



Compliance and Enforcement Division

INCIDENT REPORT

**PBF Energy Martinez Refining Company (MRC), Site # A0011
3485 Pacheco Blvd Martinez, CA
Update - December 9, 2022**

On November 25, 2022, Air District staff responded to complaints from Martinez residents alleging dust/fallout at their homes and on their cars. The source of the fallout was the Martinez Refining Company (MRC).

On November 26, 2022, Air District staff continued its investigation into the incident. Air District staff met with representatives of MRC at the refinery to gather additional information about the event and subsequent fallout in the neighboring areas. MRC stated they experienced a process unit upset at their Fluid Catalytic Cracking Unit (FCCU). MRC representatives informed Air District staff on the 26th that the FCCU was back to normal operations, and they did not anticipate any additional issues.

An FCCU is composed of three pieces: the reactor, the regenerator, and the fractionator. The area of concern for the fallout event includes the reactor and regenerator. In the reactor, a heavy oil feed stock is introduced to steam and catalyst. The catalyst causes bonds within the longer carbon chain product to crack into smaller carbon chain products, therefore producing several types of products that can be further treated and used within the refinery. Once the reaction is complete, the reactor contains "spent catalyst" and the cracked products. The spent catalyst now contains deposited carbon, or coke, and it reduces the reactivity of the catalyst. Therefore, the spent catalyst needs to be regenerated by burning off the coke in the regenerator. As the coke is burned off the spent catalyst, flue gas is created and must be separated from the catalyst itself. The regenerated catalyst and flue gas are separated using cyclones; then the regenerated catalyst is re-used in the reactor and the flue gas is sent to MRCs Carbon Monoxide Boilers (COBs). These boilers use the flue gas as fuel to provide steam for the refinery, however, the flue gas can still contain small quantities of catalyst. MRCs COBs are equipped with abatement devices called Electrostatic Precipitators (ESPs). ESPs use electricity to remove catalyst and other particulate matter that remains entrained in the flue gas.

Under normal operations, the ESPs are online to prevent opacity excesses. However, MRC electively shuts down the ESPs during startup and shutdown of the FCCU as part of their safety protocols. On late Sunday night 11/20/22, MRCs FCCU experienced a unit upset. From the early morning of Monday 11/21/22 to Friday 11/25/22, MRC was restarting the FCCU back to normal operations. As a result, MRCs ESPs were offline from Monday 11/21/22 to Friday 11/25/22. There was no abatement control that could prevent an opacity excess at the COBs during this period of time.

Air District staff has found that MRC recorded 12 indicated opacity excesses at the COBs between 11/24/22 and 11/25/22. These opacity excesses were caused by spent catalyst exiting the COB stacks. MRC has provided the Air District a rough estimate that between 20-24 tons of catalyst was lost during these two days which is the equivalent to the weight of an average fire truck. The Air District has been provided with the data for these excesses and is evaluating the data to determine the extent of the violation.

In addition, Air District staff took samples at the complaint locations in the community and from the identified source in the refinery. These samples were analyzed by two laboratories and the results

confirmed the source of the dust deposited throughout the Downtown Martinez community was spent catalyst from MRCs FCCU. The test results determined the catalyst primarily contained element such as Carbon (C) (trace), Oxygen (O), Magnesium (MG), Aluminum (Al), Sulphur (S) and Silica (Si), however, it also contained trace elements of heavy metals such as nickel (Ni), vanadium (V), chromium (Cr), and zinc (Zn). The test results are attached to this report.

Air District staff has been in constant contact with MRC since the incident and has toured the FCCU and COBs and spoken with operations and process engineering staff to begin to determine the root cause of this event and determine compliance with all applicable air quality regulations. The Air District has already issued a Notice of Violation (#A60836) to MRC for violating Bay Area Air Quality Management District Regulation 1, Section 301 (Public Nuisance) due to the fallout into the community.

The Air District is continuing its investigation of the event. We are working closely with Contra Costa County Health Department and officials from the City of Martinez. We will provide additional updates once we obtain further information.

Sample Analysis Results



McC Campbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 2211J04

Report Created for: BAAQMD

375 Beale Street Suite 600
San Francisco, CA 94105

Project Contact: [REDACTED]

Project P.O.:

Project: MRC

Project Received: 11/30/2022

Analytical Report reviewed & approved for release on 12/01/2022 by:

Jennifer Lagerbom

Project Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in a case narrative.





