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CHARACTERIZATION OF THE WYMARK CO_2 RESERVOIR: A NATURAL ANALOG TO LONG-TERM CO_2 STORAGE AT WEYBURN

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EXECUTIVE SUMMARY

Natural accumulations of CO_2 occur in the Duperow and other Devonian strata on the western flank of the Williston Basin in lithologies very similar to those into which anthropogenic CO_2 is being injected as part of an EOR program in the Weyburn-Midale pool. Previous workers have established the stratgraphic and petrographic similarities between the Duperow and Midale beds (Lake and Whittaker, 2004 and 2006). As the CO_2 accumulations in the Devonian strata may be as old as 50 Ma, this similarity provides confidence in the efficacy of long-term geologic sequestration of CO_2 in the Midale-Weyburn pool. Here we attempt to extend this comparison with whole rock and mineral chemistry using the same sample suite used by Lake and Whittaker. We provide XRD, XRF, and electron microprobe analysis of major constituent minerals along with extensive backscattered electron and x-ray imaging to identify trace phases and silicate minerals. LPNORM analysis is used to quantify modal concentrations of minerals species. Samples from depth intervals where CO_2 has been observed are compared to those where CO_2 was absent, with no systematic differences in mineral composition observed. Gas accumulation can be correlated with sample porosity. In particular gas-bearing samples from the Eastend region are more porous than the overlying gas-free samples. Silicate minerals are rare in the Duperow carbonates, never exceeding 3 wt%. As such, mineral trapping is precluded in these lithologies. The geochemical data presented here will be used for comparison with a similar geochemical-mineralogical study of the Midale (Durocher et al., 2003) in a subsequent report.

1. Introduction

Carbon dioxide is currently being injected into Mississipian carbonates of the Williston Basin at the Weyburn Field (Figure 1). This EOR program provides an opportunity to monitor the subsurface physical and chemical processes associated with active CO_2 injection, and to evaluate the potential of fractured carbonate reservoirs as hosts for CO_2 sequestration, and serves as the primary goal of the Weyburn Project. While the results can be used to validate models of migration, storage and mineralization, evalution of long-term storage, > 1000 years, requires significant extrapolation. Natural occurrences of carbonate minerals, cements and CO_2-rich gases, demonstrate the ability of the Earth's crust to successfully sequester CO_2 over geologic time, and may provide an opportunity to assess the efficacy of long-term storage, adding greater confidence to engineered subsurface CO_2 storage.

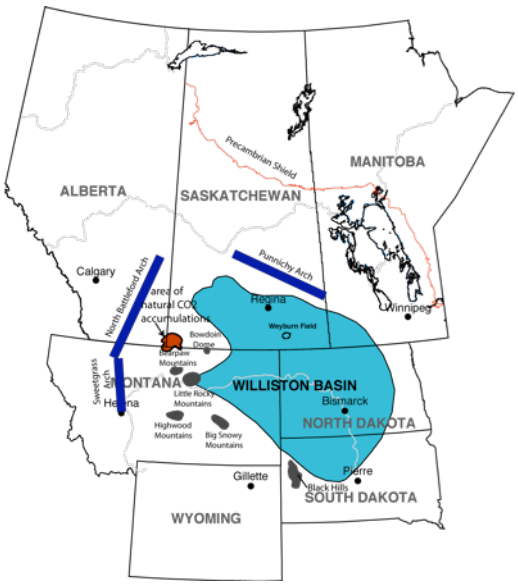


Figure 1. Map showing the location of the Williston Basin and natural CO_2 occurrences (shown in red) in southwestern Saskatchewan relative to the location of the Weyburn CO_2 injection site (From Lake and Whittaker, 2006).

