

# Field Documentation

1 Taylor Leahy + John Corbys  
 CDM SM HA  
 2 Friday, Sept 19 20:40 @ 1PM (1300)  
 3 Site: 108<sup>th</sup> + Buffalo (S)  
 - Sunny + Windy (27 km/hr)  
 4ADust Collection @ sidewalk  
 and hoses at 10822 + 10816  
 (SAMPLE DSTOIL) (completed @ 13:20)  
 (3 sidewalk panels)

4B) DSTO2 Sampled @ 10103 Buffalo  
 located @ 109<sup>th</sup> + Buffalo  
 completed @ 13:40 (25 sidewalk panels)

4C) Rebound  
~~10103 Buffalo Street~~  
~~10103 Buffalo Street~~  
 → Buffalo + 10<sup>th</sup> in front of  
 house left of 10052 Buffalo  
 (no address posted)  
 - extra windy (412 completed @ 1:10)  
 (3 sidewalk panels)  
 5) departed @ 14:15

Angela Leahy



2. Pet coke Dust Collection 8/19/14  
 1400 John Grabs & Taylor Leahy  
 1500 CDM Smith, back at office.  
 8/19/14 Several things to recap.  
 weather: see previous page  
 PPE: gloves only  
 Plan: to collect three dust samples

from horizontal impervious surfaces east of KCBX South.

The best surfaces found were sidewalk. Relatively smooth without significant pitting that was found in street.

Samples were collected at the locations noted on the previous page. Samples collected with new whisk brooms & dust pans purchased Home Depot on the way to site. Each sample was collected using new equipment.

CDM personnel were ready to collect last sample

ended 8/19/14

fri 8/19/14  
 Pet coke Dust Collection 8/19/14  
 (cont.) when resident came out and told us he had cut grass & leaf blowed sidewalk earlier. moved to other side of street. this location was partially obstructed by a tree, but there weren't any other decent locations in the area.  
 will now pack samples for shipment to U. of Col.

John Leahy



















Sprint 3G 1:12 PM 83%

10809 S Burley Ave, Chicago, IL

**CLEAR**

**72**  
and rising

**FEELS LIKE 72°**

HEAVY  
-----  
MED  
-----  
LIGHT


10 min 20 min 30 min 40 min 50 min

**Next hour: no precipitation**  
(Nearest precip: 163 mi to the northwest)


 **MAP**  **NOTIFY**

Sprint 3G 1:13 PM 82%

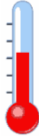
weatherbug.com


 **WeatherBug Mobile Web**

**Bruay-la-Buissiere, France** [Change](#)

**Local Weather**  **GO**

**Current Conditions**

 **Temp**  
**19.0°C**


 **14**  
km/h

**So Far Today**

Hi: 27°C	Avg Wind: NNE 0 km/h
Lo: 16°C	Gust: NW 27 km/h
Feels Like: 19°C	Rain: 0.00 mm
Pressure: 1010.84 mb/h	Humidity: 78%
Dew Point: 15°C	Sunrise: 7:28 AM
	Sunset: 7:53 PM

As reported at 1:13 PM on September 19, 2014 from Lille (Lesquin)  
[Change Weather Station](#)

---

**Friday**  **Hi: 26°C**

9/19/14

Scattered showers. Partly cloudy.  
Temperature of 26°C. Winds SW  
8km/h. Humidity will be 49% with a  
dewpoint of 15° and feels-like  
temperature of 26°C





