Glossary of Terms & Qualifier Definitions

Client: BAAQMD

WorkOrder: 2211J04

Project: MRC

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
CPT	Consumer Product Testing not NELAP Accredited
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
LQL	Lowest Quantitation Level
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	MDL is the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results. Definition and Procedure for the Determination of the Method Detection Limit, Revision 2, 40CFR, Part 136, Appendix B, EPA 821-R-16-006, December 2016.
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NA	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting limit is the lowest level that can be reliably determined within specified limits of precision and accuracy during routine laboratory operating conditions. (The RL cannot be lower than the lowest calibration standard used in the initial calibration of the instrument and must be greater than the MDL.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
TZA	TimeZone Net Adjustment for sample collected outside of MAI's UTC.
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)



Glossary of Terms & Qualifier Definitions

Client: BAAQMD

WorkOrder: 2211J04

Project: MRC

Analytical Qualifiers

a7 Reporting limit raised due to limited sample amount.



Analytical Report

Client: BAAQMD
Date Received: 11/30/2022 14:37
Date Prepared: 11/30/2022
Project: MRC

WorkOrder: 2211J04
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
1- [REDACTED]	2211J04-001A	Solid	11/26/2022 12:56	ICP-MS5 110SMPL.d	259224

Analytes	Result	RL	DF	Date Analyzed
Antimony	ND	24	1	12/01/2022 10:08
Arsenic	ND	24	1	12/01/2022 10:08
Barium	ND	240	1	12/01/2022 10:08
Beryllium	ND	24	1	12/01/2022 10:08
Cadmium	ND	24	1	12/01/2022 10:08
Chromium	ND	24	1	12/01/2022 10:08
Cobalt	ND	24	1	12/01/2022 10:08
Copper	ND	24	1	12/01/2022 10:08
Lead	ND	24	1	12/01/2022 10:08
Mercury	ND	2.4	1	12/01/2022 10:08
Molybdenum	ND	24	1	12/01/2022 10:08
Nickel	160	24	1	12/01/2022 10:08
Selenium	ND	24	1	12/01/2022 10:08
Silver	ND	24	1	12/01/2022 10:08
Thallium	ND	24	1	12/01/2022 10:08
Vanadium	570	24	1	12/01/2022 10:08
Zinc	ND	240	1	12/01/2022 10:08

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	109	70-130	12/01/2022 10:08

Analyst(s): AL

Analytical Comments: a7



Analytical Report

Client: BAAQMD
Date Received: 11/30/2022 14:37
Date Prepared: 11/30/2022
Project: MRC

WorkOrder: 2211J04
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
2- [REDACTED]	2211J04-002A	Solid	11/26/2022 13:18	ICP-MS5 113SMPL.d	259224

Analytes	Result	RL	DF	Date Analyzed
Antimony	ND	3.4	1	12/01/2022 10:19
Arsenic	ND	3.4	1	12/01/2022 10:19
Barium	86	34	1	12/01/2022 10:19
Beryllium	ND	3.4	1	12/01/2022 10:19
Cadmium	ND	3.4	1	12/01/2022 10:19
Chromium	15	3.4	1	12/01/2022 10:19
Cobalt	6.5	3.4	1	12/01/2022 10:19
Copper	23	3.4	1	12/01/2022 10:19
Lead	12	3.4	1	12/01/2022 10:19
Mercury	ND	0.34	1	12/01/2022 10:19
Molybdenum	ND	3.4	1	12/01/2022 10:19
Nickel	200	3.4	1	12/01/2022 10:19
Selenium	3.8	3.4	1	12/01/2022 10:19
Silver	ND	3.4	1	12/01/2022 10:19
Thallium	ND	3.4	1	12/01/2022 10:19
Vanadium	580	3.4	1	12/01/2022 10:19
Zinc	61	34	1	12/01/2022 10:19

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	106	70-130	12/01/2022 10:19

Analyst(s): AL

Analytical Comments: a7



Analytical Report

Client: BAAQMD
Date Received: 11/30/2022 14:37
Date Prepared: 11/30/2022
Project: MRC

WorkOrder: 2211J04
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
3- [REDACTED]	2211J04-003A	Solid	11/26/2022 13:31	ICP-MS5 114SMPL.d	259224

Analytes	Result	RL	DF	Date Analyzed
Antimony	ND	13	1	12/01/2022 10:22
Arsenic	ND	13	1	12/01/2022 10:22
Barium	ND	130	1	12/01/2022 10:22
Beryllium	ND	13	1	12/01/2022 10:22
Cadmium	ND	13	1	12/01/2022 10:22
Chromium	16	13	1	12/01/2022 10:22
Cobalt	ND	13	1	12/01/2022 10:22
Copper	26	13	1	12/01/2022 10:22
Lead	ND	13	1	12/01/2022 10:22
Mercury	ND	1.3	1	12/01/2022 10:22
Molybdenum	ND	13	1	12/01/2022 10:22
Nickel	200	13	1	12/01/2022 10:22
Selenium	ND	13	1	12/01/2022 10:22
Silver	ND	13	1	12/01/2022 10:22
Thallium	ND	13	1	12/01/2022 10:22
Vanadium	610	13	1	12/01/2022 10:22
Zinc	200	130	1	12/01/2022 10:22