The Williston Basin is composed of a Paleozoic-Cenozoic sequence of thick limestone and dolomite, with lesser thicknesses of sandstones, siltsones, shales, and evaporites deposited on Precambrian basement. The sediments reach a maximum thickness of ~5 km and the stratigraphy is essentially continuous across the oval-shaped. The Weyburn Oil Pool lies in the north-central region of the Basin and CO_2 is currently being injected into the Mississipian Midale Formation. On the western flank of the basin, about 400 km west of the Weyburn injection site, CO_2 accumulations have been observed in the Devonian carbonates and Cambrian siliciclastics (Lane, 1987). Inert gases with variable amounts of CO_2, N_2, and He are generally trapped within the Devonian strata of the Duperow carbonates, and found predominately within the Middle and Upper Units of the Wymark Member (Table 1). The probable origin of the CO_2 is decarbonation reactions associated with intrusion of alkalic magma into limestone units in the Bearpaw and Little Rocky Mountain areas in Montana, 50 m.y. ago (Figure 2). The CO_2 migrated north and was trapped in the Paleozoic units. Importantly, natural gas analyses from the overlying Mesozoic strata in this region reveal no detectable CO_2, arguing that the system of traps and seals within the Duperow Formation has trapped CO_2 as a gaseous phase for close to 50 m.y. As such, the CO_2 accumulations within the Duperow constitute a natural analog for CO_2 sequestration

in a carbonate reservoir. Similarities between Duperow Formation and the Midale Beds can, therefore, provide an important test of long-term CO_2 sequestration in the Midale units.

Lake and Whittaker (2004) compared the structural, sedimentalogic and petrographic features of the Duperow and Midale strata, demonstrating the overall similarities between these units. The Duperow and Midale are characterized as cyclic shallow water deposits with porous intervals sealed by impermeable evaporite deposits, the Dinsmore and Midale evaporates, respectively. They also demonstrated a striking