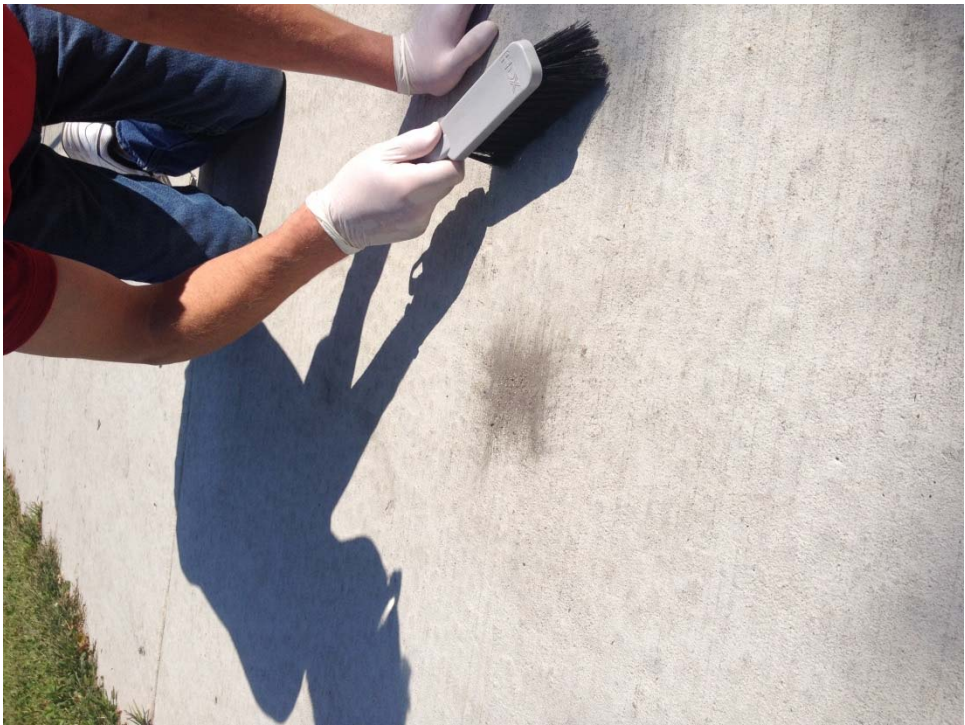














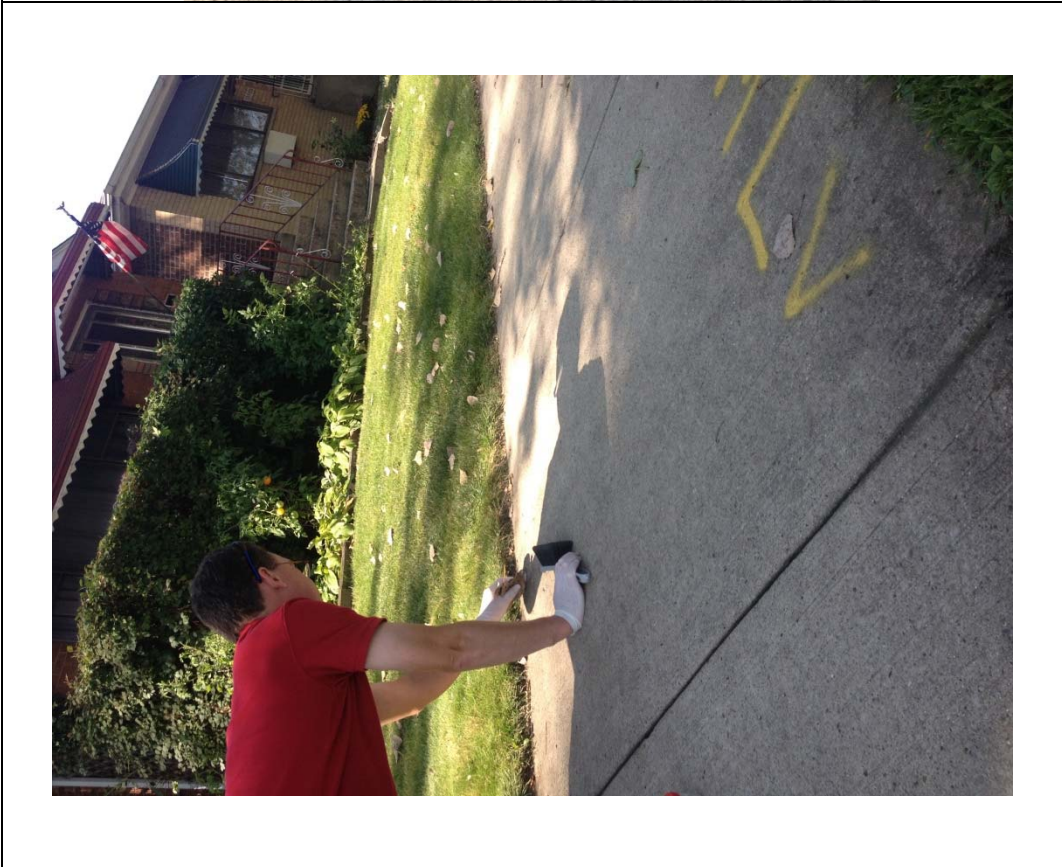














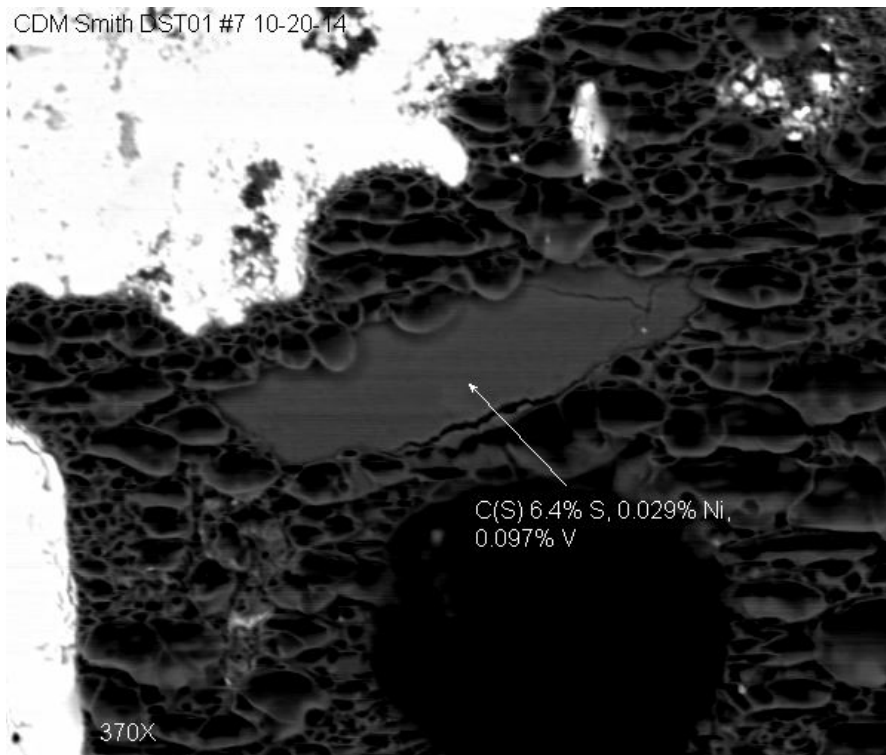






# EMP Photos

CDM Smith DST01 #7 10-20-14



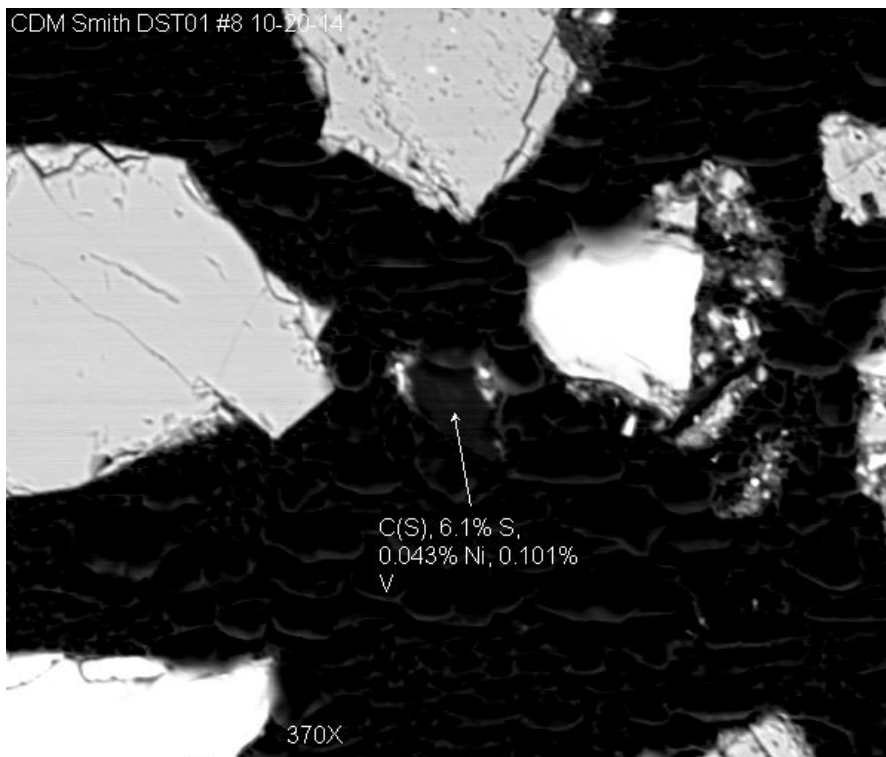
C(S) 6.4% S, 0.029% Ni,  
0.097% V

370X

50µm

BEI

CDM Smith DST01 #8 10-20-14



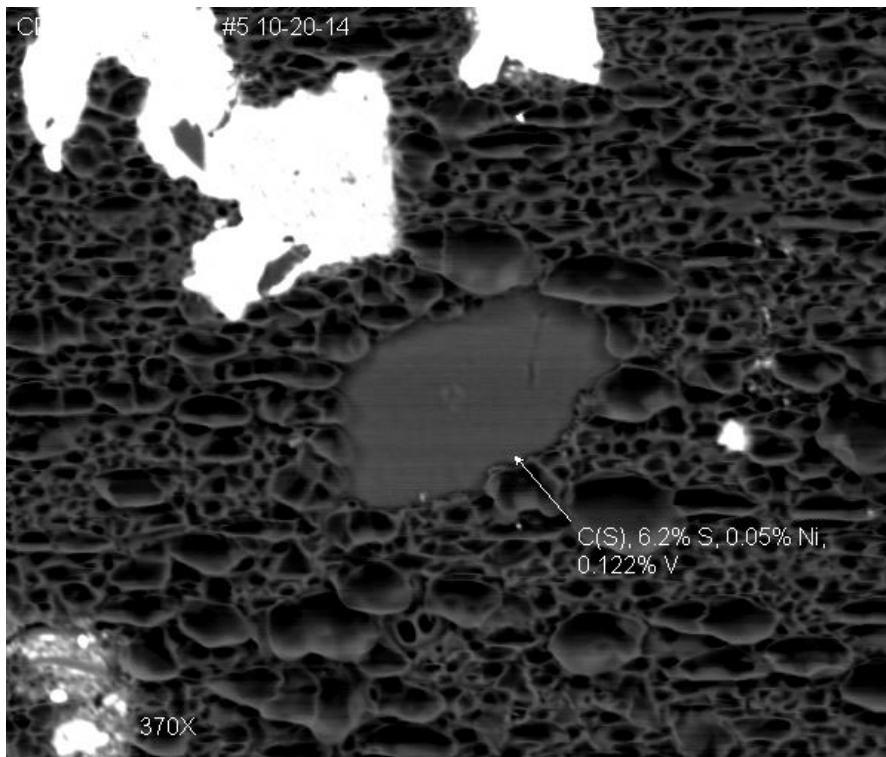
C(S), 6.1% S,  
0.043% Ni, 0.101%  
V

370X

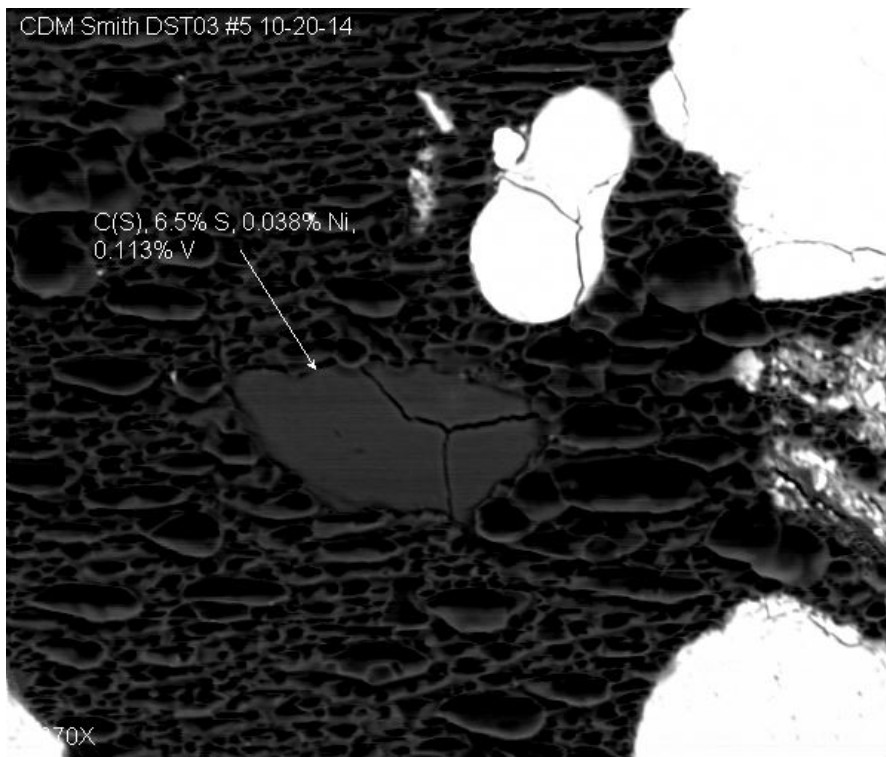
50µm

BEI

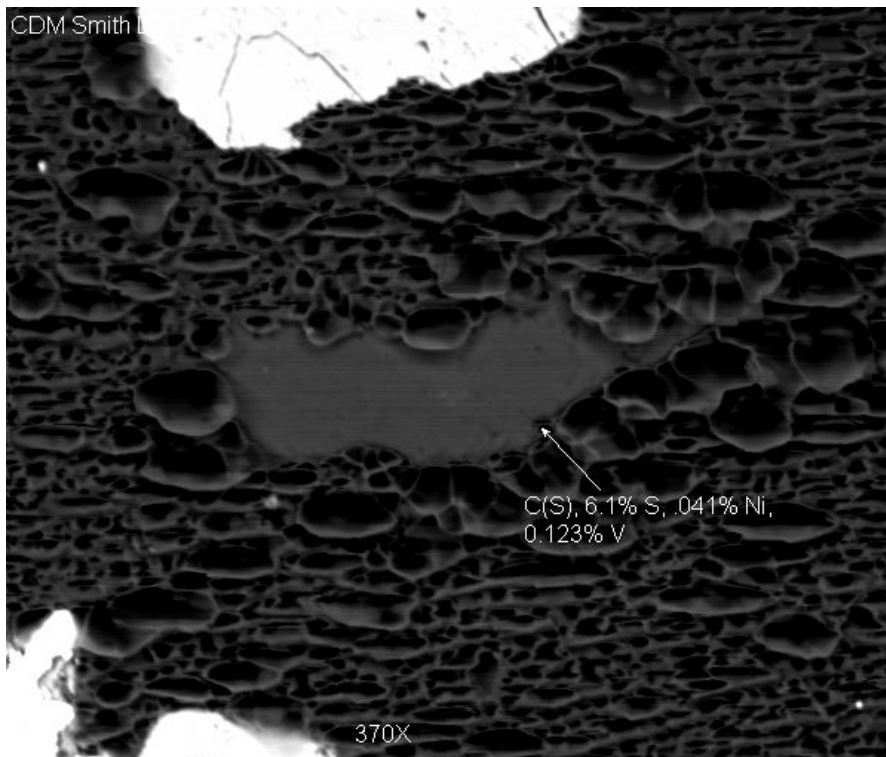




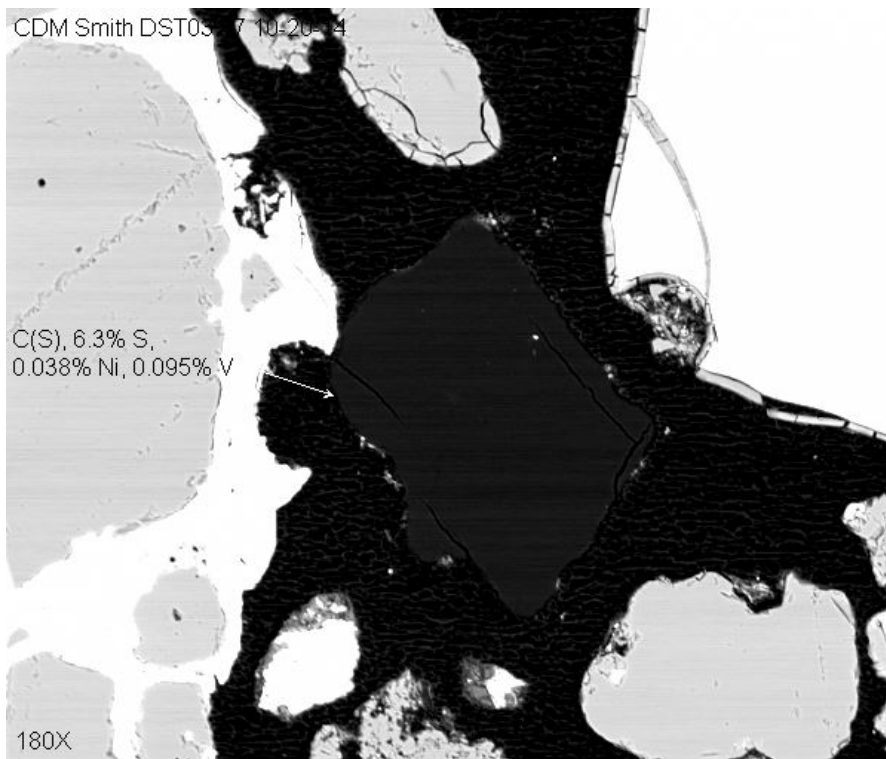
BEI



BEI

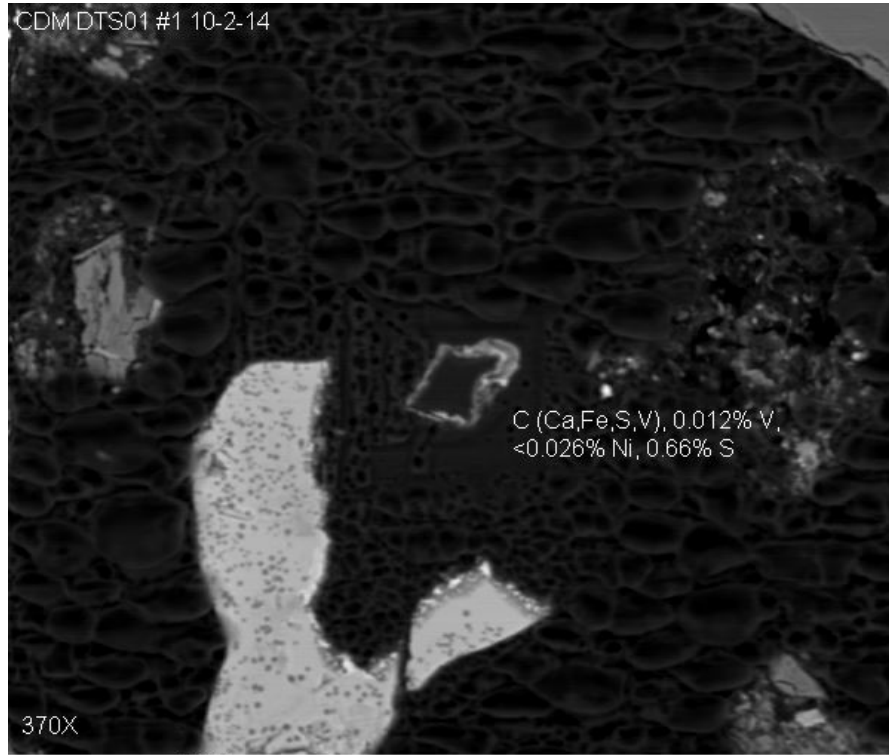


BEI

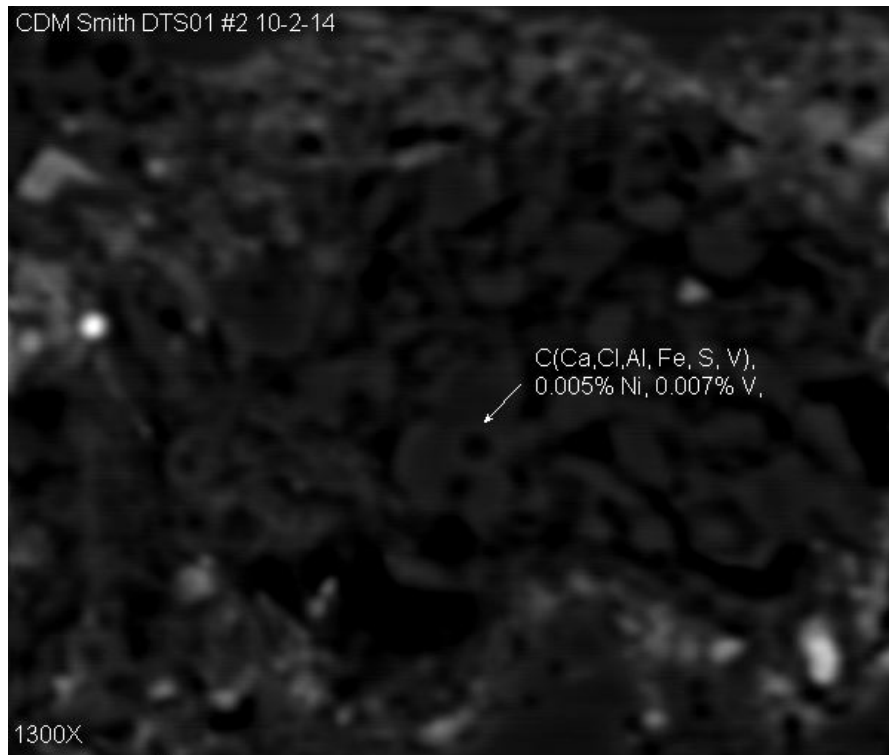


BEI



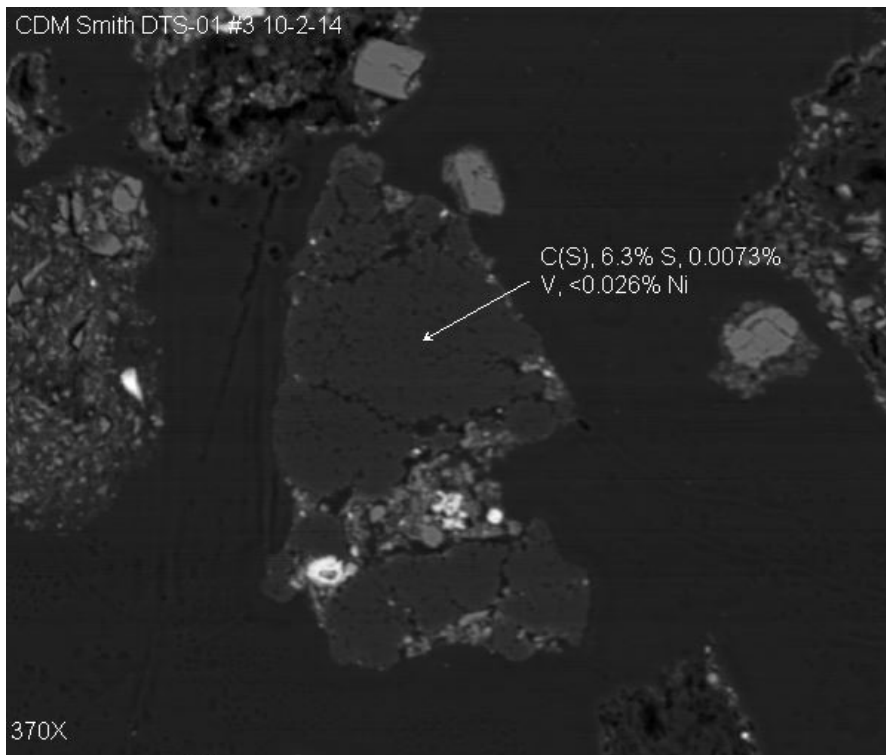


BEI



BEI

CDM Smith DTS-01 #3 10-2-14



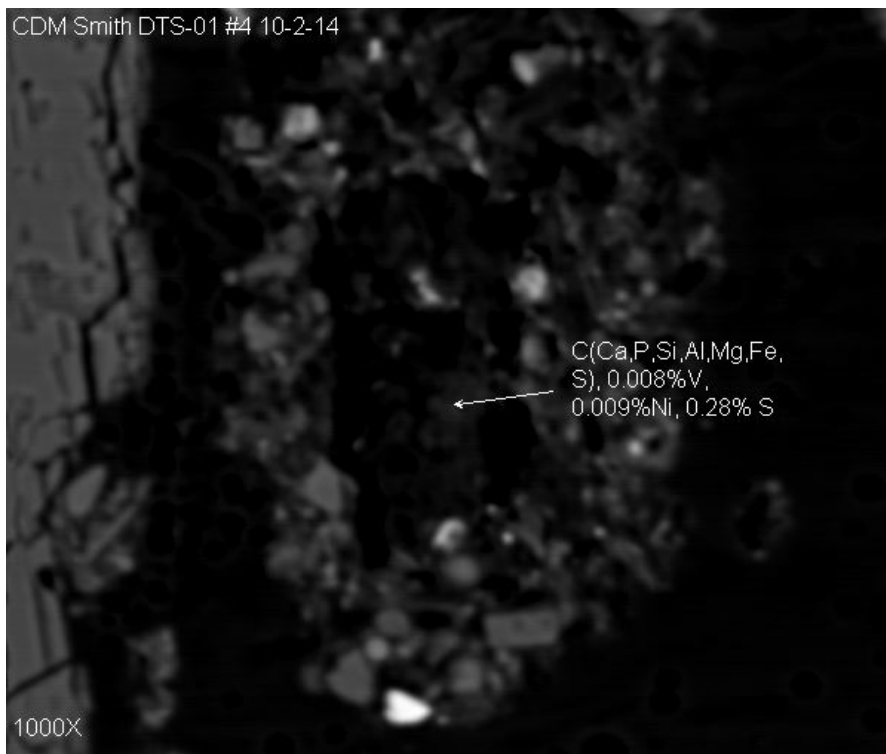
C(S), 6.3% S, 0.0073%  
V, <0.026% Ni

370X

50µm

BEI

CDM Smith DTS-01 #4 10-2-14



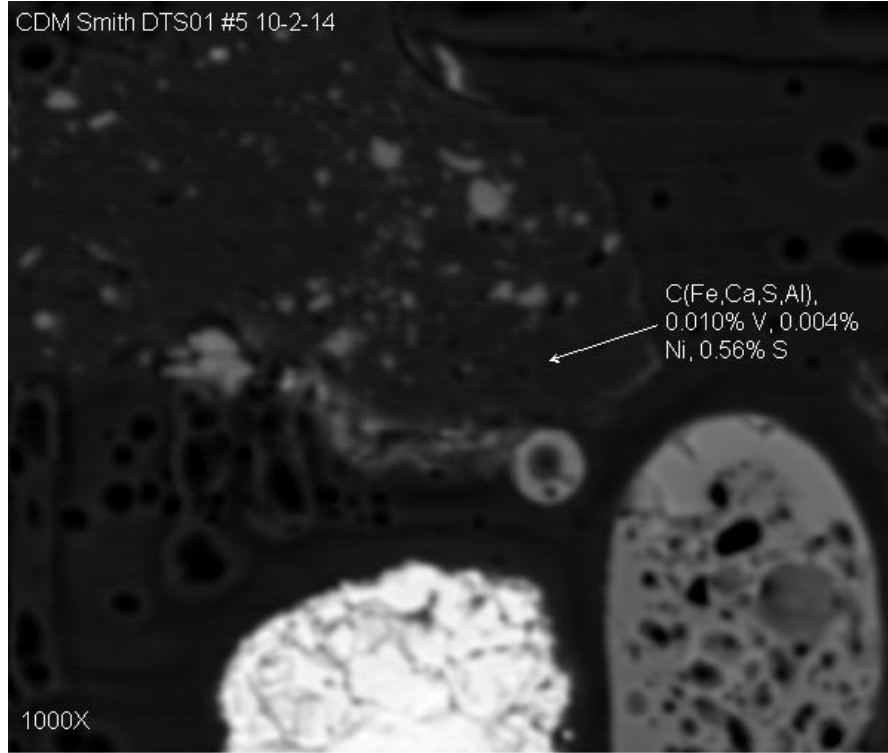
C(Ca,P,Si,Al,Mg,Fe,  
S), 0.008%V,  
0.009%Ni, 0.28% S

1000X

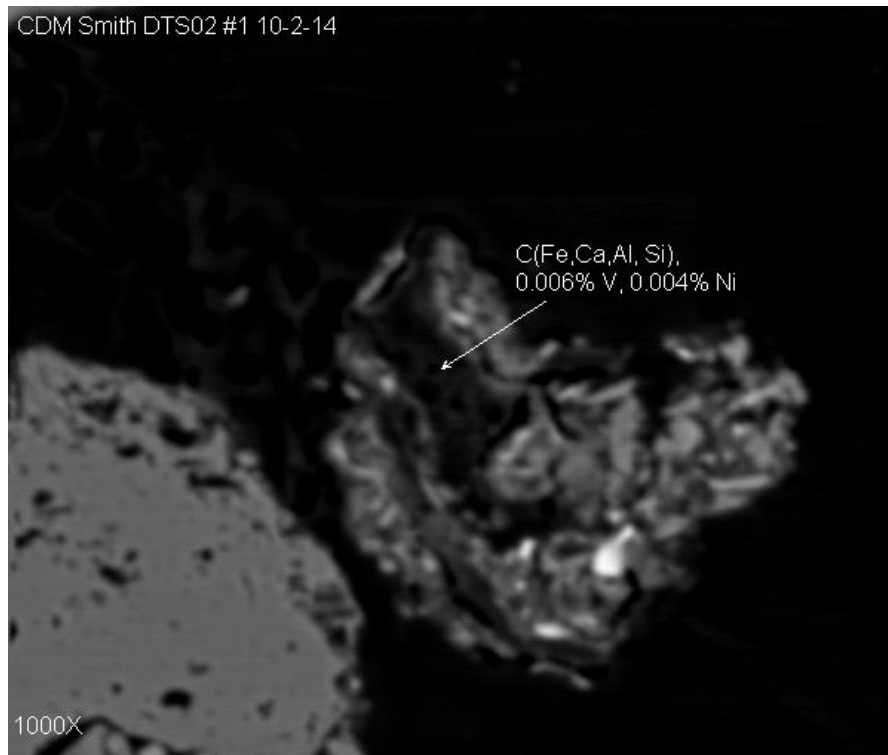
20µm

BEI

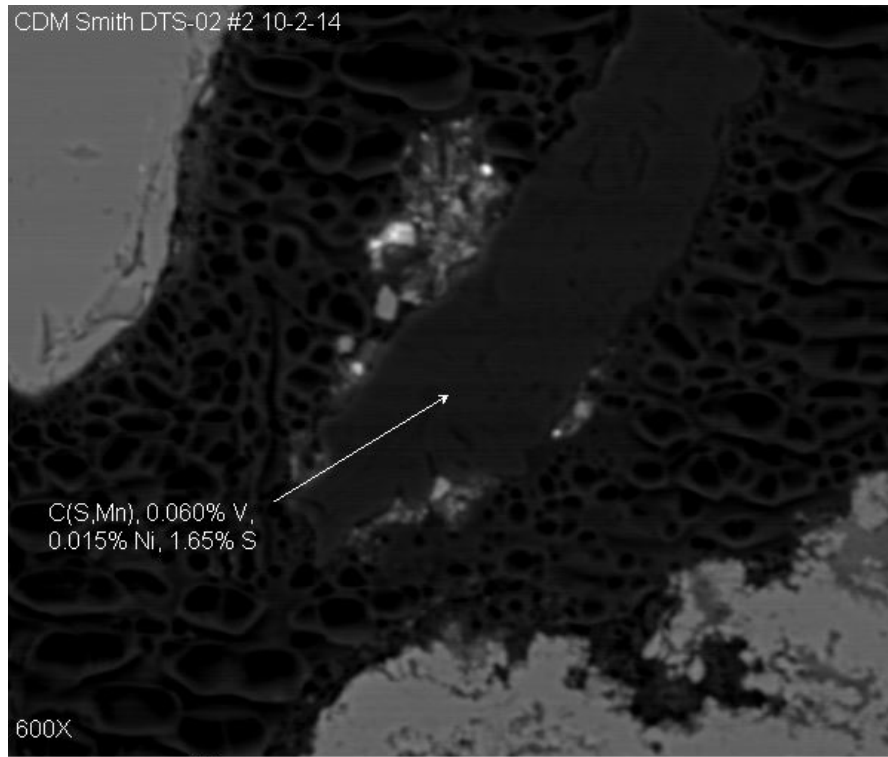




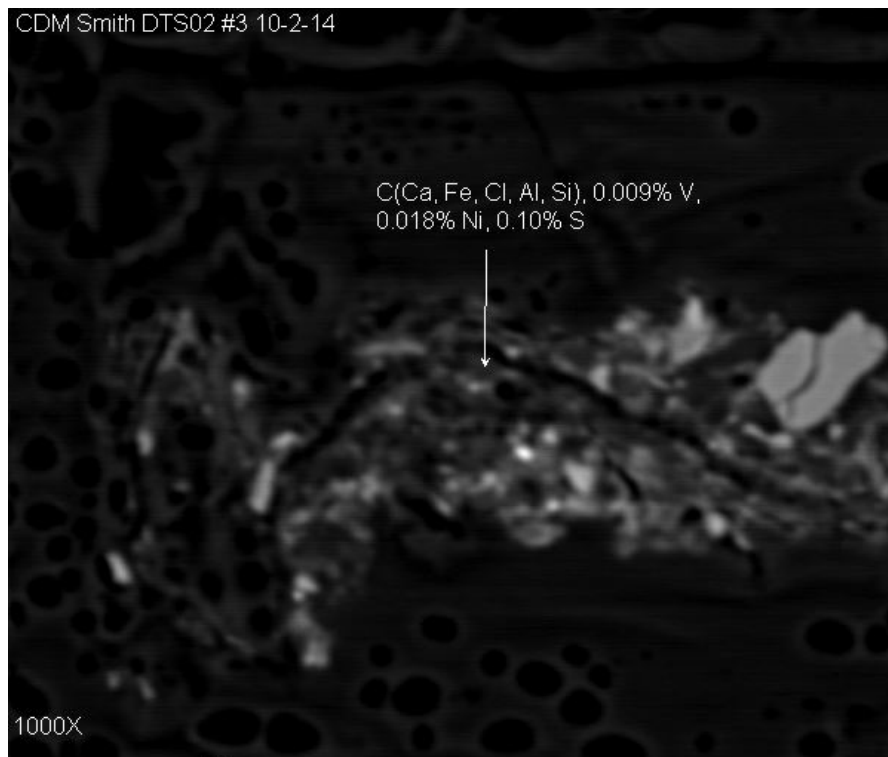
BEI



BEI

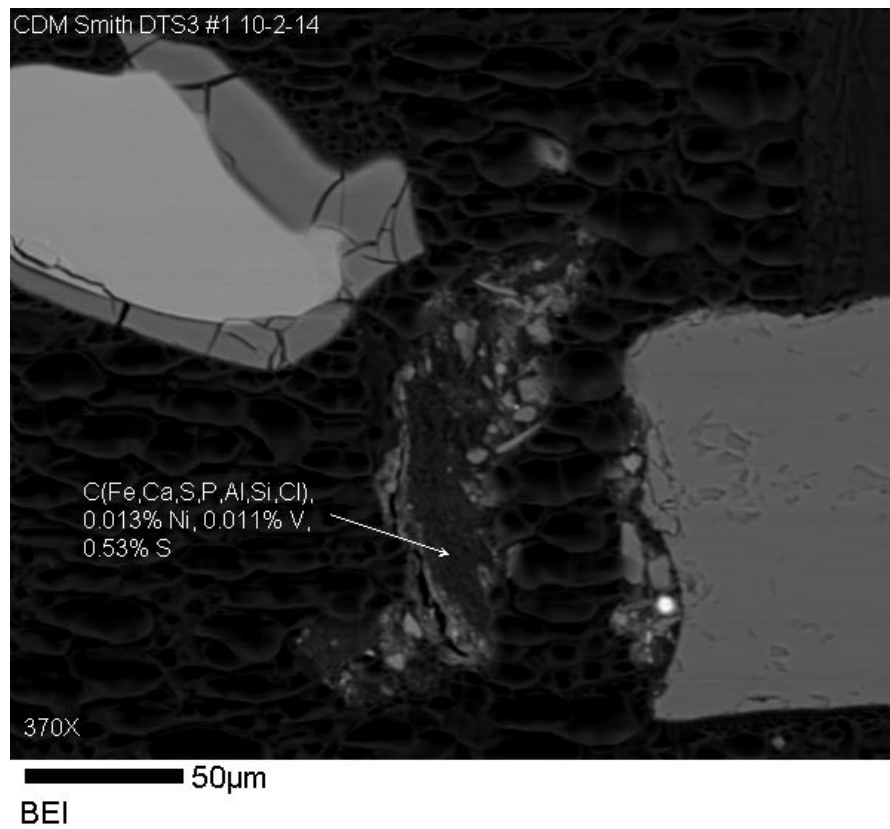
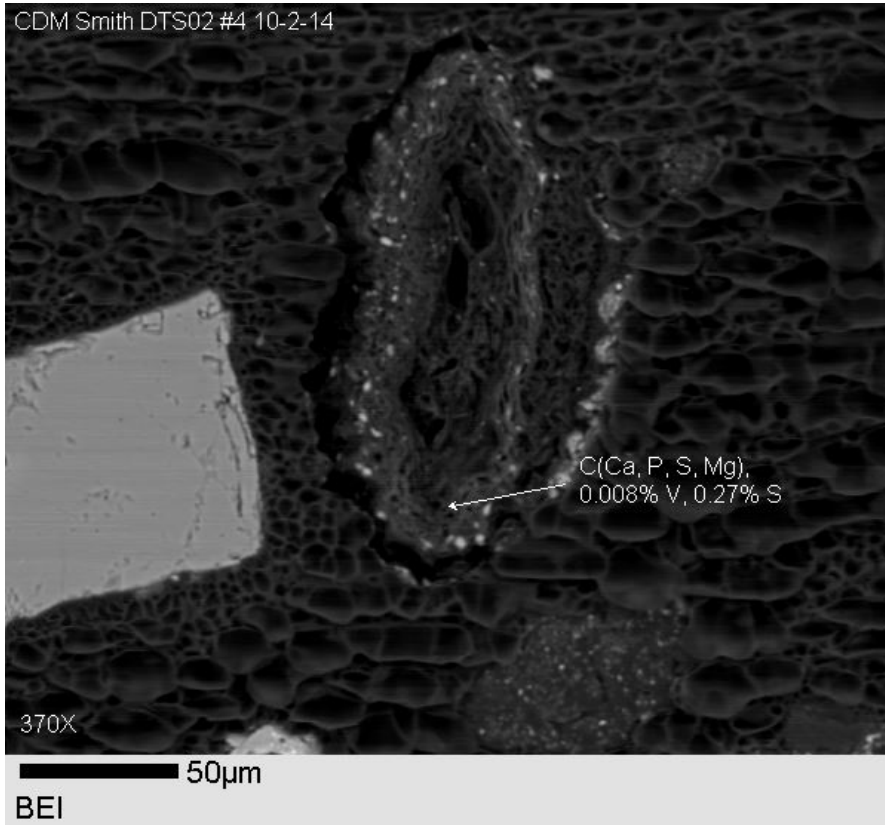


