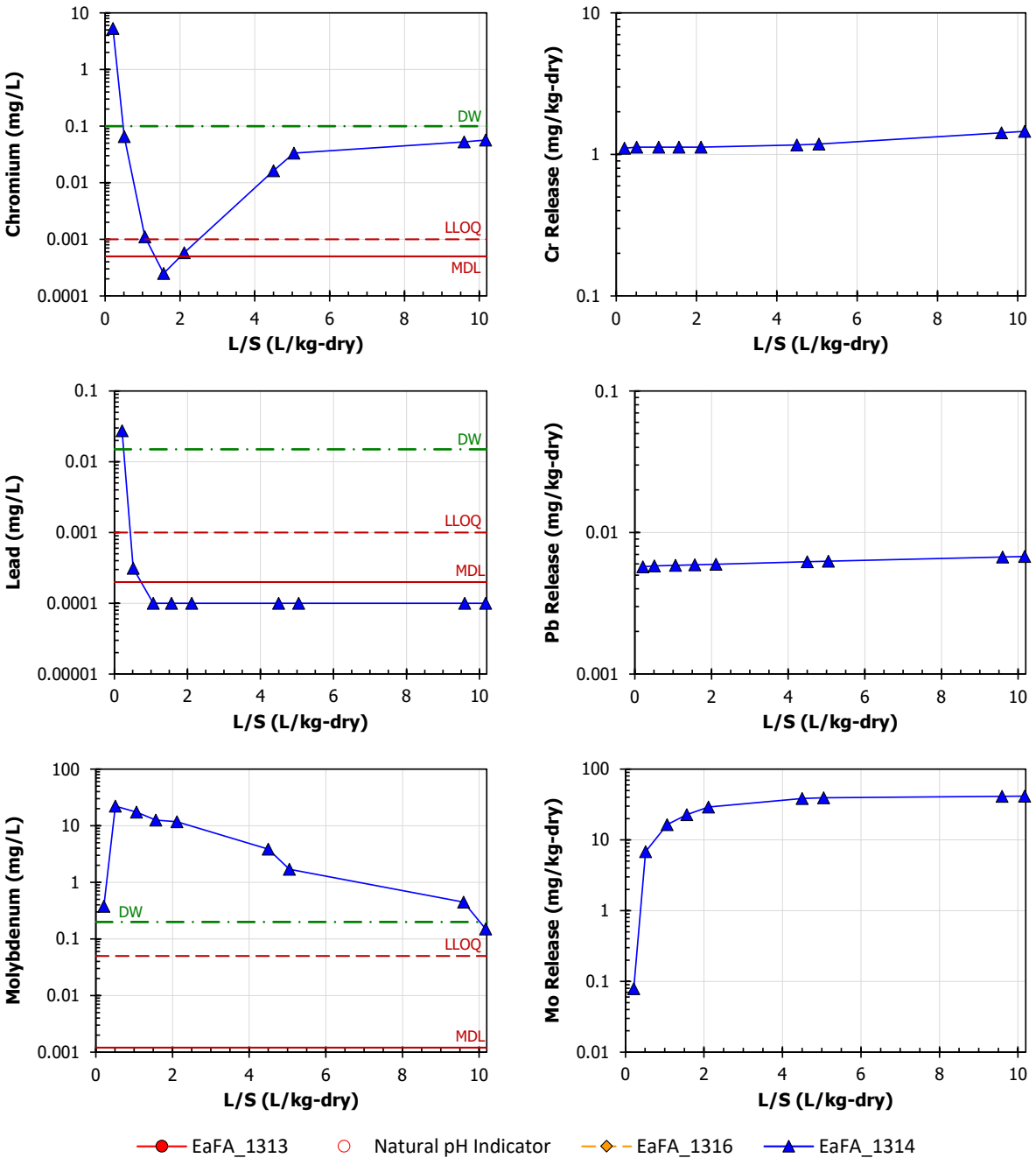

Figure B-5. Method 1314 results for a low-carbon coal fly ash (EaFA):
Chromium, lead and molybdenum.

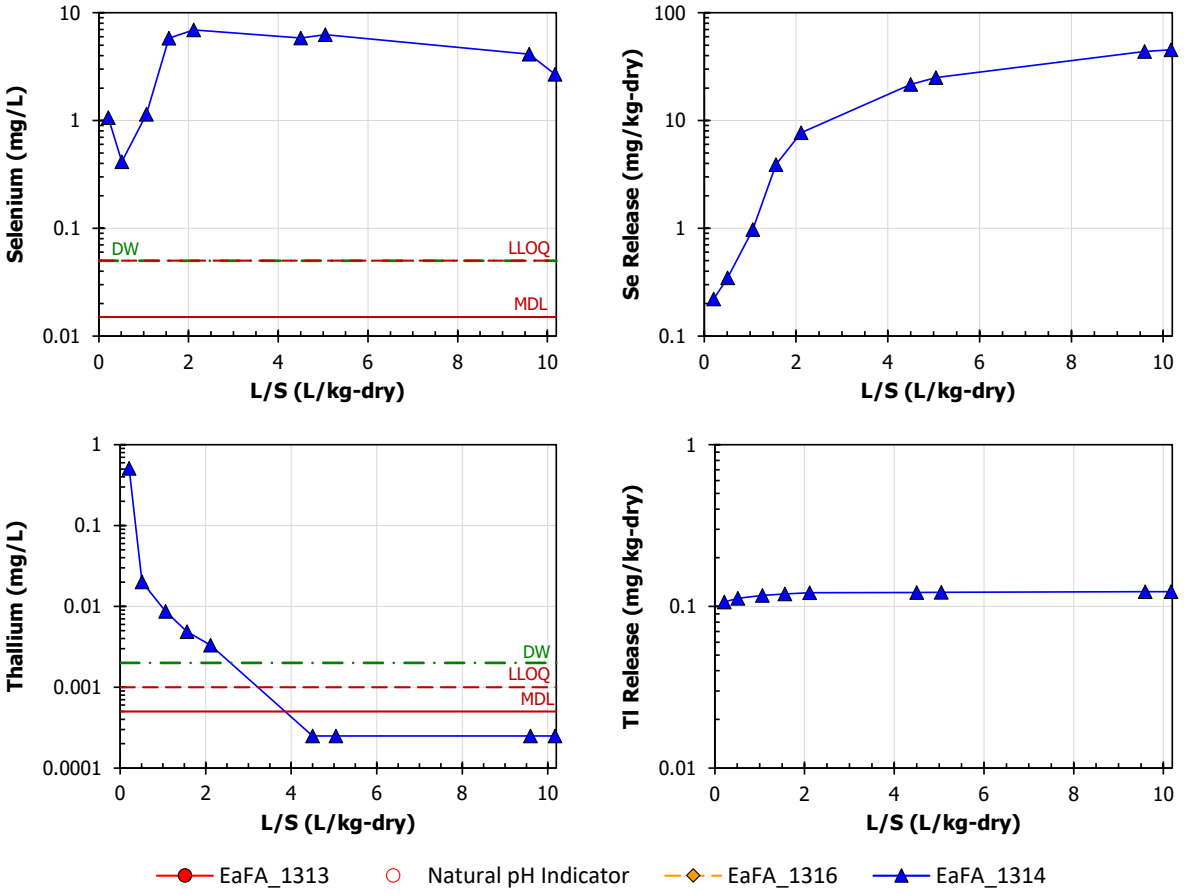

Figure B-6. Method 1314 results for a low-carbon coal fly ash (EaFA):
Selenium and thallium.

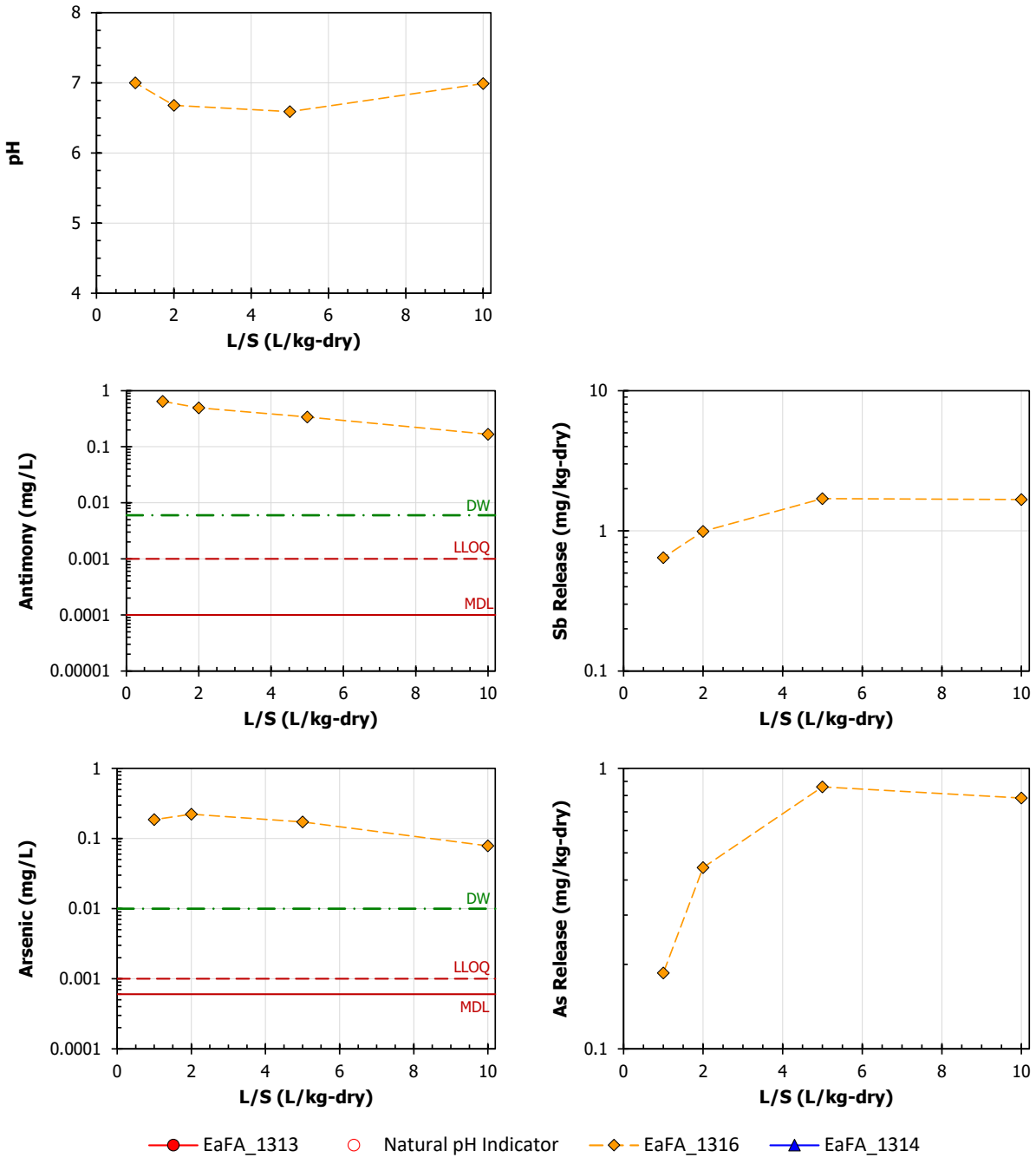

Figure B-7. Method 1316 results for a low-carbon coal fly ash (EaFA):
Eluate pH, antimony and arsenic.

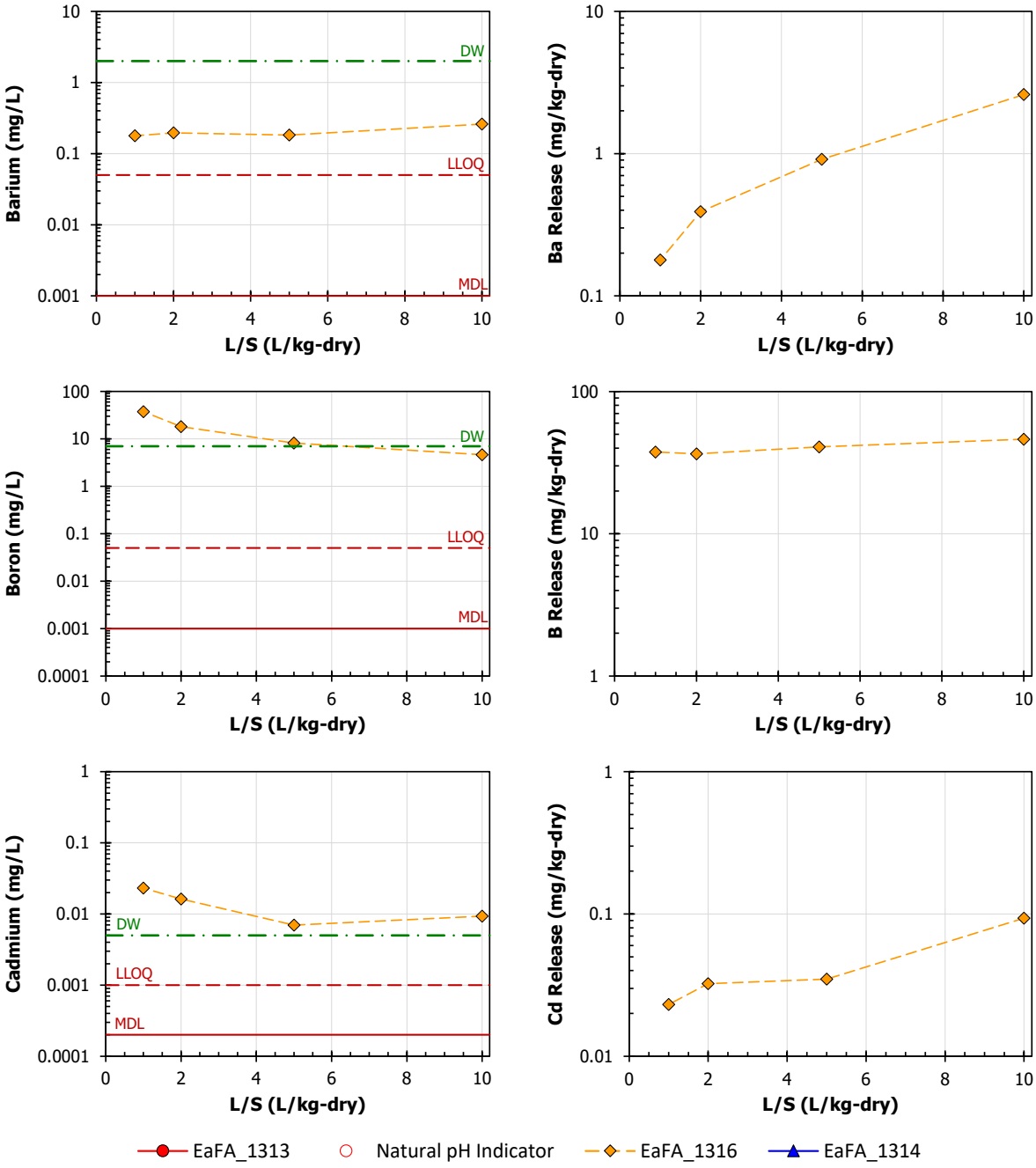

Figure B-8. Method 1316 results for a low-carbon coal fly ash (EaFA):
Barium, boron and cadmium.

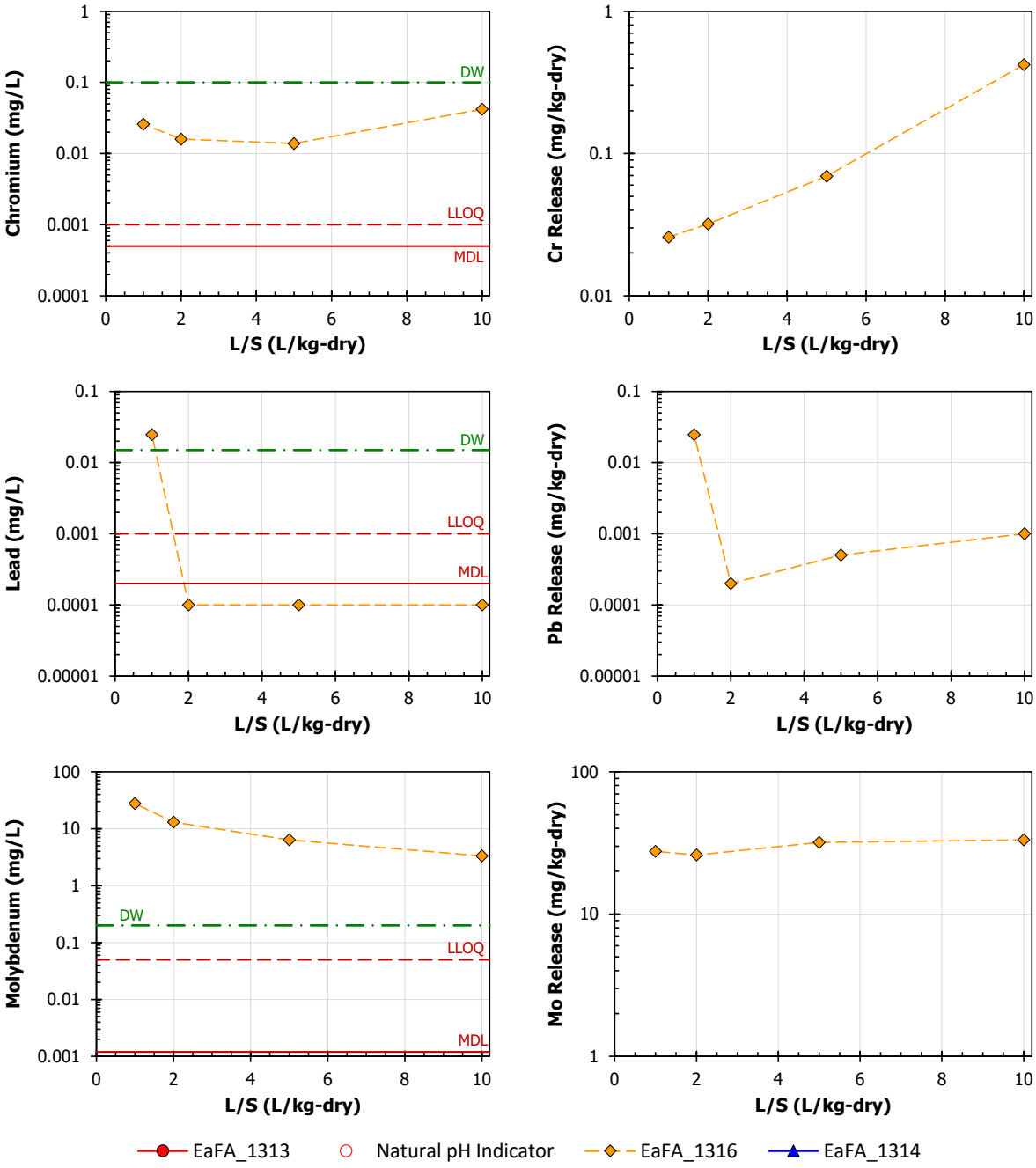

Figure B-9. Method 1316 results for a low-carbon coal fly ash (EaFA):
Chromium, lead and molybdenum.

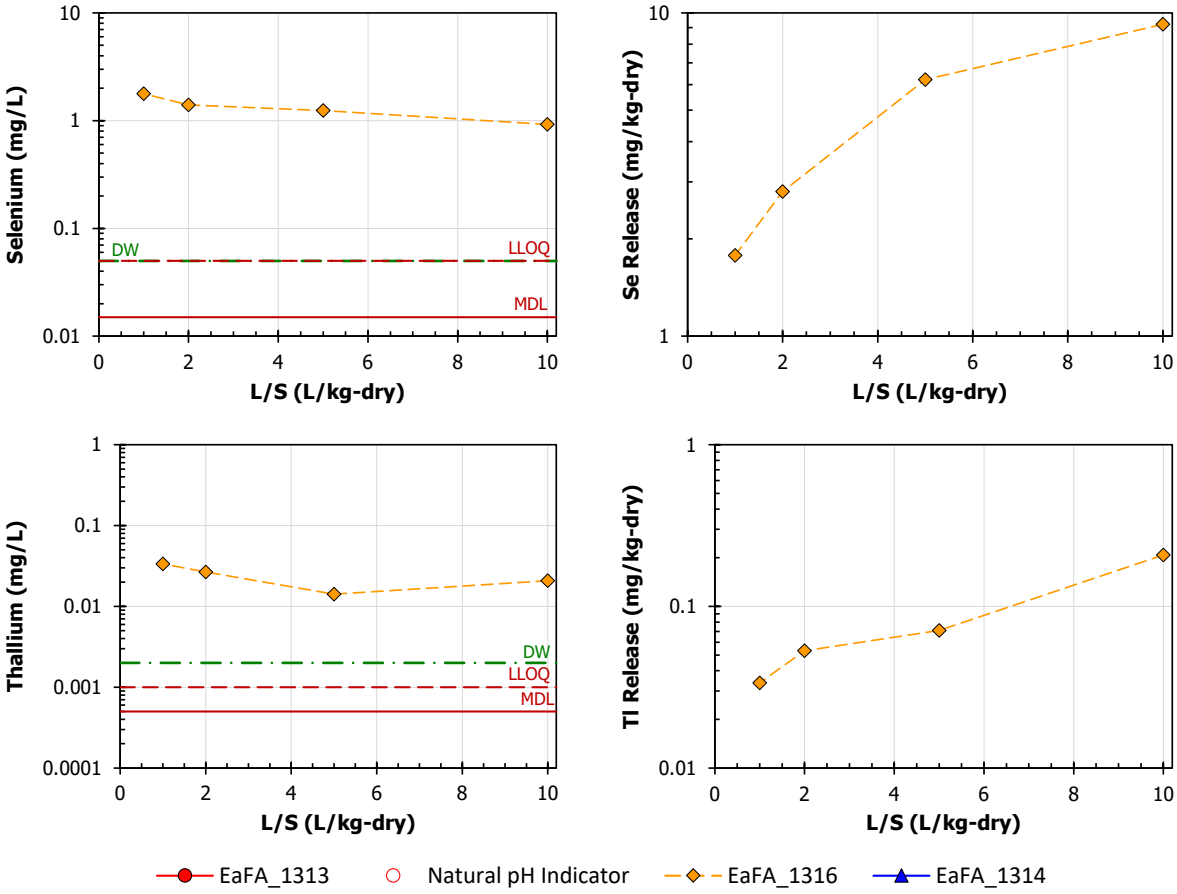

Figure B-10. Method 1316 results for a low-carbon coal fly ash (EaFA):
Selenium and thallium.