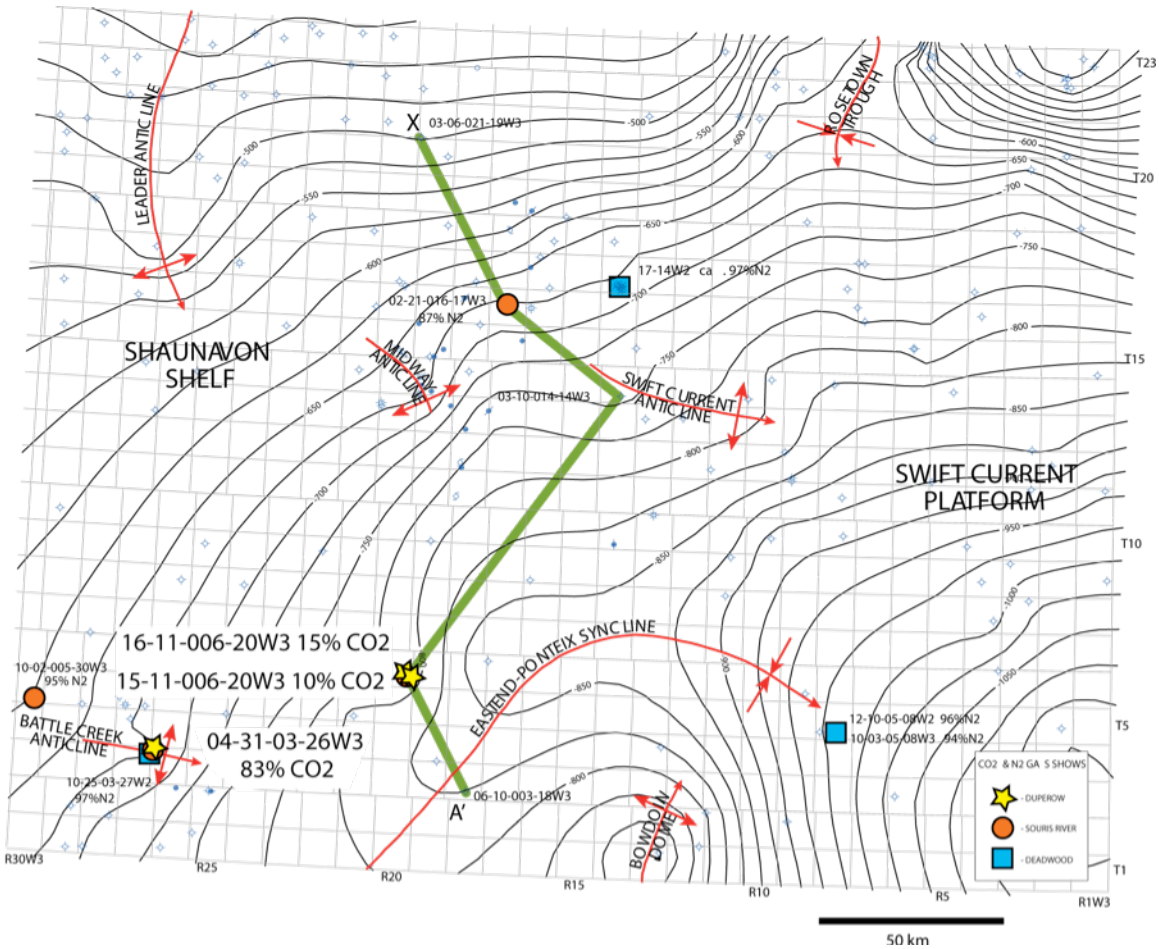


Figure 2. Structure map of the Duperow Formation displaying the wells from which inert gas samples high in CO_2 or N_2 have been observed (after Lake and Whittaker, 2006). Of particular interest are the Eastend (16-11-006020W3, 15-11-006-20W3) and Battle Creek Wells (04-31-03-26W3).

similarity between the reservoir petrography in both locations. Here we provide a baseline mineralogic and chemical characterization of the samples used in their petrographic analysis, similar to that of Durocher et al. (2003) for the Midale reservoir. The results of these investigations will be the focus of a subsequent report.

Table 1. Sample core locations and mineralogy

Wymark core	Well	Unit	Mineralogy	Mol% CO_2
3-10-14-14-W3M 5555	T.W. Wymark #1	Wymark Middle	Cal, Do (Fl)	-
3-10-14-14-W3M 5627	T.W. Wymark #1	Wymark Middle	Anhy, Do, Cal	-
4-14-18-16 W3M 4827	Norcanoil Pennant	Wymark Upper	Do, Cal, (Qtz)	-
4-31-3-26 W3M 5163	Imp. Battle Cr.	Wymark Upper	Do, Anhy, (Py)	81.3
4-31-3-26 W3M 5164	Imp. Battle Cr.	Wymark Upper	Do, Anhy, (Py)	81.3
4-31-3-26 W3M 5627	Imp. Battle Cr.	Wymark Middle	Cal, Do, Anhy (Fl)	81.3
4-31-3-26 W3M 5632	Imp. Battle Cr.	Wymark Middle	Cal, Do, Anhy	82.6
4-31-3-26 W3M 5642	Imp. Battle Cr.	Wymark Middle	Cal, Do, (Py)	-
5-7-14-10 W3M 5288	Braddock	Wymark Upper	Anhy, Cal, Do, (Py), (Ksp)	-
5-7-14-10 W3M 5413	Braddock	Wymark Upper	Do, Anhy, $SrSO_3$, (Py)	-
10-32-183 W3M 4596	Parkbeg Cr #1	Upper Birdbear	Do, Anhy, (Fl)	-
10-32-183 W3M 4639	Parkbeg Cr #1	Lower Birdbear	Do, Anhy, (Py), (Ksp)	-
10-32-183 W3M 4645	Parkbeg Cr #1	Lower Birdbear	Do, Anhy, (Py), (Ksp)	-
10-32-183 W3M 4746	Parkbeg Cr #1	Basal Seward B.	Do, (Py), (Ksp)	-
10-32-183 W3M 4813	Parkbeg Cr #1	Basal Seward A	Do, Cal, Anhy, $SrSO_3$, (Py)	-
Eastend Core				
15-11-6-20 W3M 6014	T.W. Eastend Cr. #1	Wymark Upper	Anhy, Do, (Py), (Qtz)	-
15-11-6-20 W3M 6029	T.W. Eastend Cr. #1	Wymark Upper	Cal, Do, An, (Py), (Qtz)	-
15-11-6-20 W3M 6040	T.W. Eastend Cr. #1	Wymark Upper	Anhy, Do, (Py)	2.8
15-11-6-20 W3M 6053	T.W. Eastend Cr. #1	Wymark Upper	Cal, Do, (Py)	2.8
15-11-6-20 W3M 6059	T.W. Eastend Cr. #1	Wymark Upper	Cal, Do, Anhy, (Py)	9.56
15-11-6-20 W3M 6070	T.W. Eastend Cr. #1	Wymark Upper	Cal, Do, Anhy, (Py)	9.56
15-11-6-20 W3M 6141	T.W. Eastend Cr. #1	Wymark Middle	Cal, Do, An, (Qtz)	9.56
15-11-6-20 W3M 6161	T.W. Eastend Cr. #1	Wymark Middle	Cal, Do, Anhy, (Qtz)	9.56