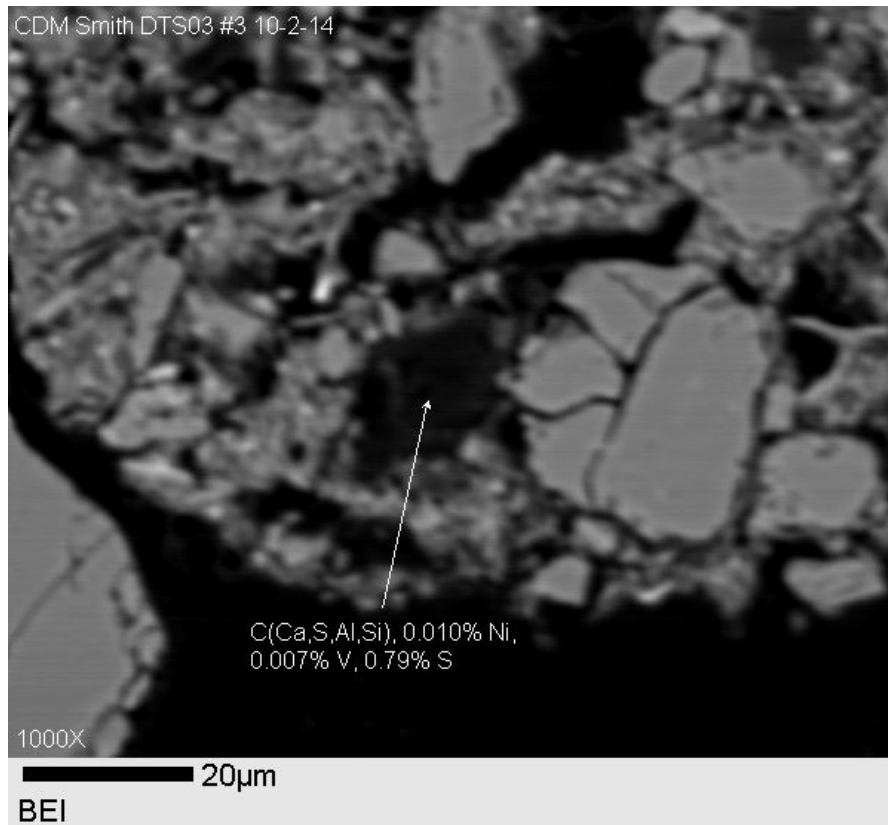
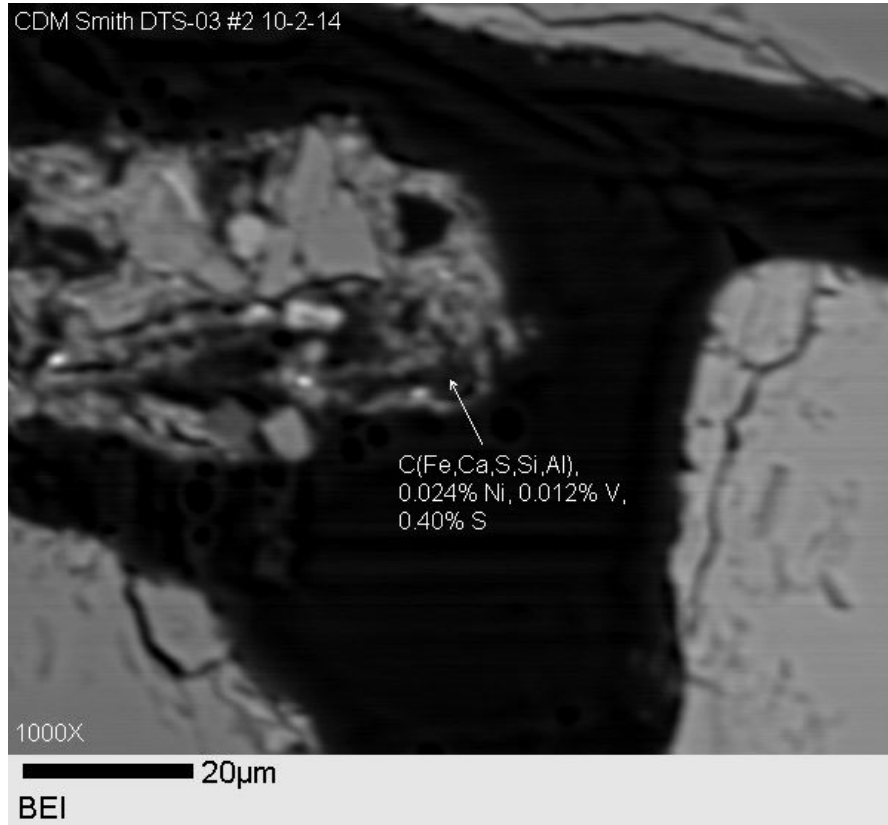
BEI



BEI

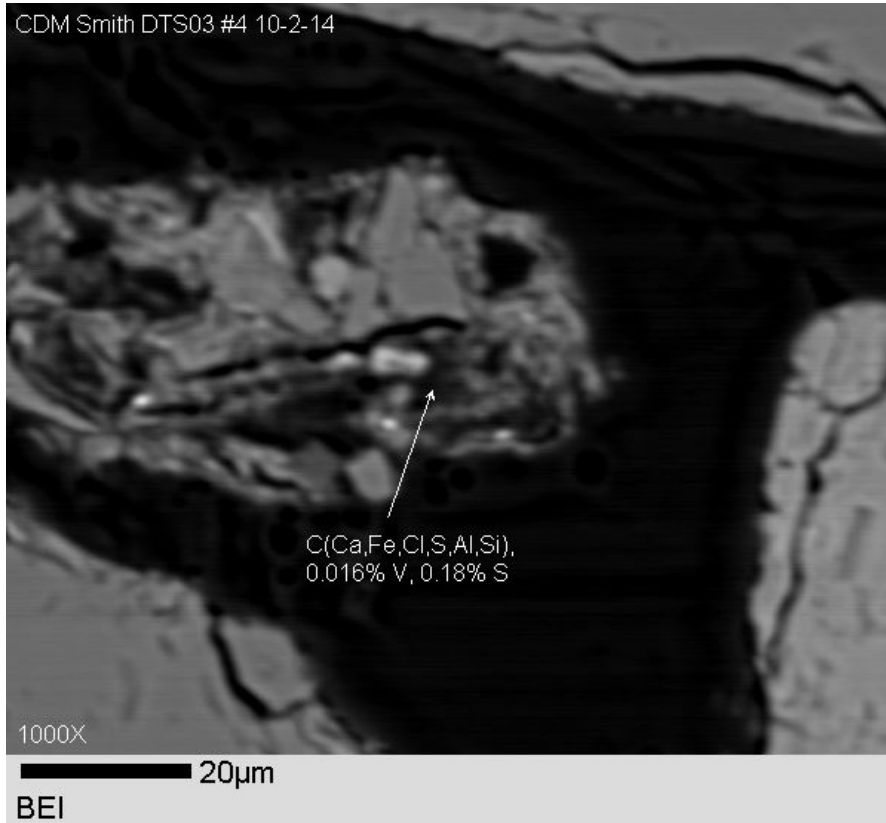






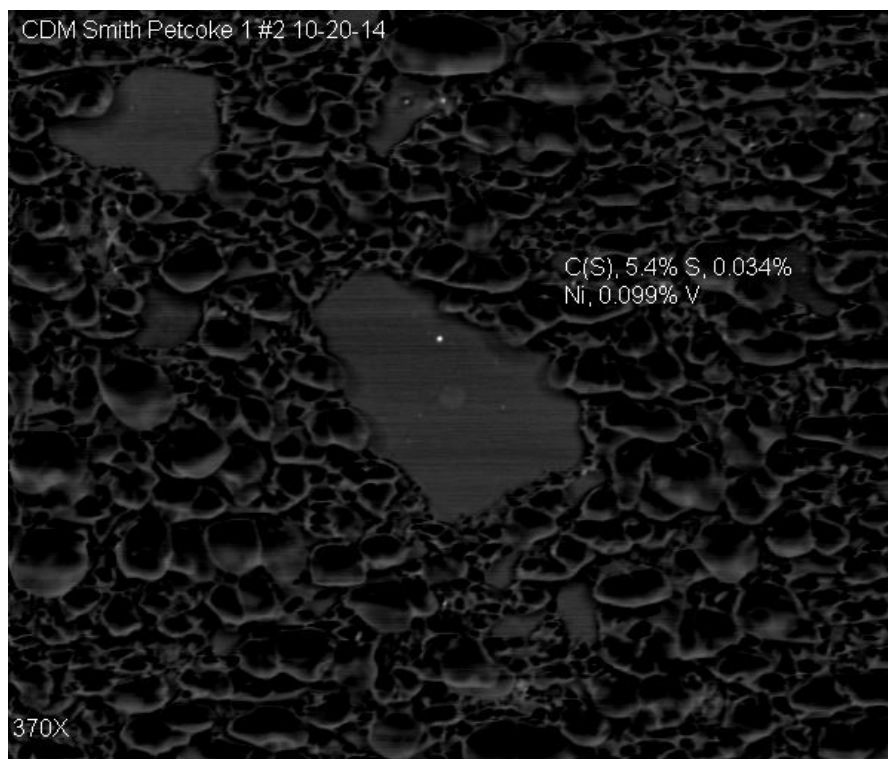
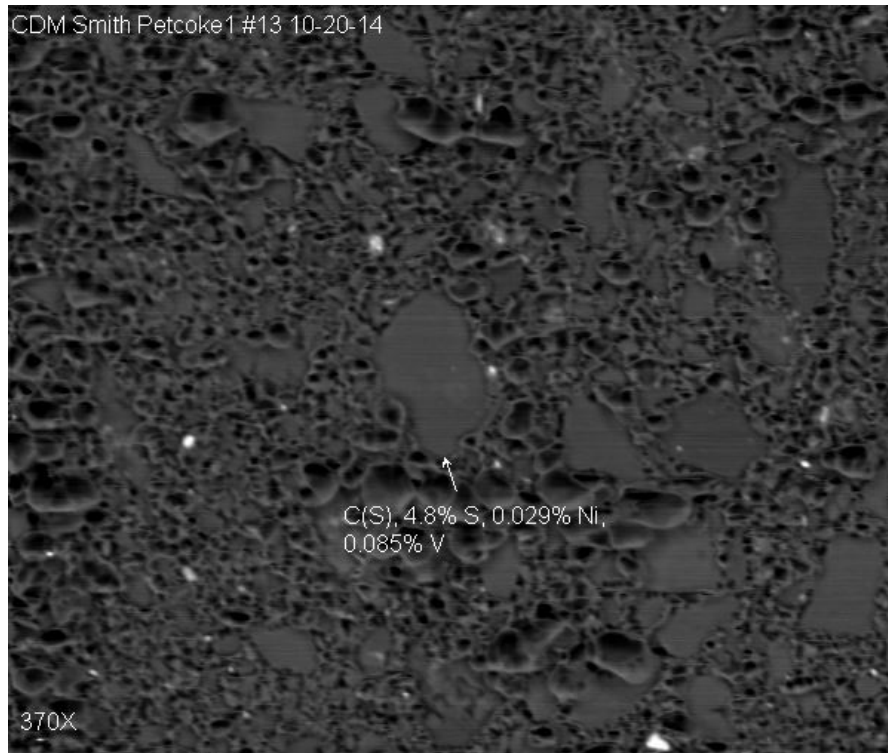


CDM Smith DTS03 #4 10-2-14



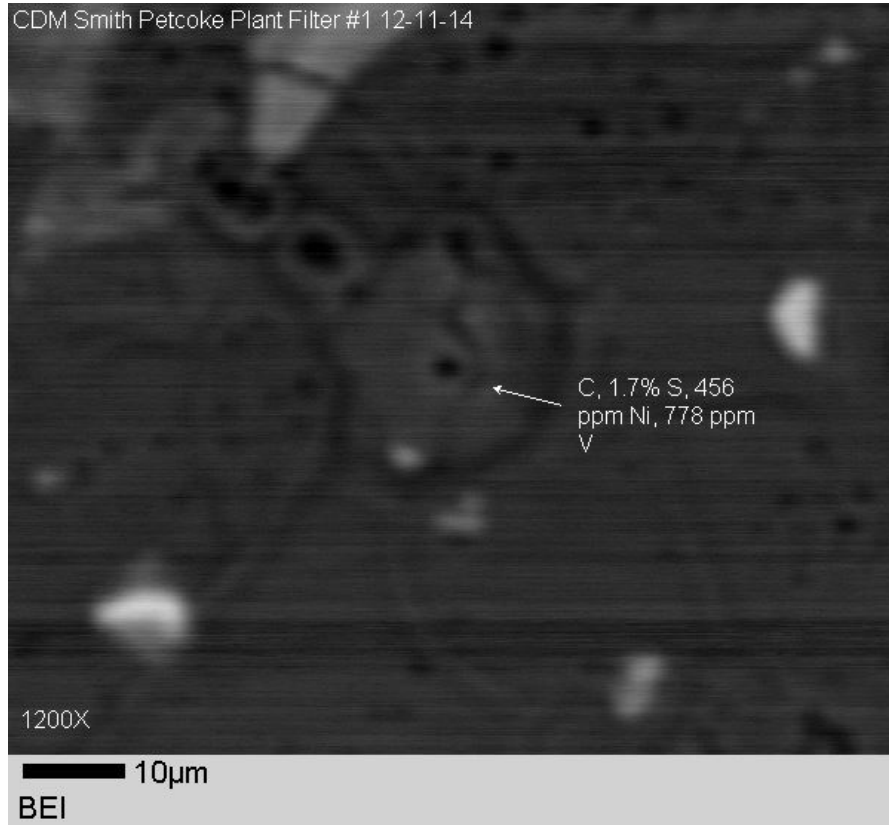
CDM Smith Petcoke1 #1 10-20-14



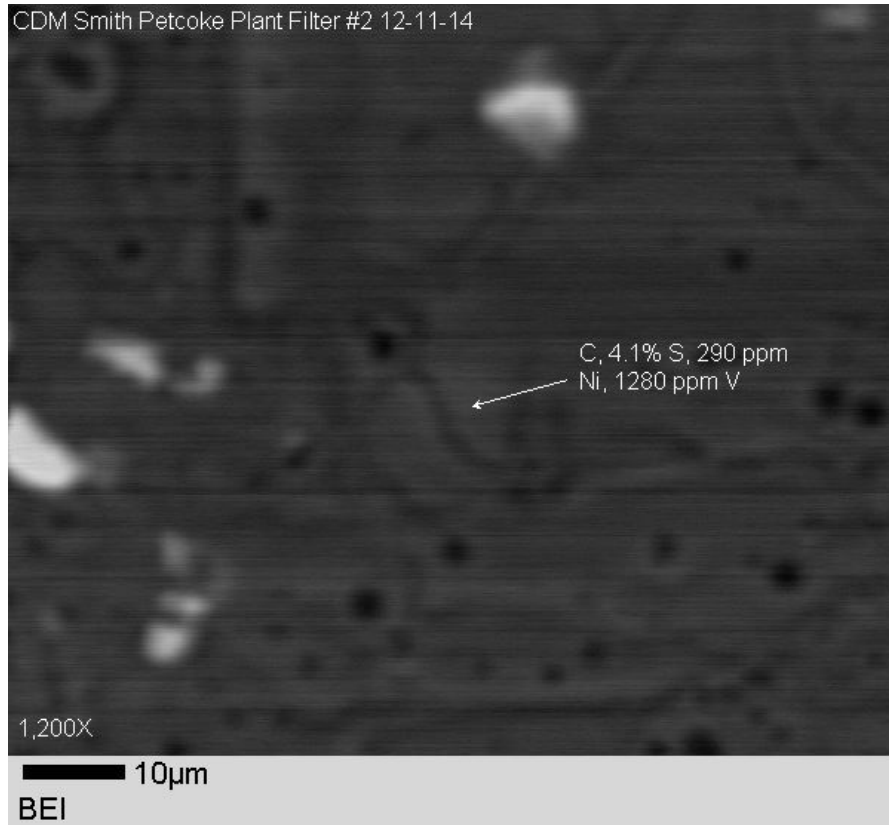


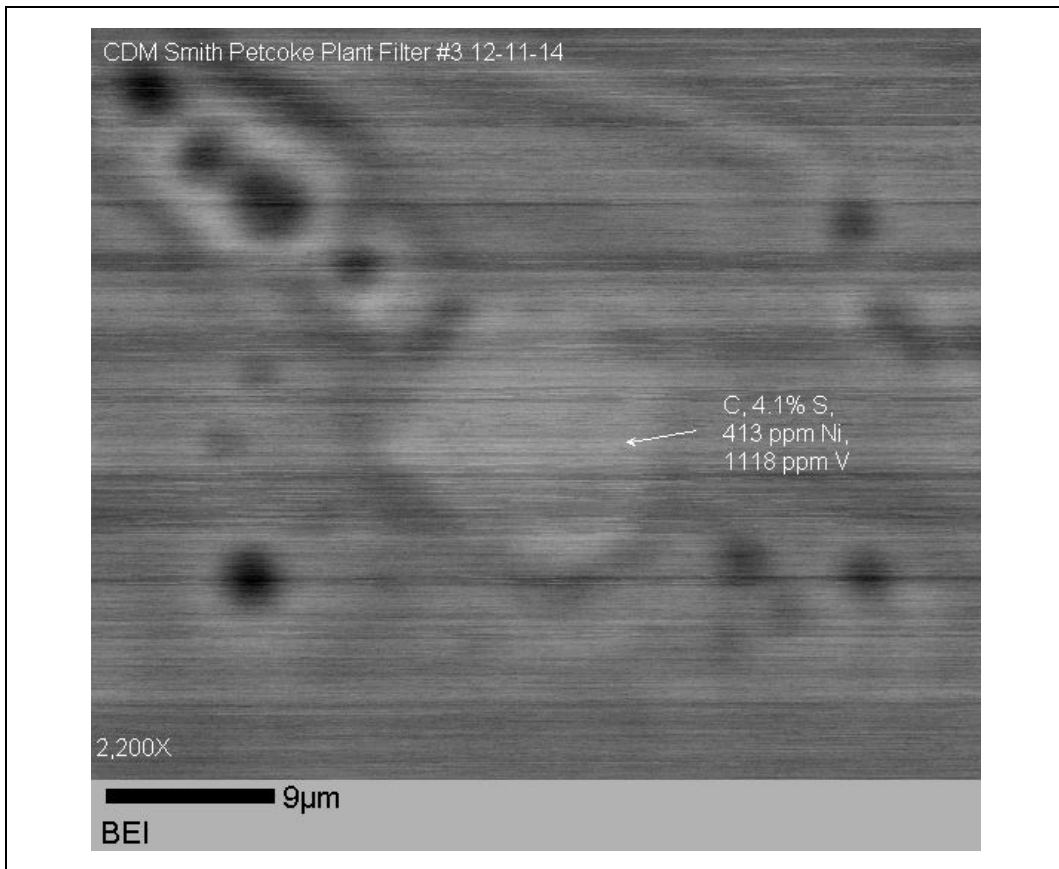


CDM Smith Petcoke Plant Filter #1 12-11-14



CDM Smith Petcoke Plant Filter #2 12-11-14





# EMP Analyses



## Element Weight Percent:

Pt#	Ni	S	V	C	Total Ni	S	V	C	Total X(mm)
	Y(mm)	Date	Time	Label					
1	0.0000		0.6554		0.0159	99.33	100.00		0.0000
	0.6554		0.0159		99.33	100.00		20.1777	20.3926
	10/02/14		10:16:01AM						
2	0.0049		0.4911		0.0065	99.50	100.00		0.0049
	0.4911		0.0065		99.50	100.00		21.6120	19.3862
	10/02/14		10:47:41AM	DTS01_2					
3	0.0000	6.32	0.0073		93.67	100.00		0.0000	6.32
	0.0073	93.67	100.00		19.7569		9.1458		10/02/14
	11:33:28AM			DTS01_3					
4	0.0086		0.2826		0.0077	99.70	100.00		0.0086
	0.2826		0.0077		99.70	100.00		18.9416	12.7531
	10/02/14		12:32:07PM	DTS01_4					
5	0.0039		0.5612		0.0100	99.42	100.00		0.0039
	0.5612		0.0100		99.42	100.00		12.3440	13.3624
	10/02/14		12:48:21PM	DTS01_5					
6	0.0021		0.3842		0.0072	99.61	100.00		0.0021
	0.3842		0.0072		99.61	100.00		60.5677	21.0613
	10/02/14		01:04:47PM	DTS02_1					

## Element Weight Percent:

Pt#	Ni	S	V	C	Si	Al	Fe	Ca	Total	Ni	S
	V	C	Si	Al	Fe	Ca	Total	X(mm)	Y(mm)	Date	Time
	Label										
1	0.0044		0.3792		0.0063		94.17	1.5365		0.7591	
	0.7398		2.4029		100.00		0.0044			0.3792	
	0.0063		94.17	1.5365		0.7591		0.7398		2.4029	
	100.00		60.5677		21.0613		10/02/14		01:17:40PM	DTS02	
<u>1</u> b											
2	0.0149		1.6497		0.0596		98.21	0.0098		0.0019	
	0.0484		0.0089		100.00		0.0149			1.6497	
	0.0596		98.21	0.0098		0.0019		0.0484		0.0089	
	100.00		61.9979		20.8197		10/02/14		01:40:21PM	DTS02	
<u>2</u>											
3	0.0178		0.1032		0.0090		93.74	1.9228		0.6694	
	0.4405		3.10	100.00		0.0178		0.1032		0.0090	
	93.74	1.9228		0.6694		0.4405		3.10	100.00		
	61.0337		20.1629		10/02/14		01:57:17PM	DTS02	<u>3</u>		
4	0.0000		0.2665		0.0076		96.83	0.1123		0.0285	
	0.0401		2.7184		100.00		0.0000			0.2665	
	0.0076		96.83	0.1123		0.0285		0.0401		2.7184	
	100.00		60.4703		19.4348		10/02/14		02:13:24PM	DTS02	
<u>4</u>											
5	0.0133		0.5269		0.0111		90.98	2.3109		1.1110	
	1.1417		3.91	100.00		0.0133		0.5269		0.0111	
	90.98	2.3109		1.1110		1.1417		3.91	100.00		
	19.5999		61.1814		10/02/14		02:37:30PM	DTS03	<u>1</u>		
6	0.0237		0.4031		0.0120		86.36	6.69		1.8835	
	1.9301		2.6996		100.00		0.0237			0.4031	
	0.0120		86.36	6.69	1.8835		1.9301			2.6996	
	100.00		18.2301		62.2986		10/02/14		02:51:37PM	DTS03	
<u>2</u>											
<u>7</u>	0.0097		0.7865		0.0069		98.73	0.0332		0.0038	
	0.0299		0.4015		100.00		0.0097			0.7865	
	0.0069		98.73	0.0332		0.0038		0.0299		0.4015	
	100.00		18.5816		62.7211		10/02/14		03:05:31PM	DTS03	
<u>3</u>											
8	0.0000		0.1773		0.0164		90.72	3.81		2.0317	
	2.5386		0.7070		100.00		0.0000			0.1773	
	0.0164		90.72	3.81	2.0317		2.5386			0.7070	
	100.00		18.2414		62.2915		10/02/14		03:23:19PM	DTS03	
<u>4</u>											