Analysis report according to EPA Method 1313

Created by LeachXS™, version 2.0.92 (18-Oct-2016)
Report created on 25-Jan-2017 2:49 PM

Material Information

Sample ID	EaFA (P,1,1)
Sample Name	EaFA
Sample Replicate	A
Test Replicate	A
Category	Coal Combustion
Subcategory	Fly Ash
Full Name	EaFA
Description	Fly Ash / Unit 1 / Facility Ea
Origin	EPA LEAF Methods validation
Sample Database	C:\Users\User\Documents\LeachXS User Objects\ DATABASES\LEAF Guide (16-Dec-2016).mdb

Test Parameters

Start Date	19-Apr-10	
End Date	20-Apr-10	
Particle Size	0.3	*mm*
Contact Interval	24.0	*h*
Solids Content	100	*%*

Legend

pH	Acidity	V(acid)	Volume of added acid
E(h)	Redox potential	[acid]	Concentration of added acid
K(25°C)	Conductivity at 25 °C	V(base)	Volume of added base
L/S-dry	Liquid-to-solid ratio	[base]	Concentration of added base
M	Dry mass	[H3O+]	Acid neutralization capacity
V	Volume DI water	[OH-]	Base neutralization capacity
Total V	Total liquid volume		
N/A	Not analyzed or measured		
N/C	Not calculated		

Concentrations below the method detection limit (MDL) are reported between parentheses as half of the MDL.

Fraction Information

Fraction	pH	E(h) mV	K(25°C) mS/cm	L/S-dry L/kg	M kg dry	V mL	Total V mL
9	2.08	N/A	17.5	10.0	0.0400	387	400
8	3.85	N/A	4.51	10.0	0.0400	398	400
7	5.40	N/A	2.88	10.0	0.0400	400	400
6	6.99	N/A	2.71	10.0	0.0400	400	400
5	7.97	N/A	2.75	10.0	0.0400	400	400
4	9.26	N/A	3.26	10.0	0.0400	399	400
3	10.4	N/A	3.29	10.0	0.0400	398	400
2	12.0	N/A	10.9	10.0	0.0400	392	400
1	13.1	N/A	108	10.0	0.0400	336	400

Titration Information

Fraction	pH	V(acid) mL	[acid] mol/L	V(base) mL	[base] mol/L	$[H_3O^+]$ mol/kg dry	$[OH^-]$ mol/kg dry
9	2.08	13.0	2.00			0.650	
8	3.85	2.00	2.00			0.100	
7	5.40	0.400	2.00			0.0200	
6	6.99						
5	7.97			0.400	1.00		0.0100
4	9.26			1.50	1.00		0.0375
3	10.4			2.50	1.00		0.0625
2	12.0			8.00	1.00		0.200
1	13.1			64.0	1.00		1.60

Concentration in mg/L

Fraction	*9*	*8*	*7*	*6*	*5*	*4*	*3*	*2*	*1*
pH	*2.08*	*3.85*	*5.40*	*6.99*	*7.97*	*9.26*	*10.4*	*12.0*	*13.1*
Al	128	32.0	0.335	0.202	1.21	17.7	27.1	33.8	37.0
As	1.55	0.0900	0.0417	0.0784	0.199	0.560	1.05	1.01	9.69
B	3.25	3.82	4.98	4.62	4.38	4.50	4.64	4.99	9.77
Ba	0.876	0.220	0.281	0.260	0.256	0.562	0.903	0.921	0.659
Be	0.441	0.142	0.00258	(0.000320)	(0.000320)	(0.000320)	(0.000320)	(0.000320)	(0.000320)
Br^-	(0.00871)	0.668	0.687	0.515	0.598	0.700	0.652	0.722	0.827
Ca	141	140	167	155	135	111	87.3	40.9	9.20
Cd	0.0555	0.0427	0.0311	0.00580	0.00470	0.00460	0.00461	0.00505	0.00540
Cl^-	1.64	1.57	1.25	1.30	1.28	1.30	1.26	1.30	4.19
Co	0.419	0.214	0.252	0.0261	0.00430	0.00140	0.00118	0.000726	(0.000207)
Cr	1.96	0.175	(0.000249)	0.0422	0.134	0.223	0.248	0.306	0.392
Cs	0.0642	0.0239	0.0172	0.0130	0.0148	0.0188	0.0218	0.0282	0.0336
Cu	3.16	1.91	0.0894	0.000900	(0.000351)	(0.000351)	0.000900	0.00192	0.0179
DIC	0.138	0.150	0.154	(0.0650)	(0.0650)	0.653	1.93	7.95	29.2
DOC	1.69	1.04	1.06	1.15	1.21	1.83	3.19	9.66	142
F^-	0.0945	3.34	0.409	1.70	2.05	3.13	3.62	3.91	9.38
Fe	33.9	0.419	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)	0.0202	0.0339
K	22.1	18.6	26.1	25.0	55.3	135	190	441	1719
Li	1.51	2.12	3.26	3.24	2.97	2.70	2.56	2.23	1.56
Mg	14.0	7.69	8.90	7.49	5.10	2.86	0.111	(0.000500)	(0.000500)
Mn	1.84	1.17	0.982	0.268	0.0324	(0.000171)	(0.000171)	(0.000171)	(0.000171)
Mo	0.334	0.108	0.552	3.32	3.49	3.70	3.83	3.77	3.92

Concentration in mg/L

Fraction	*9*	*8*	*7*	*6*	*5*	*4*	*3*	*2*	*1*
pH	*2.08*	*3.85*	*5.40*	*6.99*	*7.97*	*9.26*	*10.4*	*12.0*	*13.1*
Na	3.85	4.51	6.63	6.45	6.27	6.39	6.50	6.80	8.92
Ni	0.762	0.519	0.603	0.0646	0.00910	(0.000365)	(0.000365)	(0.000365)	(0.000365)
NO_2^-	(0.00916)	(0.00916)	(0.00916)	(0.00916)	(0.00916)	(0.00916)	(0.00916)	0.0582	1.14
NO_3^-	4786	584	94.9	0.916	0.755	0.757	0.612	0.657	0.668
P	2.42	0.0629	(0.00185)	0.0163	0.0396	0.0854	0.0430	0.0372	0.209
Pb	0.257	0.00610	0.00150	0.000900	0.000700	(0.000115)	(0.000115)	(0.000115)	(0.000115)
PO_4^{3-}	1.01	(0.0118)	(0.0118)	(0.0118)	0.123	0.814	1.33	1.36	2.05
Re	0.00119	(0.000120)	(0.000120)	(0.000120)	(0.000120)	(0.000120)	0.00141	0.00223	0.00309
S	69.0	104	152	164	160	163	160	162	185
Sb	0.0227	0.0525	0.0717	0.148	0.138	0.126	0.143	0.147	0.181
Se	0.546	0.0841	0.230	0.922	1.64	4.01	4.92	5.60	6.88
Si	72.2	18.0	6.17	1.43	0.535	0.278	0.720	3.76	30.6
Sn	(0.000350)	(0.000350)	(0.000350)	(0.000350)	(0.000350)	(0.000350)	(0.000350)	(0.000350)	(0.000350)
SO_4^{2-}	426	414	401	425	421	416	418	411	430
Sr	5.56	3.07	3.09	2.54	2.30	2.10	1.96	1.64	0.916
Ti	1.50	0.00373	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)
Tl	0.256	0.0940	0.0322	0.0101	0.00680	0.00350	0.00290	0.00290	0.00320
U	0.451	0.0155	(0.000150)	(0.000150)	(0.000150)	(0.000150)	0.00107	0.00415	0.0292
V	6.64	0.0818	0.0794	0.158	0.209	0.832	2.07	2.74	5.21
Zn	1.63	1.16	1.14	(0.000500)	(0.000500)	(0.000500)	(0.000500)	(0.000500)	0.0567

Method Detection Limit in mg/L

Fraction	*9*	*8*	*7*	*6*	*5*	*4*	*3*	*2*	*1*
pH	*2.08*	*3.85*	*5.40*	*6.99*	*7.97*	*9.26*	*10.4*	*12.0*	*13.1*
Al	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
As	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640
B	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
Ba	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
Be	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640
Br^-	0.0174	0.0174	0.0174	0.0174	0.0174	0.0174	0.0174	0.0174	0.0174
Ca	0.00260	0.00260	0.00260	0.00260	0.00260	0.00260	0.00260	0.00260	0.00260
Cd	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170
Cl^-	0.00649	0.00649	0.00649	0.00649	0.00649	0.00649	0.00649	0.00649	0.00649
Co	0.000414	0.000414	0.000414	0.000414	0.000414	0.000414	0.000414	0.000414	0.000414
Cr	0.000497	0.000497	0.000497	0.000497	0.000497	0.000497	0.000497	0.000497	0.000497
Cs	0.000490	0.000490	0.000490	0.000490	0.000490	0.000490	0.000490	0.000490	0.000490
Cu	0.000701	0.000701	0.000701	0.000701	0.000701	0.000701	0.000701	0.000701	0.000701
DIC	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130
DOC	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170
F^-	0.00705	0.00705	0.00705	0.00705	0.00705	0.00705	0.00705	0.00705	0.00705
Fe	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200
K	0.00160	0.00160	0.00160	0.00160	0.00160	0.00160	0.00160	0.00160	0.00160
Li	0.00190	0.00190	0.00190	0.00190	0.00190	0.00190	0.00190	0.00190	0.00190
Mg	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
Mn	0.000342	0.000342	0.000342	0.000342	0.000342	0.000342	0.000342	0.000342	0.000342
Mo	0.00120	0.00120	0.00120	0.00120	0.00120	0.00120	0.00120	0.00120	0.00120

Method Detection Limit in mg/L

Fraction	*9*	*8*	*7*	*6*	*5*	*4*	*3*	*2*	*1*
pH	*2.08*	*3.85*	*5.40*	*6.99*	*7.97*	*9.26*	*10.4*	*12.0*	*13.1*
Na	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250
Ni	0.000730	0.000730	0.000730	0.000730	0.000730	0.000730	0.000730	0.000730	0.000730
NO_2^-	0.0183	0.0183	0.0183	0.0183	0.0183	0.0183	0.0183	0.0183	0.0183
NO_3^-	0.0258	0.0258	0.0258	0.0258	0.0258	0.0258	0.0258	0.0258	0.0258
P	0.00370	0.00370	0.00370	0.00370	0.00370	0.00370	0.00370	0.00370	0.00370
Pb	0.000230	0.000230	0.000230	0.000230	0.000230	0.000230	0.000230	0.000230	0.000230
PO_4^{3-}	0.0237	0.0237	0.0237	0.0237	0.0237	0.0237	0.0237	0.0237	0.0237
Re	0.000240	0.000240	0.000240	0.000240	0.000240	0.000240	0.000240	0.000240	0.000240
S	0.00680	0.00680	0.00680	0.00680	0.00680	0.00680	0.00680	0.00680	0.00680
Sb	7.94E-05	7.94E-05	7.94E-05	7.94E-05	7.94E-05	7.94E-05	7.94E-05	7.94E-05	7.94E-05
Se	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150
Si	0.00110	0.00110	0.00110	0.00110	0.00110	0.00110	0.00110	0.00110	0.00110
Sn	0.000700	0.000700	0.000700	0.000700	0.000700	0.000700	0.000700	0.000700	0.000700
SO_4^{2-}	0.0208	0.0208	0.0208	0.0208	0.0208	0.0208	0.0208	0.0208	0.0208
Sr	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
Ti	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200
Tl	0.000510	0.000510	0.000510	0.000510	0.000510	0.000510	0.000510	0.000510	0.000510
U	0.000300	0.000300	0.000300	0.000300	0.000300	0.000300	0.000300	0.000300	0.000300
V	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150
Zn	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100

Release in mg/kg

Fraction	*9*	*8*	*7*	*6*	*5*	*4*	*3*	*2*	*1*
pH	*2.08*	*3.85*	*5.40*	*6.99*	*7.97*	*9.26*	*10.4*	*12.0*	*13.1*
Al	1280	320	3.35	2.02	12.1	177	271	338	370
As	15.5	0.900	0.417	0.784	1.99	5.60	10.5	10.1	96.9
B	32.5	38.2	49.8	46.2	43.8	45.0	46.4	49.9	97.7
Ba	8.76	2.20	2.81	2.60	2.56	5.62	9.03	9.21	6.59
Be	4.41	1.42	0.0258	(0.00320)	(0.00320)	(0.00320)	(0.00320)	(0.00320)	(0.00320)
Br^-	(0.0871)	6.68	6.87	5.15	5.98	7.00	6.52	7.22	8.27
Ca	1413	1395	1673	1551	1351	1111	873	409	92.0
Cd	0.555	0.427	0.311	0.0580	0.0470	0.0460	0.0461	0.0505	0.0540
Cl^-	16.4	15.7	12.5	13.0	12.8	13.0	12.6	13.0	41.9
Co	4.19	2.14	2.52	0.261	0.0430	0.0140	0.0118	0.00726	(0.00207)
Cr	19.6	1.75	(0.00249)	0.422	1.34	2.23	2.48	3.06	3.92
Cs	0.642	0.239	0.172	0.130	0.148	0.188	0.218	0.282	0.336
Cu	31.6	19.1	0.894	0.00900	(0.00351)	(0.00351)	0.00900	0.0192	0.179
DIC	1.38	1.50	1.54	(0.650)	(0.650)	6.53	19.3	79.5	292
DOC	16.9	10.4	10.6	11.5	12.1	18.3	31.9	96.6	1416
F^-	0.945	33.4	4.09	17.0	20.5	31.3	36.2	39.1	93.8
Fe	339	4.19	(0.0100)	(0.0100)	(0.0100)	(0.0100)	(0.0100)	0.202	0.339
K	221	186	261	250	553	1348	1901	4406	1.72E+04
Li	15.1	21.2	32.6	32.4	29.7	27.0	25.6	22.3	15.6
Mg	140	76.9	89.0	74.9	51.0	28.6	1.11	(0.00500)	(0.00500)
Mn	18.4	11.7	9.82	2.68	0.324	(0.00171)	(0.00171)	(0.00171)	(0.00171)
Mo	3.34	1.08	5.52	33.2	34.9	37.0	38.3	37.7	39.2

Release in mg/kg

Fraction	*9*	*8*	*7*	*6*	*5*	*4*	*3*	*2*	*1*
pH	*2.08*	*3.85*	*5.40*	*6.99*	*7.97*	*9.26*	*10.4*	*12.0*	*13.1*
Na	38.5	45.1	66.3	64.5	62.7	63.9	65.0	68.0	89.2
Ni	7.62	5.19	6.03	0.646	0.0910	(0.00365)	(0.00365)	(0.00365)	(0.00365)
NO_2^-	(0.0916)	(0.0916)	(0.0916)	(0.0916)	(0.0916)	(0.0916)	(0.0916)	0.582	11.4
NO_3^-	4.79E+04	5839	949	9.16	7.55	7.57	6.12	6.57	6.68
P	24.2	0.629	(0.0185)	0.163	0.396	0.854	0.430	0.372	2.09
Pb	2.57	0.0610	0.0150	0.00900	0.00700	(0.00115)	(0.00115)	(0.00115)	(0.00115)
PO_4^{3-}	10.1	(0.118)	(0.118)	(0.118)	1.23	8.14	13.3	13.6	20.5
Re	0.0119	(0.00120)	(0.00120)	(0.00120)	(0.00120)	(0.00120)	0.0141	0.0223	0.0309
S	690	1039	1522	1638	1599	1631	1605	1621	1854
Sb	0.227	0.525	0.717	1.48	1.38	1.26	1.43	1.47	1.81
Se	5.46	0.841	2.30	9.22	16.4	40.1	49.2	56.0	68.8
Si	722	180	61.7	14.3	5.35	2.78	7.20	37.6	306
Sn	(0.00350)	(0.00350)	(0.00350)	(0.00350)	(0.00350)	(0.00350)	(0.00350)	(0.00350)	(0.00350)
SO_4^{2-}	4263	4145	4011	4251	4214	4160	4180	4109	4298
Sr	55.6	30.7	30.9	25.4	23.0	21.0	19.6	16.4	9.16
Ti	15.0	0.0373	(0.0100)	(0.0100)	(0.0100)	(0.0100)	(0.0100)	(0.0100)	(0.0100)
Tl	2.56	0.940	0.322	0.101	0.0680	0.0350	0.0290	0.0290	0.0320
U	4.51	0.155	(0.00150)	(0.00150)	(0.00150)	(0.00150)	0.0107	0.0415	0.292
V	66.4	0.818	0.794	1.58	2.09	8.32	20.7	27.4	52.1
Zn	16.3	11.6	11.4	(0.00500)	(0.00500)	(0.00500)	(0.00500)	(0.00500)	0.567

Interpolated Concentration in mg/L

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
pH	*2.00*	*4.00*	*5.50*	*6.99*	*7.00*	*8.00*	*9.00*	*10.5*	*12.0*	*13.0*
Al	128	20.6	0.324	0.202	0.206	1.29	10.3	27.4	33.8	36.6
As	1.77	0.0835	0.0433	0.0784	0.0791	0.203	0.455	1.05	1.05	7.64
B	3.23	3.92	4.95	4.62	4.62	4.38	4.48	4.65	5.05	9.10
Ba	0.921	0.225	0.279	0.260	0.260	0.261	0.480	0.904	0.915	0.682
Be	0.441	0.0963	0.00226	(0.000320)	(0.000320)	(0.000320)	(0.000320)	(0.000320)	(0.000320)	(0.000320)
Br^-	(0.00871)	0.670	0.675	0.515	0.516	0.600	0.678	0.655	0.724	0.816
Ca	141	142	167	155	155	134	116	84.3	39.8	10.8
Cd	0.0555	0.0414	0.0280	0.00580	0.00579	0.00470	0.00462	0.00463	0.00506	0.00536
Cl^-	1.65	1.53	1.25	1.30	1.30	1.28	1.30	1.26	1.32	3.71
Co	0.419	0.218	0.219	0.0261	0.0256	0.00419	0.00176	0.00115	0.000710	(0.000207)
Cr	1.96	0.0927	(0.000249)	0.0422	0.0427	0.136	0.201	0.250	0.308	0.382
Cs	0.0642	0.0232	0.0169	0.0130	0.0130	0.0149	0.0179	0.0221	0.0283	0.0330
Cu	3.16	1.42	0.0670	0.000900	0.000891	(0.000351)	(0.000351)	0.000931	0.00200	0.0142
DIC	0.137	0.150	0.146	(0.0650)	(0.0650)	(0.0650)	0.410	2.05	8.13	25.4
DOC	1.72	1.04	1.06	1.15	1.15	1.22	1.68	3.36	10.1	107
F^-	0.0804	2.73	0.447	1.70	1.70	2.07	2.87	3.63	3.97	8.55
Fe	33.9	0.234	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)	0.0204	0.0321
K	22.3	19.2	26.0	25.0	25.2	56.5	113	197	451	1490
Li	1.48	2.21	3.26	3.24	3.24	2.96	2.75	2.54	2.22	1.62
Mg	14.0	7.80	8.81	7.49	7.46	5.03	3.22	0.0867	(0.000500)	(0.000500)
Mn	1.84	1.15	0.905	0.268	0.262	0.0287	0.000492	(0.000171)	(0.000171)	(0.000171)
Mo	0.351	0.126	0.618	3.32	3.33	3.50	3.66	3.82	3.77	3.90

Interpolated Concentration in mg/L

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
pH	*2.00*	*4.00*	*5.50*	*6.99*	*7.00*	*8.00*	*9.00*	*10.5*	*12.0*	*13.0*
Na	3.82	4.68	6.62	6.45	6.45	6.27	6.37	6.52	6.83	8.67
Ni	0.762	0.526	0.524	0.0646	0.0634	0.00844	(0.000365)	(0.000365)	(0.000365)	(0.000365)
NO_2^-	(0.00916)	(0.00916)	(0.00916)	(0.00916)	(0.00916)	(0.00916)	(0.00916)	(0.00916)	0.0613	0.831
NO_3^-	4786	490	70.9	0.916	0.914	0.755	0.756	0.614	0.657	0.667
P	2.42	0.0447	(0.00185)	0.0163	0.0165	0.0403	0.0731	0.0427	0.0384	0.174
Pb	0.257	0.00533	0.00145	0.000900	0.000898	0.000671	(0.000115)	(0.000115)	(0.000115)	(0.000115)
PO_4^{3-}	1.23	(0.0118)	(0.0118)	(0.0118)	(0.0118)	0.129	0.556	1.34	1.37	1.96
Re	0.00132	(0.000120)	(0.000120)	(0.000120)	(0.000120)	(0.000120)	(0.000120)	0.00144	0.00224	0.00299
S	67.8	108	153	164	164	160	162	161	163	183
Sb	0.0219	0.0541	0.0751	0.148	0.148	0.138	0.129	0.143	0.148	0.177
Se	0.595	0.0927	0.251	0.922	0.928	1.67	3.34	4.95	5.62	6.73
Si	72.2	16.2	5.63	1.43	1.41	0.527	0.317	0.775	3.90	24.6
Sn	(0.000350)	(0.000350)	(0.000350)	(0.000350)	(0.000350)	(0.000350)	(0.000350)	(0.000350)	(0.000350)	(0.000350)
SO_4^{2-}	427	413	403	425	425	421	417	418	411	428
Sr	5.56	3.07	3.05	2.54	2.54	2.29	2.14	1.95	1.63	0.974
Ti	1.50	0.00328	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)
Tl	0.256	0.0847	0.0299	0.0101	0.0101	0.00670	0.00400	0.00290	0.00291	0.00317
U	0.451	0.00989	(0.000150)	(0.000150)	(0.000150)	(0.000150)	(0.000150)	0.00114	0.00429	0.0238
V	6.64	0.0816	0.0830	0.158	0.158	0.216	0.630	2.09	2.77	4.87
Zn	1.63	1.16	0.699	(0.000500)	(0.000500)	(0.000500)	(0.000500)	(0.000500)	(0.000500)	0.0345

Interpolated Release in mg/kg

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
pH	*2.00*	*4.00*	*5.50*	*6.99*	*7.00*	*8.00*	*9.00*	*10.5*	*12.0*	*13.0*
Al	1281	206	3.24	2.02	2.06	12.9	103	274	339	361
As	17.7	0.835	0.433	0.784	0.791	2.03	4.54	10.5	10.6	75.3
B	32.3	39.1	49.5	46.2	46.2	43.8	44.8	46.5	50.7	89.7
Ba	9.22	2.25	2.79	2.60	2.60	2.61	4.80	9.04	9.18	6.72
Be	4.42	0.963	0.0226	(0.00320)	(0.00320)	(0.00320)	(0.00320)	(0.00320)	(0.00321)	(0.00315)
Br^-	(0.0872)	6.70	6.75	5.15	5.16	6.00	6.78	6.56	7.25	8.03
Ca	1415	1419	1665	1551	1549	1345	1155	844	399	106
Cd	0.556	0.414	0.280	0.0580	0.0579	0.0470	0.0462	0.0463	0.0507	0.0528
Cl^-	16.5	15.3	12.5	13.0	13.0	12.8	13.0	12.6	13.3	36.5
Co	4.19	2.18	2.19	0.261	0.256	0.0419	0.0175	0.0116	0.00712	(0.00204)
Cr	19.6	0.927	(0.00248)	0.422	0.427	1.36	2.01	2.50	3.08	3.77
Cs	0.643	0.231	0.169	0.130	0.130	0.149	0.179	0.221	0.284	0.325
Cu	31.6	14.2	0.670	0.00900	0.00891	(0.00351)	(0.00350)	0.00932	0.0200	0.139
DIC	1.38	1.50	1.46	(0.650)	(0.650)	(0.650)	4.10	20.5	81.5	251
DOC	17.3	10.4	10.6	11.5	11.5	12.2	16.8	33.6	101	1052
F^-	0.805	27.3	4.47	17.0	17.0	20.7	28.7	36.3	39.8	84.3
Fe	339	2.34	(0.01000)	(0.0100)	(0.0100)	(0.0100)	(0.00999)	(0.0100)	0.204	0.316
K	223	192	260	250	252	565	1126	1975	4523	1.47E+04
Li	14.8	22.1	32.6	32.4	32.4	29.6	27.5	25.5	22.3	16.0
Mg	141	78.0	88.1	74.9	74.6	50.3	32.1	0.868	(0.00501)	(0.00493)
Mn	18.5	11.5	9.05	2.68	2.62	0.287	0.00492	(0.00171)	(0.00171)	(0.00168)
Mo	3.52	1.26	6.18	33.2	33.3	35.0	36.6	38.2	37.8	38.5