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	107	70-130	12/01/2022 10:22

Analyst(s): AL

Analytical Comments: a7



Analytical Report

Client: BAAQMD
Date Received: 11/30/2022 14:37
Date Prepared: 11/30/2022
Project: MRC

WorkOrder: 2211J04
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
4- [REDACTED]	2211J04-004A	Solid	11/26/2022 13:07	ICP-MS5 115SMPL.d	259224

Analytes	Result	RL	DF	Date Analyzed
Antimony	ND	340	1	12/01/2022 10:26
Arsenic	ND	340	1	12/01/2022 10:26
Barium	ND	3400	1	12/01/2022 10:26
Beryllium	ND	340	1	12/01/2022 10:26
Cadmium	ND	340	1	12/01/2022 10:26
Chromium	ND	340	1	12/01/2022 10:26
Cobalt	ND	340	1	12/01/2022 10:26
Copper	ND	340	1	12/01/2022 10:26
Lead	ND	340	1	12/01/2022 10:26
Mercury	ND	34	1	12/01/2022 10:26
Molybdenum	ND	340	1	12/01/2022 10:26
Nickel	ND	340	1	12/01/2022 10:26
Selenium	ND	340	1	12/01/2022 10:26
Silver	ND	340	1	12/01/2022 10:26
Thallium	ND	340	1	12/01/2022 10:26
Vanadium	510	340	1	12/01/2022 10:26
Zinc	19,000	3400	1	12/01/2022 10:26

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	105	70-130	12/01/2022 10:26

Analyst(s): AL

Analytical Comments: a7



Analytical Report

Client: BAAQMD
Date Received: 11/30/2022 14:37
Date Prepared: 11/30/2022
Project: MRC

WorkOrder: 2211J04
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
6- [REDACTED]	2211J04-006A	Solid	11/26/2022 14:15	ICP-MS5 116SMPL.d	259224

Analytes	Result	RL	DF	Date Analyzed
Antimony	ND	0.50	1	12/01/2022 10:29
Arsenic	5.8	0.50	1	12/01/2022 10:29
Barium	63	5.0	1	12/01/2022 10:29
Beryllium	0.68	0.50	1	12/01/2022 10:29
Cadmium	ND	0.50	1	12/01/2022 10:29
Chromium	15	0.50	1	12/01/2022 10:29
Cobalt	7.9	0.50	1	12/01/2022 10:29
Copper	29	0.50	1	12/01/2022 10:29
Lead	12	0.50	1	12/01/2022 10:29
Mercury	ND	0.050	1	12/01/2022 10:29
Molybdenum	12	0.50	1	12/01/2022 10:29
Nickel	200	0.50	1	12/01/2022 10:29
Selenium	3.5	0.50	1	12/01/2022 10:29
Silver	ND	0.50	1	12/01/2022 10:29
Thallium	ND	0.50	1	12/01/2022 10:29
Vanadium	510	2.5	5	12/01/2022 10:48
Zinc	16	5.0	1	12/01/2022 10:29

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	96	70-130	12/01/2022 10:29

Analyst(s): AL



Quality Control Report

Client: BAAQMD
Date Prepared: 11/30/2022
Date Analyzed: 12/01/2022
Instrument: ICP-MS5
Matrix: Soil
Project: MRC

WorkOrder: 2211J04
BatchID: 259224
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/kg
Sample ID: MB/LCS/LCSD-259224

QC Summary Report for Metals

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Antimony	ND	0.12	0.50	-	-	-
Arsenic	ND	0.11	0.50	-	-	-
Barium	ND	0.71	5.0	-	-	-
Beryllium	ND	0.10	0.50	-	-	-
Cadmium	ND	0.092	0.50	-	-	-
Chromium	ND	0.13	0.50	-	-	-
Cobalt	ND	0.064	0.50	-	-	-
Copper	ND	0.13	0.50	-	-	-
Lead	ND	0.065	0.50	-	-	-
Mercury	ND	0.038	0.050	-	-	-
Molybdenum	ND	0.092	0.50	-	-	-
Nickel	ND	0.080	0.50	-	-	-
Selenium	ND	0.21	0.50	-	-	-
Silver	ND	0.057	0.50	-	-	-
Thallium	ND	0.072	0.50	-	-	-
Vanadium	ND	0.11	0.50	-	-	-
Zinc	ND	2.5	5.0	-	-	-
Surrogate Recovery						
Terbium	540			500	108	70-130



Quality Control Report

Client: BAAQMD
Date Prepared: 11/30/2022
Date Analyzed: 12/01/2022
Instrument: ICP-MS5
Matrix: Soil
Project: MRC

WorkOrder: 2211J04
BatchID: 259224
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/kg
Sample ID: MB/LCS/LCSD-259224