## Element Weight Percent:

Pt#	Ni	S	V	C	Si	Al	Fe	Ca	Mg	Total Ni		
	S	V	C	Si	Al	Fe	Ca	Mg	Total	X(mm)	Y(mm)	
	Date	Time	Label									
1	0.0176		4.80	0.0685		95.09	0.0031		0.0008			
	0.0117		0.0055		0.0020		100.00		0.0176		4.80	
	0.0685		95.09	0.0031		0.0008		0.0117		0.0055		
	0.0020		100.00		21.9813		20.3945		10/20/14			
	09:46:57AM		Test CS	particle								
2	0.0018		0.0218		0.2148		33.91	0.3047		4.07	30.39	
	31.02	0.0576		100.00		0.0018		0.0218		0.2148		
	33.91	0.3047		4.07	30.39	31.02	0.0576		100.00			
	22.1469		19.5267		10/20/14		09:53:49AM		Test CaFe			
	particle											
3	0.0317		5.00	0.0920		94.85	0.0023		0.0093			
	0.0126		0.0083		0.0005		100.00		0.0317		5.00	
	0.0920		94.85	0.0023		0.0093		0.0126		0.0083		
	0.0005		100.00		22.1806		19.4706		10/20/14			
	10:29:40AM		Petcokel_1									
4	0.0337		5.36	0.0986		94.50	0.0010		0.0025			
	0.0016		0.0042		0.0000		100.00		0.0337		5.36	
	0.0986		94.50	0.0010		0.0025		0.0016		0.0042		
	0.0000		100.00		21.8777		19.6732		10/20/14			
	10:46:28AM		Petcokel_2									
5	0.0439		6.15	0.1126		93.69	0.0010		0.0000			
	0.0019		0.0017		0.0014		100.00		0.0439		6.15	
	0.1126		93.69	0.0010		0.0000		0.0019		0.0017		
	0.0014		100.00		22.3487		18.6528		10/20/14			
	11:01:05AM		Petcokel_3									
6	0.0382		3.92	0.0906		95.91	0.0076		0.0168			
	0.0130		0.0062		0.0026		100.00		0.0382		3.92	
	0.0906		95.91	0.0076		0.0168		0.0130		0.0062		
	0.0026		100.00		22.1721		20.6409		10/20/14			
	11:11:51AM		Petcokel_4									
7	0.0214		5.92	0.0607		93.98	0.0036		0.0098			
	0.0016		0.0000		0.0000		100.00		0.0214		5.92	
	0.0607		93.98	0.0036		0.0098		0.0016		0.0000		
	0.0000		100.00		22.2472		20.8885		10/20/14			
	11:18:17AM		Petcokel_5									
8	0.0252		4.64	0.0861		95.21	0.0026		0.0113			
	0.0212		0.0034		0.0016		100.00		0.0252		4.64	
	0.0861		95.21	0.0026		0.0113		0.0212		0.0034		
	0.0016		100.00		22.1711		22.2975		10/20/14			
	11:25:20AM		Petcokel_6									
9	0.0314		4.88	0.0678		95.01	0.0039		0.0040			
	0.0000		0.0000		0.0000		100.00		0.0314		4.88	
	0.0678		95.01	0.0039		0.0040		0.0000		0.0000		
	0.0000		100.00		22.4121		25.5265		10/20/14			
	11:32:19AM		Petcokel_7									
10	0.0358		5.87	0.1059		93.98	0.0027		0.0000			
	0.0085		0.0000		0.0000		100.00		0.0358		5.87	
	0.1059		93.98	0.0027		0.0000		0.0085		0.0000		



	0.0000	100.00	21.0016	25.4855	10/20/14	
	11:42:18AM	Petcoke1_8				
11	0.0374	6.07	0.1002	93.76	0.0008	0.0095
	0.0203	0.0032	0.0009	100.00	0.0374	6.07
	0.1002	93.76	0.0008	0.0095	0.0203	0.0032
	0.0009	100.00	18.3950	25.5071	10/20/14	
	11:50:57AM	Petcoke1_9				
12	0.0069	3.16	0.0337	96.58	0.0091	0.1837
	0.0000	0.0264	0.0000	100.00	0.0069	3.16
	0.0337	96.58	0.0091	0.1837	0.0000	0.0264
	0.0000	100.00	17.4847	24.3017	10/20/14	
	11:57:39AM	Petcoke1_10				
13	0.0000	1.0396	0.0110	98.90	0.0085	0.0000
	0.0272	0.0111	0.0000	100.00	0.0000	
	1.0396	0.0110	98.90	0.0085	0.0000	0.0272
	0.0111	0.0000	100.00	62.5701	21.9170	
	10/20/14	01:31:58PM DST01_6				
14	0.0294	6.38	0.0972	93.43	0.0096	0.0000
	0.0391	0.0155	0.0001	100.00	0.0294	6.38
	0.0972	93.43	0.0096	0.0000	0.0391	0.0155
	0.0001	100.00	60.2046	22.4131	10/20/14	
	01:40:20PM	DST01_7				
15	0.0430	6.13	0.1013	93.61	0.0112	0.0045
	0.0776	0.0236	0.0000	100.00	0.0430	6.13
	0.1013	93.61	0.0112	0.0045	0.0776	0.0236
	0.0000	100.00	58.9937	25.1482	10/20/14	
	02:04:01PM	DST01_8				
16	0.0382	6.46	0.1128	93.36	0.0072	0.0011
	0.0123	0.0086	0.0003	100.00	0.0382	6.46
	0.1128	93.36	0.0072	0.0011	0.0123	0.0086
	0.0003	100.00	62.3274	68.4771	10/20/14	
	02:21:23PM	DST03_5				
17	0.0409	6.07	0.1233	93.73	0.0009	0.0000
	0.0239	0.0056	0.0000	100.00	0.0409	6.07
	0.1233	93.73	0.0009	0.0000	0.0239	0.0056
	0.0000	100.00	65.1467	58.2811	10/20/14	
	02:34:15PM	DST03_6				
18	0.0376	6.29	0.0949	93.48	0.0060	0.0000
	0.0858	0.0016	0.0000	100.00	0.0376	6.29
	0.0949	93.48	0.0060	0.0000	0.0858	0.0016
	0.0000	100.00	61.3758	55.0893	10/20/14	
	02:50:00PM	DST03_7				
19	0.0407	6.06	0.1162	93.76	0.0022	0.0000
	0.0067	0.0149	0.0000	100.00	0.0407	6.06
	0.1162	93.76	0.0022	0.0000	0.0067	0.0149
	0.0000	100.00	66.1729	57.0421	10/20/14	
	03:09:13PM	DST03_8				
20	0.0499	6.23	0.1216	93.53	0.0035	0.0006
	0.0555	0.0046	0.0009	100.00	0.0499	6.23
	0.1216	93.53	0.0035	0.0006	0.0555	0.0046
	0.0009	100.00	19.8954	62.9123	10/20/14	
	03:19:44PM	DST02_5				

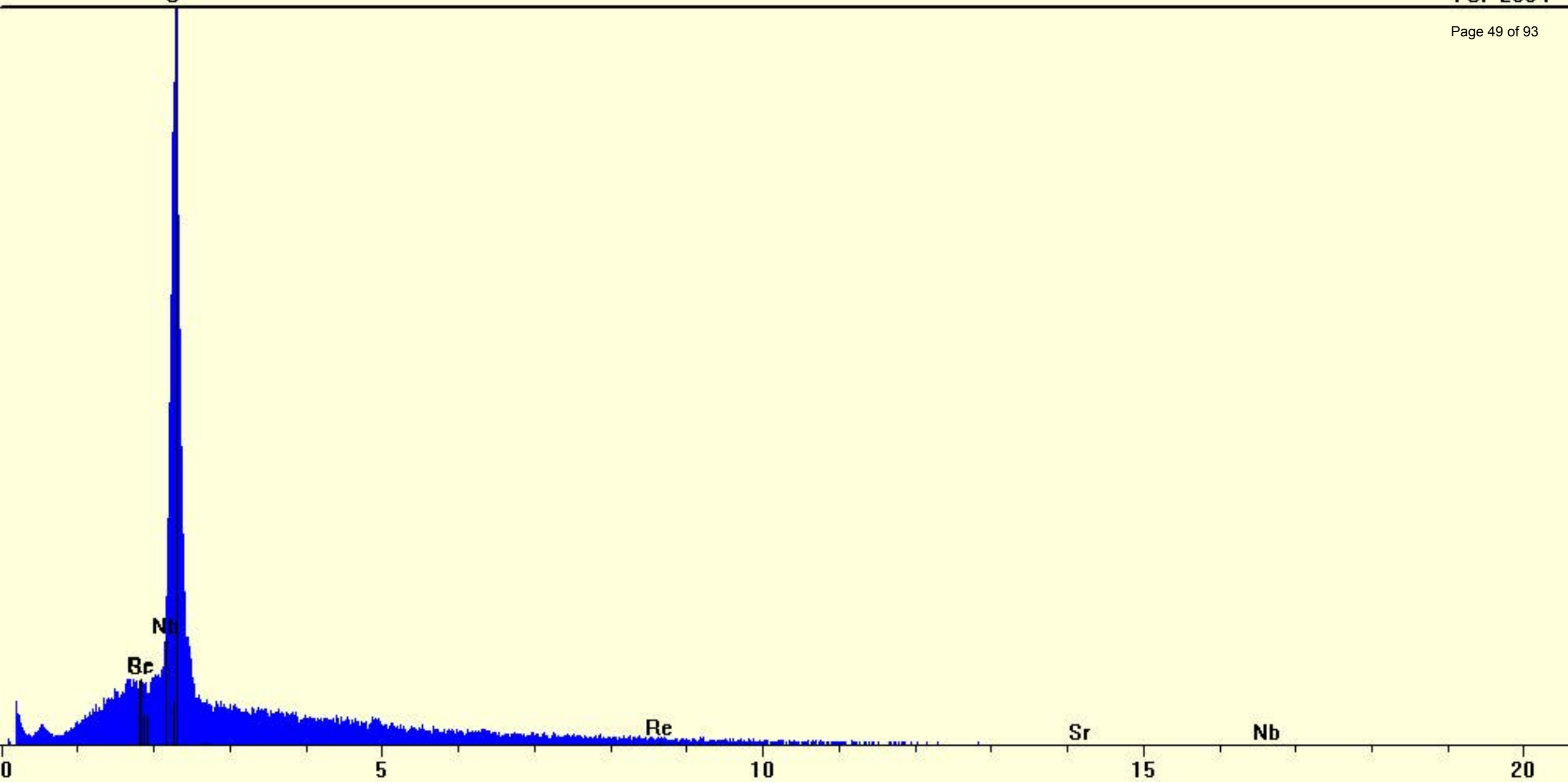
21	0.0390	6.11	0.1143	93.69	0.0106	0.0028	
	0.0051	0.0277	0.0006	100.00	0.0390	6.11	
	0.1143	93.69	0.0106	0.0028	0.0051	0.0277	
	0.0006	100.00	20.1802	58.4155	10/20/14		
	03:31:24PM DST02_6						
22	0.0346	6.17	0.1078	93.65	0.0169	0.0012	
	0.0158	0.0022	0.0000	100.00	0.0346	6.17	
	0.1078	93.65	0.0169	0.0012	0.0158	0.0022	
	0.0000	100.00	20.3266	56.5909	10/20/14		
	03:38:42PM DST02_7						
23	0.0391	5.99	0.0906	93.82	0.0084	0.0008	
	0.0325	0.0150	0.0013	100.00	0.0391	5.99	
	0.0906	93.82	0.0084	0.0008	0.0325	0.0150	
	0.0013	100.00	20.4637	55.9004	10/20/14		
	03:46:03PM DST02_8						
24	0.0475	6.24	0.1045	93.54	0.0024	0.0002	
	0.0534	0.0066	0.0000	100.00	0.0475	6.24	
	0.1045	93.54	0.0024	0.0002	0.0534	0.0066	
	0.0000	100.00	63.5463	18.3554	10/20/14		
	04:01:03PM DST01_9						
25	0.0348	6.20	0.0997	93.62	0.0061	0.0032	
	0.0191	0.0163	0.0005	100.00	0.0348	6.20	
	0.0997	93.62	0.0061	0.0032	0.0191	0.0163	
	0.0005	100.00	12.9891	22.7155	10/20/14		
	04:16:23PM DST01_10						
26	0.0347	6.27	0.1126	93.48	0.0047	0.0000	
	0.0937	0.0001	0.0000	100.00	0.0347	6.27	
	0.1126	93.48	0.0047	0.0000	0.0937	0.0001	
	0.0000	100.00	65.9455	16.0964	10/20/14		
	04:32:14PM DST01_9						
27	0.0294	4.78	0.0851	95.07	0.0036	0.0038	
	0.0200	0.0052	0.0002	100.00	0.0294	4.78	
	0.0851	95.07	0.0036	0.0038	0.0200	0.0052	
	0.0002	100.00	25.9024	18.7097	10/20/14		
	04:40:13PM Petcoke1_13						

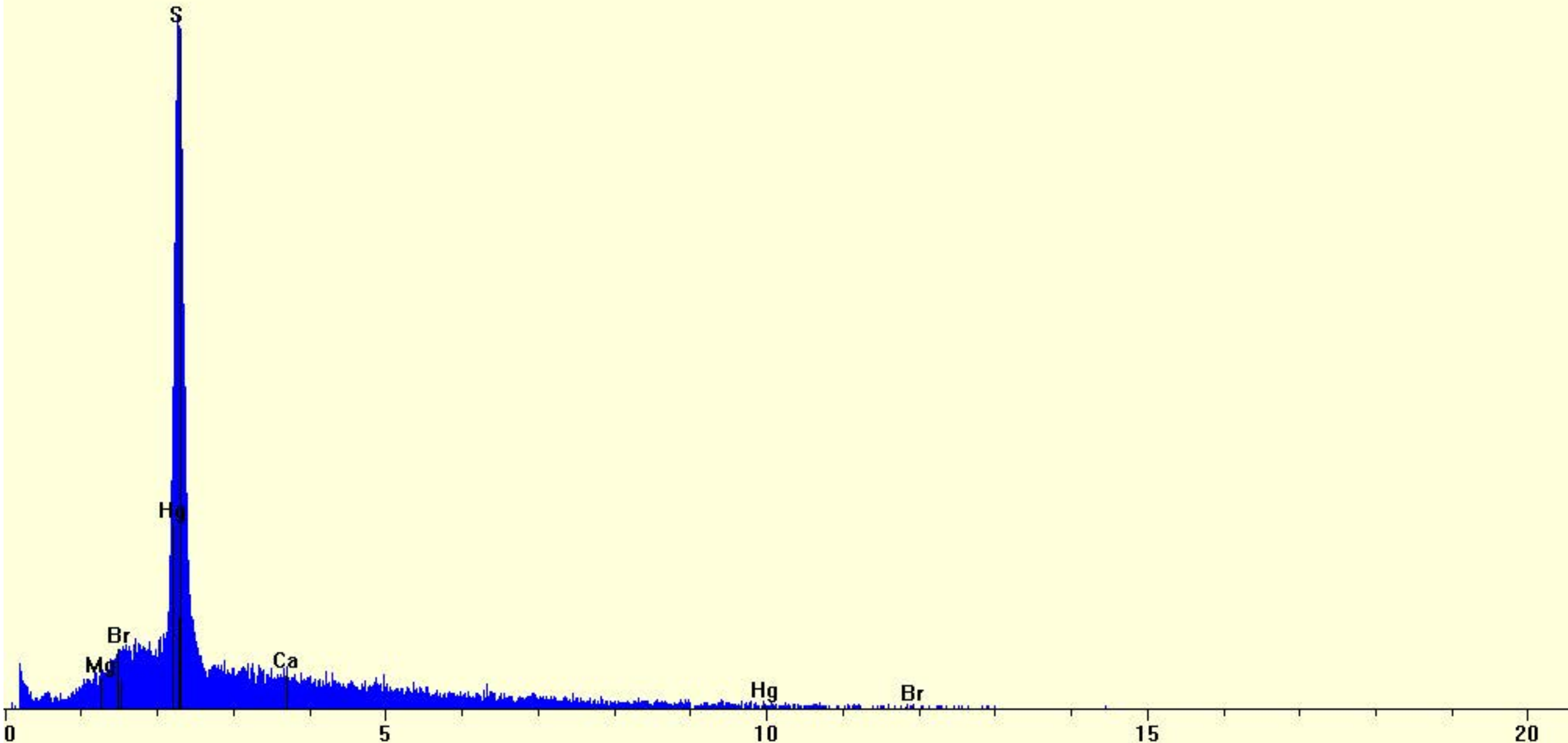
## Element Weight Percent: Garnet

Pt#	Al	Si	S	V	Ca	Ni	Fe	Total	Al	Si	S
	V	Ca	Ni	Fe	Total	X(mm)	Y(mm)	Date	Time	Label	
1	0.0137		0.0431		1.7253		0.0778		0.0219		
	0.0456		0.0047		1.93	0.7076		2.2330		89.30	4.03
	1.1346		2.3584		0.2428		100.00		61.1192		
	44.4910		12/11/14		02:20:13PM					PetcokePlantFilter_1	
2	0.0076		0.0079		4.09	0.1281		0.0089		0.0290	
	0.0000		4.27	0.1785		0.1840		95.75	2.9995		
	0.2090		0.6795		0.0000		100.00		61.1578		
	44.5349		12/11/14		02:34:45PM					PetcokePlantFilter_2	
3	0.0091		0.0098		4.10	0.1118		0.0053		0.0413	
	0.0118		4.29	0.2133		0.2275		95.59	2.6075		
	0.1239		0.9624		0.2763		100.00		63.4798		
	45.0299		12/11/14		02:54:21PM					PetcokePlantFilter_3	
4	0.0786		0.2283		2.5705		0.0621		0.0280		
	0.0056		0.0867		3.06	2.5684		7.46	84.01	2.0309	
	0.9161		0.1830		2.8346		100.00		63.5602		
	45.1296		12/11/14		03:13:23PM					PetcokePlantFilter_4	