Interpolated Release in mg/kg

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
pH	*2.00*	*4.00*	*5.50*	*6.99*	*7.00*	*8.00*	*9.00*	*10.5*	*12.0*	*13.0*
Na	38.3	46.8	66.2	64.5	64.5	62.7	63.7	65.2	68.5	85.4
Ni	7.63	5.26	5.24	0.646	0.634	0.0844	(0.00365)	(0.00365)	(0.00366)	(0.00360)
NO_2^-	(0.0917)	(0.0915)	(0.0915)	(0.0916)	(0.0916)	(0.0916)	(0.0915)	(0.0916)	0.615	8.19
NO_3^-	4.79E+04	4896	709	9.16	9.14	7.55	7.56	6.14	6.58	6.57
P	24.2	0.447	(0.0185)	0.163	0.165	0.403	0.731	0.427	0.385	1.72
Pb	2.57	0.0532	0.0145	0.00900	0.00898	0.00671	(0.00115)	(0.00115)	(0.00115)	(0.00113)
PO_4^{3-}	12.3	(0.118)	(0.118)	(0.118)	(0.118)	1.29	5.56	13.4	13.8	19.3
Re	0.0132	(0.00120)	(0.00120)	(0.00120)	(0.00120)	(0.00120)	(0.00120)	0.0144	0.0225	0.0294
S	678	1078	1529	1638	1637	1599	1624	1606	1629	1801
Sb	0.219	0.541	0.751	1.48	1.48	1.38	1.29	1.43	1.48	1.74
Se	5.95	0.927	2.51	9.22	9.28	16.7	33.4	49.6	56.3	66.3
Si	722	162	56.3	14.3	14.1	5.27	3.17	7.76	39.1	242
Sn	(0.00350)	(0.00350)	(0.00350)	(0.00350)	(0.00350)	(0.00350)	(0.00350)	(0.00350)	(0.00351)	(0.00345)
SO_4^{2-}	4274	4130	4025	4251	4251	4213	4169	4180	4122	4214
Sr	55.7	30.7	30.5	25.4	25.4	22.9	21.4	19.5	16.3	9.59
Ti	15.0	0.0328	(0.01000)	(0.0100)	(0.0100)	(0.0100)	(0.00999)	(0.0100)	(0.0100)	(0.00985)
Tl	2.56	0.847	0.299	0.101	0.101	0.0670	0.0400	0.0290	0.0291	0.0312
U	4.52	0.0989	(0.00150)	(0.00150)	(0.00150)	(0.00150)	(0.00150)	0.0114	0.0431	0.234
V	66.5	0.815	0.830	1.58	1.58	2.16	6.29	21.0	27.8	48.0
Zn	16.4	11.6	6.99	(0.00500)	(0.00500)	(0.00500)	(0.00500)	(0.00500)	(0.00501)	0.340

Assessment on interpolated values; available content on as measured values

Available Content **From pH range (2, 9, 13), on as measured values.**

Scenario min pH 5.5

Scenario max pH 9

	Reporting Limit (mg/L)		*Concentration (mg/L)*			*Release (mg/kg)*		*Available (mg/kg)*	
	min	*max*	*min*	*max*	*max at pH*	*min*	*max*		*at pH*
Al	0.00100	0.00100	0.202	10.3	9.00	2.02	103	1280	2.08
As	0.000640	0.000640	0.0433	0.455	9.00	0.433	4.54	96.9	13.1
B	0.00100	0.00100	4.38	4.95	5.50	43.8	49.5	97.7	13.1
Ba	0.00100	0.00100	0.260	0.480	9.00	2.60	4.80	8.76	2.08
Be	0.000640	0.000640	(0.000320)	0.00226	5.50	(0.00320)	0.0226	4.41	2.08
Br^-	0.0174	0.0174	0.515	0.678	9.00	5.15	6.78	8.27	13.1
Ca	0.00260	0.00260	116	167	5.50	1155	1665	1413	2.08
Cd	0.000170	0.000170	0.00462	0.0280	5.50	0.0462	0.280	0.555	2.08
Cl^-	0.00649	0.00649	1.25	1.30	6.99	12.5	13.0	41.9	13.1
Co	0.000414	0.000414	0.00176	0.219	5.50	0.0175	2.19	4.19	2.08
Cr	0.000497	0.000497	(0.000249)	0.201	9.00	(0.00248)	2.01	19.6	2.08
Cs	0.000490	0.000490	0.0130	0.0179	9.00	0.130	0.179	0.642	2.08
Cu	0.000701	0.000701	(0.000351)	0.0670	5.50	(0.00350)	0.670	31.6	2.08
DIC	0.130	0.130	(0.0650)	0.410	9.00	(0.650)	4.10	292	13.1
DOC	0.170	0.170	1.06	1.68	9.00	10.6	16.8	1416	13.1
F^-	0.00705	0.00705	0.447	2.87	9.00	4.47	28.7	93.8	13.1
Fe	0.00200	0.00200	(0.00100)	(0.00100)	5.50	(0.00999)	(0.0100)	339	2.08
K	0.00160	0.00160	25.0	113	9.00	250	1126	785	5.67
Li	0.00190	0.00190	2.75	3.26	5.50	27.5	32.6	27.0	9.26
Mg	0.00100	0.00100	3.22	8.81	5.50	32.1	88.1	140	2.08
Mn	0.000342	0.000342	0.000492	0.905	5.50	0.00492	9.05	18.4	2.08
Mo	0.00120	0.00120	0.618	3.66	9.00	6.18	36.6	39.2	13.1

Assessment on interpolated values; available content on as measured values

Available Content **From pH range (2, 9, 13), on as measured values.**

Scenario min pH 5.5

Scenario max pH 9

	Reporting Limit (mg/L)		*Concentration (mg/L)*			*Release (mg/kg)*		*Available (mg/kg)*	
	min	*max*	*min*	*max*	*max at pH*	*min*	*max*		*at pH*
Na	0.00250	0.00250	6.27	6.62	5.50	62.7	66.2	89.2	13.1
Ni	0.000730	0.000730	(0.000365)	0.524	5.50	(0.00365)	5.24	7.62	2.08
NO_2^-	0.0183	0.0183	(0.00916)	(0.00916)	5.50	(0.0915)	(0.0916)	11.4	13.1
NO_3^-	0.0258	0.0258	0.755	70.9	5.50	7.55	709	2.39E+04	5.67
P	0.00370	0.00370	(0.00185)	0.0731	9.00	(0.0185)	0.731	24.2	2.08
Pb	0.000230	0.000230	(0.000115)	0.00145	5.50	(0.00115)	0.0145	2.57	2.08
PO_4^{3-}	0.0237	0.0237	(0.0118)	0.556	9.00	(0.118)	5.56	20.5	13.1
Re	0.000240	0.000240	(0.000120)	(0.000120)	5.50	(0.00120)	(0.00120)	0.0309	13.1
S	0.00680	0.00680	153	164	6.99	1529	1638	1854	13.1
Sb	7.94E-05	7.94E-05	0.0751	0.148	6.99	0.751	1.48	1.81	13.1
Se	0.0150	0.0150	0.251	3.34	9.00	2.51	33.4	68.8	13.1
Si	0.00110	0.00110	0.317	5.63	5.50	3.17	56.3	722	2.08
Sn	0.000700	0.000700	(0.000350)	(0.000350)	5.50	(0.00350)	(0.00350)	0.00350	13.1
SO_4^{2-}	0.0208	0.0208	403	425	6.99	4025	4251	4298	13.1
Sr	0.00100	0.00100	2.14	3.05	5.50	21.4	30.5	55.6	2.08
Ti	0.00200	0.00200	(0.00100)	(0.00100)	5.50	(0.00999)	(0.0100)	15.0	2.08
Tl	0.000510	0.000510	0.00400	0.0299	5.50	0.0400	0.299	2.56	2.08
U	0.000300	0.000300	(0.000150)	(0.000150)	5.50	(0.00150)	(0.00150)	4.51	2.08
V	0.00150	0.00150	0.0830	0.630	9.00	0.830	6.29	66.4	2.08
Zn	0.00100	0.00100	(0.000500)	0.699	5.50	(0.00500)	6.99	16.3	2.08

Analysis report according to EPA Method 1314

Created by LeachXS™, version 2.0.92 (18-Oct-2016)
Report created on 25-Jan-2017 3:00 PM

Material Information

Sample ID	EaFA (C,1,1)
Sample Name	EaFA
Sample Replicate	A
Test Replicate	A
Category	Coal Combustion
Subcategory	Fly Ash
Full Name	Coal combustion fly ash from Facility Ea
Description	Fly Ash / Unit 1 / Facility Ea
Origin	EPA LEAF Methods validation
Sample Database	C:\Users\User\Documents\LeachXS User Objects\DATABASES\LEAF Guide (16-Dec-2016).mdb

Test Parameters

Start Date	15-Jun-10	
End Date	28-Jun-10	
Eluate	0.3	*mm*
Solids Content	100	*%*
Bed Length	30.0	*cm*
Column Diameter	4.80	*cm*
Bed Volume	543	cm^3
As Tested Mass	0.541	*kg*
Dry Mass	0.541	*kg*
Temperature	21.0	*°C*
Flowrate	432	*ml/day*
Flowrate	0.798	*L/S per day*

Legend

pH	Acidity
E(h)	Redox potential
K(25°C)	Conductivity at 25 °C
Σ L/S-dry	Cumulative liquid-to-solid ratio, in L/kg
L/S-dry	Liquid-to-solid ratio of fraction, in L/kg
V	Volume
Σ V	Cumulative volume
N/A	Not analyzed or measured
N/C	Not calculated

Concentrations below the method detection limit (MDL) are reported between parentheses as half of the MDL. Cumulative releases calculated with any concentration below the MDL are listed between parentheses.

Fraction Information

Fraction	*Σ L/S-dry L/kg*	*pH*	*E(h) mV*	*K(25°C) mS/cm*	*L/S-dry L/kg*	*V mL*	*Σ V mL*
1	0.208	4.20	N/A	6.55	0.208	112	112
2	0.511	4.86	N/A	2.21	0.303	164	276
3	1.06	6.01	N/A	2.04	0.549	297	573
4	1.56	6.76	N/A	2.04	0.503	272	845
5	2.11	7.07	N/A	1.50	0.551	298	1143
6	4.50	6.78	N/A	0.283	2.39	1290	2433
7	5.05	7.02	N/A	0.0649	0.549	297	2730
8	9.59	7.16	N/A	0.0564	4.55	2459	5188
9	10.2	7.59	N/A	0.0411	0.576	311	5500

Concentration in mg/L

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Σ L/S-dry	*0.208*	*0.511*	*1.06*	*1.56*	*2.11*	*4.50*	*5.05*	*9.59*	*10.2*
pH	*4.20*	*4.86*	*6.01*	*6.76*	*7.07*	*6.78*	*7.02*	*7.16*	*7.59*
Al	307	2.50	0.627	0.102	0.155	1.74	1.94	2.56	2.63
As	1.07	0.0919	0.0235	0.0160	0.0268	0.195	0.650	2.32	2.37
B	157	12.8	5.39	2.89	1.95	0.901	0.572	0.381	0.262
Ba	1.43	0.541	0.347	0.232	0.329	1.42	2.24	1.33	0.938
Be	0.110	0.0334	0.00787	0.00288	(0.000320)	(0.000320)	(0.000320)	(0.000320)	(0.000320)
Br^-	37.8	1.67	0.339	(0.00871)	(0.00871)	0.0552	0.0595	0.0286	0.0211
Ca	501	733	706	661	484	79.5	12.9	9.75	8.20
Cd	1.42	0.0261	0.0190	0.0135	0.0114	0.00372	0.00147	0.000390	(8.50E-05)
Cl^-	94.3	3.44	2.65	0.532	0.418	0.161	0.111	0.0639	0.0419
Co	8.01	0.0190	0.00820	0.00415	0.00399	0.000700	(0.000207)	(0.000207)	(0.000207)
Cr	5.32	0.0653	0.00111	(0.000249)	0.000580	0.0163	0.0333	0.0525	0.0568
Cs	0.894	0.0132	0.00526	0.00322	0.00227	0.00124	0.000882	0.000873	0.000730
Cu	23.9	0.571	0.0863	0.0192	0.0128	0.00503	(0.000351)	(0.000351)	(0.000351)
DIC	0.157	0.147	0.135	(6.50E-05)	1.26	1.88	1.50	0.982	1.35
DOC	0.0686	1.53	1.47	0.958	0.885	2.88	1.21	1.08	1.24
F^-	7.82	0.704	1.02	2.55	2.66	2.49	2.24	1.09	0.470
Fe	16.0	1.72	0.601	0.0241	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)
K	1609	15.4	5.29	3.15	2.15	0.912	0.582	0.483	0.442
Li	41.3	0.513	0.220	0.143	0.143	0.0985	0.0667	0.0548	0.0470
Mg	247	6.95	3.06	0.942	0.326	0.0912	0.0523	0.0644	0.0891
Mn	30.8	0.258	0.160	0.0899	0.0469	0.00830	0.00229	(0.000171)	(0.000171)
Mo	0.379	22.3	17.4	12.6	11.7	3.87	1.71	0.448	0.150

Concentration in mg/L

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Σ L/S-dry	*0.208*	*0.511*	*1.06*	*1.56*	*2.11*	*4.50*	*5.05*	*9.59*	*10.2*
pH	*4.20*	*4.86*	*6.01*	*6.76*	*7.07*	*6.78*	*7.02*	*7.16*	*7.59*
Na	129	0.928	0.394	0.270	0.290	0.430	0.541	0.333	0.243
Ni	23.4	0.0943	0.0462	0.0328	0.0163	(0.000365)	(0.000365)	(0.000365)	(0.000365)
NO_2^-	(0.00916)	(0.00916)	(0.00916)	(0.00916)	(0.00916)	(0.00916)	(0.00916)	(0.00916)	(0.00916)
NO_3^-	14.4	4.89	0.454	(0.0129)	(0.0129)	0.0582	0.136	0.0478	0.0592
P	1.41	(0.00185)	(0.00185)	(0.00185)	(0.00185)	(0.00185)	(0.00185)	0.0759	0.145
Pb	0.0275	0.000313	(0.000115)	(0.000115)	(0.000115)	(0.000115)	(0.000115)	(0.000115)	(0.000115)
PO_4^{3-}	(0.0118)	(0.0118)	(0.0118)	(0.0118)	(0.0118)	1.71	1.78	1.20	0.782
Re	(0.000120)	0.000272	0.000308	0.000545	0.000916	0.00255	0.00301	0.000787	0.000268
S	1754	554	544	518	357	53.6	2.60	1.53	1.07
Sb	0.0754	0.175	0.232	0.304	0.382	0.327	0.262	0.155	0.0965
Se	1.06	0.415	1.14	5.79	6.93	5.83	6.25	4.12	2.68
Si	41.7	5.39	3.35	2.32	1.13	0.611	0.435	0.538	0.600
Sn	0.00261	0.000799	(0.000350)	(0.000350)	(0.000350)	(0.000350)	(0.000350)	(0.000350)	(0.000350)
SO_4^{2-}	9404	2008	1918	1814	1240	146	5.45	2.94	2.06
Sr	13.3	6.57	8.85	8.41	6.17	1.60	0.517	0.303	0.244
Ti	0.273	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)
Tl	0.511	0.0201	0.00866	0.00486	0.00331	(0.000255)	(0.000255)	(0.000255)	(0.000255)
U	0.221	0.00184	(0.000150)	(0.000150)	(0.000150)	(0.000150)	(0.000150)	(0.000150)	(0.000150)
V	0.538	0.173	0.118	0.0655	0.0952	1.47	2.22	2.32	2.75
Zn	45.0	0.0922	0.0411	0.0600	0.0441	0.0275	0.0179	0.00840	0.00530

Method Detection Limit in mg/L

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Σ L/S-dry	*0.208*	*0.511*	*1.06*	*1.56*	*2.11*	*4.50*	*5.05*	*9.59*	*10.2*
pH	*4.20*	*4.86*	*6.01*	*6.76*	*7.07*	*6.78*	*7.02*	*7.16*	*7.59*
Al	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
As	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640
B	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
Ba	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
Be	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640
Br^-	0.0174	0.0174	0.0174	0.0174	0.0174	0.0174	0.0174	0.0174	0.0174
Ca	0.00260	0.00260	0.00260	0.00260	0.00260	0.00260	0.00260	0.00260	0.00260
Cd	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170
Cl^-	0.00649	0.00649	0.00649	0.00649	0.00649	0.00649	0.00649	0.00649	0.00649
Co	0.000414	0.000414	0.000414	0.000414	0.000414	0.000414	0.000414	0.000414	0.000414
Cr	0.000497	0.000497	0.000497	0.000497	0.000497	0.000497	0.000497	0.000497	0.000497
Cs	0.000490	0.000490	0.000490	0.000490	0.000490	0.000490	0.000490	0.000490	0.000490
Cu	0.000701	0.000701	0.000701	0.000701	0.000701	0.000701	0.000701	0.000701	0.000701
DIC	0.000130	0.000130	0.000130	0.000130	0.000130	0.000130	0.000130	0.000130	0.000130
DOC	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170
F^-	0.00705	0.00705	0.00705	0.00705	0.00705	0.00705	0.00705	0.00705	0.00705
Fe	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200
K	0.00160	0.00160	0.00160	0.00160	0.00160	0.00160	0.00160	0.00160	0.00160
Li	0.00190	0.00190	0.00190	0.00190	0.00190	0.00190	0.00190	0.00190	0.00190
Mg	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
Mn	0.000342	0.000342	0.000342	0.000342	0.000342	0.000342	0.000342	0.000342	0.000342
Mo	0.00120	0.00120	0.00120	0.00120	0.00120	0.00120	0.00120	0.00120	0.00120

Method Detection Limit in mg/L

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Σ L/S-dry	*0.208*	*0.511*	*1.06*	*1.56*	*2.11*	*4.50*	*5.05*	*9.59*	*10.2*
pH	*4.20*	*4.86*	*6.01*	*6.76*	*7.07*	*6.78*	*7.02*	*7.16*	*7.59*
Na	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250
Ni	0.000730	0.000730	0.000730	0.000730	0.000730	0.000730	0.000730	0.000730	0.000730
NO_2^-	0.0183	0.0183	0.0183	0.0183	0.0183	0.0183	0.0183	0.0183	0.0183
NO_3^-	0.0258	0.0258	0.0258	0.0258	0.0258	0.0258	0.0258	0.0258	0.0258
P	0.00370	0.00370	0.00370	0.00370	0.00370	0.00370	0.00370	0.00370	0.00370
Pb	0.000230	0.000230	0.000230	0.000230	0.000230	0.000230	0.000230	0.000230	0.000230
PO_4^{3-}	0.0237	0.0237	0.0237	0.0237	0.0237	0.0237	0.0237	0.0237	0.0237
Re	0.000240	0.000240	0.000240	0.000240	0.000240	0.000240	0.000240	0.000240	0.000240
S	0.00680	0.00680	0.00680	0.00680	0.00680	0.00680	0.00680	0.00680	0.00680
Sb	7.94E-05	7.94E-05	7.94E-05	7.94E-05	7.94E-05	7.94E-05	7.94E-05	7.94E-05	7.94E-05
Se	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150
Si	0.00110	0.00110	0.00110	0.00110	0.00110	0.00110	0.00110	0.00110	0.00110
Sn	0.000700	0.000700	0.000700	0.000700	0.000700	0.000700	0.000700	0.000700	0.000700
SO_4^{2-}	0.0208	0.0208	0.0208	0.0208	0.0208	0.0208	0.0208	0.0208	0.0208
Sr	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
Ti	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200
Tl	0.000510	0.000510	0.000510	0.000510	0.000510	0.000510	0.000510	0.000510	0.000510
U	0.000300	0.000300	0.000300	0.000300	0.000300	0.000300	0.000300	0.000300	0.000300
V	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150
Zn	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100

Cumulative Release in mg/kg

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Σ L/S-dry	*0.208*	*0.511*	*1.06*	*1.56*	*2.11*	*4.50*	*5.05*	*9.59*	*10.2*
pH	*4.20*	*4.86*	*6.01*	*6.76*	*7.07*	*6.78*	*7.02*	*7.16*	*7.59*
Al	63.7	64.5	64.8	64.9	65.0	69.1	70.2	81.8	83.3
As	0.221	0.249	0.262	0.270	0.285	0.751	1.11	11.6	13.0
B	32.7	36.5	39.5	40.9	42.0	44.2	44.5	46.2	46.4
Ba	0.297	0.461	0.651	0.768	0.949	4.34	5.56	11.6	12.2
Be	0.0229	0.0330	0.0373	0.0388	(0.0389)	(0.0397)	(0.0399)	(0.0413)	(0.0415)
Br^-	7.85	8.36	8.55	(8.55)	(8.55)	(8.69)	(8.72)	(8.85)	(8.86)
Ca	104	326	714	1046	1313	1503	1510	1554	1559
Cd	0.295	0.303	0.314	0.320	0.327	0.336	0.336	0.338	(0.338)
Cl^-	19.6	20.7	22.1	22.4	22.6	23.0	23.0	23.3	23.4
Co	1.66	1.67	1.68	1.68	1.68	1.68	(1.68)	(1.68)	(1.68)
Cr	1.11	1.13	1.13	(1.13)	(1.13)	(1.17)	(1.18)	(1.42)	(1.46)
Cs	0.186	0.190	0.193	0.194	0.196	0.199	0.199	0.203	0.203
Cu	4.97	5.14	5.19	5.20	5.20	5.22	(5.22)	(5.22)	(5.22)
DIC	0.0326	0.0770	0.151	(0.151)	(0.848)	(5.33)	(6.15)	(10.6)	(11.4)
DOC	0.0143	0.478	1.28	1.76	2.25	9.12	9.78	14.7	15.4
F^-	1.63	1.84	2.40	3.68	5.15	11.1	12.3	17.3	17.5
Fe	3.32	3.84	4.17	4.18	(4.18)	(4.18)	(4.18)	(4.19)	(4.19)
K	335	339	342	344	345	347	347	350	350
Li	8.58	8.73	8.85	8.93	9.00	9.24	9.28	9.52	9.55
Mg	51.4	53.5	55.2	55.7	55.9	56.1	56.1	56.4	56.5
Mn	6.41	6.49	6.58	6.62	6.65	6.67	6.67	(6.67)	(6.67)
Mo	0.0787	6.83	16.4	22.7	29.2	38.4	39.4	41.4	41.5