QC Summary Report for Metals

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Antimony	50	51	50	100	101	75-125	1.27	20
Arsenic	50	51	50	100	102	75-125	1.93	20
Barium	510	510	500	102	101	75-125	0.512	20
Beryllium	51	52	50	102	104	75-125	1.21	20
Cadmium	51	52	50	101	103	75-125	1.92	20
Chromium	48	49	50	96	98	75-125	1.70	20
Cobalt	52	52	50	103	104	75-125	1.25	20
Copper	51	52	50	101	104	75-125	2.70	20
Lead	49	50	50	98	100	75-125	2.04	20
Mercury	1.2	1.3	1.25	100	102	75-125	2.46	20
Molybdenum	51	52	50	102	103	75-125	0.840	20
Nickel	50	51	50	100	103	75-125	2.53	20
Selenium	49	52	50	97	104	75-125	7.10	20
Silver	50	51	50	101	102	75-125	0.809	20
Thallium	50	51	50	100	102	75-125	2.01	20
Vanadium	50	51	50	100	102	75-125	1.88	20
Zinc	500	510	500	101	103	75-125	2.10	20
Surrogate Recovery								
Terbium	530	540	500	106	108	70-130	1.58	20

**Optical and Scanning Electron Microscopic with Dispersive X-ray Analysis
(SEM/EDS) Analysis**

Bay Area Air Quality
[REDACTED]

375 Beale ST
San Francisco CA 94105

PO#: 37208

Job ID:

Site:

Pages: 1/6

Client Number: C2763

Report Number: P019036

Analyst: BT

Date Received: 11/28/22

Date Reported: 12/01/22

Material received: Five samples (5) plastic bags of collected unknown material (Samples 1-5) were received and one (sample 6, exemplar) to compare to the other 5 samples. All samples were received sealed and in good condition.

Purpose of Examination: Characterize and identify the unknown particulate collected from cars at the following Locations:

Sample #	[REDACTED]	Description of samples
Sample 1	[REDACTED]	Unknown White Powder
Sample 2	[REDACTED]	Unknown White Powder
Sample 3	[REDACTED]	Unknown White Powder
Sample 4	[REDACTED]	Unknown White Powder
Sample 5	[REDACTED]	Unknown White Powder
Sample	[REDACTED]	White Powder (Exemplar)

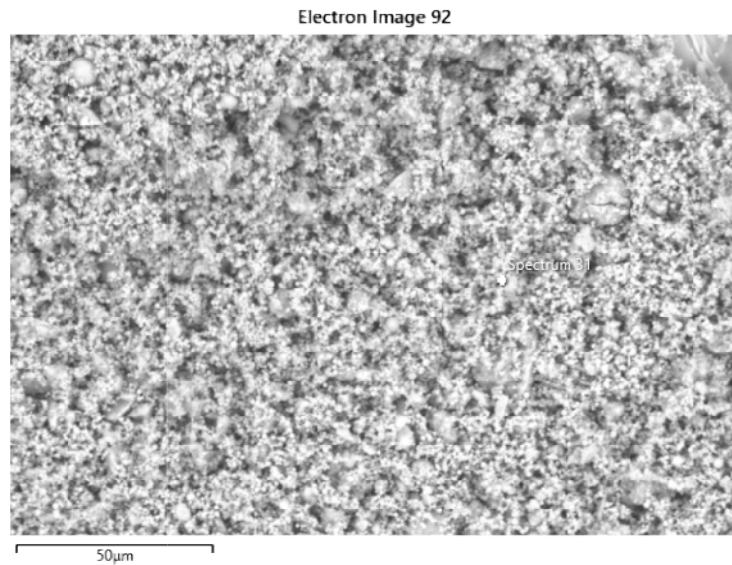
Examination of Material: The above listed samples were examined in the Particle Identification Department (PID). Samples 1-5 were compared to sample 6 (exemplar). The samples were initially examined by low magnification stereomicroscopy. Samples 1-5 were white in color and appeared to be granular in morphology. Sample 6 was a very fine white particulate. Small portion of each sample were placed onto double sided Carbon tape for SEM/EDS analysis.

Results/Conclusions: SEM/EDS analysis of sample six showed a fine homogeneous particulate (See image 1). The EDS analysis found the particles consisted of Carbon (C) (trace), Oxygen (O), Magnesium (MG), Aluminum (Al), Sulphur (S) and Silica (Si). (See spectra 32, spectra 1). Sample 1 appears to be "spalded" which is indicative of the particles exposed to high heat (see Image 2). The particles were brittle and friable. The EDS analysis of the particles found them to consist of Carbon (C) (trace), Oxygen (O), Magnesium (MG), Aluminum (Al), Sulphur (S) and Silica (Si) with Trace amounts (0.1 weight percent) of Sodium (Na) and Calcium (Ca) (See Spectra 2). Samples 2-5 were consistent in morphology to sample 1 and in chemistry with varying trace amounts (0.1 weight percent) of Iron (Fe) and Titanium (TI) (see images 3-6