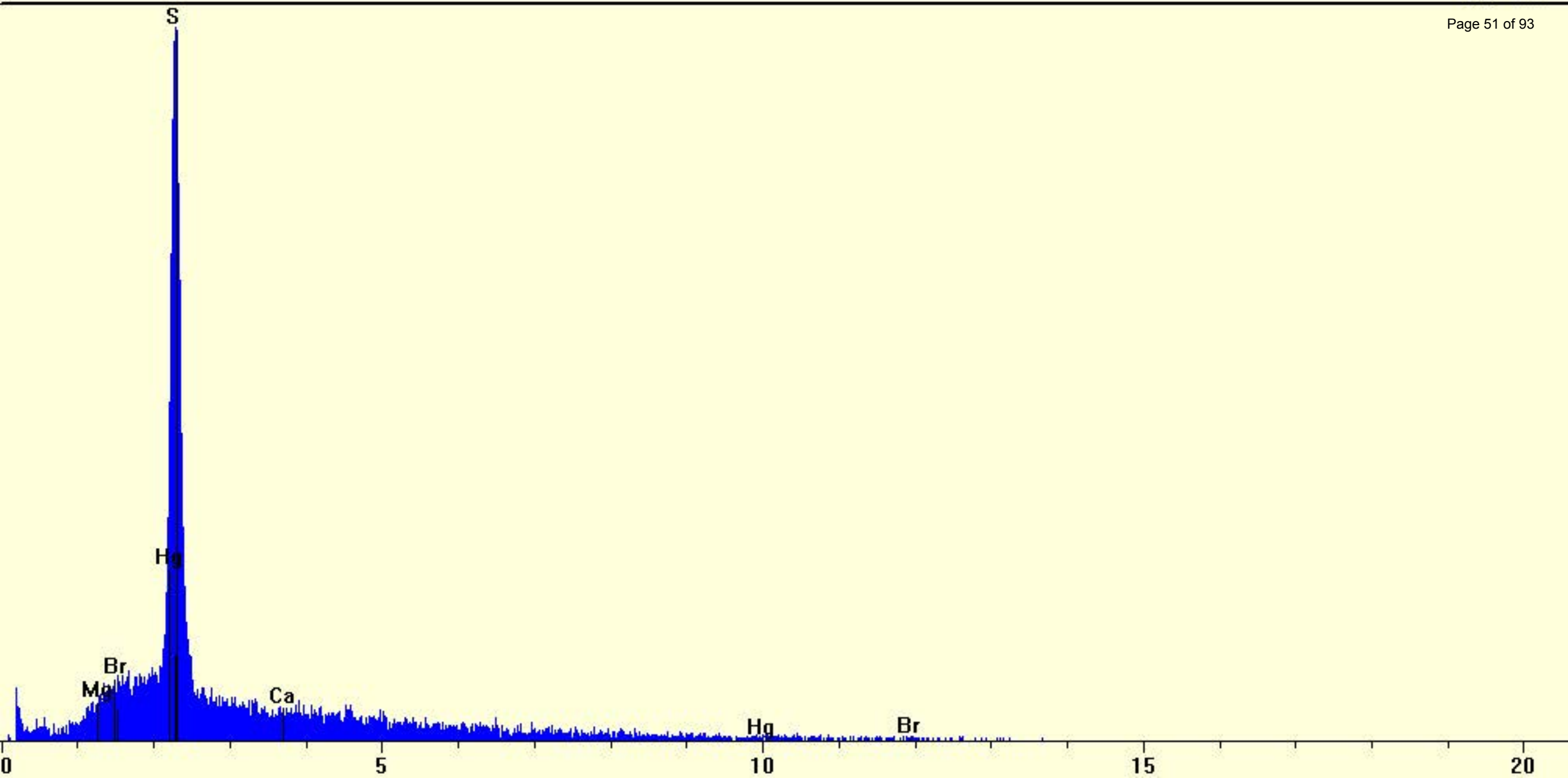


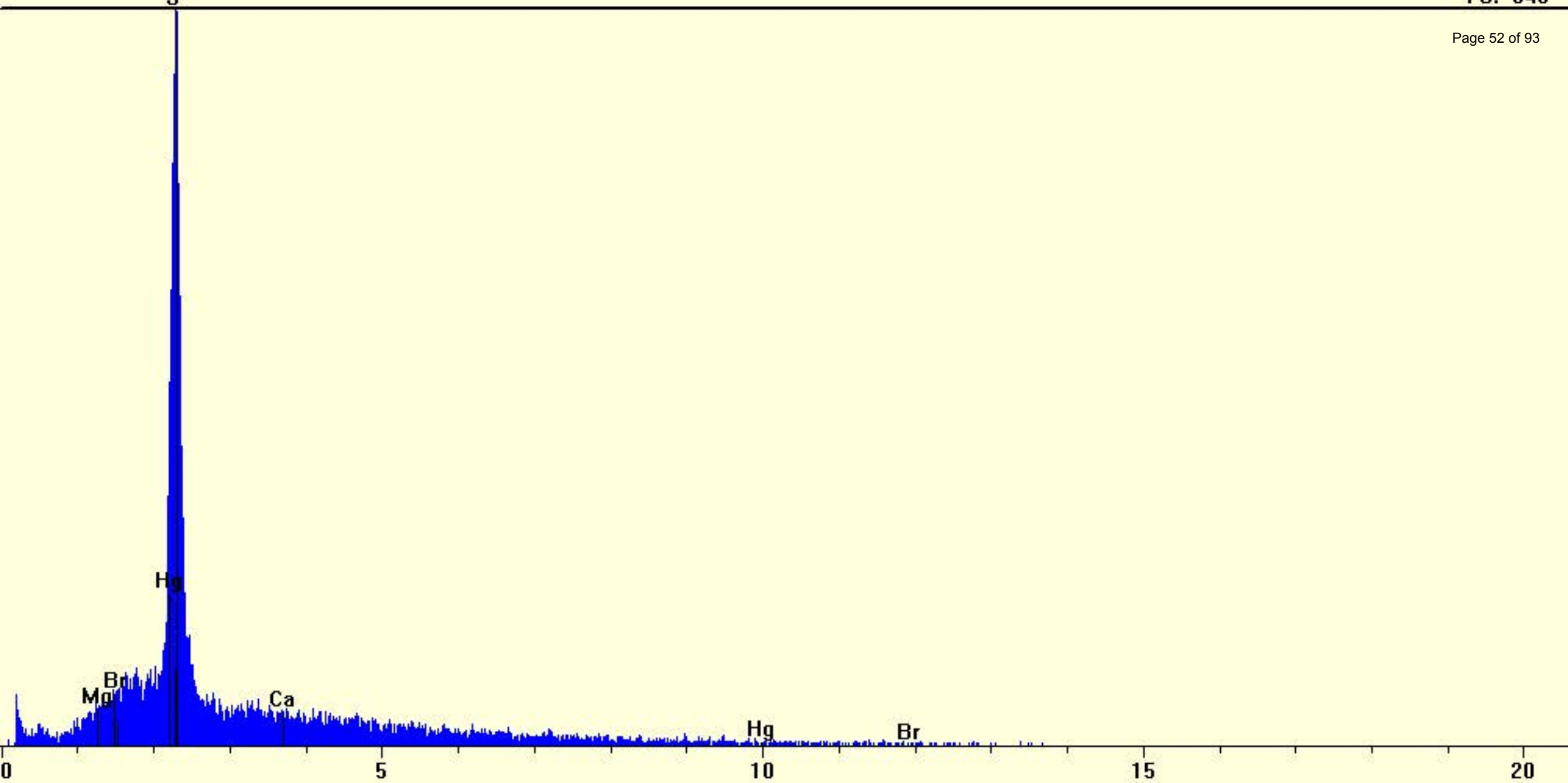
# EMP Spectragraphs

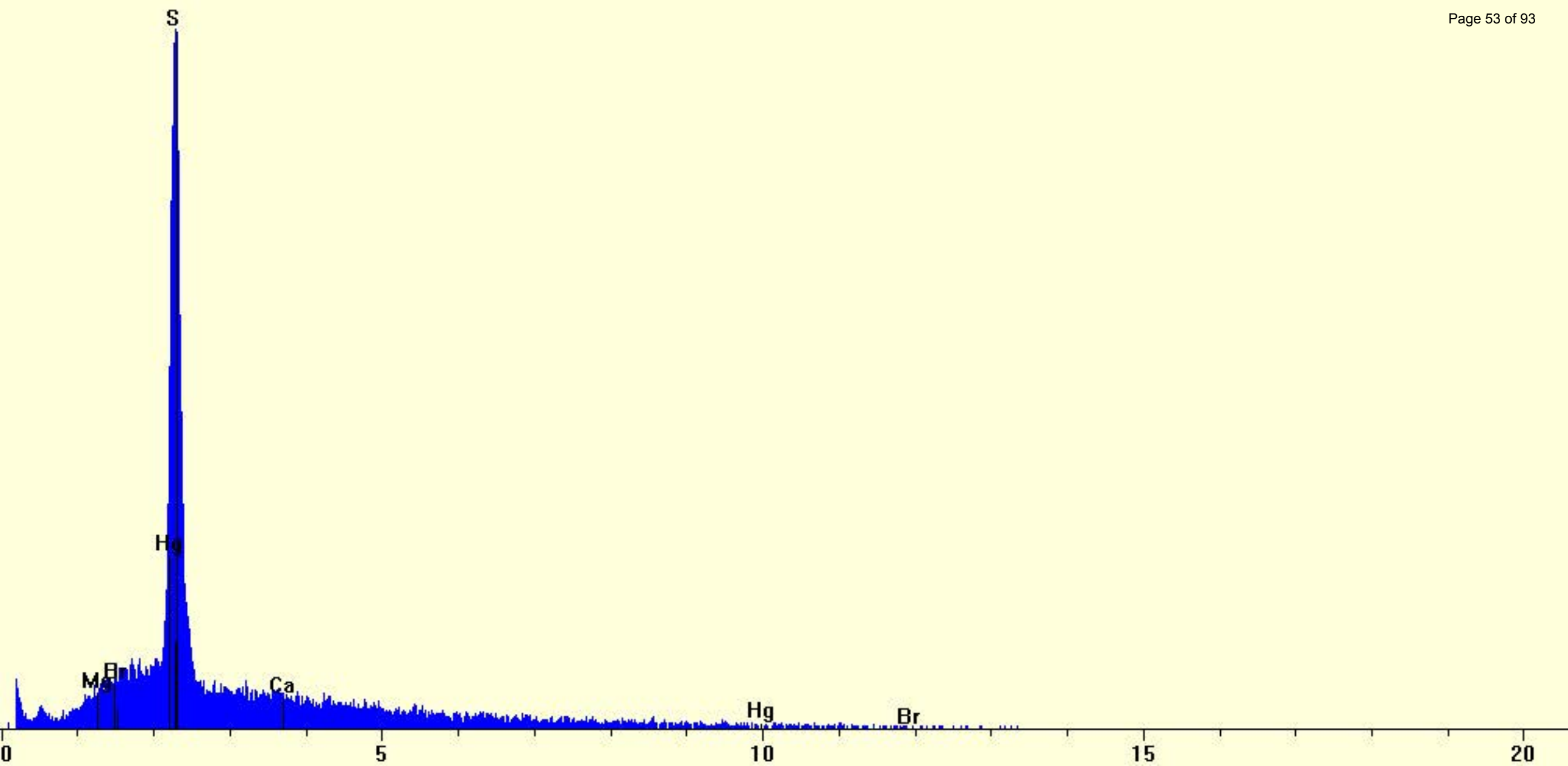




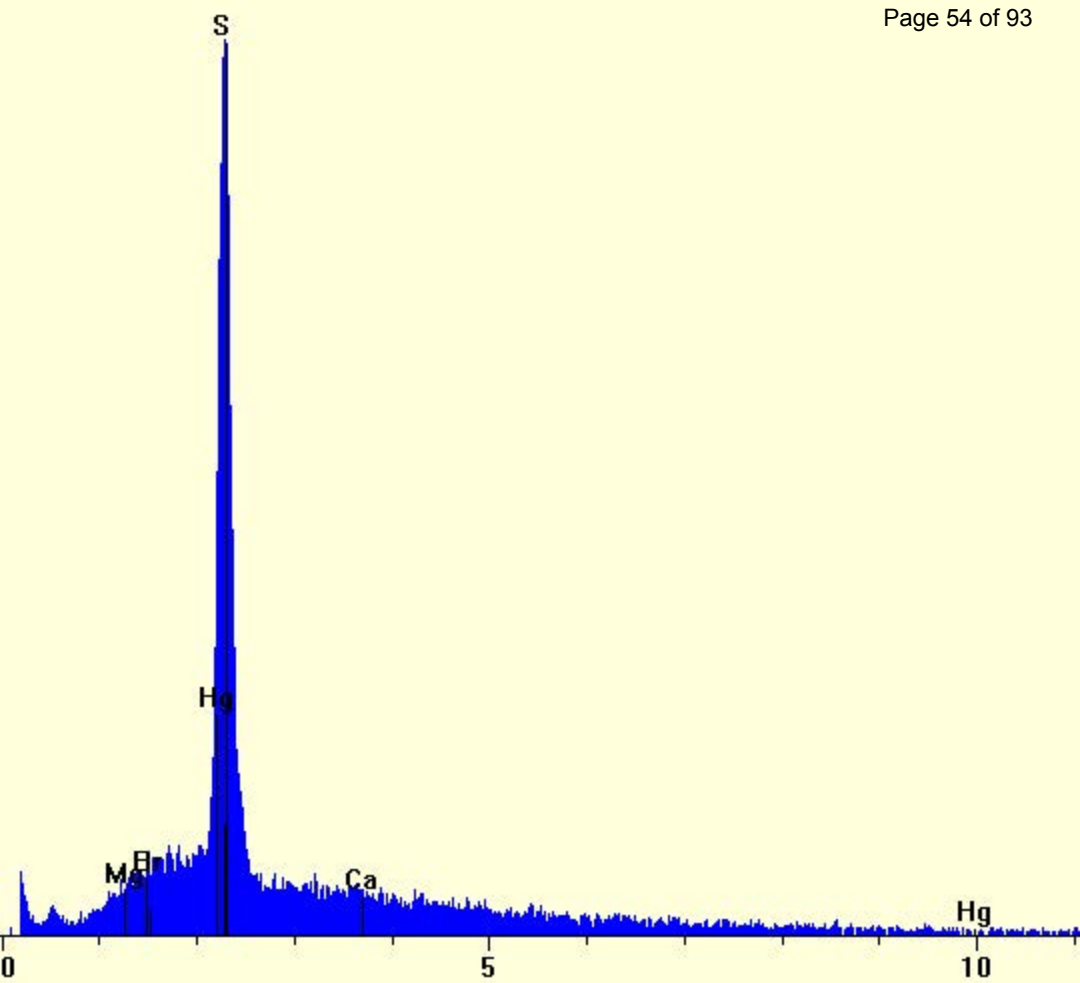


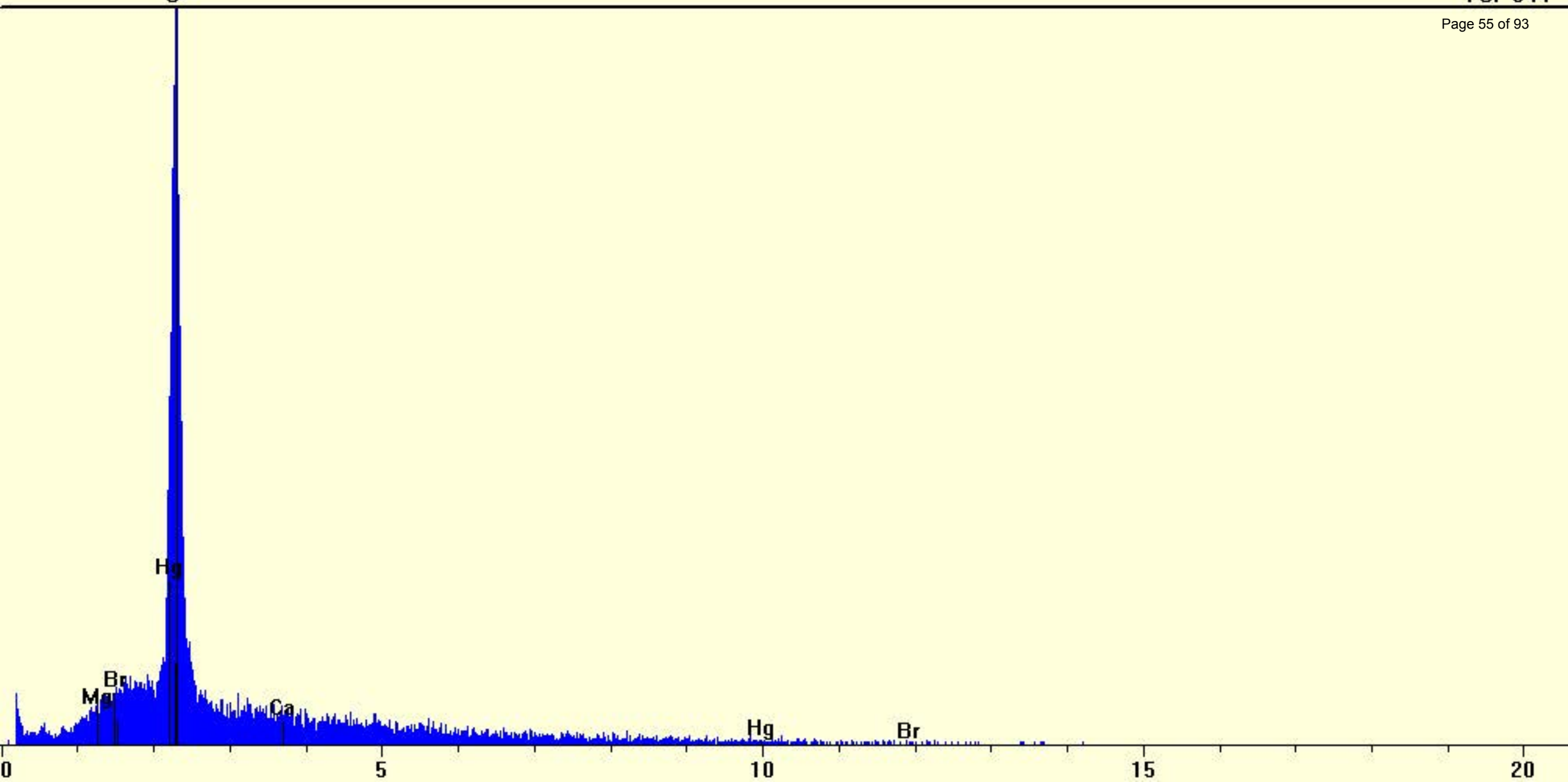


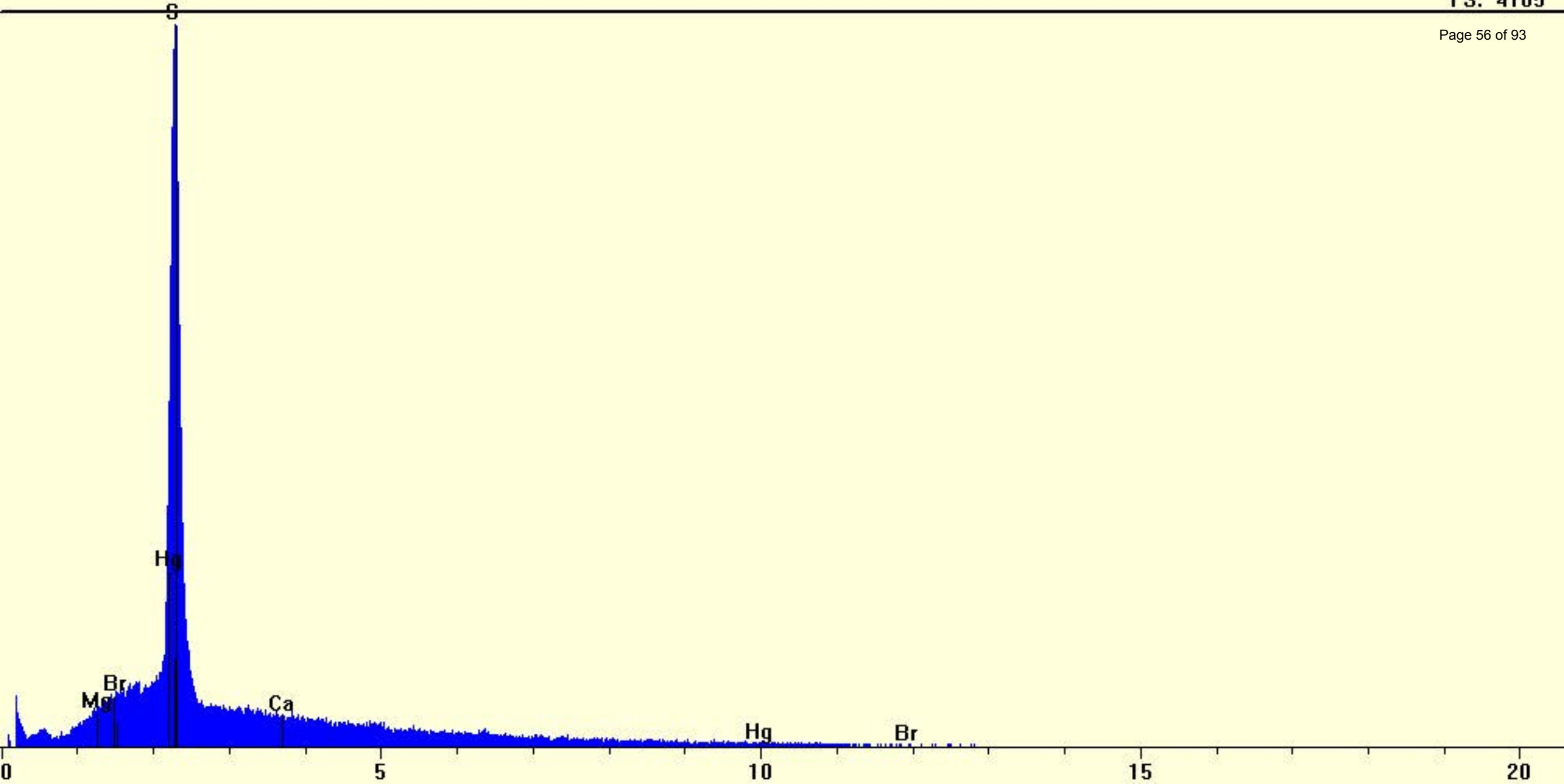




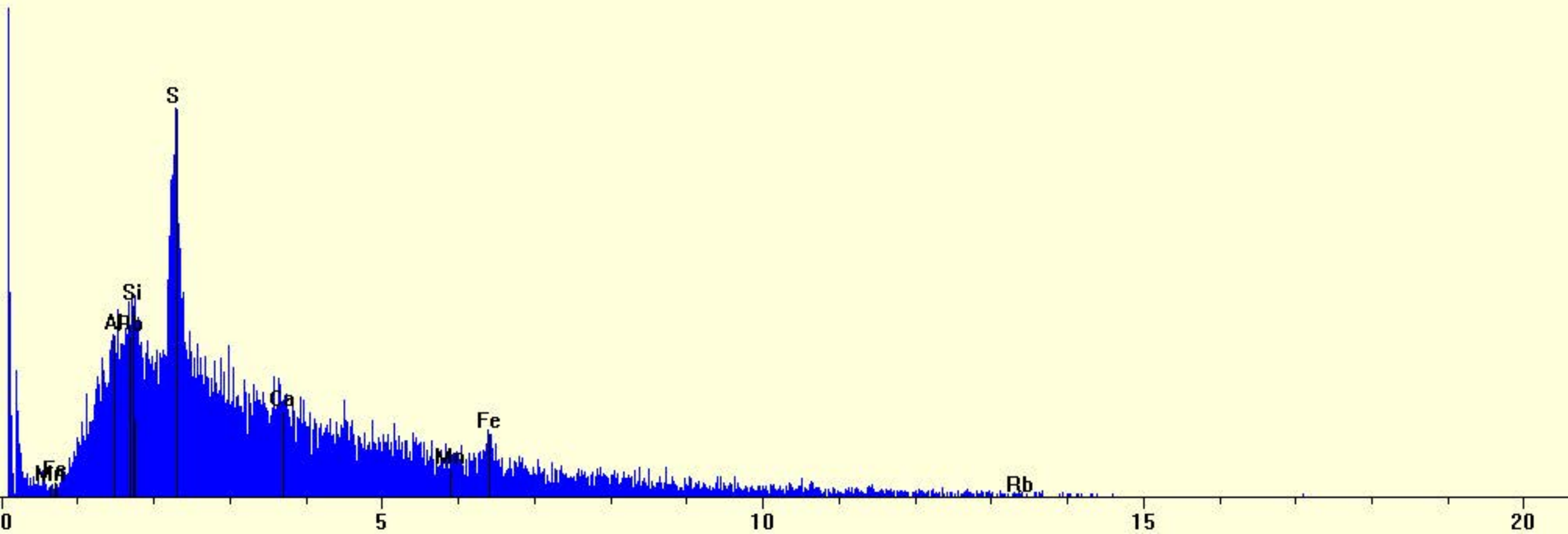


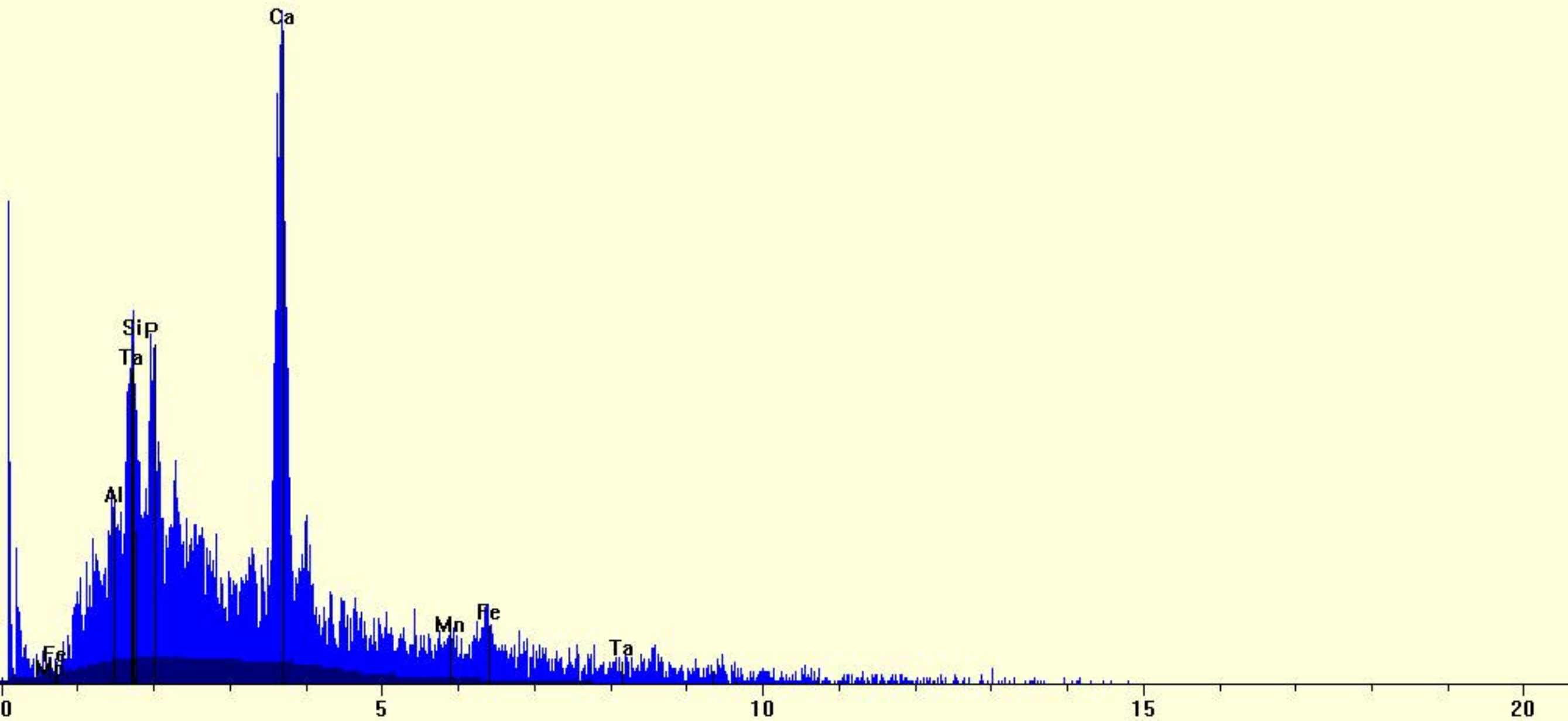


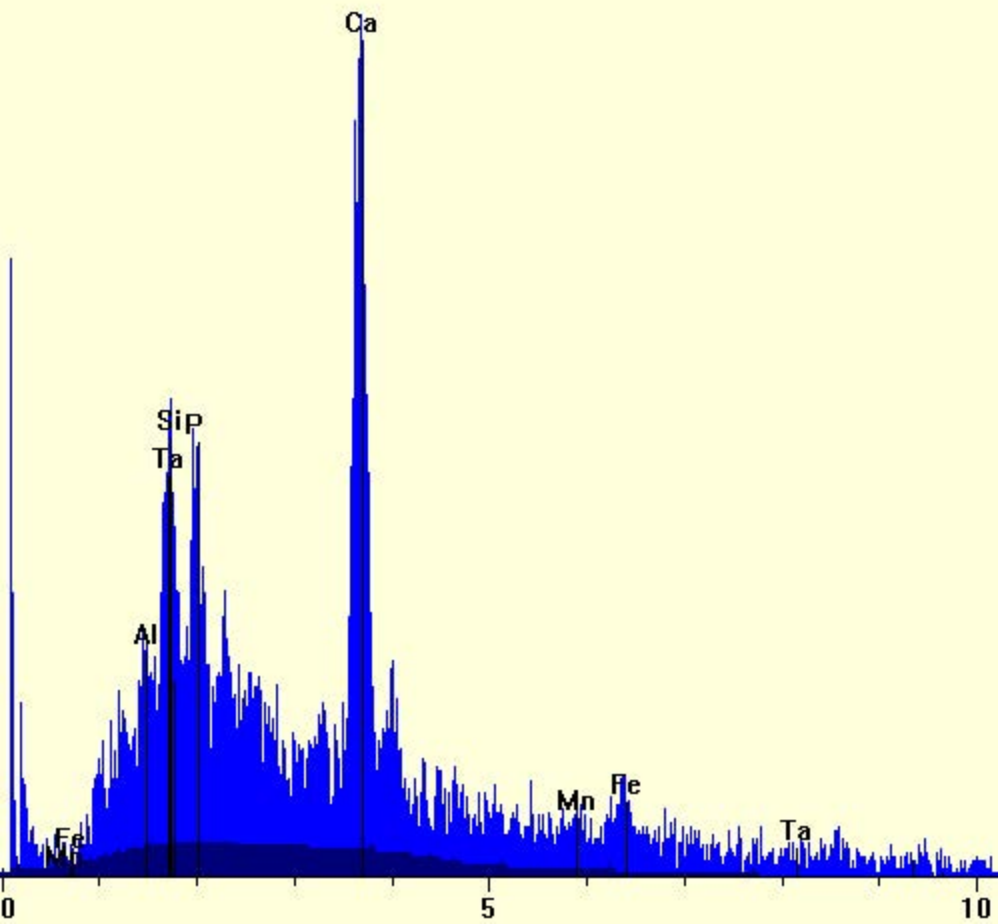




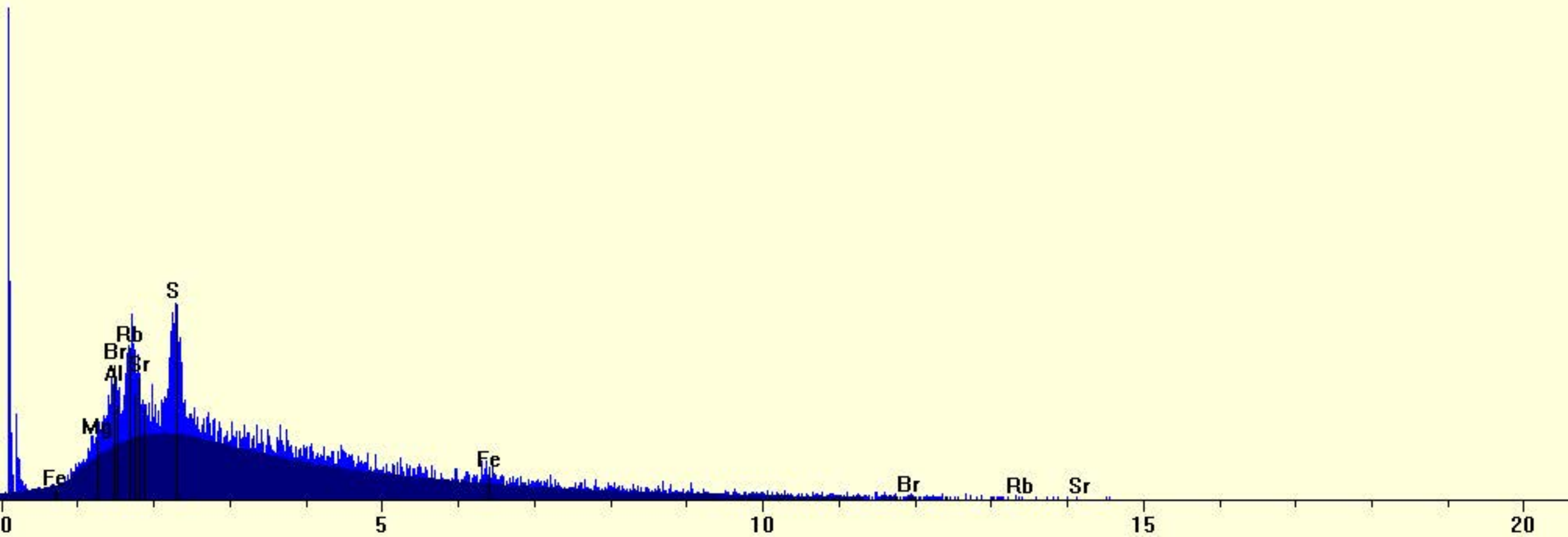


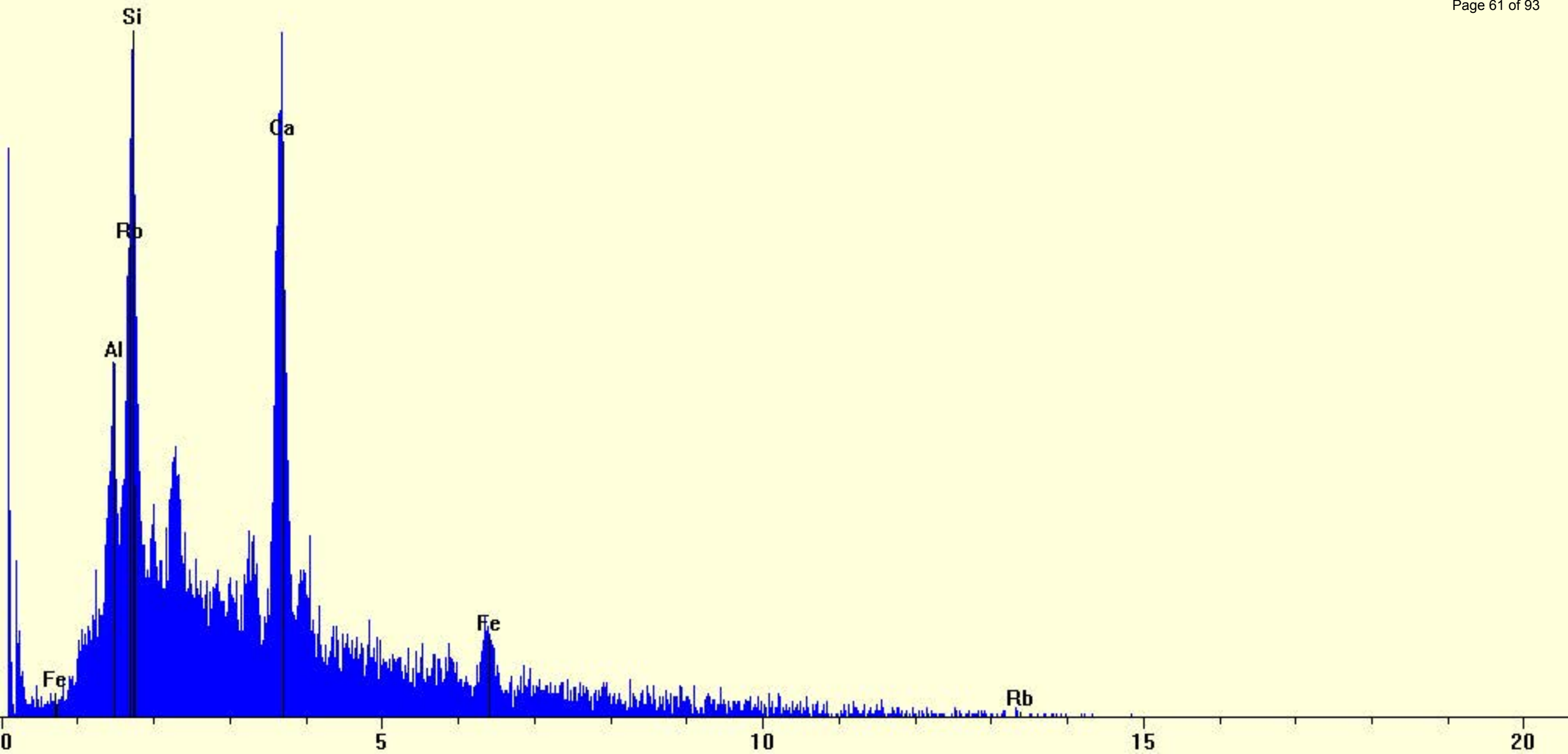


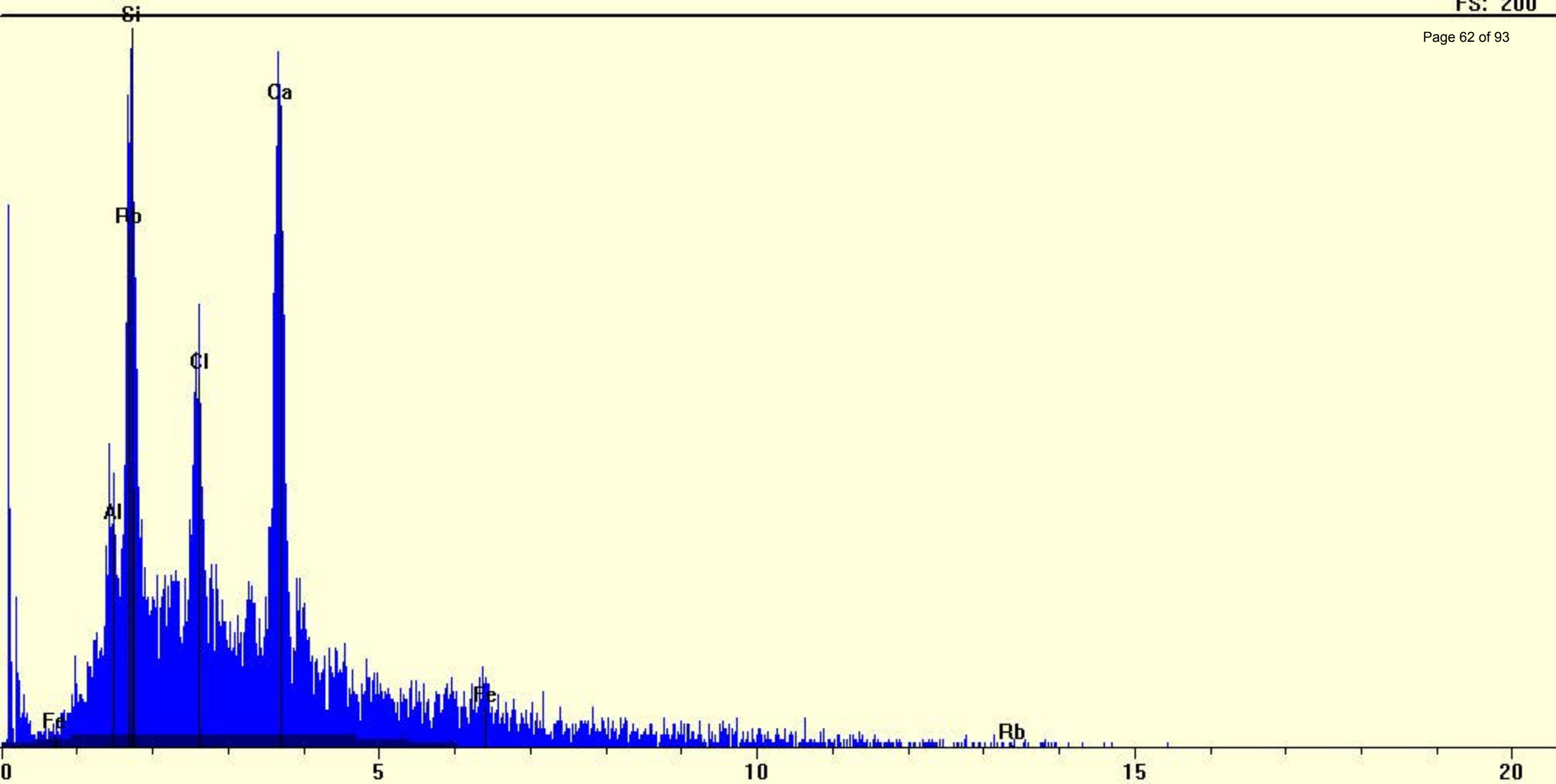


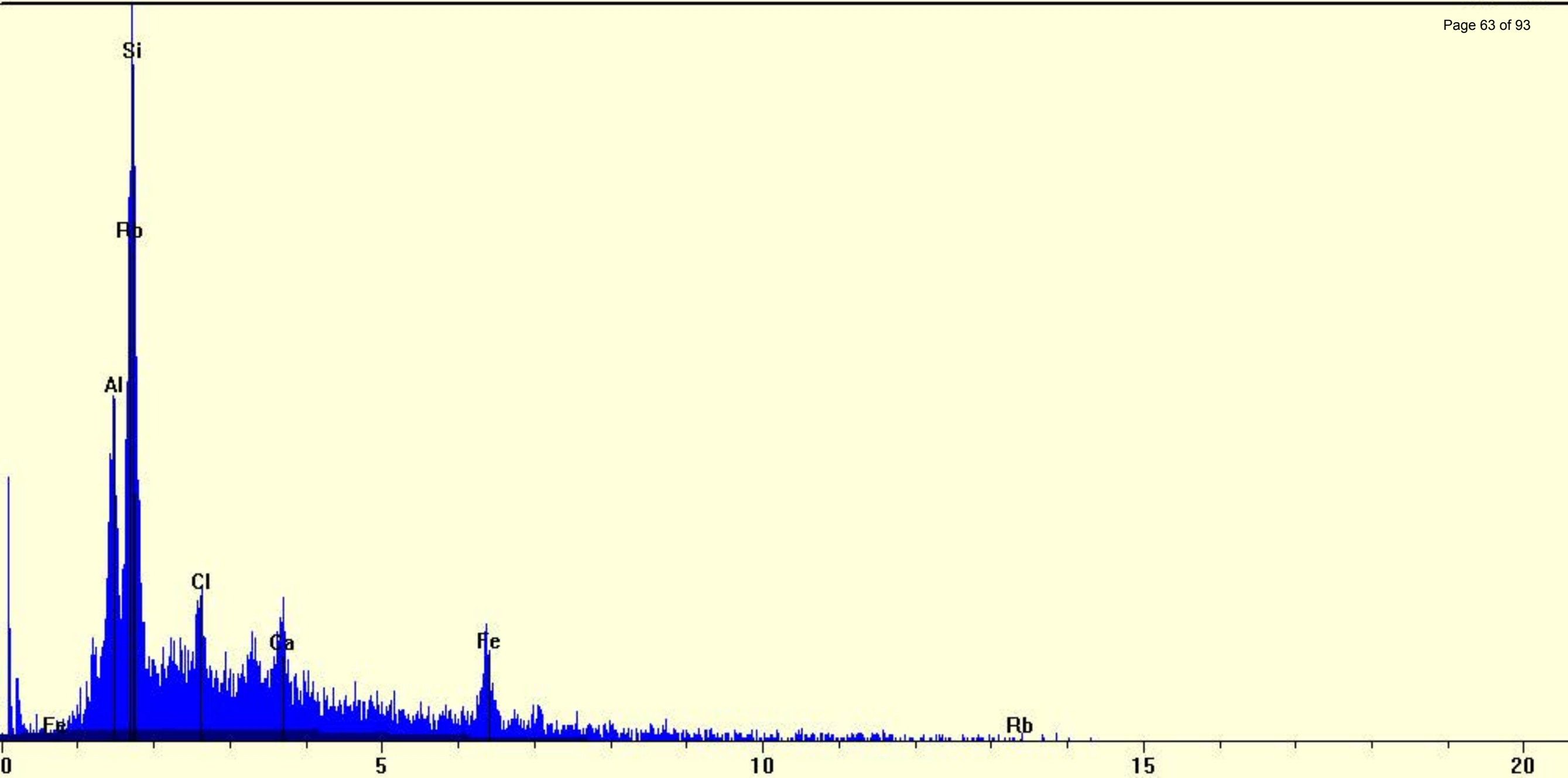




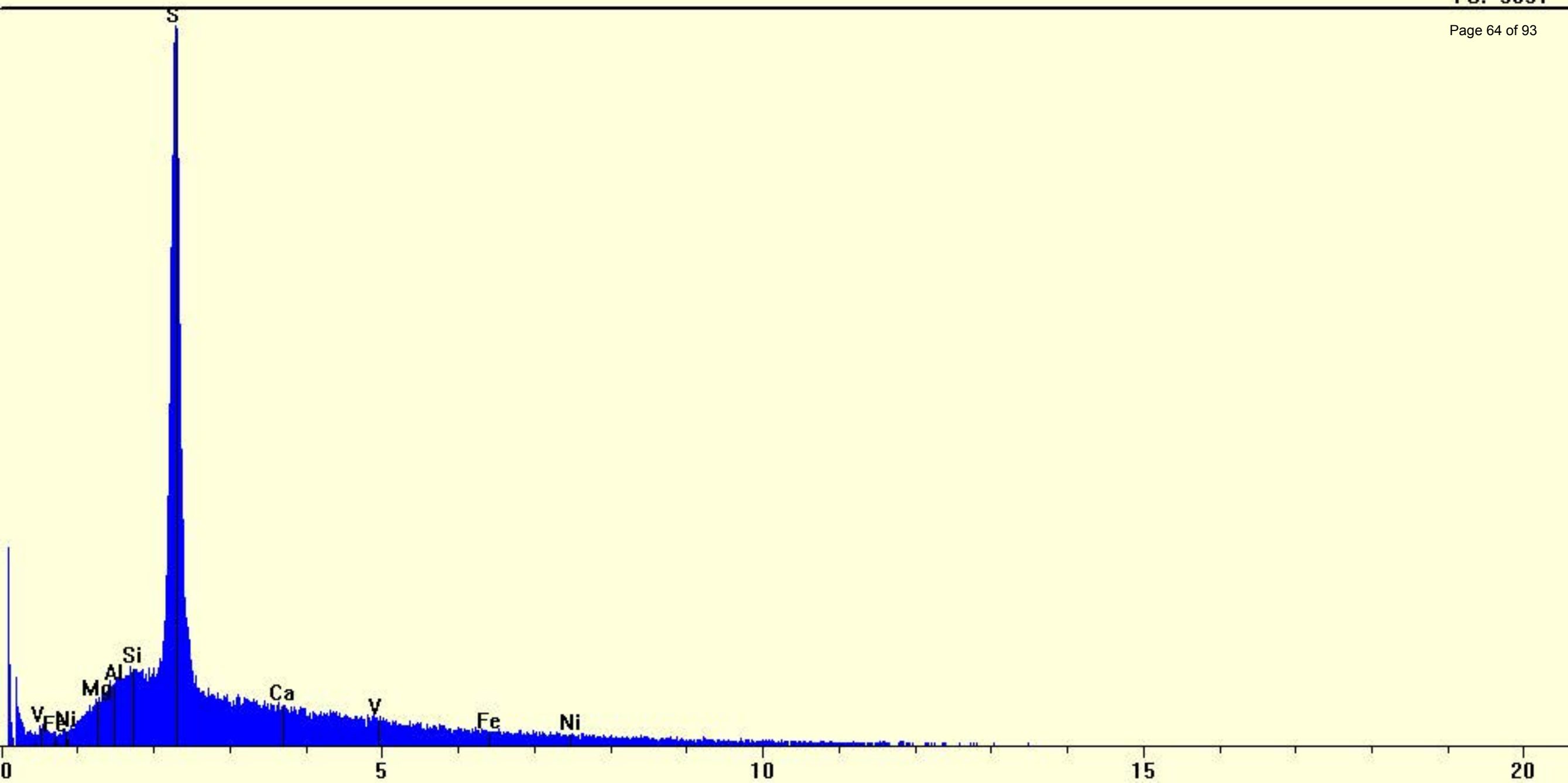


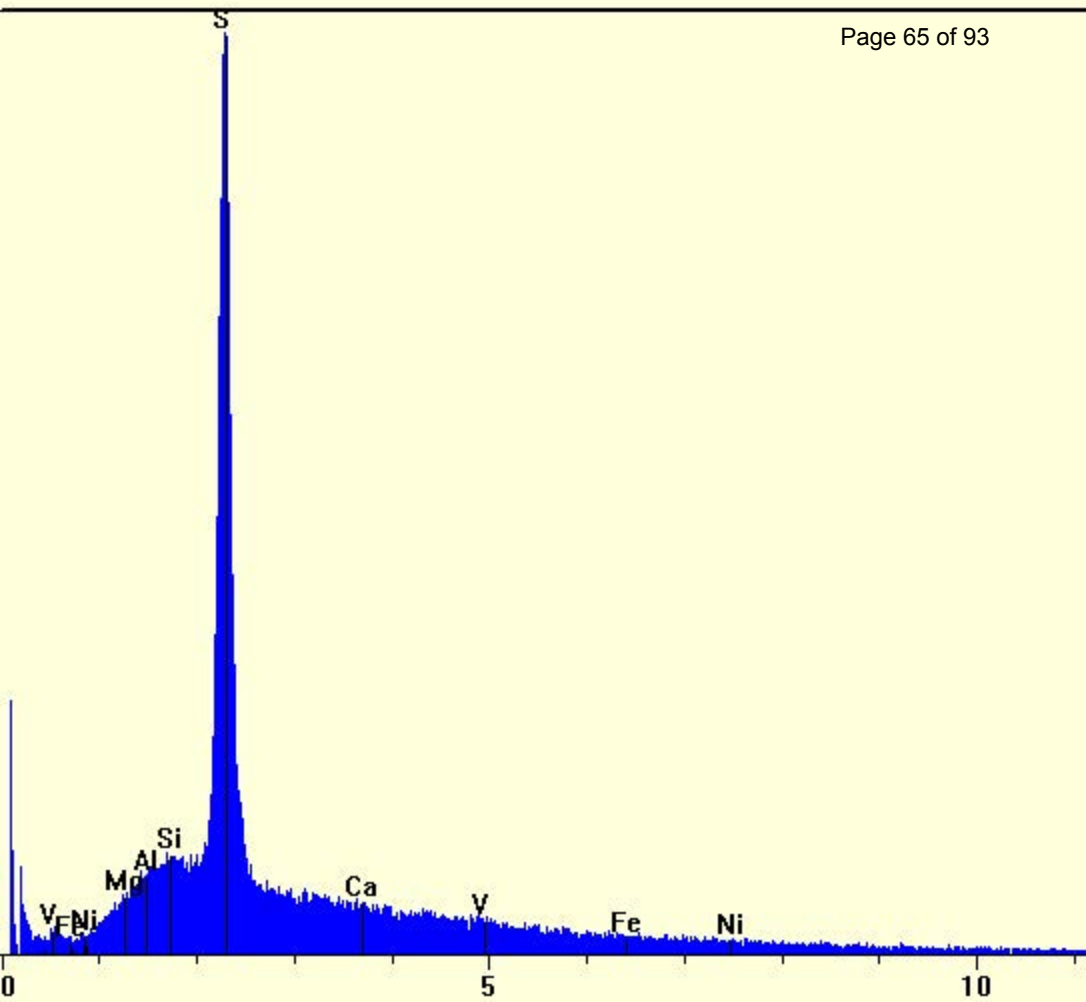


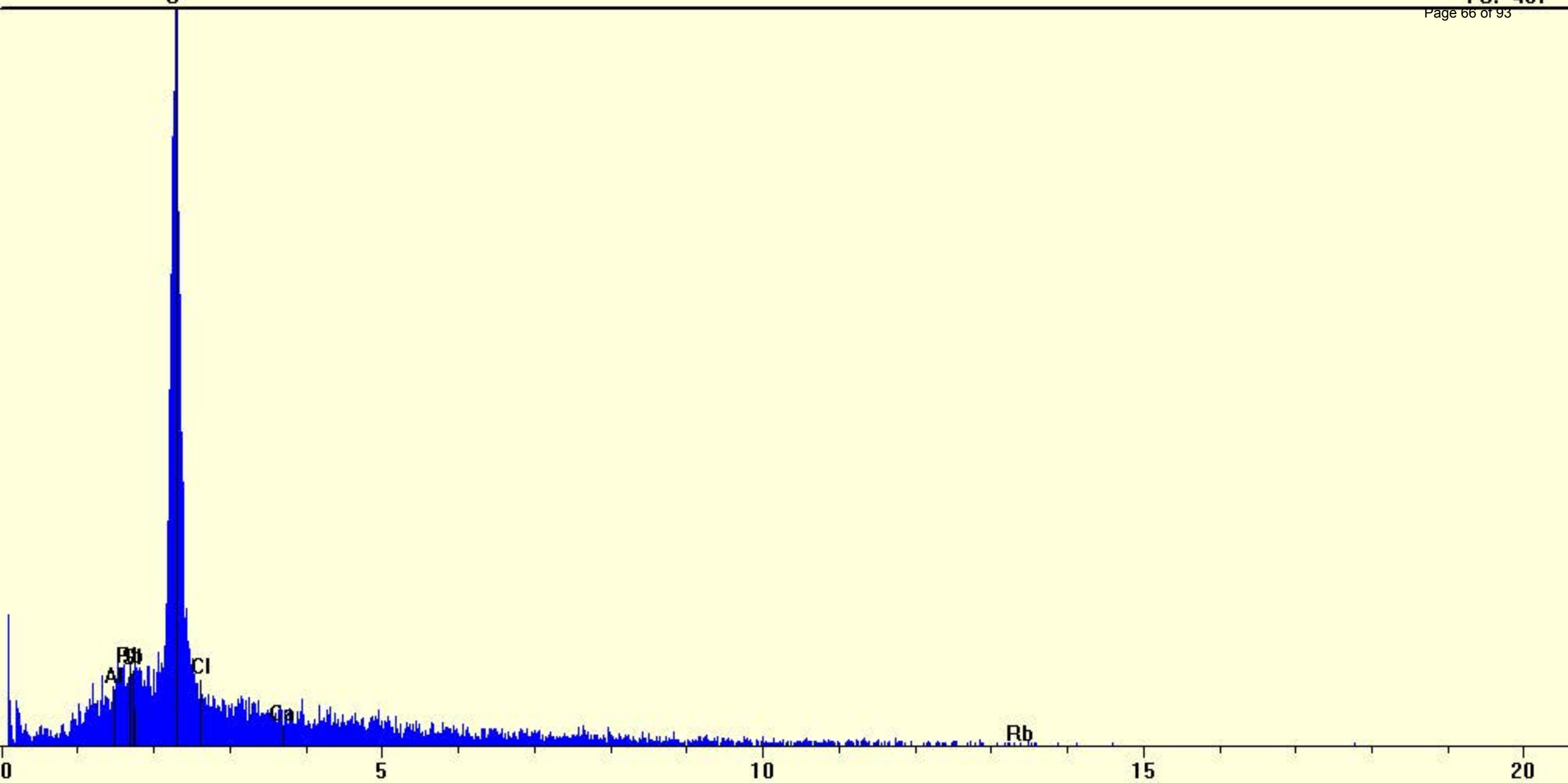


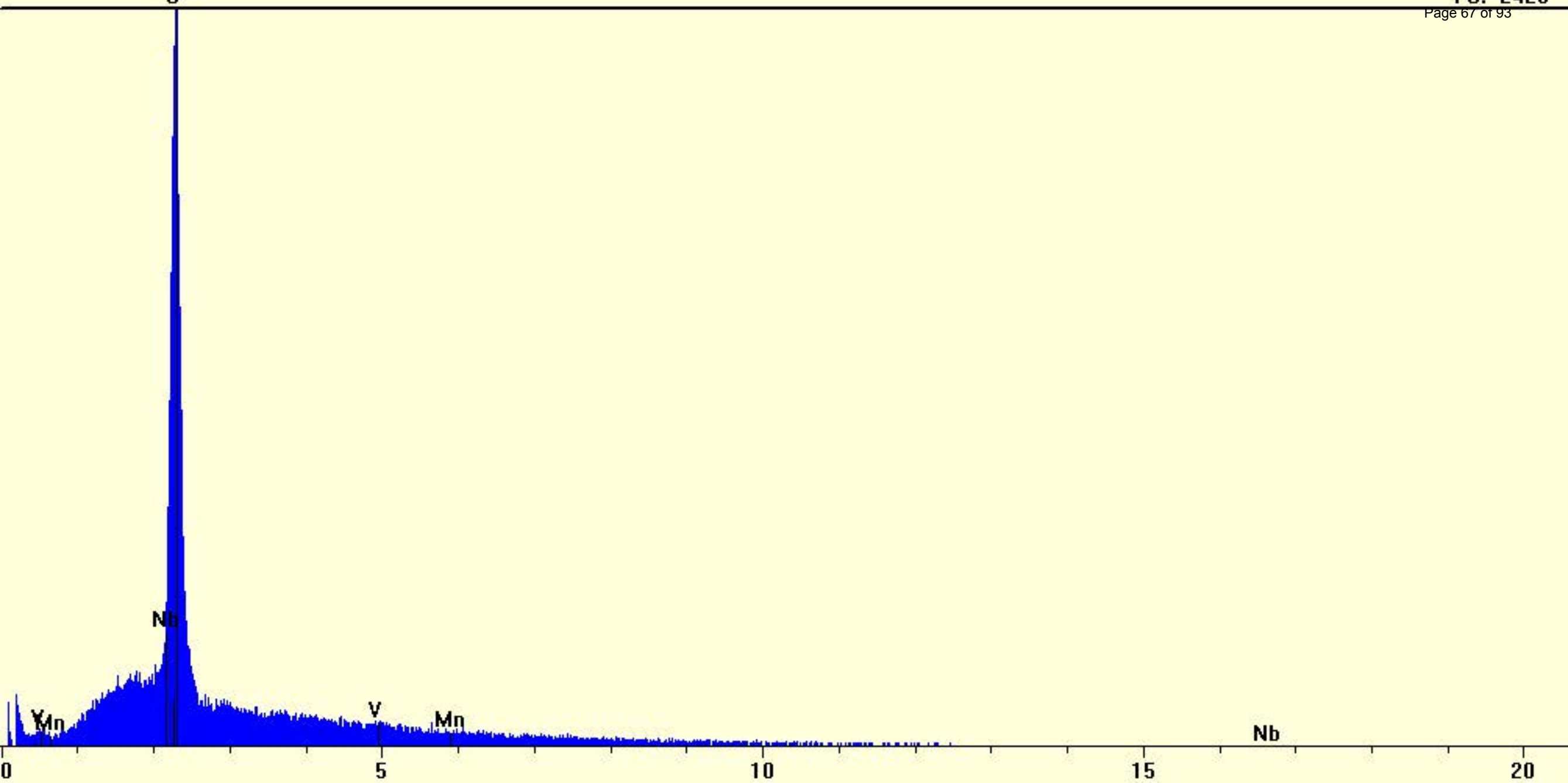




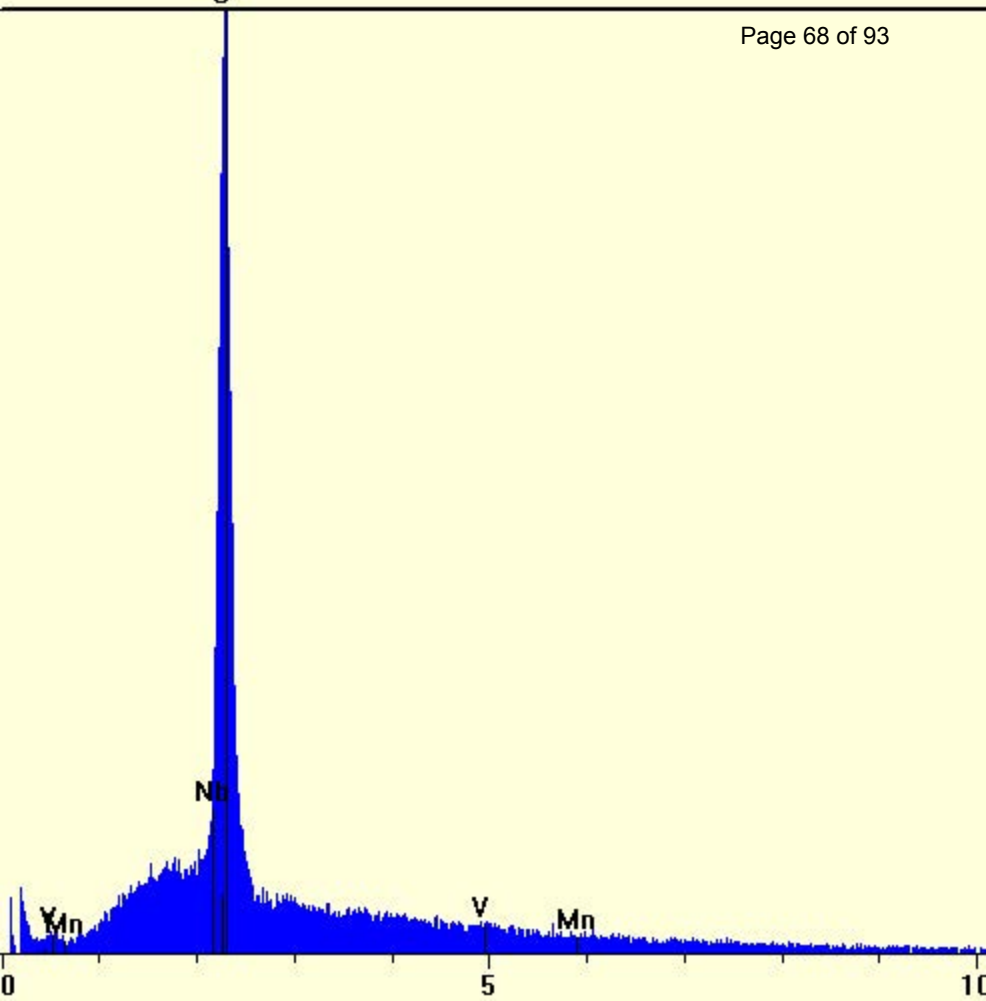












# Raw Petcoke Analyses

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Denver

4955 Yarrow Street

Arvada, CO 80002

Tel: (303)736-0100

TestAmerica Job ID: 280-61195-1

Client Project/Site: Confidential Client

For:

CDM Smith, Inc.

125 South Wacker Drive

Suite 600

Chicago, Illinois 60606

Attn: John Grabs



Authorized for release by:

10/30/2014 4:35:31 PM

Donna Rydberg, Senior Project Manager

(303)736-0192

[donna.rydberg@testamericainc.com](mailto:donna.rydberg@testamericainc.com)

### LINKS

Review your project  
results through

**TotalAccess**

Have a Question?



Visit us at:

[www.testamericainc.com](http://www.testamericainc.com)

*The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

1

2

3

4

5

6

7

8

9

10

11

12

13



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Definitions . . . . .	5
Detection Summary . . . . .	6
Method Summary . . . . .	7
Sample Summary . . . . .	8
Client Sample Results . . . . .	9
QC Sample Results . . . . .	10
QC Association . . . . .	15
Chronicle . . . . .	16
Receipt Checklists . . . . .	17
Chain of Custody . . . . .	18



Client: CDM Smith, Inc.  
Project/Site: Confidential Client

TestAmerica Job ID: 280-61195-1

**Job ID: 280-61195-1**

Laboratory: TestAmerica Denver

**Narrative**

**CASE NARRATIVE**

**Client: CDM Smith, Inc.**

**Project: Confidential Client**

**Report Number: 280-61195-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

**RECEIPT**

The sample was received on 10/14/2014 at 10:35 AM; the sample arrived in good condition and properly preserved. The temperature of the cooler at receipt was 21.5°C. Only metals were requested and they do not require thermal preservation.

It was noted at sample login that the relinquished by date listed on the chain-of-custody read 11/14/14; however, since the sample was received at the laboratory on 10/14/14, it was assumed the date was written in error and should have been 10/14/14.

The sample collection date and time were not present on the associated chain-of-custody. The date and time listed on the container label read 10/17/14 08:00. A sampled date of 10/14/14 was logged in for the sample as it would not have been possible at the time for the sample to have been collected on the 17th and received on the 14th. The client was notified on 10/16/2014.

**TOTAL METALS (ICP)**

Sample PetCoke-1 (280-61195-1) was analyzed for Total Metals (ICP) in accordance with EPA SW-846 Method 6010C.