Cal=calcite, Do=Dolomite, Anhy=Anhydrite, Fl=Fluorite, Py=Pyrite, Qtz=Quartz, Ksp=K-Feldspar, (xx) = trace constituent

Last 4 digits in sample name give the depth in ft.

2. Analytical Methods

Sample well locations and depths, along with the CO_2 concentrations in the drillstem gas samples are give in Table 1. Electron microprobe analysis was performed on the same polished thin sections characterized petrographically by Lake and Whittaker (2004). In addition we retrieved bulk samples for adjacent core for XRF and XRD analysis.

2.1 X-ray Flourescence Analysis (XRF)

The XRF analyses were performed at the XRF laboratory at Michigan State University under the direction of Thomas Vogel. Analyses were performed on a Bruker S4 PIONEER, a 4 kW wavelength dispersive X-ray fluorescence spectrometer (WDXRF). The S4 PIONEER with advanced 4 kW tube provides highest sensitivity especially for light elements and trace elements due to optimized beam geometry and very thin Beryllium XRF tube window used in combination with software optimized excitation parameters for each element analyzed. Data reduction is performed with Bruker's SPECTRAplus software using fundamental parameters. The samples were prepared by fusion and Li-tetraborate. The samples were analyzed for Si, Al, Fe, Mn, Mg, Ca, Na, K, P and S, along with trace elements Cr, Ni, Cu, Zn, Rb, Sr, Y, Nb, Ba and La. Sr was the only trace element routinely above detection limits. The analyses are given in Table 2. The high "loss on ignition" (LOI) reflect the loss of CO_2 during fusion. Analyses are typically within 2% of standard values on a relative basis.

2.2 X-ray Diffraction Analysis (XRD)

X-ray powder diffraction analysis performed on a Rigaku Geigerflex D-MAX/A Diffractometer using Cu-Ka radiation in the Dept. on Earth and Planetary Sciences at Washington University under the direction of Paul Carpenter. The instrument is equipped with a vertical goniometer and a scintillation counter. Analyses were obtained at 35kV and 35mA and acquired using PC-based Datascan software by MDI and processed using Jade software. The software "search-match" routines were used for peak identification. All x-ray patterns are presented in Appendix A.

2.3 Electron Microprobe analysis (EPMA)

Electron microprobe analyses were performed on a JEOL-8200 at Lawrence Livermore National Laboratory. The instrument was operated at 15 kV with a beam current of 5 na and a 5 μm diameter spot. Higher beam currents resulted in beam damage to some of the carbonate minerals. Analysis locations were obtained in the following sequence: (1) a "synoptic" backscattered electron map was obtained for the entire thin section at by assembling 40X maps into a mosaic (Appendix B), x-ray maps were also acquired (Appendix C), (2) the synoptic maps were then used to establish an analysis grid for point-by-point analysis of the sample. (3) The synoptic maps were used to locate area of interest from which higher magnification

backscattered electron maps and x-ray maps were acquired. (4) Point analyses were obtained in areas where mineral zoning was observed. The analytical results are given in Appendices D and E.