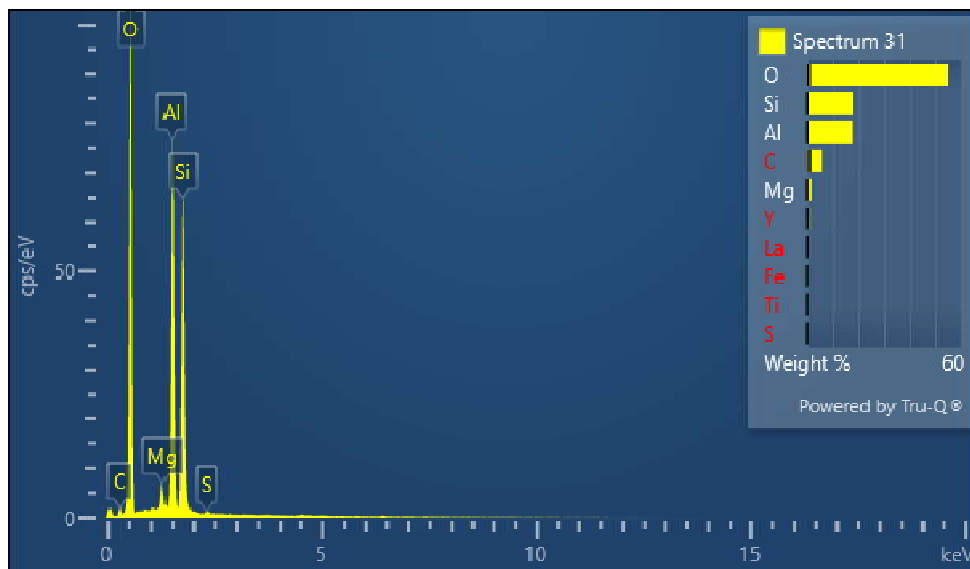
Optical and Scanning Electron Microscopic with Dispersive X-ray Analysis (SEM/EDS) Analysis

and spectra 3-6). Based on the chemistry of samples 1-5, they are chemically consistent with sample 6. The difference in morphology could be due to heating.