The continuing calibration verification (CCVL) associated with batch 248843 recovered above the upper control limit for Silver. The samples associated with this CCV were below the reporting limit for the affected analytes; therefore, the data have been reported. The following samples are impacted: (CCVL 280-248843/49).

The continuing calibration verification (CCV) associated with batch 248843 recovered above the upper control limit for Cadmium. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported.

Copper was detected in method blank MB 280-247990/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

The LCS for batch 247990 recovered below the lower limits for SiO2, Silica in analytical batch 248843. The associated sample results have been flagged “\*”. This compound has been identified as a poor performing element when analyzed using this method; therefore, corrective action is not initiated.

Several spike recoveries were outside control limits in the MS and MSD associated with batch 250457 and performed on sample PetCoke-1 (280-61195-1). Matrix interference is suspect.



Client: CDM Smith, Inc.  
Project/Site: Confidential Client

TestAmerica Job ID: 280-61195-1

1
2
3
4
5
6
7
8
9
10
11
12
13

---

**Job ID: 280-61195-1 (Continued)**

---

**Laboratory: TestAmerica Denver (Continued)**

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

**TOTAL MERCURY (CVAA)**

Sample PetCoke-1 (280-61195-1) was analyzed for total mercury (CVAA) in accordance with EPA SW-846 Method 7471B.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

**PERCENT SOLIDS**

Sample PetCoke-1 (280-61195-1) was analyzed for percent solids in accordance with ASTM D2216-90.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC exceeds the control limits.
B	Compound was found in the blank and sample.
*	LCS or LCSD exceeds the control limits
F1	MS and/or MSD Recovery exceeds the control limits
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Detection Summary

Client: CDM Smith, Inc.  
 Project/Site: Confidential Client

TestAmerica Job ID: 280-61195-1

**Client Sample ID: PetCoke-1**

**Lab Sample ID: 280-61195-1**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Aluminum	440		9.7	1.5	mg/Kg	1		☼	6010C	Total/NA
Arsenic	0.80	J	1.9	0.64	mg/Kg	1		☼	6010C	Total/NA
Barium	49		0.97	0.074	mg/Kg	1		☼	6010C	Total/NA
Beryllium	0.28	J	0.49	0.032	mg/Kg	1		☼	6010C	Total/NA
Cadmium	0.13	J ^	0.49	0.040	mg/Kg	1		☼	6010C	Total/NA
Calcium	2700		49	14	mg/Kg	1		☼	6010C	Total/NA
Chromium	4.6		1.5	0.056	mg/Kg	1		☼	6010C	Total/NA
Cobalt	1.4		0.97	0.097	mg/Kg	1		☼	6010C	Total/NA
Copper	4.8	B	1.9	0.21	mg/Kg	1		☼	6010C	Total/NA
Iron	1100		15	3.7	mg/Kg	1		☼	6010C	Total/NA
Lead	5.5		0.78	0.26	mg/Kg	1		☼	6010C	Total/NA
Magnesium	670		19	3.6	mg/Kg	1		☼	6010C	Total/NA
Manganese	59		0.97	0.097	mg/Kg	1		☼	6010C	Total/NA
Nickel	230		3.9	0.12	mg/Kg	1		☼	6010C	Total/NA
Phosphorus	37	J	290	1.6	mg/Kg	1		☼	6010C	Total/NA
Potassium	67	J	290	40	mg/Kg	1		☼	6010C	Total/NA
Silver	0.21	J ^	0.97	0.16	mg/Kg	1		☼	6010C	Total/NA
SiO2, Silica	320	*	110	12	mg/Kg	1		☼	6010C	Total/NA
Sodium	340	J	490	57	mg/Kg	1		☼	6010C	Total/NA
Sulfur	5900		15	4.7	mg/Kg	1		☼	6010C	Total/NA
Vanadium	560		1.9	0.091	mg/Kg	1		☼	6010C	Total/NA
Zinc	58		2.9	0.39	mg/Kg	1		☼	6010C	Total/NA
Mercury	58		34	11	ug/Kg	1		☼	7471B	Total/NA

This Detection Summary does not include radiochemical test results.