3.0 Results

Table 2. Inert Gas Analysis for samples investigated in this study

Well Location	Interval Tested	Gas Flow X 10^3 m^3/D	Gas Analysis (mol %)					Formation Tested
			CO_2	C_1	N_2	He	Other	
15-11-06-20								
	1840.7-1845.6	8.5	2.8	16.1	73.5	-	0.76	Duperow
	1845.3-1851.1	11.8	-	-	-	-	-	Duperow
	1868.4-1877.6	2.8	-	-	-	-	-	Duperow
	1845.6-1891.0	14.1	9.56	.59	89.85	-	-	Duperow
	1926.2-1936.7	98.6	-	-	-	-	-	Duperow
04-31-03-26								
	1710.8-1715.1	115.5	81.3	5.3	13.05	-	.35	Duperow
	1714.5-1716.6	25.4	82.6	4.65	12.6	-	.15	Duperow
	1716.6-1718.2	13.2	-	-	-	-	-	Duperow
	1718.2-1719.7	12.4	-	-	-	-	-	Duperow
	1864.2-1871.8	183.1	0.3	4.3	95.4	-	-	Souris River
	1871.2-1873.3	174.7	-	-	-	-	-	Souris River
	1874.8-1876.3	7.3	-	-	-	-	-	Souris River
	1893.1-1895.6	152.1	-	-	-	-	-	Souris River
	1894.9-1898.9	120.9	-	-	-	-	-	Souris River

All data from Lane (1987)

3.1 Gas Analysis

The inert gas analyses for well locations 15-11-06-20 and 04-31-03-26 (Lane, 1987) are given in Table 2. Gas analyses are not available for other samples investigated here. The inert gases are composed primarily of CO_2 and N_2 with minor natural gas (C_1). The gas compositions display strong variations with depth likely due to the spatial distribution of traps formed as collapse features due to salt dissolution (Lake and Whittaker, 2004). A more complete analysis of gas composition is available for Well W4M in Alberta

(Lane, 1987) and displays a non-systematic variation of CO_2 and N_2 concentration with depth, as well as an inverse correlation in CO_2 and N_2 concentration (Figure 3).

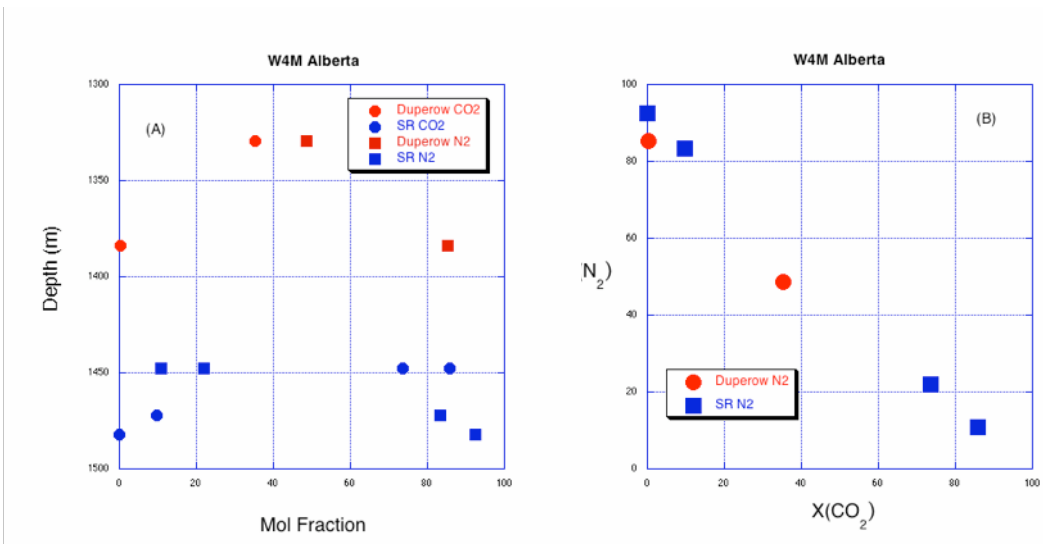


Figure 3. (a) Inert gas compositions as a function of depth from the Duperow and Souris Lake Formations at well W4M Alberta (b) inversely correlated CO_2 and N_2 concentrations.