Image 1 of Particulate from Sample 6

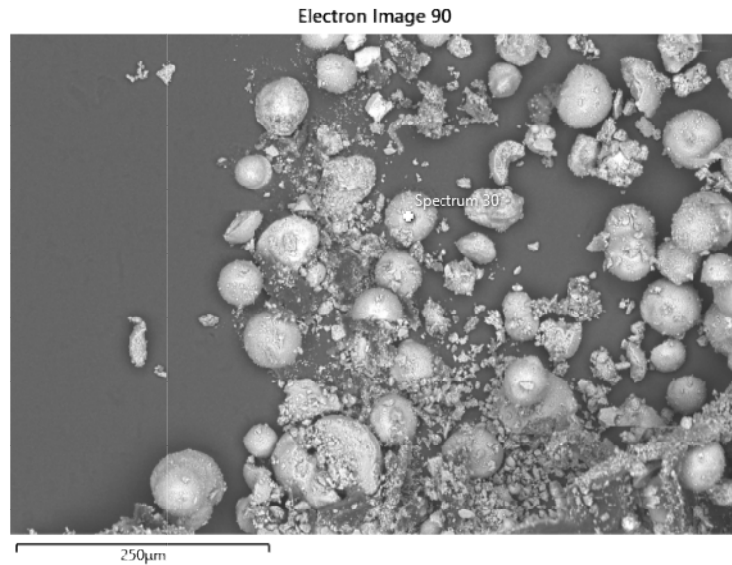


Spectra 1 showing the Exemplar chemistry of the particles from sample 6

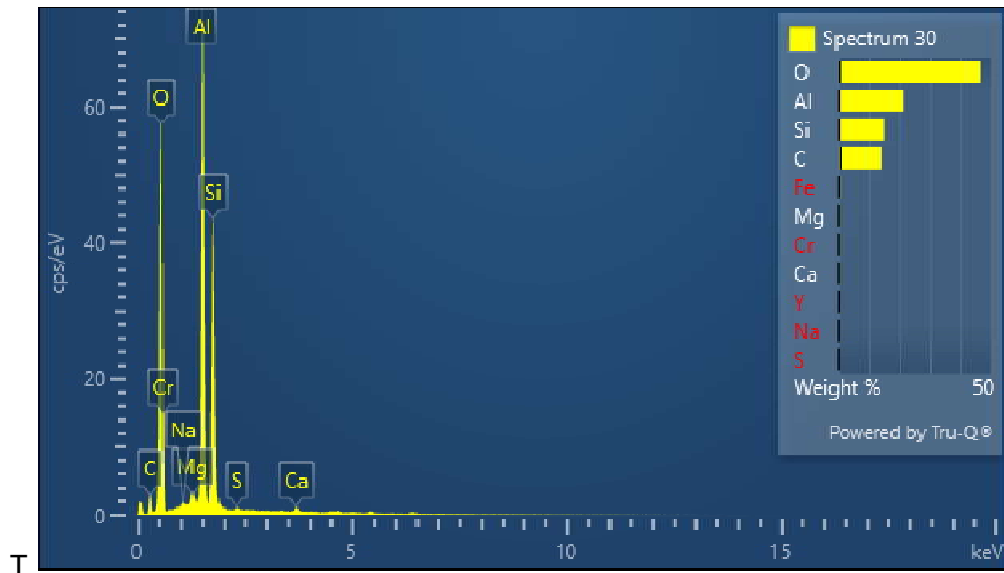


Optical and Scanning Electron Microscopic with Dispersive X-ray Analysis (SEM/EDS) Analysis

Image 2 of Sample 1 showing the spherical appearance of the particles (Spalded)

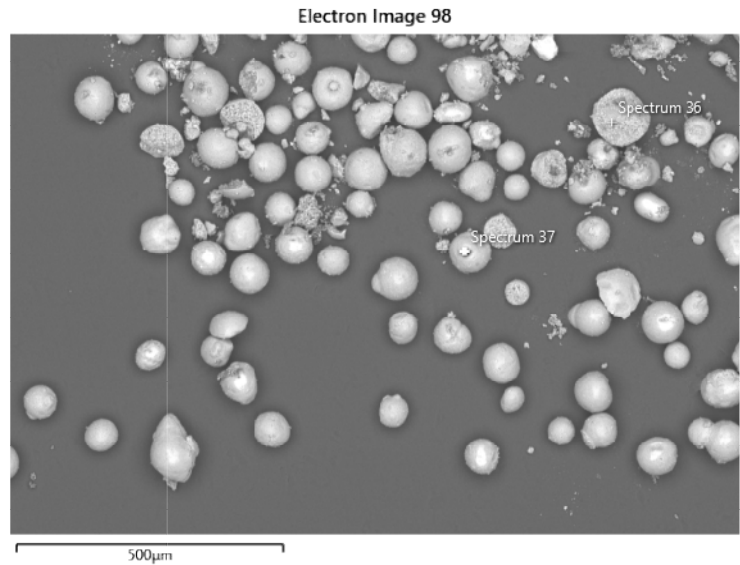


Spectra 2 showing the chemistry of the particles from Sample 1

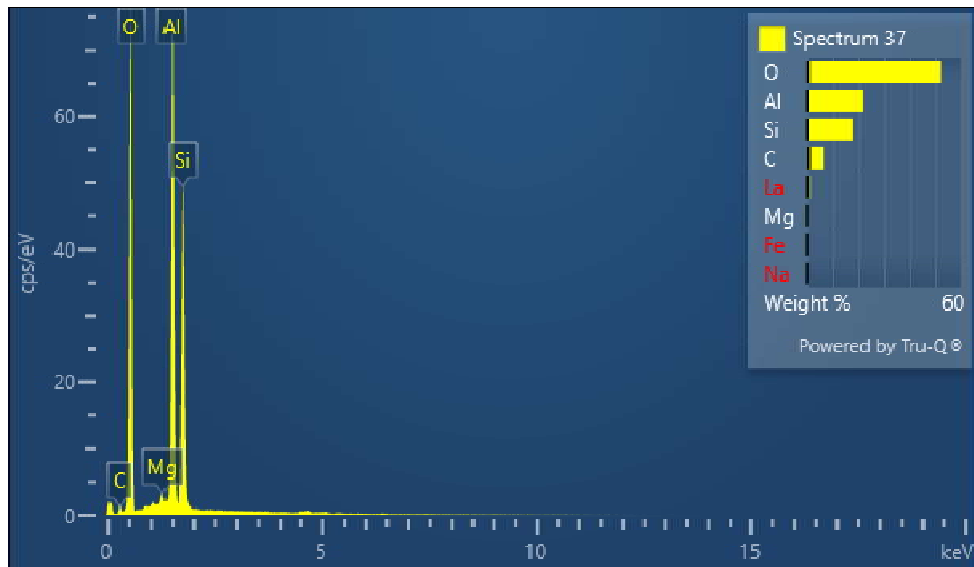


Optical and Scanning Electron Microscopic with Dispersive X-ray Analysis (SEM/EDS) Analysis