# Method Summary

Client: CDM Smith, Inc.  
Project/Site: Confidential Client

TestAmerica Job ID: 280-61195-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL DEN
7471B	Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)	SW846	TAL DEN
Moisture	Percent Moisture	EPA	TAL DEN

**Protocol References:**

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100



# Sample Summary

Client: CDM Smith, Inc.  
Project/Site: Confidential Client

TestAmerica Job ID: 280-61195-1

---

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
280-61195-1	PetCoke-1	Solid	10/14/14 08:00	10/14/14 10:35

---

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13

# Client Sample Results

Client: CDM Smith, Inc.  
Project/Site: Confidential Client

TestAmerica Job ID: 280-61195-1

## Method: 6010C - Metals (ICP)

**Client Sample ID: PetCoke-1**  
**Date Collected: 10/14/14 08:00**  
**Date Received: 10/14/14 10:35**

**Lab Sample ID: 280-61195-1**  
**Matrix: Solid**  
**Percent Solids: 98.8**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	440		9.7	1.5	mg/Kg	☼	10/16/14 08:30	10/21/14 23:35	1
Antimony	ND		1.5	0.37	mg/Kg	☼	10/16/14 08:30	10/21/14 04:18	1
Arsenic	0.80	J	1.9	0.64	mg/Kg	☼	10/16/14 08:30	10/21/14 04:18	1
Barium	49		0.97	0.074	mg/Kg	☼	10/16/14 08:30	10/21/14 04:18	1
Beryllium	0.28	J	0.49	0.032	mg/Kg	☼	10/16/14 08:30	10/21/14 04:18	1
Cadmium	0.13	J ^	0.49	0.040	mg/Kg	☼	10/16/14 08:30	10/21/14 04:18	1
Calcium	2700		49	14	mg/Kg	☼	10/16/14 08:30	10/21/14 04:18	1
Chromium	4.6		1.5	0.056	mg/Kg	☼	10/16/14 08:30	10/21/14 23:35	1
Cobalt	1.4		0.97	0.097	mg/Kg	☼	10/16/14 08:30	10/21/14 04:18	1
Copper	4.8	B	1.9	0.21	mg/Kg	☼	10/16/14 08:30	10/21/14 04:18	1
Iron	1100		15	3.7	mg/Kg	☼	10/16/14 08:30	10/21/14 23:35	1
Lead	5.5		0.78	0.26	mg/Kg	☼	10/16/14 08:30	10/21/14 04:18	1
Magnesium	670		19	3.6	mg/Kg	☼	10/16/14 08:30	10/21/14 04:18	1
Manganese	59		0.97	0.097	mg/Kg	☼	10/16/14 08:30	10/21/14 04:18	1
Nickel	230		3.9	0.12	mg/Kg	☼	10/16/14 08:30	10/21/14 23:35	1
Phosphorus	37	J	290	1.6	mg/Kg	☼	10/16/14 08:30	10/21/14 04:18	1
Potassium	67	J	290	40	mg/Kg	☼	10/16/14 08:30	10/21/14 04:18	1
Selenium	ND		1.3	0.84	mg/Kg	☼	10/16/14 08:30	10/21/14 04:18	1
Silver	0.21	J ^	0.97	0.16	mg/Kg	☼	10/16/14 08:30	10/21/14 04:18	1
SiO2, Silica	320	*	110	12	mg/Kg	☼	10/16/14 08:30	10/21/14 04:18	1
Sodium	340	J	490	57	mg/Kg	☼	10/16/14 08:30	10/21/14 04:18	1
Sulfur	5900		15	4.7	mg/Kg	☼	10/16/14 08:30	10/29/14 12:46	1
Thallium	ND		1.2	0.63	mg/Kg	☼	10/16/14 08:30	10/21/14 23:35	1
Vanadium	560		1.9	0.091	mg/Kg	☼	10/16/14 08:30	10/21/14 04:18	1
Zinc	58		2.9	0.39	mg/Kg	☼	10/16/14 08:30	10/21/14 04:18	1

## Method: 7471B - Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

**Client Sample ID: PetCoke-1**  
**Date Collected: 10/14/14 08:00**  
**Date Received: 10/14/14 10:35**

**Lab Sample ID: 280-61195-1**  
**Matrix: Solid**  
**Percent Solids: 98.8**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	58		34	11	ug/Kg	☼	10/17/14 08:30	10/17/14 13:45	1

## General Chemistry

**Client Sample ID: PetCoke-1**  
**Date Collected: 10/14/14 08:00**  
**Date Received: 10/14/14 10:35**

**Lab Sample ID: 280-61195-1**  
**Matrix: Solid**

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	1.2		0.10	0.10	%			10/16/14 09:41	1
Percent Solids	99		0.10	0.10	%			10/16/14 09:41	1