3.2 Porosity

Relative to the data available for the Weyburn-Midale area, porosity data for the Duperow are relatively limited. Unlike the distribution the Weyburn-Midale area the 980 Duperow porosity analyses (courtesy of Erik Nickel, Saskatchewan Ministry of Energy and Resources) exhibit a close to Gaussian distribution, with a single mode and a mean of 0.106 ± 0.06 (Figure 4).

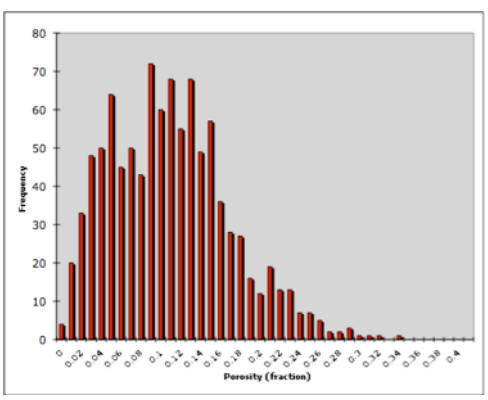


Figure 4. Porosity distribution for the Duperow Formation. Data from the Saskatchewan Ministry of Energy and Resources.

3.3 Whole Rock Analysis

The XRF whole rock analyses of the Duperow samples are given in Table 3. Of particular note is the generally low concentration of SiO_2 in these samples, with values typically less that 1wt%. Mineral trapping requires the aluminosilicate minerals as reactants providing the necessary cations for the formation

Table 3. XRF analysis of Duperow Formation Samples (wt%)

Wymark Core	SiO_2	Al_2O_3	Fe_2O_3	MgO	Na_2O	CaO	K_2O	TiO_2	P_2O_5	MnO	SO_2	LOI%
3-10-14-14-W3M 5555	0.41	0.10	0.19	2.63	0.00	55.05	0.04	0.01	0.00	0.00	0.00	41.48
3-10-14-14-W3M 5627	1.95	0.46	0.34	7.97	0.00	47.01	0.14	0.02	0.00	0.00	0.00	42.08
4-31-3-26 W3M 5164	0.39	0.06	0.41	19.17	0.00	32.40	0.02	0.00	0.00	0.02	4.91	42.55
4-31-3-26 W3M 5627	0.25	0.03	0.15	2.27	0.00	53.84	0.01	0.00	0.00	0.00	1.96	41.45
4-31-3-26 W3M 5632	0.19	0.03	0.15	3.16	0.00	54.39	0.01	0.00	0.00	0.00	0.00	42.04
4-31-3-26 W3M 5642	0.25	0.04	0.17	1.21	0.00	56.67	0.01	0.00	0.00	0.00	0.00	41.63
5-7-14-10 W3M 5288	2.24	0.66	0.43	4.41	0.00	47.17	0.59	0.04	0.01	0.01	4.47	39.74
5-7-14-10 W3M 5413	1.00	0.29	0.26	14.75	0.00	32.69	0.13	0.01	0.00	0.01	10.55	40.20
6-10-3-18W3M 5711	0.66	0.20	0.52	20.61	0.00	32.70	0.10	0.01	0.00	0.03	0.00	45.15
6-10-3-18W3M 6196	0.02	0.00	0.14	0.30	0.00	42.47	0.00	0.00	0.00	0.00	19.04	37.89
10-32-183 W3M 4596	0.24	0.07	0.35	20.83	0.00	32.44	0.03	0.01	0.00	0.10	1.97	43.93
10-32-183 W3M 4639	3.04	0.95	1.51	19.96	0.00	30.20	0.40	0.06	0.00	0.02	2.03	41.80
10-32-183 W3M 4645	0.74	0.23	0.35	17.22	0.00	32.01	0.09	0.01	0.00	0.02	8.08	41.14
10-32-183 W3M 4746	5.07	2.00	1.43	17.47	0.00	31.63	0.75	0.09	0.01	0.05	0.00	41.47
10-32-183 W3M 4813	0.12	0.03	1.15	2.38	0.00	49.28	0.00	0.00	0.00	0.01	7.31	39.35
Eastend Core												
15-11-6-20 W3M 6053	0.14	0.03	0.17	1.52	0.00	55.79	0.02	0.00	0.00	0.00	0.00	42.30
15-11-6-20 W3M 6059	0.12	0.02	0.15	1.81	0.00	53.65	0.00	0.00	0.00	0.00	3.00	41.21
15-11-6-20 W3M 6070	1.20	0.23	0.39	5.07	0.00	50.90	0.12	0.01	0.00	0.00	0.00	42.04
15-11-6-20 W3M 6141	0.37	0.06	0.19	3.45	0.00	47.49	0.03	0.00	0.00	0.00	8.39	39.94
15-11-6-20 W3M 6161	0.24	0.03	0.16	0.82	0.00	55.35	0.02	0.00	0.00	0.00	1.70	41.63