Cumulative Release in mg/kg

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Σ L/S-dry	*0.208*	*0.511*	*1.06*	*1.56*	*2.11*	*4.50*	*5.05*	*9.59*	*10.2*
pH	*4.20*	*4.86*	*6.01*	*6.76*	*7.07*	*6.78*	*7.02*	*7.16*	*7.59*
Na	26.9	27.2	27.4	27.5	27.7	28.7	29.0	30.5	30.7
Ni	4.87	4.89	4.92	4.94	4.95	(4.95)	(4.95)	(4.95)	(4.95)
NO_2^-	(0.00190)	(0.00468)	(0.00970)	(0.0143)	(0.0194)	(0.0412)	(0.0462)	(0.0878)	(0.0931)
NO_3^-	3.00	4.48	4.73	(4.73)	(4.74)	(4.88)	(4.95)	(5.17)	(5.20)
P	0.293	(0.293)	(0.294)	(0.295)	(0.296)	(0.301)	(0.302)	(0.647)	(0.730)
Pb	0.00572	0.00581	(0.00588)	(0.00593)	(0.00600)	(0.00627)	(0.00633)	(0.00686)	(0.00692)
PO_4^{3-}	(0.00246)	(0.00604)	(0.0125)	(0.0185)	(0.0250)	(4.11)	(5.09)	(10.6)	(11.0)
Re	(2.50E-05)	(0.000107)	(0.000276)	(0.000551)	(0.00106)	(0.00714)	(0.00879)	(0.0124)	(0.0125)
S	365	532	831	1091	1288	1416	1417	1424	1425
Sb	0.0157	0.0688	0.196	0.349	0.559	1.34	1.48	2.19	2.24
Se	0.221	0.346	0.973	3.89	7.71	21.6	25.0	43.8	45.3
Si	8.67	10.3	12.1	13.3	13.9	15.4	15.6	18.1	18.4
Sn	0.000543	0.000785	(0.000977)	(0.00115)	(0.00135)	(0.00218)	(0.00237)	(0.00396)	(0.00417)
SO_4^{2-}	1955	2564	3616	4529	5212	5561	5564	5578	5579
Sr	2.77	4.76	9.62	13.9	17.3	21.1	21.4	22.7	22.9
Ti	0.0567	(0.0570)	(0.0576)	(0.0581)	(0.0586)	(0.0610)	(0.0616)	(0.0661)	(0.0667)
Tl	0.106	0.112	0.117	0.120	0.121	(0.122)	(0.122)	(0.123)	(0.123)
U	0.0460	0.0465	(0.0466)	(0.0467)	(0.0468)	(0.0471)	(0.0472)	(0.0479)	(0.0480)
V	0.112	0.164	0.229	0.262	0.314	3.81	5.03	15.6	17.2
Zn	9.36	9.39	9.41	9.44	9.46	9.53	9.54	9.58	9.58

Assessment

	Concentration (mg/L)			*Cumulative Release*
	max	*at pH*	*at Σ L/S-dry*	*at Σ L/S=10.2 (mg/kg)*
Al	307	4.20	0.208	83.3
As	2.37	7.59	10.2	13.0
B	157	4.20	0.208	46.4
Ba	2.24	7.02	5.05	12.2
Be	0.110	4.20	0.208	(0.0415)
Br^-	37.8	4.20	0.208	(8.86)
Ca	733	4.86	0.511	1559
Cd	1.42	4.20	0.208	(0.338)
Cl^-	94.3	4.20	0.208	23.4
Co	8.01	4.20	0.208	(1.68)
Cr	5.32	4.20	0.208	(1.46)
Cs	0.894	4.20	0.208	0.203
Cu	23.9	4.20	0.208	(5.22)
DIC	1.88	6.78	4.50	(11.4)
DOC	2.88	6.78	4.50	15.4
F^-	7.82	4.20	0.208	17.5
Fe	16.0	4.20	0.208	(4.19)
K	1609	4.20	0.208	350
Li	41.3	4.20	0.208	9.55
Mg	247	4.20	0.208	56.5
Mn	30.8	4.20	0.208	(6.67)
Mo	22.3	4.86	0.511	41.5

Assessment

	Concentration (mg/L)			*Cumulative Release*
	max	*at pH*	*at Σ L/S-dry*	*at Σ L/S=10.2 (mg/kg)*
Na	129	4.20	0.208	30.7
Ni	23.4	4.20	0.208	(4.95)
NO_2^-	(0.00916)	4.20	0.208	(0.0931)
NO_3^-	14.4	4.20	0.208	(5.20)
P	1.41	4.20	0.208	(0.730)
Pb	0.0275	4.20	0.208	(0.00692)
PO_4^{3-}	1.78	7.02	5.05	(11.0)
Re	0.00301	7.02	5.05	(0.0125)
S	1754	4.20	0.208	1425
Sb	0.382	7.07	2.11	2.24
Se	6.93	7.07	2.11	45.3
Si	41.7	4.20	0.208	18.4
Sn	0.00261	4.20	0.208	(0.00417)
SO_4^{2-}	9404	4.20	0.208	5579
Sr	13.3	4.20	0.208	22.9
Ti	0.273	4.20	0.208	(0.0667)
Tl	0.511	4.20	0.208	(0.123)
U	0.221	4.20	0.208	(0.0480)
V	2.75	7.59	10.2	17.2
Zn	45.0	4.20	0.208	9.58

Analysis report according to EPA Method 1316

Created by LeachXS™, version 2.0.92 (18-Oct-2016)
Report created on 25-Jan-2017 3:02 PM

Material Information

Sample ID	EaFA (B,1,1)
Sample Name	EaFA
Sample Replicate	A
Test Replicate	A
Category	Coal Combustion
Subcategory	Fly Ash
Full Name	EaFA
Description	Fly Ash / Unit 1 / Facility Ea
Origin	EPA LEAF Methods validation
Sample Database	C:\Users\User\Documents\LeachXS User Objects\ DATABASES\LEAF Guide (16-Dec-2016).mdb

Test Parameters

Start Date	28-Apr-10	
End Date	29-Apr-10	
Particle Size	0.3	*mm*
Contact Interval	24.0	*h*
Solids Content	100	*%*
Temperature	21.0	*°C*

Legend

pH	Acidity
E(h)	Redox potential
K(25°C)	Conductivity at 25 °C
L/S-dry	Liquid-to-solid ratio, in L/kg
M	Mass, as tested
V	Volume of eluant
Total V	Total liquid volume
N/A	Not analyzed or measured
N/C	Not calculated

Concentrations below the method detection limit (MDL) are reported between parentheses as half of the MDL.

Fraction Information

Fraction	*L/S-dry*	*pH*	*E(h)*	*K(25°C)*	*M*	*V*	*Total V*
	L/kg		*mV*	*mS/cm*	*g*	*mL*	*mL*
4	1.00	7.00	N/A	3.99	100	100	100
3	2.00	6.68	N/A	6.61	50.0	100	100
2	5.00	6.59	N/A	3.96	40.0	200	200
1	10.0	6.99	N/A	2.71	40.0	400	400

Concentration in mg/L

Fraction	*4*	*3*	*2*	*1*
L/S-dry	*1.00*	*2.00*	*5.00*	*10.0*
pH	*7.00*	*6.68*	*6.59*	*6.99*
Al	0.431	0.279	0.186	0.202
As	0.186	0.221	0.172	0.0784
B	37.6	18.2	8.16	4.62
Ba	0.179	0.195	0.182	0.260
Be	(0.000320)	(0.000320)	(0.000320)	0.00872
Br^-	9.72	4.59	2.06	1.14
Ca	446	645	294	155
Cd	0.0231	0.0162	0.00696	0.00933
Cl^-	23.0	15.2	6.13	1.39
Co	0.108	0.181	0.0779	0.0293
Cr	0.0259	0.0160	0.0139	0.0422
Cs	0.104	0.0618	0.0277	0.00636
Cu	0.0267	0.0207	0.0139	0.00342
DIC	0.861	0.455	0.217	(0.0650)
DOC	3.38	2.19	1.20	1.05
F^-	38.8	35.7	23.9	6.94
Fe	(0.00100)	(0.00100)	(0.00100)	(0.00100)
K	202	104	42.8	25.0
Li	33.6	15.4	6.70	3.24
Mg	54.4	30.6	12.9	7.49
Mn	1.62	1.50	0.683	0.268
Mo	27.6	13.0	6.37	3.32

Concentration in mg/L

Fraction	*4*	*3*	*2*	*1*
L/S-dry	*1.00*	*2.00*	*5.00*	*10.0*
pH	*7.00*	*6.68*	*6.59*	*6.99*
Na	59.9	28.2	11.3	6.45
Ni	0.351	0.429	0.186	0.0646
NO_2^-	(0.00916)	(0.00916)	(0.00916)	(0.00916)
NO_3^-	9.56	5.57	2.53	0.806
P	0.0617	0.0571	0.0413	0.0163
Pb	0.0247	(0.000115)	(0.000115)	(0.000115)
PO_4^{3-}	0.384	0.516	0.354	0.251
Re	0.000257	(0.000120)	(0.000120)	(0.000120)
S	773	684	309	164
Sb	0.644	0.496	0.340	0.167
Se	1.78	1.40	1.24	0.922
Si	2.62	2.79	2.69	1.43
Sn	(0.000350)	(0.000350)	(0.000350)	(0.000350)
SO_4^{2-}	3948	3861	1421	589
Sr	6.74	7.22	3.69	2.54
Ti	(0.00100)	(0.00100)	(0.00100)	(0.00100)
Tl	0.0336	0.0266	0.0142	0.0208
U	0.00695	0.00131	(0.000150)	(0.000150)
V	0.401	0.347	0.316	0.158
Zn	0.0923	0.0971	0.0220	(0.000500)

Method Detection Limit in mg/L

Fraction	*4*	*3*	*2*	*1*
L/S-dry	*1.00*	*2.00*	*5.00*	*10.0*
pH	*7.00*	*6.68*	*6.59*	*6.99*
Al	0.00100	0.00100	0.00100	0.00100
As	0.000640	0.000640	0.000640	0.000640
B	0.00100	0.00100	0.00100	0.00100
Ba	0.00100	0.00100	0.00100	0.00100
Be	0.000640	0.000640	0.000640	0.000640
Br^-	0.0174	0.0174	0.0174	0.0174
Ca	0.00260	0.00260	0.00260	0.00260
Cd	0.000170	0.000170	0.000170	0.000170
Cl^-	0.00649	0.00649	0.00649	0.00649
Co	0.000414	0.000414	0.000414	0.000414
Cr	0.000497	0.000497	0.000497	0.000497
Cs	0.000490	0.000490	0.000490	0.000490
Cu	0.000701	0.000701	0.000701	0.000701
DIC	0.130	0.130	0.130	0.130
DOC	0.170	0.170	0.170	0.170
F^-	0.00705	0.00705	0.00705	0.00705
Fe	0.00200	0.00200	0.00200	0.00200
K	0.00160	0.00160	0.00160	0.00160
Li	0.00190	0.00190	0.00190	0.00190
Mg	0.00100	0.00100	0.00100	0.00100
Mn	0.000342	0.000342	0.000342	0.000342
Mo	0.00120	0.00120	0.00120	0.00120

Method Detection Limit in mg/L

Fraction	*4*	*3*	*2*	*1*
L/S-dry	*1.00*	*2.00*	*5.00*	*10.0*
pH	*7.00*	*6.68*	*6.59*	*6.99*
Na	0.00250	0.00250	0.00250	0.00250
Ni	0.000730	0.000730	0.000730	0.000730
NO_2^-	0.0183	0.0183	0.0183	0.0183
NO_3^-	0.0258	0.0258	0.0258	0.0258
P	0.00370	0.00370	0.00370	0.00370
Pb	0.000230	0.000230	0.000230	0.000230
PO_4^{3-}	0.0237	0.0237	0.0237	0.0237
Re	0.000240	0.000240	0.000240	0.000240
S	0.00680	0.00680	0.00680	0.00680
Sb	7.94E-05	7.94E-05	7.94E-05	7.94E-05
Se	0.0150	0.0150	0.0150	0.0150
Si	0.00110	0.00110	0.00110	0.00110
Sn	0.000700	0.000700	0.000700	0.000700
SO_4^{2-}	0.0208	0.0208	0.0208	0.0208
Sr	0.00100	0.00100	0.00100	0.00100
Ti	0.00200	0.00200	0.00200	0.00200
Tl	0.000510	0.000510	0.000510	0.000510
U	0.000300	0.000300	0.000300	0.000300
V	0.00150	0.00150	0.00150	0.00150
Zn	0.00100	0.00100	0.00100	0.00100

Release in mg/kg

Fraction	*4*	*3*	*2*	*1*
L/S-dry	*1.00*	*2.00*	*5.00*	*10.0*
pH	*7.00*	*6.68*	*6.59*	*6.99*
Al	0.431	0.558	0.929	2.02
As	0.186	0.443	0.860	0.784
B	37.6	36.4	40.8	46.2
Ba	0.179	0.391	0.910	2.60
Be	0.000320	0.000640	0.00160	0.0872
Br^-	9.72	9.19	10.3	11.4
Ca	446	1290	1470	1551
Cd	0.0231	0.0324	0.0348	0.0933
Cl^-	23.0	30.5	30.6	13.9
Co	0.108	0.362	0.390	0.293
Cr	0.0259	0.0320	0.0695	0.422
Cs	0.104	0.124	0.139	0.0636
Cu	0.0267	0.0415	0.0697	0.0342
DIC	0.861	0.910	1.09	0.650
DOC	3.38	4.38	6.00	10.5
F^-	38.8	71.4	119	69.4
Fe	0.00100	0.00200	0.00500	0.0100
K	202	208	214	250
Li	33.6	30.8	33.5	32.4
Mg	54.4	61.2	64.3	74.9
Mn	1.62	3.01	3.42	2.68
Mo	27.6	26.0	31.8	33.2

Release in mg/kg

Fraction	*4*	*3*	*2*	*1*
L/S-dry	*1.00*	*2.00*	*5.00*	*10.0*
pH	*7.00*	*6.68*	*6.59*	*6.99*
Na	59.9	56.5	56.5	64.5
Ni	0.351	0.858	0.931	0.646
NO_2^-	0.00916	0.0183	0.0458	0.0916
NO_3^-	9.56	11.1	12.6	8.06
P	0.0617	0.114	0.207	0.163
Pb	0.0247	0.000230	0.000575	0.00115
PO_4^{3-}	0.384	1.03	1.77	2.51
Re	0.000257	0.000240	0.000600	0.00120
S	773	1367	1543	1638
Sb	0.644	0.992	1.70	1.67
Se	1.78	2.80	6.22	9.22
Si	2.62	5.58	13.5	14.3
Sn	0.000350	0.000700	0.00175	0.00350
SO_4^{2-}	3948	7721	7106	5886
Sr	6.74	14.4	18.4	25.4
Ti	0.00100	0.00200	0.00500	0.0100
Tl	0.0336	0.0532	0.0710	0.208
U	0.00695	0.00262	0.000750	0.00150
V	0.401	0.694	1.58	1.58
Zn	0.0923	0.194	0.110	0.00500

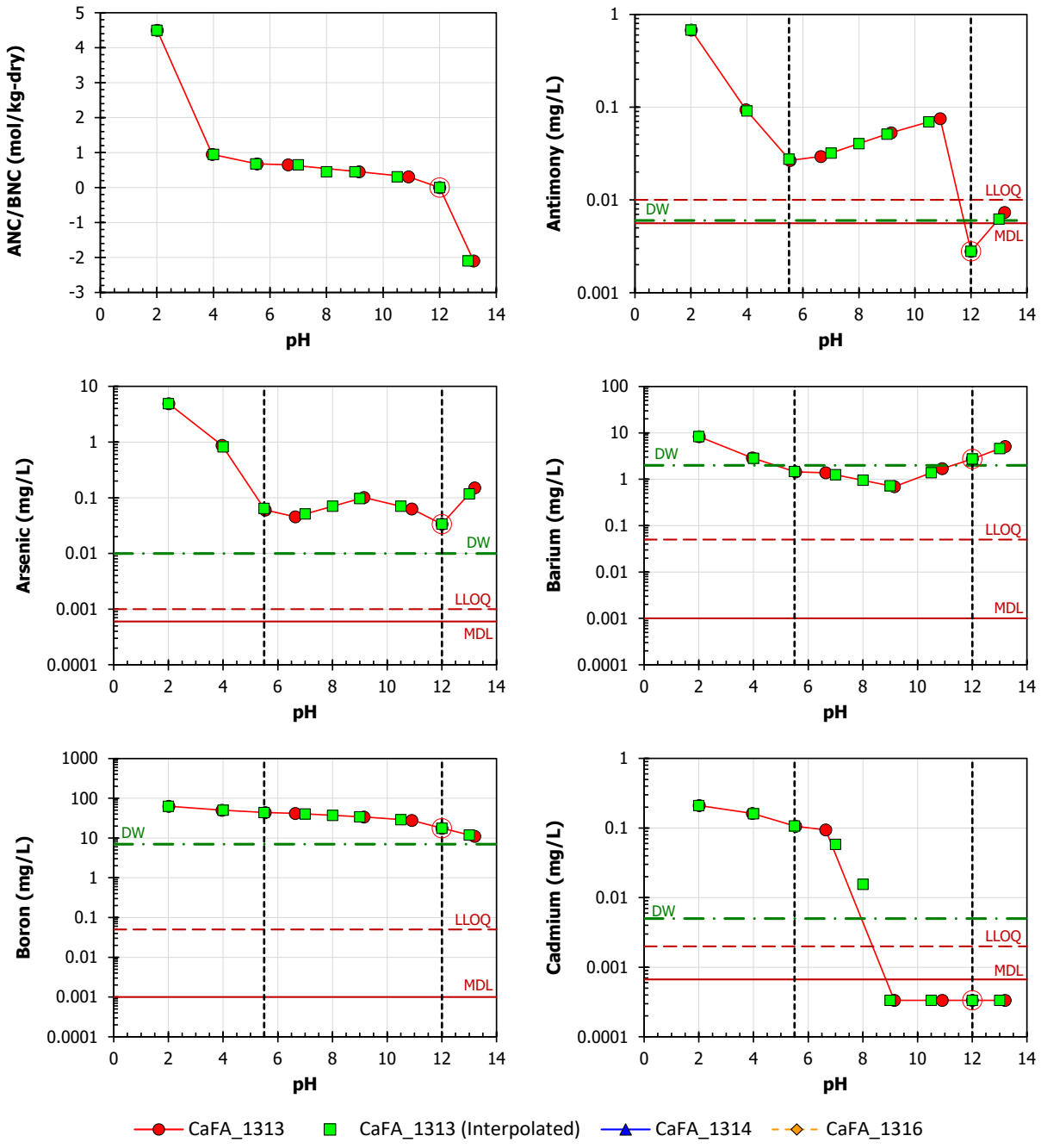

Figure B-11. Method 1313 results for a high-carbon coal fly ash (CaFA):
Titration curve, antimony, arsenic, barium, boron and cadmium.

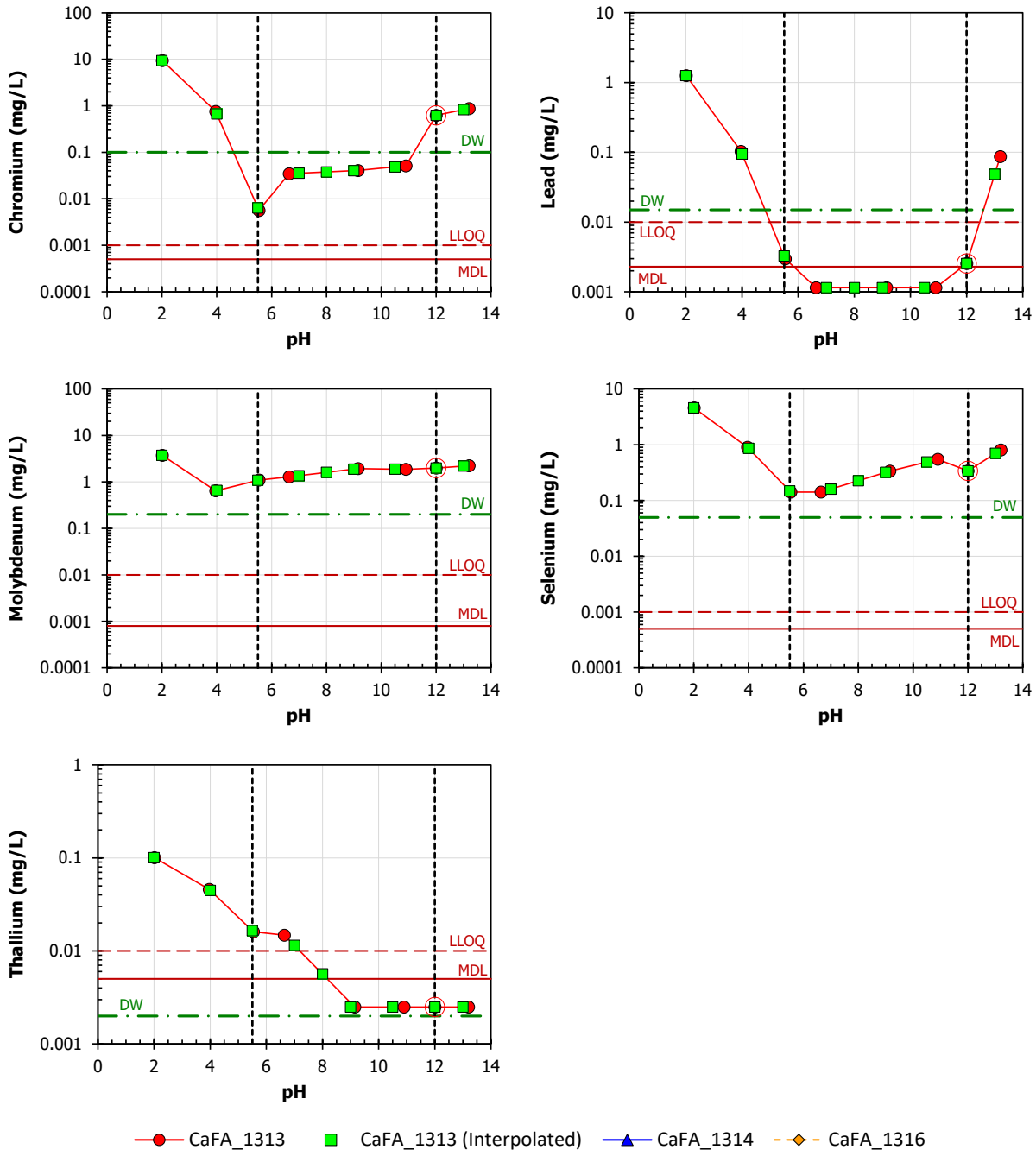

Figure B-12. Method 1313 results for a high-carbon coal fly ash (CaFA):
Chromium, lead, molybdenum, selenium and thallium.