# QC Sample Results

Client: CDM Smith, Inc.  
Project/Site: Confidential Client

TestAmerica Job ID: 280-61195-1

## Method: 6010C - Metals (ICP)

**Lab Sample ID: MB 280-247990/1-A**  
**Matrix: Solid**  
**Analysis Batch: 248843**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 247990**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		1.5	0.38	mg/Kg		10/16/14 08:30	10/21/14 04:13	1
Arsenic	ND		2.0	0.66	mg/Kg		10/16/14 08:30	10/21/14 04:13	1
Barium	ND		1.0	0.076	mg/Kg		10/16/14 08:30	10/21/14 04:13	1
Beryllium	ND		0.50	0.033	mg/Kg		10/16/14 08:30	10/21/14 04:13	1
Cadmium	ND	^	0.50	0.041	mg/Kg		10/16/14 08:30	10/21/14 04:13	1
Calcium	ND		50	14	mg/Kg		10/16/14 08:30	10/21/14 04:13	1
Cobalt	ND		1.0	0.10	mg/Kg		10/16/14 08:30	10/21/14 04:13	1
Copper	0.248	J	2.0	0.22	mg/Kg		10/16/14 08:30	10/21/14 04:13	1
Lead	ND		0.80	0.27	mg/Kg		10/16/14 08:30	10/21/14 04:13	1
Magnesium	ND		20	3.7	mg/Kg		10/16/14 08:30	10/21/14 04:13	1
Manganese	ND		1.0	0.10	mg/Kg		10/16/14 08:30	10/21/14 04:13	1
Phosphorus	ND		300	1.6	mg/Kg		10/16/14 08:30	10/21/14 04:13	1
Potassium	ND		300	41	mg/Kg		10/16/14 08:30	10/21/14 04:13	1
Selenium	ND		1.3	0.86	mg/Kg		10/16/14 08:30	10/21/14 04:13	1
Silver	ND	^	1.0	0.16	mg/Kg		10/16/14 08:30	10/21/14 04:13	1
SiO2, Silica	ND		110	12	mg/Kg		10/16/14 08:30	10/21/14 04:13	1
Sodium	ND		500	59	mg/Kg		10/16/14 08:30	10/21/14 04:13	1
Vanadium	ND		2.0	0.094	mg/Kg		10/16/14 08:30	10/21/14 04:13	1
Zinc	ND		3.0	0.40	mg/Kg		10/16/14 08:30	10/21/14 04:13	1

**Lab Sample ID: MB 280-247990/1-A**  
**Matrix: Solid**  
**Analysis Batch: 249004**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 247990**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		10/16/14 08:30	10/21/14 23:30	1
Chromium	ND		1.5	0.058	mg/Kg		10/16/14 08:30	10/21/14 23:30	1
Iron	ND		15	3.8	mg/Kg		10/16/14 08:30	10/21/14 23:30	1
Nickel	ND		4.0	0.12	mg/Kg		10/16/14 08:30	10/21/14 23:30	1
Thallium	ND		1.2	0.65	mg/Kg		10/16/14 08:30	10/21/14 23:30	1

**Lab Sample ID: MB 280-247990/1-A**  
**Matrix: Solid**  
**Analysis Batch: 250457**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 247990**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfur	ND		15	4.9	mg/Kg		10/16/14 08:30	10/29/14 12:40	1

**Lab Sample ID: LCS 280-247990/2-A**  
**Matrix: Solid**  
**Analysis Batch: 248843**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 247990**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	50.0	51.4		mg/Kg		103	82 - 110
Arsenic	100	91.6		mg/Kg		92	85 - 110
Barium	200	189		mg/Kg		94	87 - 112
Beryllium	5.00	4.72		mg/Kg		94	84 - 114
Cadmium	10.0	10.8	^	mg/Kg		108	87 - 110
Calcium	5000	4890		mg/Kg		98	82 - 114

TestAmerica Denver

# QC Sample Results

Client: CDM Smith, Inc.  
Project/Site: Confidential Client

TestAmerica Job ID: 280-61195-1

## Method: 6010C - Metals (ICP) (Continued)

**Lab Sample ID: LCS 280-247990/2-A**

**Matrix: Solid**

**Analysis Batch: 248843**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

**Prep Batch: 247990**

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Cobalt	50.0	46.9		mg/Kg		94	87 - 110
Copper	25.0	25.9		mg/Kg		104	88 - 110
Lead	50.0	48.6		mg/Kg		97	86 - 110
Magnesium	5000	4540		mg/Kg		91	90 - 110
Manganese	50.0	47.6		mg/Kg		95	88 - 110
Phosphorus	1000	1090		mg/Kg		109	80 - 112
Potassium	5000	4720		mg/Kg		94	89 - 110
Selenium	200	211		mg/Kg		105	83 - 110
Silver	5.00	5.35	^	mg/Kg		107	87 - 114
SiO2, Silica	2140	182	*	mg/Kg		8	10 - 70
Sodium	5000	5330		mg/Kg		107	90 - 112
Vanadium	50.0	48.8		mg/Kg		98	88 - 110
Zinc	50.0	46.4		mg/Kg		93	76 - 114

**Lab Sample ID: LCS 280-247990/2-A**

**Matrix: Solid**

**Analysis Batch: 249004**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

**Prep Batch: 247990**

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Aluminum	200	196		mg/Kg		98	82 - 116
Chromium	20.0	20.6		mg/Kg		103	84 - 114
Iron	100	98.2		mg/Kg		98	87 - 120
Nickel	50.0	51.0		mg/Kg		102	87 - 110
Thallium	200	198		mg/Kg		99	84 - 110

**Lab Sample ID: LCS 280-247990/2-A**

**Matrix: Solid**

**Analysis Batch: 250457**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

**Prep Batch: 247990**

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Sulfur	200	200		mg/Kg		100	80 - 120

**Lab Sample ID: 280-61195-1 MS**

**Matrix: Solid**

**Analysis Batch: 248843**

**Client Sample ID: PetCoke-1**

**Prep Type: Total/NA**

**Prep Batch: 247990**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS	MS	Unit	D	%Rec	%Rec. Limits
				Result	Qualifier				
Antimony	ND		46.4	23.4		mg/Kg	☼	50	20 - 200
Arsenic	0.80	J	92.9	87.2		mg/Kg	☼	93	76 - 111
Barium	49		186	227		mg/Kg	☼	96	52 - 159
Beryllium	0.28	J	4.64	4.76		mg/Kg	☼	96	72 - 105
Cadmium	0.13	J ^	9.29	10.3	^	mg/Kg	☼	109	40 - 130
Calcium	2700		4640	7260		mg/Kg	☼	99	43 - 165
Cobalt	1.4		46.4	45.0		mg/Kg	☼	94	72 - 106
Copper	4.8	B	23.2	27.4		mg/Kg	☼	97	37 - 187
Lead	5.5		46.4	50.6		mg/Kg	☼	97	70 - 200
Magnesium	670		4640	4980		mg/Kg	☼	93	64 - 145
Manganese	59		46.4	104		mg/Kg	☼	96	40 - 200
Phosphorus	37	J	929	1080		mg/Kg	☼	112	75 - 125



# QC Sample Results

Client: CDM Smith, Inc.  
Project/Site: Confidential Client

TestAmerica Job ID: 280-61195-1

## Method: 6010C - Metals (ICP) (Continued)

**Lab Sample ID: 280-61195-1 MS**

**Matrix: Solid**

**Analysis Batch: 248843**

**Client Sample ID: PetCoke-1**

**Prep Type: Total/NA**

**Prep Batch: 247990**

Analyte	Sample	Sample	Spike	MS		Unit	D	%Rec	%Rec.	
	Result	Qualifier		Result	Qualifier				Limits	Limits
Potassium	67	J	4640	4500		mg/Kg	☼	95	56 - 172	
Selenium	ND		186	203	F1	mg/Kg	☼	109	76 - 104	
Silver	0.21	J ^	4.64	4.86	^	mg/Kg	☼	100	75 - 141	
SiO2, Silica	320	*	1990	887		mg/Kg	☼	28	20 - 200	
Sodium	340	J	4640	5380		mg/Kg	☼	108	78 - 111	
Vanadium	560		46.4	596	4	mg/Kg	☼	69	50 - 169	
Zinc	58		46.4	99.8		mg/Kg	☼	91	70 - 200	

**Lab Sample ID: 280-61195-1 MS**

**Matrix: Solid**

**Analysis Batch: 249004**

**Client Sample ID: PetCoke-1**

**Prep Type: Total/NA**

**Prep Batch: 247990**

Analyte	Sample	Sample	Spike	MS		Unit	D	%Rec	%Rec.	
	Result	Qualifier		Result	Qualifier				Limits	Limits
Aluminum	440		186	1080	F1	mg/Kg	☼	341	50 - 200	
Chromium	4.6		18.6	23.6		mg/Kg	☼	102	70 - 200	
Iron	1100		92.9	1150	4	mg/Kg	☼	37	70 - 200	
Nickel	230		46.4	256	4	mg/Kg	☼	56	61 - 126	
Thallium	ND		186	120	F1	mg/Kg	☼	64	78 - 101	

**Lab Sample ID: 280-61195-1 MS**

**Matrix: Solid**

**Analysis Batch: 250457**

**Client Sample ID: PetCoke-1**

**Prep Type: Total/NA**

**Prep Batch: 247990**

Analyte	Sample	Sample	Spike	MS		Unit	D	%Rec	%Rec.	
	Result	Qualifier		Result	Qualifier				Limits	Limits
Sulfur	5900		186	5340	4	mg/Kg	☼	-320	80 - 120	

**Lab Sample ID: 280-61195-1 MSD**

**Matrix: Solid**

**Analysis Batch: 248843**

**Client Sample ID: PetCoke-1**

**Prep Type: Total/NA**

**Prep Batch: 247990**

Analyte	Sample	Sample	Spike	MSD		Unit	D	%Rec	%Rec.		RPD	
	Result	Qualifier		Result	Qualifier				Limits	RPD	Limit	
Antimony	ND		46.0	20.2		mg/Kg	☼	44	20 - 200	15	20	
Arsenic	0.80	J	92.0	86.4		mg/Kg	☼	93	76 - 111	1	20	
Barium	49		184	226		mg/Kg	☼	96	52 - 159	1	20	
Beryllium	0.28	J	4.60	4.70		mg/Kg	☼	96	72 - 105	1	20	
Cadmium	0.13	J ^	9.20	10.1	^	mg/Kg	☼	108	40 - 130	2	20	
Calcium	2700		4600	7220		mg/Kg	☼	99	43 - 165	1	20	
Cobalt	1.4		46.0	44.4		mg/Kg	☼	94	72 - 106	1	20	
Copper	4.8	B	23.0	26.6		mg/Kg	☼	95	37 - 187	3	20	
Lead	5.5		46.0	49.2		mg/Kg	☼	95	70 - 200	3	20	
Magnesium	670		4600	4940		mg/Kg	☼	93	64 - 145	1	20	
Manganese	59		46.0	102		mg/Kg	☼	93	40 - 200	2	20	
Phosphorus	37	J	920	1060		mg/Kg	☼	111	75 - 125	2	20	
Potassium	67	J	4600	4450		mg/Kg	☼	95	56 - 172	1	20	
Selenium	ND		184	200	F1	mg/Kg	☼	109	76 - 104	2	20	
Silver	0.21	J ^	4.60	4.86	^	mg/Kg	☼	101	75 - 141	0	20	
SiO2, Silica	320	*	1970	809		mg/Kg	☼	25	20 - 200	9	20	
Sodium	340	J	4600	5280		mg/Kg	☼	108	78 - 111	2	20	
Vanadium	560		46.0	594	4	mg/Kg	☼	65	50 - 169	0	20	

TestAmerica Denver

# QC Sample Results

Client: CDM Smith, Inc.  
Project/Site: Confidential Client

TestAmerica Job ID: 280-61195-1

## Method: 6010C - Metals (ICP) (Continued)

**Lab Sample ID: 280-61195-1 MSD**  
**Matrix: Solid**  
**Analysis Batch: 248843**

**Client Sample ID: PetCoke-1**  
**Prep Type: Total/NA**  
**Prep Batch: 247990**

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	RPD
	Result	Qualifier	Added	Result	Qualifier				Limits		Limit
Zinc	58		46.0	97.3		mg/Kg	✱	86	70 - 200	2	20

**Lab Sample ID: 280-61195-1 MSD**  
**Matrix: Solid**  
**Analysis Batch: 249004**

**Client Sample ID: PetCoke-1**  
**Prep Type: Total/NA**  
**Prep Batch: 247990**

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	RPD
	Result	Qualifier	Added	Result	Qualifier				Limits		Limit
Aluminum	440		184	1070	F1	mg/Kg	✱	338	50 - 200	1	20
Chromium	4.6		18.4	23.8		mg/Kg	✱	104	70 - 200	1	20
Iron	1100		92.0	1100	4	mg/Kg	✱	-16	70 - 200	4	20
Nickel	230		46.0	257	4	mg/Kg	✱	60	61 - 126	1	20
Thallium	ND		184	114	F1	mg/Kg	✱	62	78 - 101	5	20

**Lab Sample ID: 280-61195-1 MSD**  
**Matrix: Solid**  
**Analysis Batch: 250457**

**Client Sample ID: PetCoke-1**  
**Prep Type: Total/NA**  
**Prep Batch: 247990**

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	RPD
	Result	Qualifier	Added	Result	Qualifier				Limits		Limit
Sulfur	5900		184	5560	4	mg/Kg	✱	-203	80 - 120	4	20

## Method: 7471B - Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

**Lab Sample ID: MB 280-248286/1-A**  
**Matrix: Solid**  
**Analysis Batch: 248619**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 248286**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Mercury	ND		17	5.5	ug/Kg		10/17/14 08:30	10/17/14 13:38	1

**Lab Sample ID: LCS 280-248286/2-A**  
**Matrix: Solid**  
**Analysis Batch: 248619**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 248286**

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec.
							Added
Mercury	417	446		ug/Kg		107	87 - 111

**Lab Sample ID: LCSD 280-248286/3-A**  
**Matrix: Solid**  
**Analysis Batch: 248619**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 248286**

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec	%Rec.	RPD	RPD
							Added		Result
Mercury	417	459		ug/Kg		110	87 - 111	3	20

# QC Sample Results

Client: CDM Smith, Inc.  
Project/Site: Confidential Client

TestAmerica Job ID: 280-61195-1

## Method: Moisture - Percent Moisture

Lab Sample ID: 280-61209-A-3 DU  
Matrix: Solid  
Analysis Batch: 248188

Client Sample ID: Duplicate  
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Percent Moisture	3.7		3.6		%		4	20
Percent Solids	96		96		%		0.1	20

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13

# QC Association Summary

Client: CDM Smith, Inc.  
Project/Site: Confidential Client

TestAmerica Job ID: 280-61195-1

## Metals

### Prep Batch: 247990

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-61195-1	PetCoke-1	Total/NA	Solid	3050B	
280-61195-1 MS	PetCoke-1	Total/NA	Solid	3050B	
280-61195-1 MSD	PetCoke-1	Total/NA	Solid	3050B	
LCS 280-247990/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 280-247990/1-A	Method Blank	Total/NA	Solid	3050B	

### Prep Batch: 248286

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-61195-1	PetCoke-1	Total/NA	Solid	7471B	
LCS 280-248286/2-A	Lab Control Sample	Total/NA	Solid	7471B	
LCSD 280-248286/3-A	Lab Control Sample Dup	Total/NA	Solid	7471B	
MB 280-248286/1-A	Method Blank	Total/NA	Solid	7471B	

### Analysis Batch: 248619

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-61195-1	PetCoke-1	Total/NA	Solid	7471B	248286
LCS 280-248286/2-A	Lab Control Sample	Total/NA	Solid	7471B	248286
LCSD 280-248286/3-A	Lab Control Sample Dup	Total/NA	Solid	7471B	248286
MB 280-248286/1-A	Method Blank	Total/NA	Solid	7471B	248286

### Analysis Batch: 248843

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-61195-1	PetCoke-1	Total/NA	Solid	6010C	247990
280-61195-1 MS	PetCoke-1	Total/NA	Solid	6010C	247990
280-61195-1 MSD	PetCoke-1	Total/NA	Solid	6010C	247990
LCS 280-247990/2-A	Lab Control Sample	Total/NA	Solid	6010C	247990
MB 280-247990/1-A	Method Blank	Total/NA	Solid	6010C	247990

### Analysis Batch: 249004

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-61195-1	PetCoke-1	Total/NA	Solid	6010C	247990
280-61195-1 MS	PetCoke-1	Total/NA	Solid	6010C	247990
280-61195-1 MSD	PetCoke-1	Total/NA	Solid	6010C	247990
LCS 280-247990/2-A	Lab Control Sample	Total/NA	Solid	6010C	247990
MB 280-247990/1-A	Method Blank	Total/NA	Solid	6010C	247990

### Analysis Batch: 250457

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-61195-1	PetCoke-1	Total/NA	Solid	6010C	247990
280-61195-1 MS	PetCoke-1	Total/NA	Solid	6010C	247990
280-61195-1 MSD	PetCoke-1	Total/NA	Solid	6010C	247990
LCS 280-247990/2-A	Lab Control Sample	Total/NA	Solid	6010C	247990
MB 280-247990/1-A	Method Blank	Total/NA	Solid	6010C	247990

## General Chemistry

### Analysis Batch: 248188

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-61195-1	PetCoke-1	Total/NA	Solid	Moisture	
280-61209-A-3 DU	Duplicate	Total/NA	Solid	Moisture	



# Lab Chronicle

Client: CDM Smith, Inc.  
Project/Site: Confidential Client

TestAmerica Job ID: 280-61195-1

**Client Sample ID: PetCoke-1**

**Lab Sample ID: 280-61195-1**

**Date Collected: 10/14/14 08:00**

**Matrix: Solid**

**Date Received: 10/14/14 10:35**

**Percent Solids: 98.8**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.04 g	100 mL	247990	10/16/14 08:30	WDS	TAL DEN
Total/NA	Analysis	6010C		1	1.04 g	100 mL	248843	10/21/14 04:18	LLB	TAL DEN
Total/NA	Prep	3050B			1.04 g	100 mL	247990	10/16/14 08:30	WDS	TAL DEN
Total/NA	Analysis	6010C		1	1.04 g	100 mL	249004	10/21/14 23:35	SJS	TAL DEN
Total/NA	Prep	3050B			1.04 g	100 mL	247990	10/16/14 08:30	WDS	TAL DEN
Total/NA	Analysis	6010C		1	1.04 g	100 mL	250457	10/29/14 12:46	SJS	TAL DEN
Total/NA	Prep	7471B			0.30 g	50 mL	248286	10/17/14 08:30	CGG	TAL DEN
Total/NA	Analysis	7471B		1	0.30 g	50 mL	248619	10/17/14 13:45	CGG	TAL DEN
Total/NA	Analysis	Moisture		1			248188	10/16/14 09:41	OB1	TAL DEN

**Laboratory References:**

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100





## Login Sample Receipt Checklist

Client: CDM Smith, Inc.

Job Number: 280-61195-1

Login Number: 61195

List Source: TestAmerica Denver

List Number: 1

Creator: Muniz, Ashley T

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	
Cooler Temperature is acceptable.	True	Received same day of collection; chilling process has begun.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	False	No date or time on COC. See job narrative for details.
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



280-61195 Chain of Custody

# CHAIN OF CUSTODY RECORD

CDM		PetCoke				Analysis																		
NOTES: Results to burgessr@cdmsmith.com Other Instructions and Notes												Total Phosphorus		X										
												Total Sulfur		X										
												TAL Metals		X										
SAMPLE NUMBER	DATE	TIME	MATRIX	Preservative	Type & No. of Containers																			
PetCoke-1	na		Solid	na																				
Relinquished by: (Signature) 						Date/Time		Received for Laboratory by: (Signature)																
						11/14/14 0800		 1035 14 Oct 14																
Received by: (Signature) 						Date/Time		Airbit No. (s)																
								NA																
												Laboratory:		Test America Denver										

21.5 R/L to  
 14 Oct 14





www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

## ANALYTICAL SUMMARY REPORT

December 01, 2014

CDM Federal Programs  
555 17th St Ste 1100  
Denver, CO 80202

Work Order: H14120001

Project Name: PetCoke

Energy Laboratories Inc Helena MT received the following 1 sample for CDM Federal Programs on 12/1/2014 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
H14120001-001	Petcoke Material	11/26/14 12:00	12/01/14	Solid	Sulfur Forms Soil Preparation

The analyses presented in this report were performed by Energy Laboratories, Inc., 3161 E. Lyndale Ave., Helena, MT 59604, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

The results as reported relate only to the item(s) submitted for testing.

If you have any questions regarding these test results, please call.

Report Approved By:



## Work Order Sample Summary

**CLIENT:** CDM Federal Programs  
**Project:** PetCoke  
**Work Order:** H14120001

**Report Date:** 12/01/14

---

Lab ID	Client Sample ID	Collection Date	Date Received
H14120001-001	Petcoke Material	11/26/2014 12:00:00 PM	12/1/2014



www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

## LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

**Client:** CDM Federal Programs  
**Project:** PetCoke  
**Lab ID:** H14120001-001  
**Client Sample ID:** Petcoke Material

**Report Date:** 12/01/14  
**Collection Date:** 11/26/14 12:00  
**DateReceived:** 12/01/14  
**Matrix:** Solid

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>ACID BASE</b>							
Sulfur, Total	5.14	%		0.01		E3.2.3	12/01/14 12:51 / stp

**Report Definitions:** RL - Analyte reporting limit.  
QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.





www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

## QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** CDM Federal Programs

**Report Date:** 12/01/14

**Project:** PetCoke

**Work Order:** H14120001

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method:</b> E3.2.3									Batch: R102535
<b>Lab ID:</b> LCS1412011240	Laboratory Control Sample								Run: LECO632_141201A 12/01/14 12:40
Sulfur, Total	0.432	%	0.010	94	80	120			
<b>Lab ID:</b> H14120001-001ADUP	Sample Duplicate								Run: LECO632_141201A 12/01/14 12:54
Sulfur, Total	5.11	%	0.010				0.6	30	

### Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



# Workorder Receipt Checklist

CDM Federal Programs

H14120001

Login completed by: Skyler T. Pester

Date Received: 12/1/2014

Reviewed by: BL2000\sdull

Received by: wjj

Reviewed Date: 12/1/2014

Carrier FedEx Express  
name:

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on all shipping container(s)/cooler(s)?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on all sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Not Applicable <input type="checkbox"/>
Container/Temp Blank temperature:	15.3°C No Ice		
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Applicable <input checked="" type="checkbox"/>

## Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

## Contact and Corrective Action Comments:

No collection time on COC or sample. Sample collection time estimated in laboratory. No time on the COC when client relinquished the COC. Relinquished date on COC is 12/26/14 - sample was received in the laboratory on 12/1/2014. 12/1/2014 stp

# CHAIN OF CUSTODY RECORD

CDM		Project: PetCoke				Analysis												Other Instructions and Notes
NOTES: Results To Todd Burgess/burgess@cdmsmith.com phone 303-319-5043																		
SAMPLE NUMBER	DATE	TIME	MATRIX	Preservative	Type & No. of Containers													
Petcoke Material	11/26/14		solid	na	1 snap cap													Results by Wednesday 12/3/14
						Total Sulfur by Leco Furnace												
						X												
						Received for Laboratory by: (Signature)												
						Date/Time												
						12/22/14												
						Airbill No.(s)												
						NA												
						Received by: (Signature)												
						Date/Time												
						11/26/2014												
						Laboratory:												
						Energy Labs												

Fed Ex Express  
 8 Ice  
 8 Temp Blank 15.3  
 RUSH  
 H4120001