of carbonate minerals. Like the Midale Beds, the potential for mineral trapping in the Duperow is also minimal. The major variation in composition is displayed in the concentrations of Ca-Mg-SO_2 (Figure 5), and reflects the variations in modal abundance among the major mineral phases, calcite, dolomite and anhydrite.

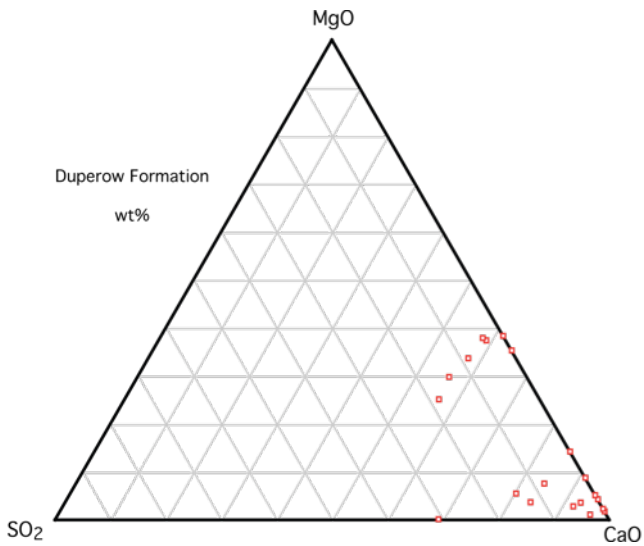


Figure 5. Whole rock compositions of Duperow carbonates. The sum of MgO, CaO, SO_2 and CO_2 are typically greater than 95 wt%.

3.4 Modal Analysis

Following Durocher *et al.* (2003), normative modal analyses were performed using the LPNORM program (De Caritat *et al*, 1994). The minerals considered are calcite, dolomite, ankerite, anhydrite, pyrite, K-feldspar, albite, K-illite, Na-illite, kaolinite, anatase and kutnohorite. As expected from the bulk compositions, petrography and x-ray diffraction data dolomite, calcite and anhydrite are the major phases observed, with calcite ranging from 3.5-95.8 wt%, dolomite from 0-84.9 wt% and anhydrite from 0-7.6 wt% (Table 4). The total mass of silicate minerals required by the normative analysis does not exceed 8 wt% (10-32-183 W3M 4746). The concentrations are given to one significant but are probably no better than ± 1 wt% (De Caritat et al., 1994), especially in light of the CO_2 concentrations being determined by loss on ignition.