Image 3 showing The morphology of particles from Sample 2

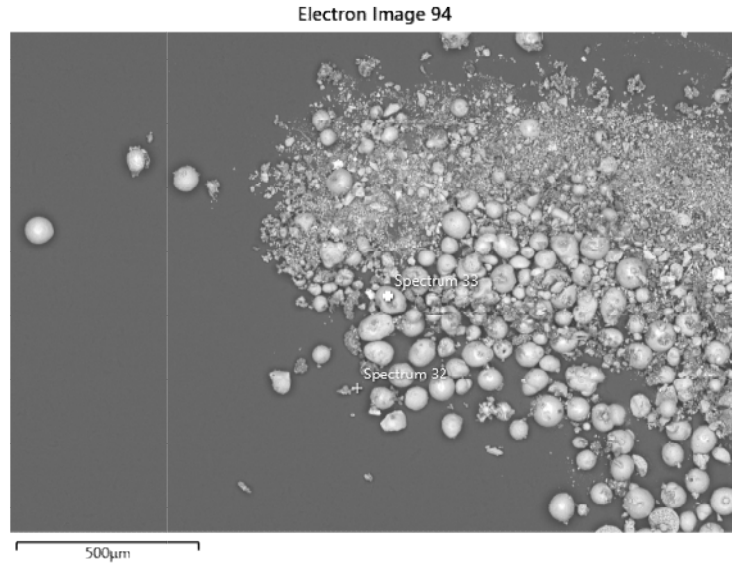


Spectra 2 showing the chemistry of particles from Sample 2

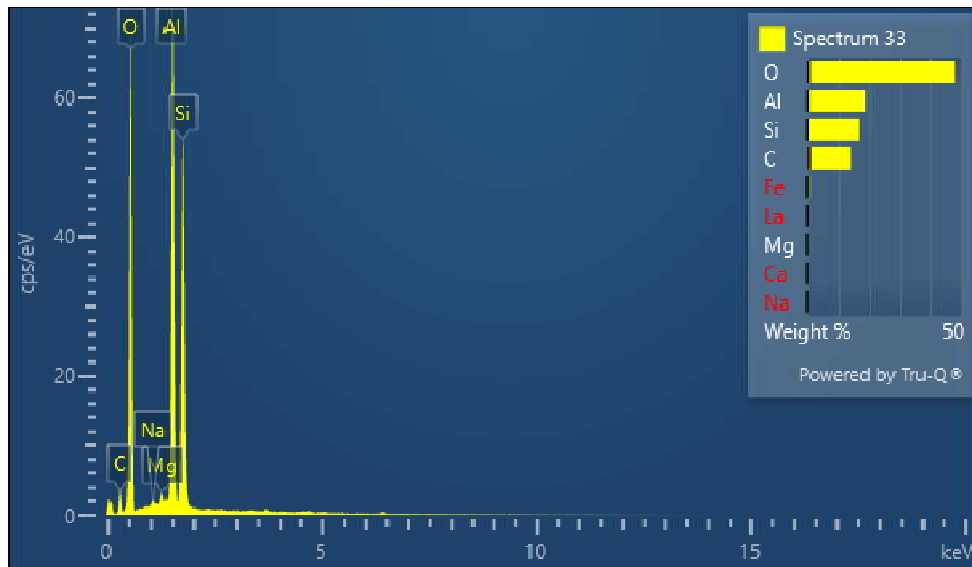


Optical and Scanning Electron Microscopic with Dispersive X-ray Analysis (SEM/EDS) Analysis