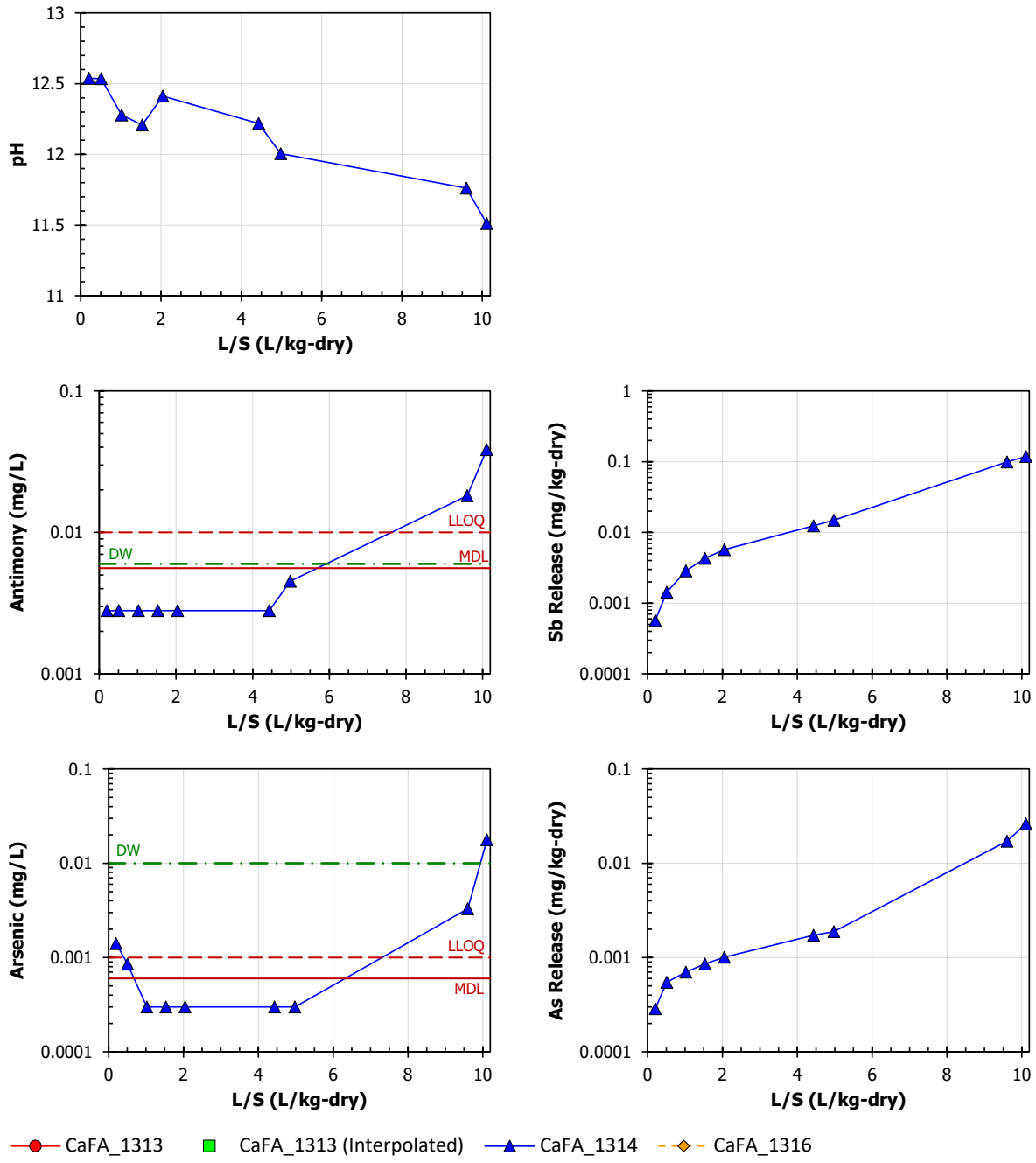

Figure B-13. Method 1314 results for a low-carbon coal fly ash (CaFA):
Eluate pH, antimony and arsenic.

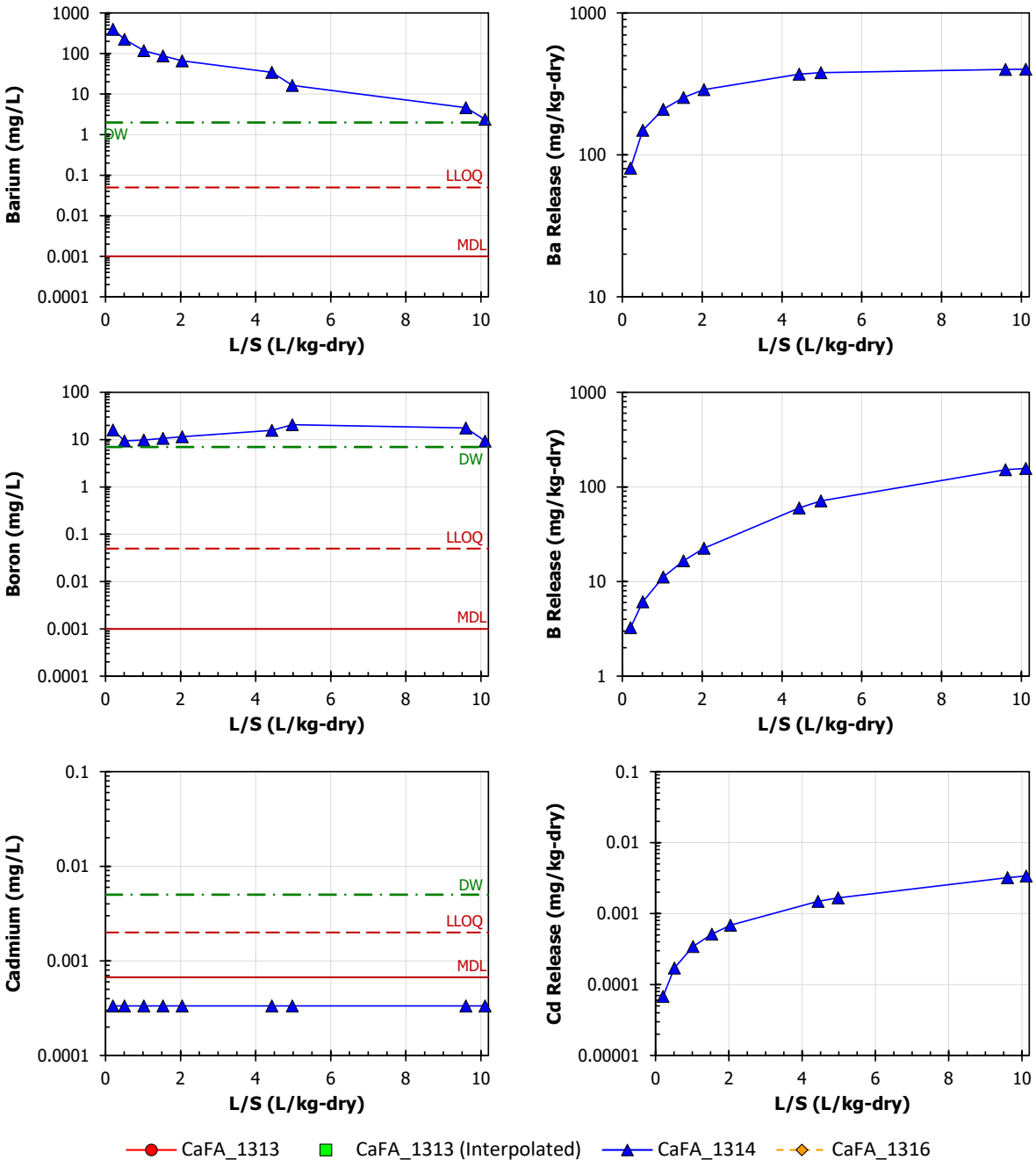

Figure B-14. Method 1314 results for a low-carbon coal fly ash (CaFA):
Barium, boron and cadmium.

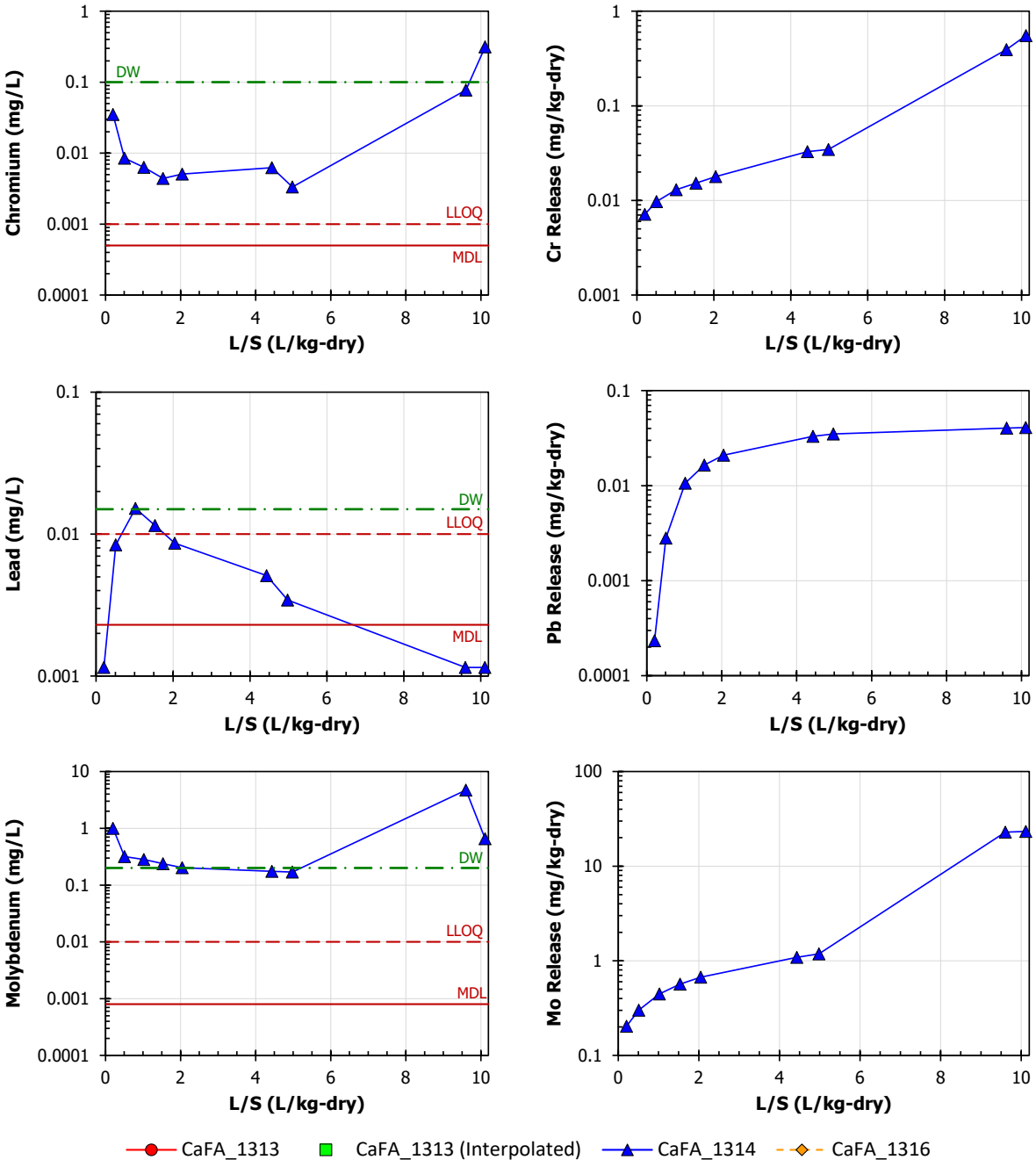

Figure B-15. Method 1314 results for a low-carbon coal fly ash (CaFA):
Chromium, lead and molybdenum.

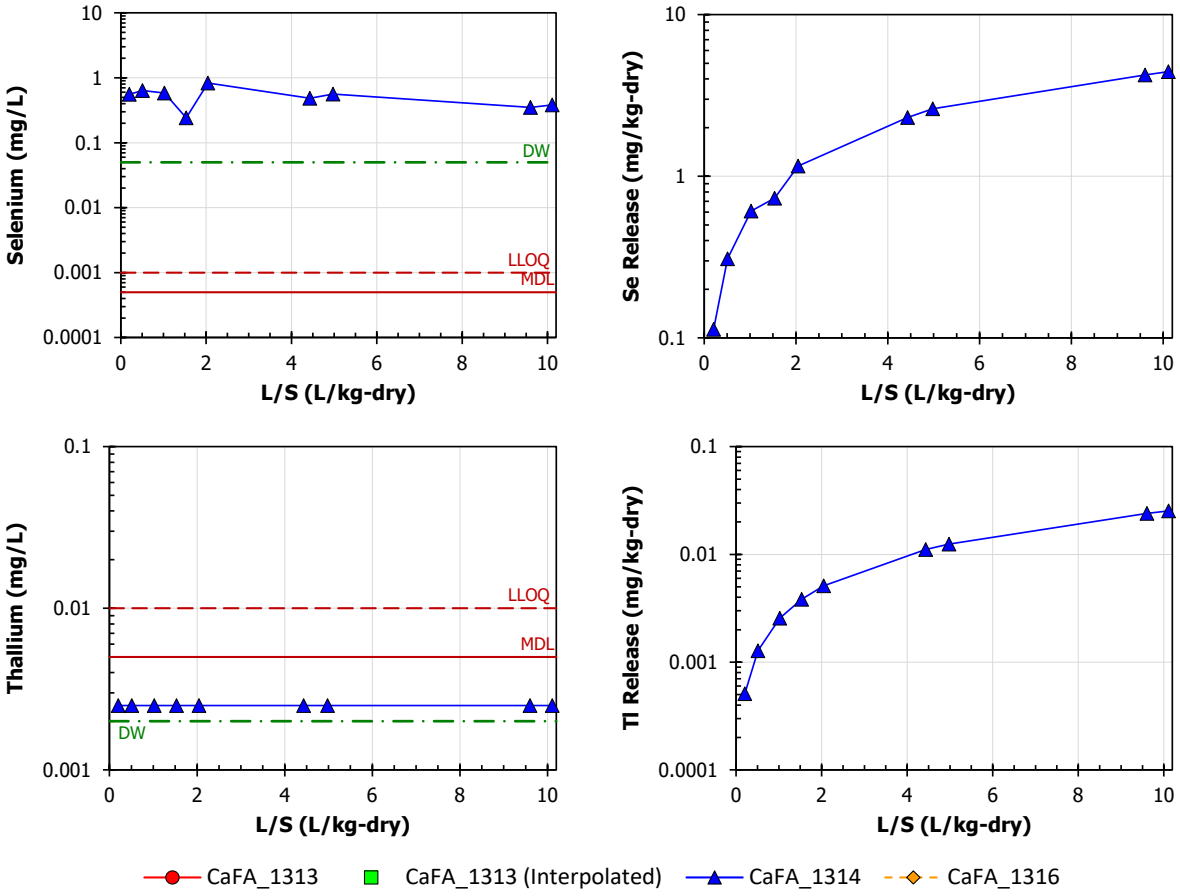

Figure B-16. Method 1314 results for a low-carbon coal fly ash (CaFA):
Selenium and thallium.

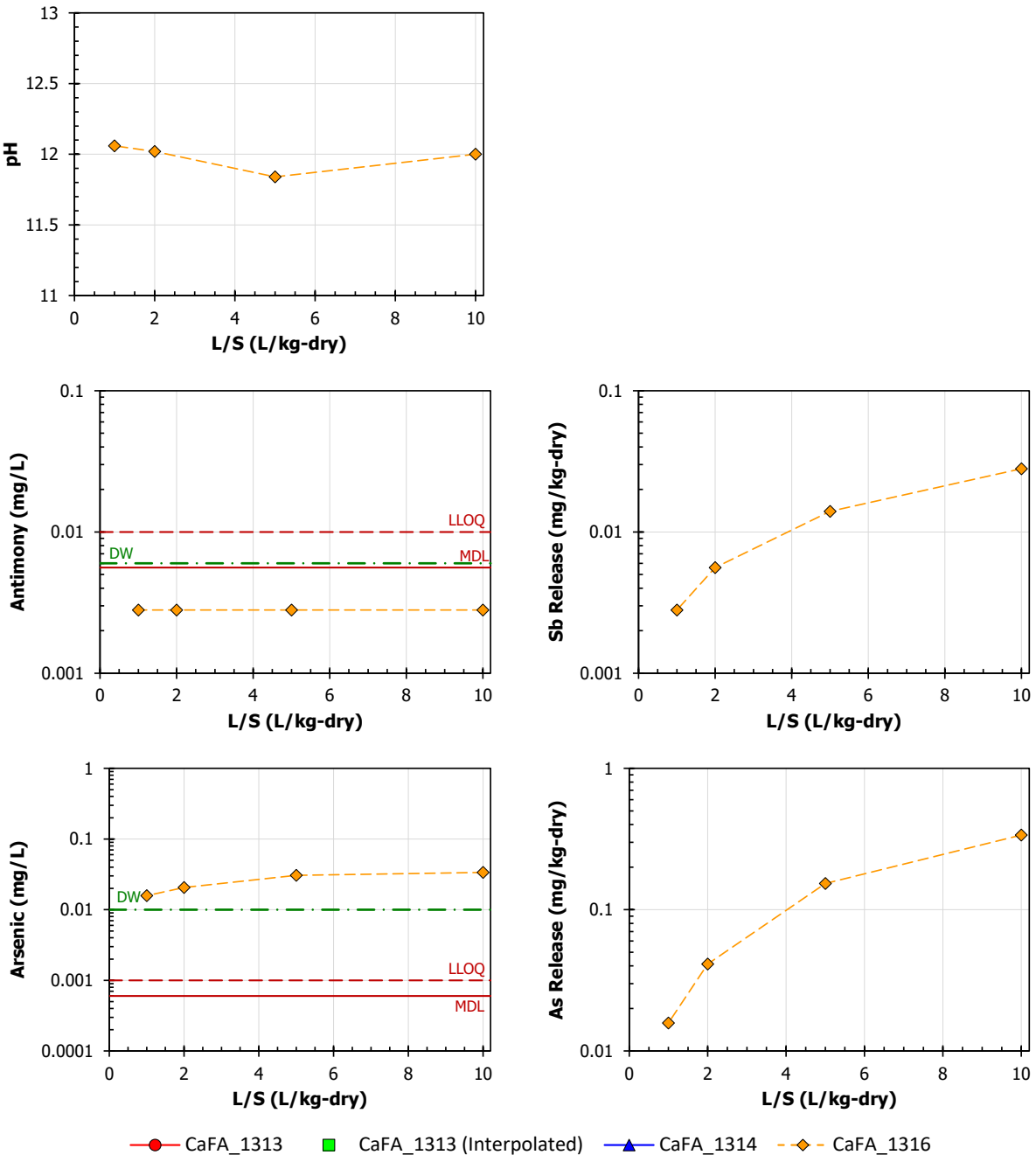

Figure B-17. Method 1316 results for a high-carbon coal fly ash (CaFA):
Eluate pH, antimony and arsenic.

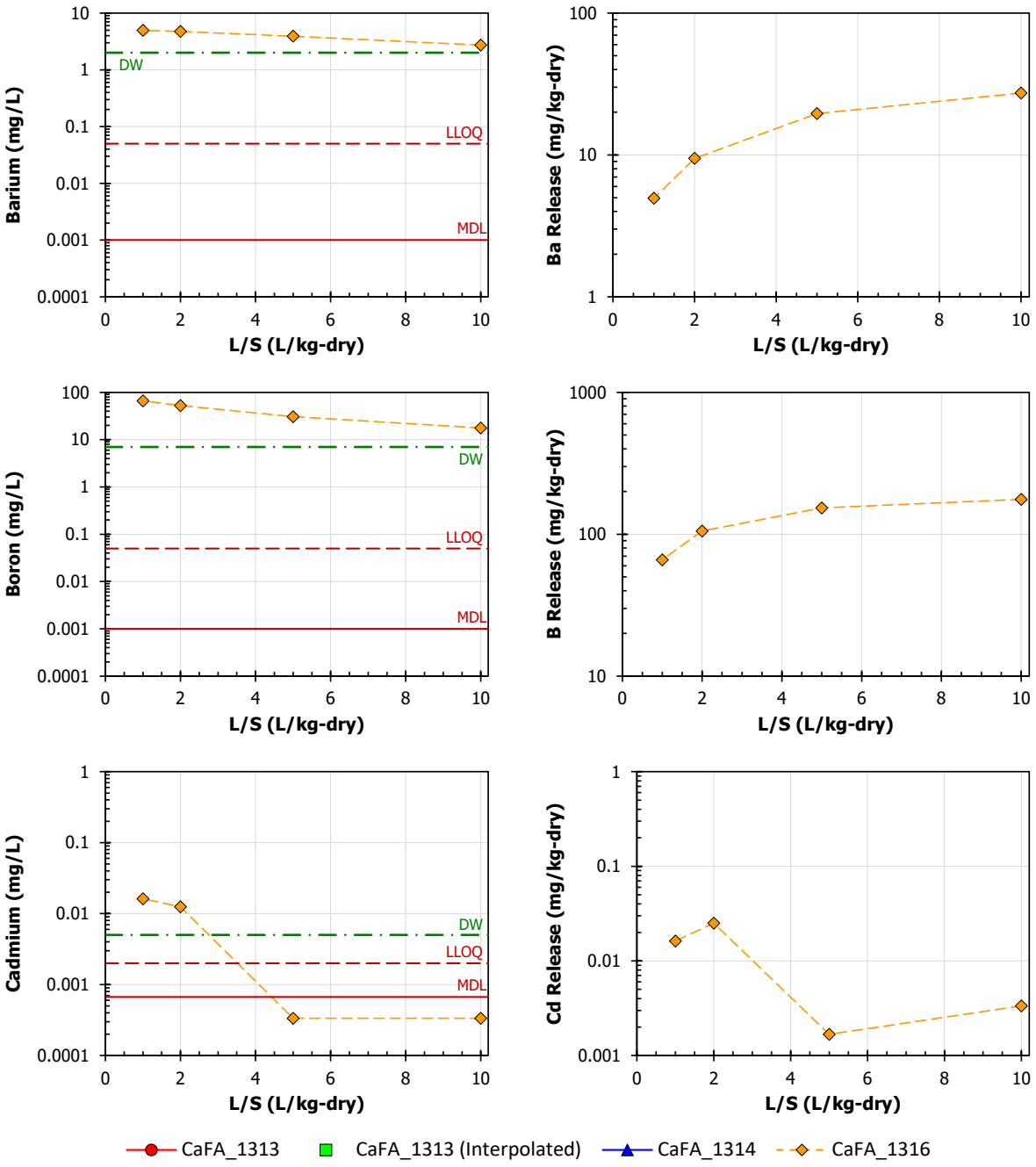

Figure B-18. Method 1316 results for a high-carbon coal fly ash (CaFA):
Barium, boron and cadmium.