Image 4 showing particles morphology from Sample 3

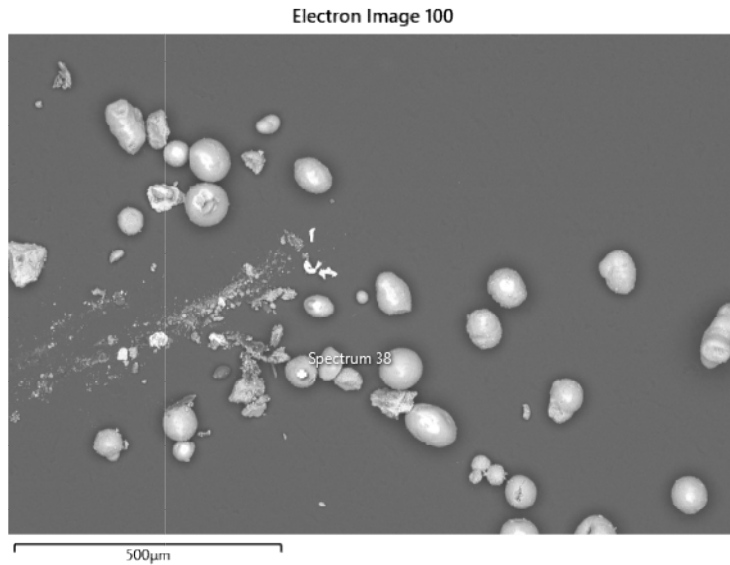


Spectra 4 showing the chemistry of the particles from sample 3

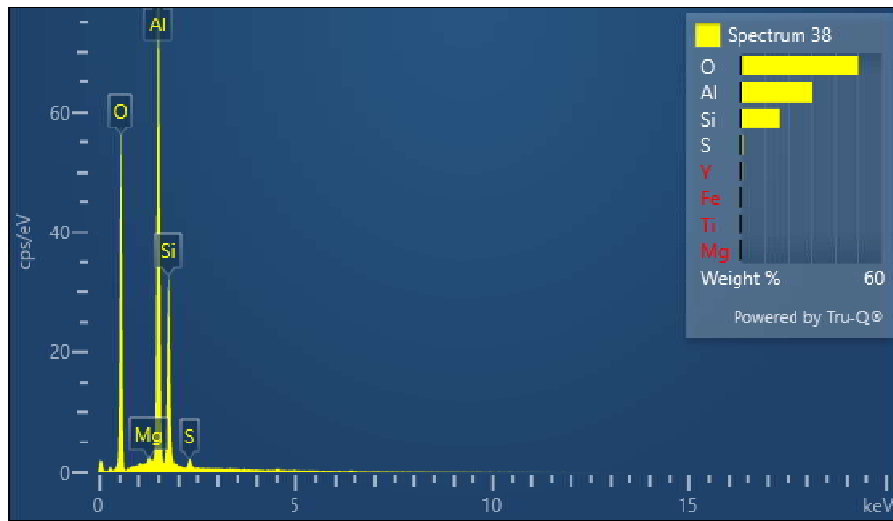


Optical and Scanning Electron Microscopic with Dispersive X-ray Analysis (SEM/EDS) Analysis

Image 5 showing particles morphology from Sample 4

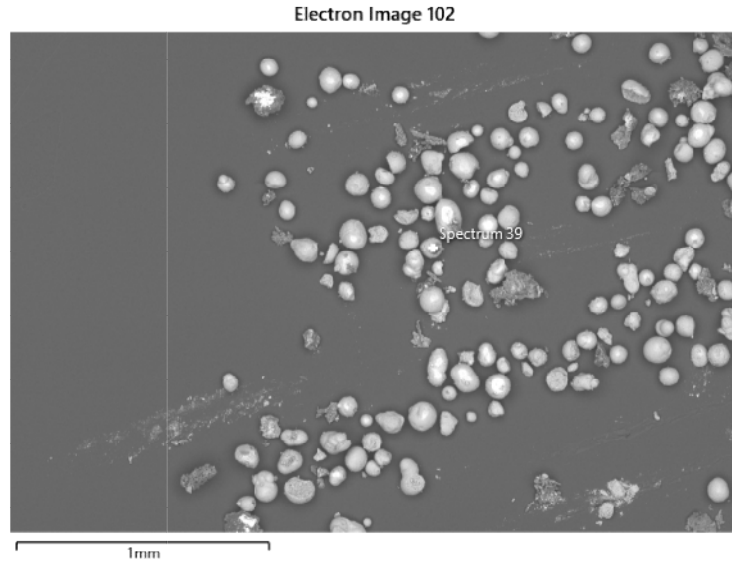


Spectra 5 showing the chemistry of the particles from sample 4

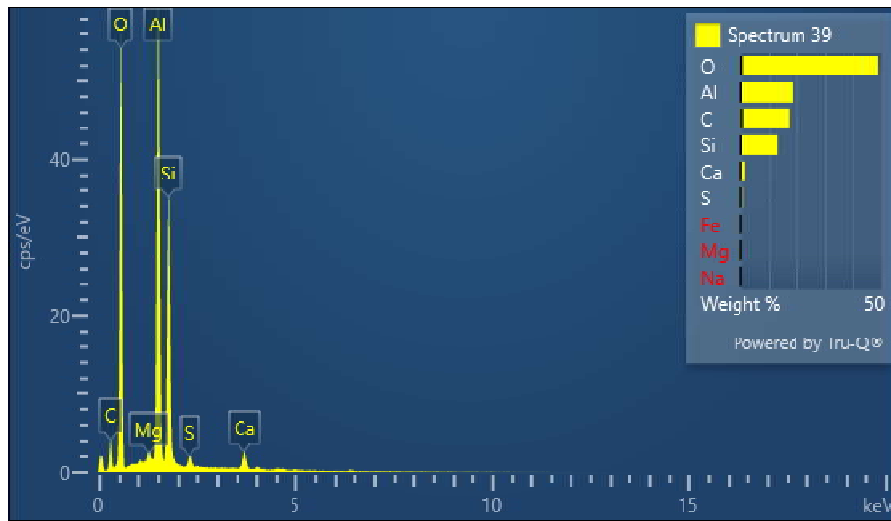


Optical and Scanning Electron Microscopic with Dispersive X-ray Analysis (SEM/EDS) Analysis

Image 6 showing particles morphology from Sample 5



Spectra 6 showing the chemistry of the particles from sample 5



B Thomas

Bernard Thomas
Technical Manager