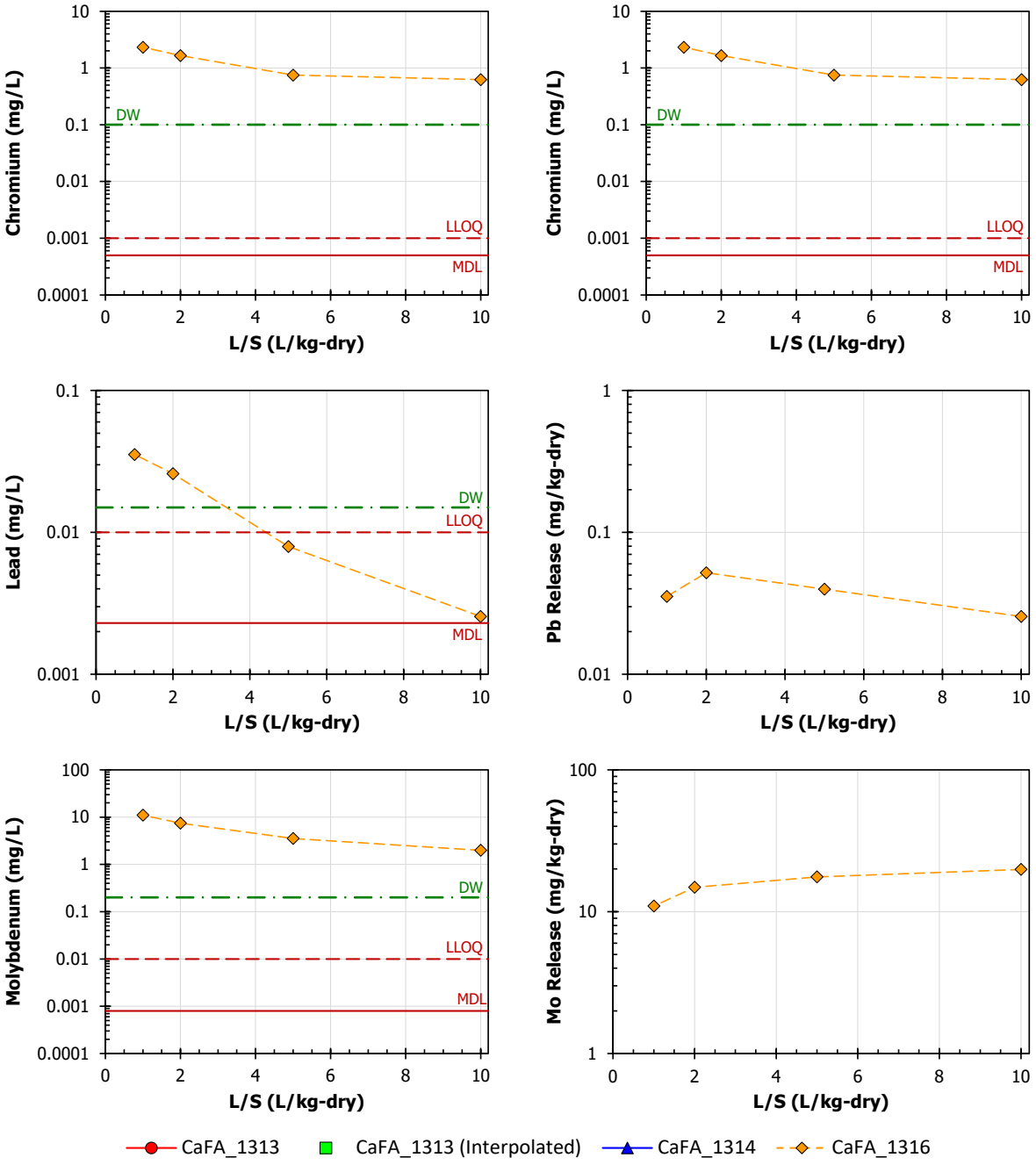

Figure B-19. Method 1316 results for a high-carbon coal fly ash (CaFA):
Chromium, lead and molybdenum.

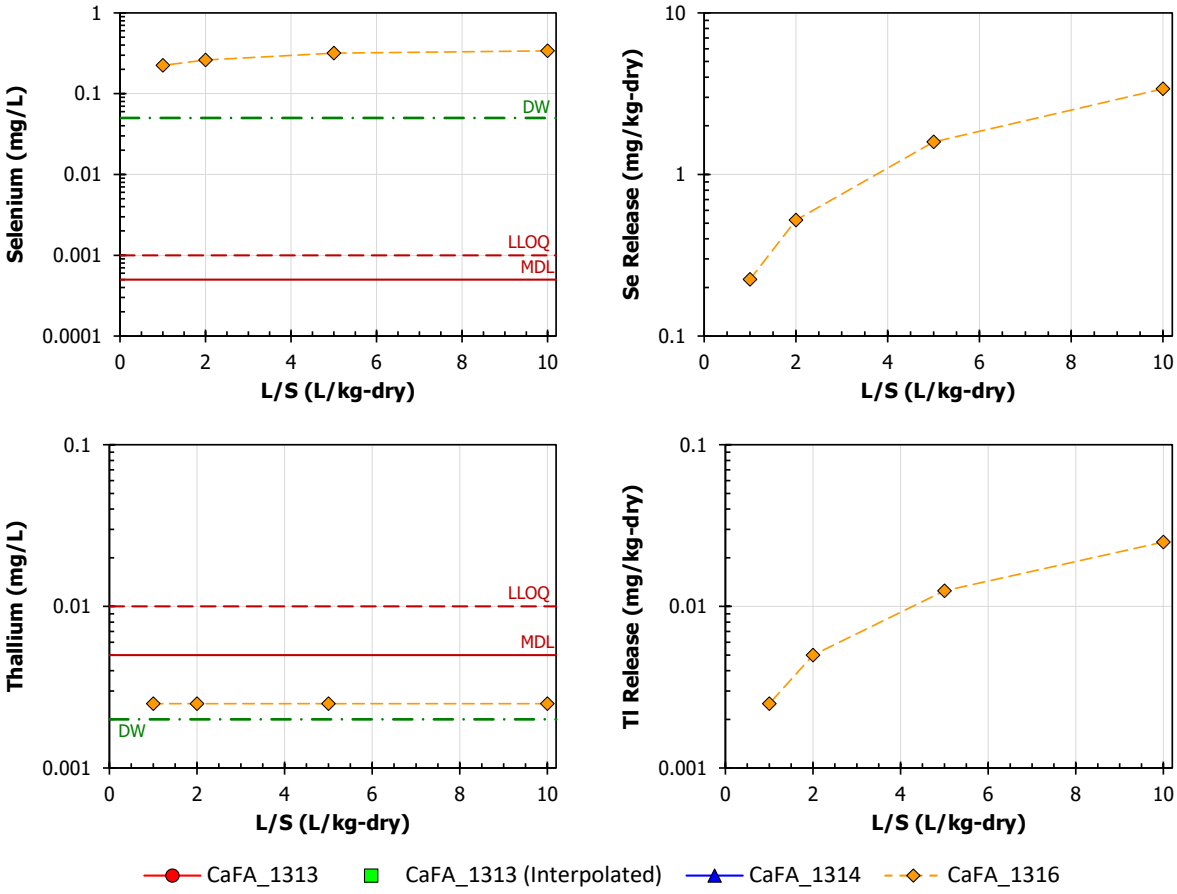

Figure B-20. Method 1316 results for a high-carbon coal fly ash (CaFA):
Selenium and thallium.

Analysis report according to EPA Method 1313

Created by LeachXS™, version 2.0.92 (18-Oct-2016)
Report created on 25-Jan-2017 2:45 PM

Material Information

Sample ID	CaFA (P,1,1)
Sample Name	CaFA
Sample Replicate	A
Test Replicate	A
Category	Coal Combustion
Subcategory	Fly Ash
Full Name	CaFA
Description	Coal combustion fly ash from Facility Ca
Origin	EPA LEAF Methods validation
Sample Database	C:\Users\User\Documents\LeachXS User Objects\DATABASES\LEAF Guide (16-Dec-2016).mdb

Test Parameters

Start Date	19-Apr-10	
End Date	20-Apr-10	
Particle Size	0.3	*mm*
Contact Interval	24.0	*h*
Solids Content	100	*%*

Legend

pH	Acidity	V(acid)	Volume of added acid
E(h)	Redox potential	[acid]	Concentration of added acid
K(25°C)	Conductivity at 25 °C	V(base)	Volume of added base
L/S-dry	Liquid-to-solid ratio	[base]	Concentration of added base
M	Dry mass	[H3O+]	Acid neutralization capacity
V	Volume DI water	[OH-]	Base neutralization capacity
Total V	Total liquid volume		
N/A	Not analyzed or measured		
N/C	Not calculated		

Concentrations below the method dectection limit (MDL) are reported between parentheses as half of the MDL.

Fraction Information

Fraction	pH	E(h) mV	K(25°C) mS/cm	L/S-dry L/kg	M kg dry	V mL	Total V mL
1	2.01	295	89.8	10.0	0.0400	310	400
2	3.96	180	15.5	10.0	0.0400	381	400
3	5.54	86.4	17.2	10.0	0.0400	387	400
4	6.64	21.3	12.7	10.0	0.0400	387	400
5	9.15	-127	12.4	10.0	0.0400	391	400
6	10.9	-231	9.44	10.0	0.0400	394	400
7	12.0	-296	7.54	10.0	0.0400	400	400
8	13.2	-367	99.9	14.2	0.0400	484	568

Titration Information

Fraction	pH	V(acid) mL	[acid] mol/L	V(base) mL	[base] mol/L	$[H_3O^+]$ mol/kg dry	$[OH^-]$ mol/kg dry
1	2.01	90.0	2.00			4.50	
2	3.96	19.0	2.00			0.950	
3	5.54	13.5	2.00			0.675	
4	6.64	13.0	2.00			0.650	
5	9.15	9.00	2.00			0.450	
6	10.9	6.10	2.00			0.305	
7	12.0						
8	13.2			84.0	1.00		2.10

Concentration in mg/L

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
pH	*2.01*	*3.96*	*5.54*	*6.64*	*9.15*	*10.9*	*12.0*	*13.2*
Al	1583	96.7	0.0419	0.0693	0.0169	1.86	3.01	1.12
As	4.90	0.875	0.0603	0.0456	0.101	0.0630	0.0337	0.151
B	63.0	50.3	43.7	41.8	33.7	27.8	17.6	11.1
Ba	8.25	2.88	1.45	1.38	0.690	1.69	2.73	5.08
Be	0.580	0.119	0.00301	0.00301	0.00301	0.00301	0.00301	0.00301
Br^-	(0.160)	(0.160)	(0.160)	(0.160)	(0.160)	(0.160)	(0.160)	(0.160)
Ca	3537	1784	1356	1318	1065	865	318	97.6
Cd	0.210	0.162	0.106	0.0940	0.00339	0.00341	0.00343	0.00412
Cl^-	(2.07)	(2.07)	(2.07)	(2.07)	(2.07)	(2.07)	(2.07)	(2.07)
Co	1.91	0.402	0.222	0.204	0.00574	0.00206	0.00206	0.00206
CO_3^{2-}	0.226	0.278	0.389	0.356	0.365	0.383	0.481	0.408
Cr	9.41	0.761	0.00563	0.0348	0.0406	0.0511	0.626	0.874
Cs	0.0334	0.00477	0.00477	0.00477	0.00477	0.00477	0.00477	0.00477
Cu	9.72	2.41	0.0288	0.0164	0.00350	0.00350	0.00350	0.0151
DIC	3.25	0.932	2.84	1.40	3.89	1.68	0.742	6.21
DOC	6.66	5.84	5.41	4.03	1.06	1.50	1.69	5.42
Fe	318	19.5	(0.00145)	(0.00145)	(0.00145)	(0.00145)	(0.00145)	(0.00145)
F^-	(0.000500)	0.00364	(0.000500)	(0.000500)	0.00230	0.00249	(0.000500)	(0.000500)
Hg	1.90E-05	3.40E-05	(3.00E-06)	9.00E-06	(3.00E-06)	(3.00E-06)	(3.00E-06)	(3.00E-06)
K	32.8	6.12	4.85	4.87	3.85	3.16	2.02	1556
Mg	260	91.1	58.5	56.1	31.7	1.31	(0.000500)	(0.000500)
Mn	56.1	21.6	15.7	14.3	0.485	0.00924	0.00483	0.0360
Mo	3.73	0.644	1.10	1.28	1.94	1.87	1.99	2.24

Concentration in mg/L

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
pH	*2.01*	*3.96*	*5.54*	*6.64*	*9.15*	*10.9*	*12.0*	*13.2*
Na	22.6	8.02	6.66	6.61	5.89	5.64	4.73	19.9
Ni	3.45	0.782	0.485	0.492	0.100	0.0430	0.0157	0.00363
NO_2^-	(0.000500)	(0.000500)	(0.000500)	(0.000500)	(0.000500)	(0.000500)	(0.000500)	(0.000500)
NO_3^-	2.65E+04	238	238	4345	3066	2023	3.32	8.20
Pb	1.26	0.103	0.00298	0.00114	0.00114	0.00114	0.00256	0.0870
PO_4^{3-}	(1.04)	(1.04)	(1.04)	(1.04)	(1.04)	(1.04)	(1.04)	(1.04)
Re	0.00459	0.00459	0.00459	0.00459	0.00459	0.00459	0.00459	0.00459
Sb	0.678	0.0941	0.0266	0.0294	0.0531	0.0753	0.00278	0.00733
Se	4.57	0.901	0.142	0.141	0.336	0.548	0.339	0.805
Si	1295	144	44.0	39.7	12.2	2.89	3.38	3.40
Sn	0.523	0.0520	0.00349	0.00349	0.00349	0.00349	0.00349	0.00349
SO_4^{2-}	223	237	327	271	258	259	115	165
Sr	22.6	8.13	5.43	5.23	3.15	2.55	1.79	1.35
Ti	110	4.49	0.00612	0.00261	0.00133	0.00201	(0.000500)	(0.000500)
Tl	0.101	0.0460	0.0161	0.0148	0.00253	0.00253	0.00253	0.00253
U	2.02	0.258	0.00133	0.00133	0.00133	0.00133	0.00133	0.00133
V	36.5	3.38	0.184	0.196	0.748	1.12	0.363	0.488
Zn	12.3	3.83	1.84	1.47	0.267	0.0773	0.0360	0.0838

Method Detection Limit in mg/L

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
pH	*2.01*	*3.96*	*5.54*	*6.64*	*9.15*	*10.9*	*12.0*	*13.2*
Al	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
As	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640
B	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
Ba	0.000570	0.000570	0.000570	0.000570	0.000570	0.000570	0.000570	0.000570
Be	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640
Br^-	0.320	0.320	0.320	0.320	0.320	0.320	0.320	0.320
Ca	0.00350	0.00350	0.00350	0.00350	0.00350	0.00350	0.00350	0.00350
Cd	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170
Cl^-	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13
Co	0.000410	0.000410	0.000410	0.000410	0.000410	0.000410	0.000410	0.000410
CO_3^{2-}	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
Cr	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500
Cs	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
Cu	0.000700	0.000700	0.000700	0.000700	0.000700	0.000700	0.000700	0.000700
DIC	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700
DOC	0.0900	0.0900	0.0900	0.0900	0.0900	0.0900	0.0900	0.0900
Fe	0.00290	0.00290	0.00290	0.00290	0.00290	0.00290	0.00290	0.00290
F^-	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
Hg	6.00E-06	6.00E-06	6.00E-06	6.00E-06	6.00E-06	6.00E-06	6.00E-06	6.00E-06
K	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150
Mg	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
Mn	0.000340	0.000340	0.000340	0.000340	0.000340	0.000340	0.000340	0.000340
Mo	0.000760	0.000760	0.000760	0.000760	0.000760	0.000760	0.000760	0.000760

Method Detection Limit in mg/L

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
pH	*2.01*	*3.96*	*5.54*	*6.64*	*9.15*	*10.9*	*12.0*	*13.2*
Na	0.00350	0.00350	0.00350	0.00350	0.00350	0.00350	0.00350	0.00350
Ni	0.000730	0.000730	0.000730	0.000730	0.000730	0.000730	0.000730	0.000730
NO_2^-	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
NO_3^-	0.475	0.475	0.475	0.475	0.475	0.475	0.475	0.475
Pb	0.000230	0.000230	0.000230	0.000230	0.000230	0.000230	0.000230	0.000230
PO_4^{3-}	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08
Re	0.000240	0.000240	0.000240	0.000240	0.000240	0.000240	0.000240	0.000240
Sb	8.00E-05	8.00E-05	8.00E-05	8.00E-05	8.00E-05	8.00E-05	8.00E-05	8.00E-05
Se	0.000520	0.000520	0.000520	0.000520	0.000520	0.000520	0.000520	0.000520
Si	0.00280	0.00280	0.00280	0.00280	0.00280	0.00280	0.00280	0.00280
Sn	0.000700	0.000700	0.000700	0.000700	0.000700	0.000700	0.000700	0.000700
SO_4^{2-}	0.505	0.505	0.505	0.505	0.505	0.505	0.505	0.505
Sr	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
Ti	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
Tl	0.000510	0.000510	0.000510	0.000510	0.000510	0.000510	0.000510	0.000510
U	0.000300	0.000300	0.000300	0.000300	0.000300	0.000300	0.000300	0.000300
V	0.000310	0.000310	0.000310	0.000310	0.000310	0.000310	0.000310	0.000310
Zn	0.000920	0.000920	0.000920	0.000920	0.000920	0.000920	0.000920	0.000920

Release in mg/kg

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
pH	*2.01*	*3.96*	*5.54*	*6.64*	*9.15*	*10.9*	*12.0*	*13.2*
Al	1.58E+04	967	0.419	0.693	0.169	18.6	30.1	16.0
As	49.0	8.75	0.603	0.456	1.01	0.630	0.337	2.14
B	630	503	437	418	337	278	176	157
Ba	82.5	28.8	14.5	13.8	6.90	16.9	27.3	72.1
Be	5.80	1.19	0.0301	0.0301	0.0301	0.0301	0.0301	0.0428
Br^-	(1.60)	(1.60)	(1.60)	(1.60)	(1.60)	(1.60)	(1.60)	(2.27)
Ca	3.54E+04	1.78E+04	1.36E+04	1.32E+04	1.07E+04	8652	3178	1386
Cd	2.10	1.62	1.06	0.940	0.0339	0.0341	0.0343	0.0585
Cl^-	(20.7)	(20.7)	(20.7)	(20.7)	(20.7)	(20.7)	(20.7)	(29.3)
Co	19.1	4.02	2.22	2.04	0.0574	0.0206	0.0206	0.0293
CO_3^{2-}	2.26	2.78	3.89	3.56	3.65	3.83	4.81	5.80
Cr	94.1	7.61	0.0563	0.348	0.406	0.511	6.26	12.4
Cs	0.334	0.0477	0.0477	0.0477	0.0477	0.0477	0.0477	0.0677
Cu	97.2	24.1	0.288	0.164	0.0350	0.0350	0.0350	0.214
DIC	32.5	9.32	28.4	14.0	38.9	16.8	7.42	88.2
DOC	66.6	58.4	54.1	40.3	10.6	15.0	16.9	76.9
Fe	3182	195	(0.0145)	(0.0145)	(0.0145)	(0.0145)	(0.0145)	(0.0206)
F^-	(0.00500)	0.0364	(0.00500)	(0.00500)	0.0230	0.0249	(0.00500)	(0.00710)
Hg	0.000190	0.000340	(3.00E-05)	9.00E-05	(3.00E-05)	(3.00E-05)	(3.00E-05)	(4.26E-05)
K	328	61.2	48.5	48.7	38.5	31.6	20.2	2.21E+04
Mg	2600	911	585	561	317	13.1	(0.00500)	(0.00710)
Mn	561	216	157	143	4.85	0.0924	0.0483	0.512
Mo	37.3	6.44	11.0	12.8	19.4	18.7	19.9	31.8

Release in mg/kg

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
pH	*2.01*	*3.96*	*5.54*	*6.64*	*9.15*	*10.9*	*12.0*	*13.2*
Na	226	80.2	66.6	66.1	58.9	56.4	47.3	282
Ni	34.5	7.82	4.85	4.92	1.00	0.430	0.157	0.0516
NO_2^-	(0.00500)	(0.00500)	(0.00500)	(0.00500)	(0.00500)	(0.00500)	(0.00500)	(0.00710)
NO_3^-	2.65E+05	2375	2375	4.35E+04	3.07E+04	2.02E+04	33.2	116
Pb	12.6	1.03	0.0298	0.0114	0.0114	0.0114	0.0256	1.23
PO_4^{3-}	(10.4)	(10.4)	(10.4)	(10.4)	(10.4)	(10.4)	(10.4)	(14.8)
Re	0.0459	0.0459	0.0459	0.0459	0.0459	0.0459	0.0459	0.0652
Sb	6.78	0.941	0.266	0.294	0.531	0.753	0.0278	0.104
Se	45.7	9.01	1.42	1.41	3.36	5.48	3.39	11.4
Si	1.29E+04	1438	440	397	122	28.9	33.8	48.3
Sn	5.23	0.520	0.0349	0.0349	0.0349	0.0349	0.0349	0.0496
SO_4^{2-}	2231	2365	3274	2711	2581	2587	1150	2346
Sr	226	81.3	54.3	52.3	31.5	25.5	17.9	19.1
Ti	1100	44.9	0.0612	0.0261	0.0133	0.0201	(0.00500)	(0.00710)
Tl	1.01	0.460	0.161	0.148	0.0253	0.0253	0.0253	0.0359
U	20.2	2.58	0.0133	0.0133	0.0133	0.0133	0.0133	0.0189
V	365	33.8	1.84	1.96	7.48	11.2	3.63	6.93
Zn	123	38.3	18.4	14.7	2.67	0.773	0.360	1.19

Interpolated Concentration in mg/L

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
pH	*2.00*	*4.00*	*5.50*	*7.00*	*8.00*	*9.00*	*10.5*	*12.0*	*13.0*
Al	1583	79.5	0.0510	0.0566	0.0323	0.0184	0.636	3.01	1.33
As	4.90	0.818	0.0645	0.0511	0.0703	0.0967	0.0702	0.0337	0.117
B	63.0	50.1	43.8	40.5	37.2	34.2	29.1	17.6	12.0
Ba	8.25	2.83	1.47	1.25	0.948	0.720	1.37	2.73	4.58
Be	0.580	0.108	0.00330	0.00301	0.00301	0.00301	0.00301	0.00301	0.00301
Br^-	(0.160)	(0.160)	(0.160)	(0.160)	(0.160)	(0.160)	(0.160)	(0.160)	(0.160)
Ca	3537	1772	1365	1278	1174	1079	907	318	119
Cd	0.210	0.161	0.107	0.0584	0.0155	0.00414	0.00340	0.00343	0.00400
Cl^-	(2.07)	(2.07)	(2.07)	(2.07)	(2.07)	(2.07)	(2.07)	(2.07)	(2.07)
Co	1.91	0.396	0.225	0.122	0.0295	0.00710	0.00261	0.00206	0.00206
CO_3^{2-}	0.226	0.281	0.386	0.357	0.361	0.365	0.379	0.481	0.419
Cr	9.41	0.672	0.00637	0.0356	0.0378	0.0402	0.0485	0.626	0.826
Cs	0.0334	0.00477	0.00477	0.00477	0.00477	0.00477	0.00477	0.00477	0.00477
Cu	9.72	2.15	0.0323	0.0131	0.00710	0.00384	0.00350	0.00350	0.0118
DIC	3.27	0.958	2.76	1.62	2.43	3.66	2.03	0.742	4.36
DOC	6.66	5.82	5.42	3.33	1.96	1.15	1.38	1.69	4.46
Fe	318	15.4	(0.00145)	(0.00145)	(0.00145)	(0.00145)	(0.00145)	(0.00145)	(0.00145)
F^-	(0.000500)	0.00344	(0.000500)	(0.000500)	0.00108	0.00209	0.00244	(0.000500)	(0.000500)
Hg	1.89E-05	3.16E-05	(3.00E-06)	7.14E-06	(3.00E-06)	(3.00E-06)	(3.00E-06)	(3.00E-06)	(3.00E-06)
K	33.1	6.08	4.88	4.71	4.29	3.91	3.31	2.02	514
Mg	260	90.1	59.2	51.7	41.2	32.8	2.71	(0.000500)	(0.000500)
Mn	56.1	21.5	15.9	8.79	2.28	0.593	0.0228	0.00483	0.0258
Mo	3.73	0.653	1.08	1.36	1.60	1.89	1.89	1.99	2.19

Interpolated Concentration in mg/L

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
pH	*2.00*	*4.00*	*5.50*	*7.00*	*8.00*	*9.00*	*10.5*	*12.0*	*13.0*
Na	22.6	7.98	6.69	6.50	6.21	5.93	5.70	4.73	15.6
Ni	3.45	0.773	0.491	0.391	0.208	0.110	0.0521	0.0157	0.00463
NO_2^-	(0.000500)	(0.000500)	(0.000500)	(0.000500)	(0.000500)	(0.000500)	(0.000500)	(0.000500)	(0.000500)
NO_3^-	2.65E+04	238	238	4133	3597	3131	2225	3.32	7.06
Pb	1.26	0.0942	0.00326	0.00114	0.00114	0.00114	0.00114	0.00256	0.0483
PO_4^{3-}	(1.04)	(1.04)	(1.04)	(1.04)	(1.04)	(1.04)	(1.04)	(1.04)	(1.04)
Re	0.00459	0.00459	0.00459	0.00459	0.00459	0.00459	0.00459	0.00459	0.00459
Sb	0.678	0.0911	0.0275	0.0320	0.0405	0.0513	0.0695	0.00278	0.00624
Se	4.57	0.860	0.149	0.160	0.226	0.319	0.490	0.339	0.697
Si	1295	140	45.4	33.5	20.9	13.1	4.02	3.38	3.40
Sn	0.523	0.0485	0.00374	0.00349	0.00349	0.00349	0.00349	0.00349	0.00349
SO_4^{2-}	223	238	325	269	264	259	259	115	156
Sr	22.6	8.04	5.48	4.86	3.98	3.25	2.68	1.79	1.41
Ti	110	3.80	0.00724	0.00237	0.00181	0.00139	0.00183	(0.000500)	(0.000500)
Tl	0.101	0.0448	0.0165	0.0115	0.00568	0.00281	0.00253	0.00253	0.00253
U	2.02	0.225	0.00152	0.00133	0.00133	0.00133	0.00133	0.00133	0.00133
V	36.5	3.14	0.198	0.237	0.405	0.691	1.02	0.363	0.465
Zn	12.3	3.76	1.88	1.15	0.582	0.295	0.103	0.0360	0.0728

Interpolated Release in mg/kg

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
pH	*2.00*	*4.00*	*5.50*	*7.00*	*8.00*	*9.00*	*10.5*	*12.0*	*13.0*
Al	1.58E+04	795	0.510	0.565	0.324	0.184	6.37	30.1	18.4
As	49.0	8.18	0.645	0.511	0.707	0.968	0.704	0.337	1.63
B	630	501	439	404	374	342	291	176	166
Ba	82.6	28.3	14.7	12.5	9.52	7.20	13.8	27.3	63.4
Be	5.80	1.08	0.0331	0.0301	0.0302	0.0301	0.0302	0.0301	0.0417
Br^-	(1.60)	(1.60)	(1.60)	(1.60)	(1.61)	(1.60)	(1.60)	(1.60)	(2.22)
Ca	3.54E+04	1.77E+04	1.37E+04	1.28E+04	1.18E+04	1.08E+04	9088	3178	1646
Cd	2.11	1.60	1.07	0.583	0.156	0.0414	0.0341	0.0343	0.0554
Cl^-	(20.7)	(20.6)	(20.7)	(20.6)	(20.7)	(20.7)	(20.7)	(20.7)	(28.6)
Co	19.2	3.95	2.25	1.22	0.296	0.0710	0.0261	0.0206	0.0286
CO_3^{2-}	2.26	2.81	3.86	3.57	3.63	3.65	3.80	4.81	5.81
Cr	94.2	6.72	0.0637	0.355	0.380	0.402	0.486	6.26	11.4
Cs	0.334	0.0477	0.0477	0.0476	0.0479	0.0477	0.0478	0.0477	0.0661
Cu	97.3	21.5	0.323	0.131	0.0713	0.0384	0.0351	0.0350	0.164
DIC	32.8	9.58	27.6	16.2	24.4	36.6	20.4	7.42	60.4
DOC	66.7	58.2	54.2	33.2	19.7	11.5	13.9	16.9	61.8
Fe	3185	153	(0.0145)	(0.0145)	(0.0146)	(0.0145)	(0.0145)	(0.0145)	(0.0201)
F^-	(0.00500)	0.0344	(0.00500)	(0.00499)	0.0109	0.0209	0.0245	(0.00500)	(0.00693)
Hg	0.000190	0.000316	(3.00E-05)	7.13E-05	(3.01E-05)	(3.00E-05)	(3.00E-05)	(3.00E-05)	(4.16E-05)
K	332	60.8	48.8	47.0	43.1	39.1	33.1	20.2	7121
Mg	2602	900	592	516	413	328	27.1	(0.00500)	(0.00693)
Mn	561	215	159	87.8	22.9	5.94	0.229	0.0483	0.357
Mo	37.4	6.53	10.8	13.6	16.1	18.9	18.9	19.9	30.4

Interpolated Release in mg/kg

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
pH	*2.00*	*4.00*	*5.50*	*7.00*	*8.00*	*9.00*	*10.5*	*12.0*	*13.0*
Na	226	79.8	66.9	64.9	62.4	59.3	57.1	47.3	217
Ni	34.6	7.72	4.91	3.91	2.09	1.10	0.522	0.157	0.0642
NO_2^-	(0.00500)	(0.00500)	(0.00500)	(0.00499)	(0.00502)	(0.00500)	(0.00501)	(0.00500)	(0.00693)
NO_3^-	2.65E+05	2374	2376	4.13E+04	3.61E+04	3.13E+04	2.23E+04	33.2	97.7
Pb	12.6	0.942	0.0326	0.0114	0.0114	0.0114	0.0114	0.0256	0.669
PO_4^{3-}	(10.4)	(10.4)	(10.4)	(10.4)	(10.4)	(10.4)	(10.4)	(10.4)	(14.4)
Re	0.0460	0.0459	0.0459	0.0459	0.0461	0.0459	0.0460	0.0459	0.0636
Sb	6.79	0.911	0.275	0.319	0.407	0.513	0.696	0.0278	0.0864
Se	45.7	8.60	1.49	1.60	2.27	3.19	4.91	3.39	9.66
Si	1.30E+04	1395	454	335	210	131	40.3	33.8	47.1
Sn	5.24	0.485	0.0374	0.0349	0.0351	0.0349	0.0350	0.0349	0.0484
SO_4^{2-}	2232	2384	3249	2688	2652	2590	2590	1150	2154
Sr	226	80.4	54.8	48.6	39.9	32.5	26.8	17.9	19.6
Ti	1101	38.0	0.0724	0.0236	0.0182	0.0139	0.0183	(0.00500)	(0.00693)
Tl	1.01	0.448	0.165	0.115	0.0570	0.0281	0.0253	0.0253	0.0350
U	20.2	2.25	0.0152	0.0133	0.0133	0.0133	0.0133	0.0133	0.0184
V	366	31.4	1.98	2.37	4.07	6.91	10.2	3.63	6.44
Zn	123	37.6	18.8	11.5	5.85	2.95	1.03	0.360	1.01

Assessment on interpolated values; available content on as measured values

Available Content **From pH range (2, 9, 13), on as measured values.**

Scenario min pH 7

Scenario max pH 12

	Reporting Limit (mg/L)		*Concentration (mg/L)*			*Release (mg/kg)*		*Available (mg/kg)*	
	min	*max*	*min*	*max*	*max at pH*	*min*	*max*		*at pH*
Al	0.00100	0.00100	0.0184	3.01	12.0	0.184	30.1	1.58E+04	2.01
As	0.000640	0.000640	0.0337	0.0967	9.00	0.337	0.968	49.0	2.01
B	0.00100	0.00100	17.6	40.5	7.00	176	404	630	2.01
Ba	0.000570	0.000570	0.720	2.73	12.0	7.20	27.3	82.5	2.01
Be	0.000640	0.000640	0.00301	0.00301	7.00	0.0301	0.0302	5.80	2.01
Br^-	0.320	0.320	(0.160)	(0.160)	7.00	(1.60)	(1.61)	2.27	13.2
Ca	0.00350	0.00350	318	1278	7.00	3178	1.28E+04	3.54E+04	2.01
Cd	0.000170	0.000170	0.00340	0.0584	7.00	0.0341	0.583	2.10	2.01
Cl^-	4.13	4.13	(2.07)	(2.07)	7.00	(20.6)	(20.7)	29.3	13.2
Co	0.000410	0.000410	0.00206	0.122	7.00	0.0206	1.22	19.1	2.01
CO_3^{2-}	0.00100	0.00100	0.357	0.481	12.0	3.57	4.81	5.80	13.2
Cr	0.000500	0.000500	0.0356	0.626	12.0	0.355	6.26	94.1	2.01
Cs	0.00100	0.00100	0.00477	0.00477	12.0	0.0476	0.0479	0.334	2.01
Cu	0.000700	0.000700	0.00350	0.0131	7.00	0.0350	0.131	97.2	2.01
DIC	0.0700	0.0700	0.742	3.66	9.00	7.42	36.6	88.2	13.2
DOC	0.0900	0.0900	1.15	3.33	7.00	11.5	33.2	76.9	13.2
Fe	0.00290	0.00290	(0.00145)	(0.00145)	7.00	(0.0145)	(0.0146)	3182	2.01
F^-	0.00100	0.00100	(0.000500)	0.00244	10.5	(0.00499)	0.0245	0.0230	9.15
Hg	6.00E-06	6.00E-06	(3.00E-06)	7.14E-06	7.00	(3.00E-05)	7.13E-05	0.000190	2.01
K	0.00150	0.00150	2.02	4.71	7.00	20.2	47.0	1.11E+04	11.2
Mg	0.00100	0.00100	(0.000500)	51.7	7.00	(0.00500)	516	2600	2.01
Mn	0.000340	0.000340	0.00483	8.79	7.00	0.0483	87.8	561	2.01
Mo	0.000760	0.000760	1.36	1.99	12.0	13.6	19.9	37.3	2.01

Assessment on interpolated values; available content on as measured values

Available Content **From pH range (2, 9, 13), on as measured values.**

Scenario min pH 7

Scenario max pH 12

	Reporting Limit (mg/L)		*Concentration (mg/L)*			*Release (mg/kg)*		*Available (mg/kg)*	
	min	*max*	*min*	*max*	*max at pH*	*min*	*max*		*at pH*
Na	0.00350	0.00350	4.73	6.50	7.00	47.3	64.9	282	13.2
Ni	0.000730	0.000730	0.0157	0.391	7.00	0.157	3.91	34.5	2.01
NO_2^-	0.00100	0.00100	(0.000500)	(0.000500)	7.00	(0.00499)	(0.00502)	0.00941	13.2
NO_3^-	0.475	0.475	3.32	4133	7.00	33.2	4.13E+04	1.54E+04	11.2
Pb	0.000230	0.000230	0.00114	0.00256	12.0	0.0114	0.0256	12.6	2.01
PO_4^{3-}	2.08	2.08	(1.04)	(1.04)	7.00	(10.4)	(10.4)	14.8	13.2
Re	0.000240	0.000240	0.00459	0.00459	12.0	0.0459	0.0461	0.0652	13.2
Sb	8.00E-05	8.00E-05	0.00278	0.0695	10.5	0.0278	0.696	6.78	2.01
Se	0.000520	0.000520	0.160	0.490	10.5	1.60	4.91	45.7	2.01
Si	0.00280	0.00280	3.38	33.5	7.00	33.8	335	1.29E+04	2.01
Sn	0.000700	0.000700	0.00349	0.00349	7.00	0.0349	0.0351	5.23	2.01
SO_4^{2-}	0.505	0.505	115	269	7.00	1150	2688	2581	9.15
Sr	0.00100	0.00100	1.79	4.86	7.00	17.9	48.6	226	2.01
Ti	0.00100	0.00100	(0.000500)	0.00237	7.00	(0.00500)	0.0236	1100	2.01
Tl	0.000510	0.000510	0.00253	0.0115	7.00	0.0253	0.115	1.01	2.01
U	0.000300	0.000300	0.00133	0.00133	7.00	0.0133	0.0133	20.2	2.01
V	0.000310	0.000310	0.237	1.02	10.5	2.37	10.2	365	2.01
Zn	0.000920	0.000920	0.0360	1.15	7.00	0.360	11.5	123	2.01

Analysis report according to EPA Method 1314

Created by LeachXS™, version 2.0.92 (18-Oct-2016)
Report created on 25-Jan-2017 2:59 PM

Material Information

Sample ID	CaFA (C,1,1)
Sample Name	CaFA
Sample Replicate	A
Test Replicate	A
Category	Coal Combustion
Subcategory	Fly Ash
Full Name	CaFA
Description	Coal combustion fly ash from Facility Ca
Origin	EPA CCR Report 3
Sample Database	C:\Users\User\Documents\LeachXS User Objects\DATABASES\LEAF Guide (16-Dec-2016).mdb

Test Parameters

Start Date	2-Mar-10	
End Date	18-Mar-10	
Eluate	0.3	*mm*
Solids Content	100.0	*%*
Bed Length	30.0	*cm*
Column Diameter	4.80	*cm*
Bed Volume	543	cm^3
As Tested Mass	0.696	*kg*
Dry Mass	0.696	*kg*
Temperature	21.0	*°C*
Flowrate	439	*ml/day*
Flowrate	0.631	*L/S per day*

Legend

pH	Acidity
E(h)	Redox potential
K(25°C)	Conductivity at 25 °C
Σ L/S-dry	Cumulative liquid-to-solid ratio, in L/kg
L/S-dry	Liquid-to-solid ratio of fraction, in L/kg
V	Volume
Σ V	Cumulative volume
N/A	Not analyzed or measured
N/C	Not calculated

Concentrations below the method detection limit (MDL) are reported between parentheses as half of the MDL. Cumulative releases calculated with any concentration below the MDL are listed between parentheses.

Fraction Information

Fraction	*Σ L/S-dry L/kg*	*pH*	*E(h) mV*	*K(25°C) mS/cm*	*L/S-dry L/kg*	*V mL*	*Σ V mL*
1	0.204	12.5	N/A	16.0	0.204	142	142
2	0.510	12.5	N/A	14.4	0.307	213	355
3	1.02	12.3	N/A	8.13	0.513	357	712
4	1.53	12.2	N/A	7.82	0.509	354	1067
5	2.05	12.4	N/A	12.3	0.513	357	1424
6	4.43	12.2	N/A	10.1	2.39	1661	3085
7	4.98	12.0	N/A	10.0	0.546	380	3465
8	9.60	11.8	N/A	3.51	4.62	3218	6682
9	10.1	11.5	N/A	2.01	0.510	355	7037

Concentration in mg/L

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Σ L/S-dry	*0.204*	*0.510*	*1.02*	*1.53*	*2.05*	*4.43*	*4.98*	*9.60*	*10.1*
pH	*12.5*	*12.5*	*12.3*	*12.2*	*12.4*	*12.2*	*12.0*	*11.8*	*11.5*
Al	0.248	0.514	0.389	0.387	0.103	1.07	0.610	9.72	8.60
As	0.00141	0.000852	(0.000320)	(0.000320)	(0.000320)	(0.000320)	(0.000320)	0.00330	0.0178
B	16.0	9.37	9.86	10.6	11.6	15.7	20.7	17.6	9.33
Ba	396	224	118	87.3	65.8	34.5	16.4	4.64	2.38
Be	(0.000320)	(0.000320)	(0.000320)	(0.000320)	(0.000320)	(0.000320)	(0.000320)	(0.000320)	(0.000320)
Ca	910	998	977	905	864	782	699	266	140
Cd	(8.50E-05)	(8.50E-05)	(8.50E-05)	(8.50E-05)	(8.50E-05)	(8.50E-05)	(8.50E-05)	0.00351	(8.50E-05)
Co	0.0200	0.0104	0.00677	0.00402	0.00378	0.00344	(0.000900)	0.00203	0.00285
Cr	0.0351	0.00849	0.00633	0.00442	0.00509	0.00625	0.00334	0.0776	0.314
Cs	0.0118	0.00226	0.000770	(0.000245)	(0.000245)	(0.000245)	(0.000245)	(0.000245)	(0.000245)
Cu	0.0147	0.0185	0.0170	0.0161	0.00758	0.0108	0.00689	0.00559	0.00412
DIC	0.000843	0.00142	0.00123	0.000703	0.000291	(6.50E-05)	0.000715	0.00347	0.00511
DOC	0.0100	0.00516	0.00406	0.00442	0.00391	0.00549	0.00474	0.00930	0.00660
Fe	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)
K	28.4	3.72	2.05	1.64	1.53	1.51	1.38	0.830	0.537
Li	21.0	2.60	1.32	0.923	0.740	0.528	0.396	0.254	0.163
Mg	0.0160	0.0289	0.0178	0.0115	0.0245	0.0150	0.109	0.0139	0.00998
Mn	(0.000170)	(0.000170)	(0.000170)	(0.000170)	(0.000170)	(0.000170)	(0.000170)	0.00388	0.00355
Mo	1.00	0.317	0.282	0.239	0.202	0.175	0.170	4.70	0.653

Concentration in mg/L

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Σ L/S-dry	*0.204*	*0.510*	*1.02*	*1.53*	*2.05*	*4.43*	*4.98*	*9.60*	*10.1*
pH	*12.5*	*12.5*	*12.3*	*12.2*	*12.4*	*12.2*	*12.0*	*11.8*	*11.5*
Na	111	47.4	26.3	17.7	13.4	7.40	3.68	1.06	0.662
Ni	0.0282	0.0303	0.0289	0.0272	0.0247	0.0256	0.0184	0.00496	0.00136
P	0.00799	(0.00185)	0.0120	0.00654	(0.00185)	(0.00185)	(0.00185)	(0.00185)	(0.00185)
Pb	0.00153	0.00841	0.0152	0.0115	0.00864	0.00511	0.00343	(0.000115)	(0.000115)
Re	0.126	0.0443	0.00241	0.00106	0.000740	0.000467	0.000374	(0.000120)	(0.000120)
S	0.514	0.137	0.121	0.0843	0.0769	6.98	6.36	3.45	9.16
Sb	0.000396	0.000993	0.00148	0.00176	0.00175	0.00275	0.00452	0.0182	0.0385
Se	0.556	0.638	0.584	0.241	0.830	0.484	0.562	0.351	0.381
Si	0.680	0.282	0.265	0.303	0.237	0.265	0.325	1.65	3.64
Sn	(0.000350)	(0.000350)	(0.000350)	(0.000350)	(0.000350)	(0.000350)	(0.000350)	(0.000350)	(0.000350)
Sr	76.6	15.3	4.89	3.69	3.14	2.26	1.73	1.14	0.872
Ti	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)	(0.00100)
Tl	(0.000255)	(0.000255)	(0.000255)	(0.000255)	(0.000255)	(0.000255)	(0.000255)	(0.000255)	(0.000255)
U	(0.000150)	(0.000150)	(0.000150)	(0.000150)	(0.000150)	(0.000150)	(0.000150)	(0.000150)	(0.000150)
V	0.0948	0.104	0.100	0.0943	0.0896	0.0822	0.0759	0.216	0.708
Zn	0.0266	0.00989	0.00502	0.00414	(0.000500)	0.0392	(0.000500)	0.00840	(0.000500)

Method Detection Limit in mg/L

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Σ L/S-dry	*0.204*	*0.510*	*1.02*	*1.53*	*2.05*	*4.43*	*4.98*	*9.60*	*10.1*
pH	*12.5*	*12.5*	*12.3*	*12.2*	*12.4*	*12.2*	*12.0*	*11.8*	*11.5*
Al	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
As	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640
B	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
Ba	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
Be	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640	0.000640
Ca	0.00260	0.00260	0.00260	0.00260	0.00260	0.00260	0.00260	0.00260	0.00260
Cd	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170
Co	0.00180	0.00180	0.00180	0.00180	0.00180	0.00180	0.00180	0.00180	0.00180
Cr	0.00120	0.00120	0.00120	0.00120	0.00120	0.00120	0.00120	0.00120	0.00120
Cs	0.000490	0.000490	0.000490	0.000490	0.000490	0.000490	0.000490	0.000490	0.000490
Cu	0.00370	0.00370	0.00370	0.00370	0.00370	0.00370	0.00370	0.00370	0.00370
DIC	0.000130	0.000130	0.000130	0.000130	0.000130	0.000130	0.000130	0.000130	0.000130
DOC	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170	0.000170
Fe	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200
K	0.00160	0.00160	0.00160	0.00160	0.00160	0.00160	0.00160	0.00160	0.00160
Li	0.00190	0.00190	0.00190	0.00190	0.00190	0.00190	0.00190	0.00190	0.00190
Mg	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
Mn	0.000340	0.000340	0.000340	0.000340	0.000340	0.000340	0.000340	0.000340	0.000340
Mo	0.00120	0.00120	0.00120	0.00120	0.00120	0.00120	0.00120	0.00120	0.00120

Method Detection Limit in mg/L

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Σ L/S-dry	*0.204*	*0.510*	*1.02*	*1.53*	*2.05*	*4.43*	*4.98*	*9.60*	*10.1*
pH	*12.5*	*12.5*	*12.3*	*12.2*	*12.4*	*12.2*	*12.0*	*11.8*	*11.5*
Na	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250
Ni	0.000730	0.000730	0.000730	0.000730	0.000730	0.000730	0.000730	0.000730	0.000730
P	0.00370	0.00370	0.00370	0.00370	0.00370	0.00370	0.00370	0.00370	0.00370
Pb	0.000230	0.000230	0.000230	0.000230	0.000230	0.000230	0.000230	0.000230	0.000230
Re	0.000240	0.000240	0.000240	0.000240	0.000240	0.000240	0.000240	0.000240	0.000240
S	0.00680	0.00680	0.00680	0.00680	0.00680	0.00680	0.00680	0.00680	0.00680
Sb	8.00E-05	8.00E-05	8.00E-05	8.00E-05	8.00E-05	8.00E-05	8.00E-05	8.00E-05	8.00E-05
Se	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150
Si	0.00110	0.00110	0.00110	0.00110	0.00110	0.00110	0.00110	0.00110	0.00110
Sn	0.000700	0.000700	0.000700	0.000700	0.000700	0.000700	0.000700	0.000700	0.000700
Sr	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
Ti	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200
Tl	0.000510	0.000510	0.000510	0.000510	0.000510	0.000510	0.000510	0.000510	0.000510
U	0.000300	0.000300	0.000300	0.000300	0.000300	0.000300	0.000300	0.000300	0.000300
V	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150
Zn	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100

Cumulative Release in mg/kg

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Σ L/S-dry	*0.204*	*0.510*	*1.02*	*1.53*	*2.05*	*4.43*	*4.98*	*9.60*	*10.1*
pH	*12.5*	*12.5*	*12.3*	*12.2*	*12.4*	*12.2*	*12.0*	*11.8*	*11.5*
Al	0.0506	0.208	0.408	0.605	0.658	3.20	3.54	48.5	52.9
As	0.000287	0.000548	(0.000713)	(0.000876)	(0.00104)	(0.00180)	(0.00198)	(0.0172)	(0.0263)
B	3.25	6.12	11.2	16.6	22.5	59.9	71.2	152	157
Ba	80.6	149	210	254	288	370	379	401	402
Be	(6.52E-05)	(0.000163)	(0.000328)	(0.000491)	(0.000655)	(0.00142)	(0.00159)	(0.00307)	(0.00324)
Ca	185	491	993	1454	1897	3763	4145	5376	5447
Cd	(1.73E-05)	(4.34E-05)	(8.70E-05)	(0.000130)	(0.000174)	(0.000377)	(0.000423)	(0.0167)	(0.0167)
Co	0.00408	0.00726	0.0107	0.0128	0.0147	0.0229	(0.0234)	(0.0328)	(0.0343)
Cr	0.00714	0.00974	0.0130	0.0152	0.0179	0.0328	0.0346	0.393	0.553
Cs	0.00240	0.00310	0.00349	(0.00362)	(0.00374)	(0.00433)	(0.00446)	(0.00559)	(0.00572)
Cu	0.00299	0.00864	0.0174	0.0256	0.0295	0.0552	0.0589	0.0848	0.0869
DIC	0.000172	0.000605	0.00123	0.00159	0.00174	(0.00190)	(0.00229)	(0.0183)	(0.0210)
DOC	0.00204	0.00363	0.00571	0.00796	0.00997	0.0231	0.0257	0.0686	0.0720
Fe	(0.000204)	(0.000510)	(0.00102)	(0.00153)	(0.00205)	(0.00443)	(0.00498)	(0.00960)	(0.0101)
K	5.79	6.93	7.98	8.82	9.60	13.2	14.0	17.8	18.1
Li	4.28	5.08	5.76	6.23	6.61	7.87	8.08	9.26	9.34
Mg	0.00326	0.0121	0.0213	0.0272	0.0397	0.0754	0.135	0.200	0.205
Mn	(3.46E-05)	(8.67E-05)	(0.000174)	(0.000261)	(0.000348)	(0.000754)	(0.000846)	(0.0188)	(0.0206)
Mo	0.204	0.301	0.446	0.567	0.671	1.09	1.18	22.9	23.3

Cumulative Release in mg/kg

Fraction	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Σ L/S-dry	*0.204*	*0.510*	*1.02*	*1.53*	*2.05*	*4.43*	*4.98*	*9.60*	*10.1*
pH	*12.5*	*12.5*	*12.3*	*12.2*	*12.4*	*12.2*	*12.0*	*11.8*	*11.5*
Na	22.6	37.1	50.6	59.7	66.5	84.2	86.2	91.1	91.4
Ni	0.00574	0.0150	0.0299	0.0437	0.0564	0.118	0.128	0.150	0.151
P	0.00163	(0.00219)	(0.00833)	(0.0117)	(0.0126)	(0.0170)	(0.0180)	(0.0266)	(0.0275)
Pb	0.000312	0.00289	0.0107	0.0166	0.0210	0.0332	0.0351	(0.0356)	(0.0356)
Re	0.0257	0.0392	0.0405	0.0410	0.0414	0.0425	0.0427	(0.0433)	(0.0433)
S	0.105	0.147	0.209	0.252	0.291	17.0	20.4	36.4	41.0
Sb	8.06E-05	0.000385	0.00114	0.00204	0.00294	0.00950	0.0120	0.0961	0.116
Se	0.113	0.309	0.609	0.731	1.16	2.31	2.62	4.24	4.43
Si	0.138	0.225	0.361	0.515	0.637	1.27	1.45	9.08	10.9
Sn	(7.13E-05)	(0.000179)	(0.000358)	(0.000537)	(0.000716)	(0.00155)	(0.00174)	(0.00336)	(0.00354)
Sr	15.6	20.3	22.8	24.7	26.3	31.7	32.6	37.9	38.4
Ti	(0.000204)	(0.000510)	(0.00102)	(0.00153)	(0.00205)	(0.00443)	(0.00498)	(0.00960)	(0.0101)
Tl	(5.19E-05)	(0.000130)	(0.000261)	(0.000391)	(0.000522)	(0.00113)	(0.00127)	(0.00245)	(0.00258)
U	(3.05E-05)	(7.65E-05)	(0.000154)	(0.000230)	(0.000307)	(0.000665)	(0.000747)	(0.00144)	(0.00152)
V	0.0193	0.0511	0.103	0.151	0.196	0.393	0.434	1.43	1.79
Zn	0.00542	0.00846	0.0110	0.0131	(0.0134)	(0.107)	(0.107)	(0.146)	(0.146)

Assessment

	Concentration (mg/L)			*Cumulative Release*
	max	*at pH*	*at Σ L/S-dry*	*at Σ L/S=10.1 (mg/kg)*
Al	9.72	11.8	9.60	52.9
As	0.0178	11.5	10.1	(0.0263)
B	20.7	12.0	4.98	157
Ba	396	12.5	0.204	402
Be	(0.000320)	11.5	10.1	(0.00324)
Ca	998	12.5	0.510	5447
Cd	0.00351	11.8	9.60	(0.0167)
Co	0.0200	12.5	0.204	(0.0343)
Cr	0.314	11.5	10.1	0.553
Cs	0.0118	12.5	0.204	(0.00572)
Cu	0.0185	12.5	0.510	0.0869
DIC	0.00511	11.5	10.1	(0.0210)
DOC	0.0100	12.5	0.204	0.0720
Fe	(0.00100)	11.5	10.1	(0.0101)
K	28.4	12.5	0.204	18.1
Li	21.0	12.5	0.204	9.34
Mg	0.109	12.0	4.98	0.205
Mn	0.00388	11.8	9.60	(0.0206)
Mo	4.70	11.8	9.60	23.3

Assessment

	Concentration (mg/L)			*Cumulative Release*
	max	*at pH*	*at Σ L/S-dry*	*at Σ L/S=10.1 (mg/kg)*
Na	111	12.5	0.204	91.4
Ni	0.0303	12.5	0.510	0.151
P	0.0120	12.3	1.02	(0.0275)
Pb	0.0152	12.3	1.02	(0.0356)
Re	0.126	12.5	0.204	(0.0433)
S	9.16	11.5	10.1	41.0
Sb	0.0385	11.5	10.1	0.116
Se	0.830	12.4	2.05	4.43
Si	3.64	11.5	10.1	10.9
Sn	(0.000350)	11.5	10.1	(0.00354)
Sr	76.6	12.5	0.204	38.4
Ti	(0.00100)	11.5	10.1	(0.0101)
Tl	(0.000255)	11.5	10.1	(0.00258)
U	(0.000150)	11.5	10.1	(0.00152)
V	0.708	11.5	10.1	1.79
Zn	0.0392	12.2	4.43	(0.146)

Analysis report according to EPA Method 1316

Created by LeachXS™, version 2.0.92 (18-Oct-2016)
Report created on 25-Jan-2017 3:01 PM

Material Information

Sample ID	CaFA (B,1,1)
Sample Name	CaFA
Sample Replicate	A
Test Replicate	A
Category	Coal Combustion
Subcategory	Fly Ash
Full Name	CaFA
Description	Coal combustion fly ash from Facility Ca
Origin	EPA Report 3
Sample Database	C:\Users\User\Documents\LeachXS User Objects\DATABASES\LEAF Guide (16-Dec-2016).mdb

Test Parameters

Start Date	28-Apr-10	
End Date	29-Apr-10	
Particle Size	0.3	*mm*
Contact Interval	24.0	*h*
Solids Content	100	*%*
Temperature	25.0	*°C*

Legend

pH	Acidity
E(h)	Redox potential
K(25°C)	Conductivity at 25 °C
L/S-dry	Liquid-to-solid ratio, in L/kg
M	Mass, as tested
V	Volume of eluant
Total V	Total liquid volume
N/A	Not analyzed or measured
N/C	Not calculated

Concentrations below the method detection limit (MDL) are reported between parentheses as half of the MDL.

Fraction Information

Fraction	*L/S-dry*	*pH*	*E(h)*	*K(25°C)*	*M*	*V*	*Total V*
	L/kg		*mV*	*mS/cm*	*g*	*mL*	*mL*
4	1.00	12.1	-299	23.4	100	100	100
3	2.00	12.0	-297	20.1	50.0	100	100
2	5.00	11.8	-286	12.7	40.0	200	200
1	10.0	12.0	-296	7.54	40.0	400	400

Concentration in mg/L

Fraction	*4*	*3*	*2*	*1*
L/S-dry	*1.00*	*2.00*	*5.00*	*10.0*
pH	*12.1*	*12.0*	*11.8*	*12.0*
Al	0.367	0.381	0.223	3.01
As	0.0158	0.0206	0.0307	0.0337
B	66.0	52.6	30.7	17.6
Ba	4.95	4.73	3.91	2.73
Be	0.00301	0.00301	0.00301	0.00301
Br^-	(0.160)	(0.160)	(0.160)	(0.160)
Ca	1115	1014	527	318
Cd	0.0162	0.0125	0.00535	0.00343
Cl^-	(2.07)	(2.07)	(2.07)	(2.07)
Co	0.00206	0.00206	0.00206	0.00206
CO_3^{2-}	0.314	0.305	0.355	0.481
Cr	2.32	1.66	0.751	0.626
Cs	0.00477	0.00477	0.00477	0.00477
Cu	0.00895	0.00999	0.00350	0.00350
DIC	3.93	1.67	6.19	N/A
DOC	10.5	0.540	5.52	N/A
Fe	(0.00145)	(0.00145)	(0.00145)	(0.00145)
F^-	(0.000500)	(0.000500)	(0.000500)	(0.000500)
Hg	9.00E-06	(3.00E-06)	(3.00E-06)	(3.00E-06)
K	10.4	5.63	2.65	2.02
Mg	0.990	(0.000500)	(0.000500)	(0.000500)
Mn	0.00413	0.00403	0.00171	0.00483
Mo	10.9	7.42	3.52	1.99

Concentration in mg/L

Fraction	*4*	*3*	*2*	*1*
L/S-dry	*1.00*	*2.00*	*5.00*	*10.0*
pH	*12.1*	*12.0*	*11.8*	*12.0*
Na	33.7	19.0	8.63	4.73
Ni	0.0654	0.0679	0.0343	0.0157
NO_2^-	(0.000500)	(0.000500)	(0.000500)	(0.000500)
NO_3^-	26.1	22.0	10.7	3.32
Pb	0.0353	0.0259	0.00795	0.00256
PO_4^{3-}	(1.04)	(1.04)	(1.04)	(1.04)
Re	0.0259	0.0159	0.00459	0.00459
Sb	0.00278	0.00278	0.00278	0.00278
Se	0.224	0.261	0.318	0.339
Si	16.3	0.538	2.77	3.38
Sn	0.00349	0.00349	0.00349	0.00349
SO_4^{2-}	258	268	210	115
Sr	13.8	8.30	3.65	1.79
Ti	(0.000500)	(0.000500)	(0.000500)	(0.000500)
Tl	0.00253	0.00253	0.00253	0.00253
U	0.00133	0.00133	0.00133	0.00133
V	0.0583	0.0704	0.157	0.363
Zn	0.0805	0.0654	0.0338	0.0360

Method Detection Limit in mg/L

Fraction	*4*	*3*	*2*	*1*
L/S-dry	*1.00*	*2.00*	*5.00*	*10.0*
pH	*12.1*	*12.0*	*11.8*	*12.0*
Al	0.00100	0.00100	0.00100	0.00100
As	0.000640	0.000640	0.000640	0.000640
B	0.00100	0.00100	0.00100	0.00100
Ba	0.000570	0.000570	0.000570	0.000570
Be	0.000640	0.000640	0.000640	0.000640
Br^-	0.320	0.320	0.320	0.320
Ca	0.00350	0.00350	0.00350	0.00350
Cd	0.000170	0.000170	0.000170	0.000170
Cl^-	4.13	4.13	4.13	4.13
Co	0.000410	0.000410	0.000410	0.000410
CO_3^{2-}	0.00100	0.00100	0.00100	0.00100
Cr	0.000500	0.000500	0.000500	0.000500
Cs	0.00100	0.00100	0.00100	0.00100
Cu	0.000700	0.000700	0.000700	0.000700
DIC	0.0700	0.0700	0.0700	N/A
DOC	0.0900	0.0900	0.0900	N/A
Fe	0.00290	0.00290	0.00290	0.00290
F^-	0.00100	0.00100	0.00100	0.00100
Hg	6.00E-06	6.00E-06	6.00E-06	6.00E-06
K	0.00150	0.00150	0.00150	0.00150
Mg	0.00100	0.00100	0.00100	0.00100
Mn	0.000340	0.000340	0.000340	0.000340
Mo	0.000760	0.000760	0.000760	0.000760

Method Detection Limit in mg/L

Fraction	*4*	*3*	*2*	*1*
L/S-dry	*1.00*	*2.00*	*5.00*	*10.0*
pH	*12.1*	*12.0*	*11.8*	*12.0*
Na	0.00350	0.00350	0.00350	0.00350
Ni	0.000730	0.000730	0.000730	0.000730
NO_2^-	0.00100	0.00100	0.00100	0.00100
NO_3^-	0.475	0.475	0.475	0.475
Pb	0.000230	0.000230	0.000230	0.000230
PO_4^{3-}	2.08	2.08	2.08	2.08
Re	0.000240	0.000240	0.000240	0.000240
Sb	8.00E-05	8.00E-05	8.00E-05	8.00E-05
Se	0.000520	0.000520	0.000520	0.000520
Si	0.00280	0.00280	0.00280	0.00280
Sn	0.000700	0.000700	0.000700	0.000700
SO_4^{2-}	0.505	0.505	0.505	0.505
Sr	0.00100	0.00100	0.00100	0.00100
Ti	0.00100	0.00100	0.00100	0.00100
Tl	0.000510	0.000510	0.000510	0.000510
U	0.000300	0.000300	0.000300	0.000300
V	0.000310	0.000310	0.000310	0.000310
Zn	0.000920	0.000920	0.000920	0.000920

Release in mg/kg

Fraction	*4*	*3*	*2*	*1*
L/S-dry	*1.00*	*2.00*	*5.00*	*10.0*
pH	*12.1*	*12.0*	*11.8*	*12.0*
Al	0.367	0.763	1.11	30.1
As	0.0158	0.0413	0.153	0.337
B	66.0	105	153	176
Ba	4.95	9.46	19.5	27.3
Be	0.00301	0.00602	0.0151	0.0301
Br^-	0.160	0.320	0.800	1.60
Ca	1115	2028	2636	3178
Cd	0.0162	0.0250	0.0267	0.0343
Cl^-	2.07	4.13	10.3	20.7
Co	0.00206	0.00412	0.0103	0.0206
CO_3^{2-}	0.314	0.610	1.78	4.81
Cr	2.32	3.32	3.76	6.26
Cs	0.00477	0.00954	0.0238	0.0477
Cu	0.00895	0.0200	0.0175	0.0350
DIC	3.93	3.34	30.9	N/C
DOC	10.5	1.08	27.6	N/C
Fe	0.00145	0.00290	0.00725	0.0145
F^-	0.000500	0.00100	0.00250	0.00500
Hg	9.00E-06	6.00E-06	1.50E-05	3.00E-05
K	10.4	11.3	13.2	20.2
Mg	0.990	0.00100	0.00250	0.00500
Mn	0.00413	0.00807	0.00854	0.0483
Mo	10.9	14.8	17.6	19.9

Release in mg/kg

Fraction	*4*	*3*	*2*	*1*
L/S-dry	*1.00*	*2.00*	*5.00*	*10.0*
pH	*12.1*	*12.0*	*11.8*	*12.0*
Na	33.7	38.0	43.1	47.3
Ni	0.0654	0.136	0.172	0.157
NO_2^-	0.000500	0.00100	0.00250	0.00500
NO_3^-	26.1	43.9	53.5	33.2
Pb	0.0353	0.0519	0.0398	0.0256
PO_4^{3-}	1.04	2.08	5.20	10.4
Re	0.0259	0.0318	0.0230	0.0459
Sb	0.00278	0.00557	0.0139	0.0278
Se	0.224	0.522	1.59	3.39
Si	16.3	1.08	13.9	33.8
Sn	0.00349	0.00698	0.0175	0.0349
SO_4^{2-}	258	536	1052	1150
Sr	13.8	16.6	18.2	17.9
Ti	0.000500	0.00100	0.00250	0.00500
Tl	0.00253	0.00506	0.0127	0.0253
U	0.00133	0.00266	0.00664	0.0133
V	0.0583	0.141	0.783	3.63
Zn	0.0805	0.131	0.169	0.360

Assessment

	Reporting Limit (mg/L)		*Concentration (mg/L)*				*Release (mg/kg)*			
	min	*max*	*min*	*max*	*max at L/S*	*max at pH*	*min*	*max*	*max at L/S*	*max at pH*
Al	1.00	1.00	223	3013	10.0	12.0	367	3.01E+04	10.0	12.0
As	0.640	0.640	15.8	33.7	10.0	12.0	15.8	337	10.0	12.0
B	1.00	1.00	1.76E+04	6.60E+04	1.00	12.1	6.60E+04	1.76E+05	10.0	12.0
Ba	0.570	0.570	2732	4947	1.00	12.1	4947	2.73E+04	10.0	12.0
Be	0.640	0.640	3.01	3.01	10.0	12.0	3.01	30.1	10.0	12.0
Br^-	320	320	(160)	(160)	10.0	12.0	(160)	(1600)	10.0	12.0
Ca	3.50	3.50	3.18E+05	1.11E+06	1.00	12.1	1.11E+06	3.18E+06	10.0	12.0
Cd	0.170	0.170	3.43	16.2	1.00	12.1	16.2	34.3	10.0	12.0
Cl^-	4130	4130	(2065)	(2065)	10.0	12.0	(2065)	(2.07E+04)	10.0	12.0
Co	0.410	0.410	2.06	2.06	10.0	12.0	2.06	20.6	10.0	12.0
CO_3^{2-}	1.00	1.00	305	481	10.0	12.0	314	4807	10.0	12.0
Cr	0.500	0.500	626	2323	1.00	12.1	2323	6256	10.0	12.0
Cs	1.00	1.00	4.77	4.77	10.0	12.0	4.77	47.7	10.0	12.0
Cu	0.700	0.700	3.50	9.99	2.00	12.0	8.95	35.0	10.0	12.0
DIC	70.0	70.0	1672	6187	5.00	11.8	3344	3.09E+04	5.00	11.8
DOC	90.0	90.0	540	1.05E+04	1.00	12.1	1080	2.76E+04	5.00	11.8
Fe	2.90	2.90	(1.45)	(1.45)	10.0	12.0	(1.45)	(14.5)	10.0	12.0
F^-	1.00	1.00	(0.500)	(0.500)	10.0	12.0	(0.500)	(5.00)	10.0	12.0
Hg	0.00600	0.00600	(0.00300)	0.00900	1.00	12.1	(0.00600)	(0.0300)	10.0	12.0
K	1.50	1.50	2024	1.04E+04	1.00	12.1	1.04E+04	2.02E+04	10.0	12.0
Mg	1.00	1.00	(0.500)	990	1.00	12.1	(1.00)	990	1.00	12.1
Mn	0.340	0.340	1.71	4.83	10.0	12.0	4.13	48.3	10.0	12.0
Mo	0.760	0.760	1985	1.09E+04	1.00	12.1	1.09E+04	1.99E+04	10.0	12.0

Assessment

	Reporting Limit (mg/L)		*Concentration (mg/L)*				*Release (mg/kg)*			
	min	*max*	*min*	*max*	*max at L/S*	*max at pH*	*min*	*max*	*max at L/S*	*max at pH*
Na	3.50	3.50	4727	3.37E+04	1.00	12.1	3.37E+04	4.73E+04	10.0	12.0
Ni	0.730	0.730	15.7	67.9	2.00	12.0	65.4	172	5.00	11.8
NO_2^-	1.00	1.00	(0.500)	(0.500)	10.0	12.0	(0.500)	(5.00)	10.0	12.0
NO_3^-	475	475	3321	2.61E+04	1.00	12.1	2.61E+04	5.35E+04	5.00	11.8
Pb	0.230	0.230	2.56	35.3	1.00	12.1	25.6	51.9	2.00	12.0
PO_4^{3-}	2080	2080	(1040)	(1040)	10.0	12.0	(1040)	(1.04E+04)	10.0	12.0
Re	0.240	0.240	4.59	25.9	1.00	12.1	23.0	45.9	10.0	12.0
Sb	0.0800	0.0800	2.78	2.78	10.0	12.0	2.78	27.8	10.0	12.0
Se	0.520	0.520	224	339	10.0	12.0	224	3386	10.0	12.0
Si	2.80	2.80	538	1.63E+04	1.00	12.1	1077	3.38E+04	10.0	12.0
Sn	0.700	0.700	3.49	3.49	10.0	12.0	3.49	34.9	10.0	12.0
SO_4^{2-}	505	505	1.15E+05	2.68E+05	2.00	12.0	2.58E+05	1.15E+06	10.0	12.0
Sr	1.00	1.00	1793	1.38E+04	1.00	12.1	1.38E+04	1.82E+04	5.00	11.8
Ti	1.00	1.00	(0.500)	(0.500)	10.0	12.0	(0.500)	(5.00)	10.0	12.0
Tl	0.510	0.510	2.53	2.53	10.0	12.0	2.53	25.3	10.0	12.0
U	0.300	0.300	1.33	1.33	10.0	12.0	1.33	13.3	10.0	12.0
V	0.310	0.310	58.3	363	10.0	12.0	58.3	3627	10.0	12.0
Zn	0.920	0.920	33.8	80.5	1.00	12.1	80.5	360	10.0	12.0