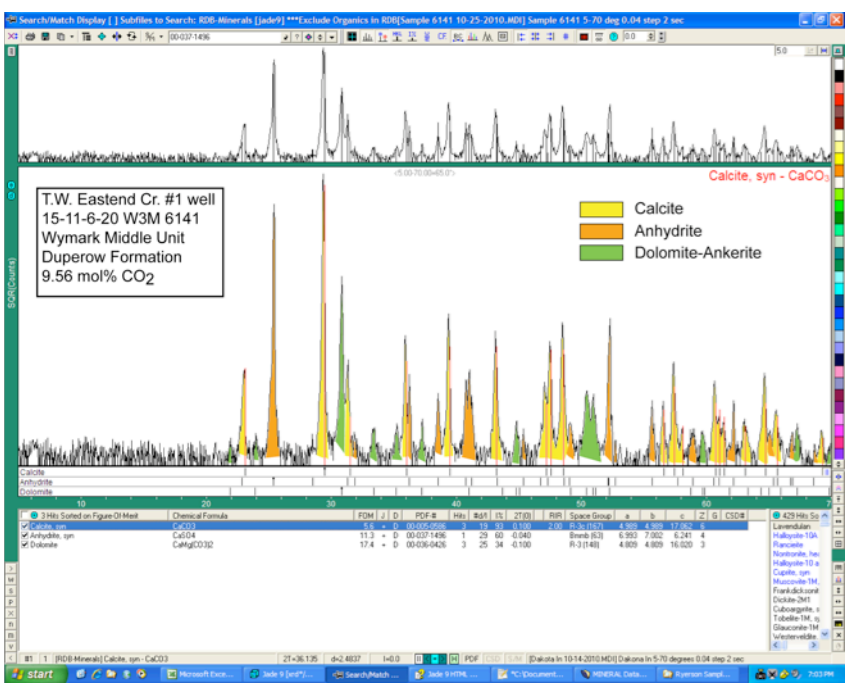


Figure 6. X-ray pattern for sample 15-11-6-20 W3M 6141'. The major lines are fit using only calcite, dolomite and anhydrite.

3.5 X-ray Diffraction Analysis

The x-ray diffraction data are consistent with the petrographic, chemical and modal revealing calcite, dolomite and anhydrite as the dominant mineral phases with only minor silicate minerals present. All the major x-ray lines in a typical x-ray pattern, sample 15-11-6-20 W3M 6141', are fit by with only dolomite, calcite and anhydrite (Figure 6). The line for quartz at 26° is free of interferences from the major phases and is found in a number of x-ray patterns. The detection limit is ~ 1% and the presence of quartz at this level is consistent with the other data.

Table 4. Modal mineral concentrations in Duperow carbonates (wt%)

	Q	Cal	Do	Anhy	Ank	Py	Ksp	K-Ill	Kao	Anat	Kut
3-10-14-14-W3M 5555	0.2	94.0	0.0	0.0	0.5	0.0	0.2	0.0	0.1	0.0	0.0
3-10-14-14-W3M 5627	1.4	72.1	21.0	0.0	0.9	0.0	0.0	1.2	0.0	0.0	0.0
4-31-3-26 W3M 5164	0.3	3.5	84.9	9.2	1.1	0.0	0.0	0.2	0.0	0.0	0.1
4-31-3-26 W3M 5627	0.2	91.8	1.9	3.7	0.4	0.0	0.1	0.0	0.1	0.0	0.0
4-31-3-26 W3M 5632	0.2	95.2	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	0.0
4-31-3-26 W3M 5642	0.2	94.3	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
5-7-14-10 W3M 5288	0.0	68.4	20.2	5.7	0.0	0.7	3.4	0.1	0.0	0.0	0.0
5-7-14-10 W3M 5713	0.5	18.1	67.5	4.3	0.0	0.4	0.4	0.6	0.0	0.0	0.0
6-10-3-18W3M 5413	0.2	14.0	80.4	1.4	0.0	0.0	0.6	0.0	0.2	0.0	0.1
6-10-3-18W3M 6196	0.0	75.1	1.4	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
10-32-183 W3M 4596	0.1	9.7	82.0	3.7	1.0	0.0	0.2	0.0	0.1	0.0	0.3
10-32-183 W3M 4639	1.5	6.4	78.2	3.8	4.1	0.0	1.0	2.0	0.0	0.1	0.0
10-32-183 W3M 4645	0.2	8.0	78.8	7.6	0.0	0.5	0.5	0.0	0.3	0.0	0.1
10-32-183 W3M 4746	2.2	18.6	66.3	0.0	3.9	0.0	1.2	4.6	0.0	0.1	0.2
10-32-183 W3M 4813	0.1	77.6	10.9	5.3	0.0	1.7	0.0	0.0	0.1	0.0	0.0
15-11-6-20 W3M 6053	0.1	95.8	0.0	0.0	0.5	0.0	0.1	0.1	0.0	0.0	0.0
15-11-6-20 W3M 6059	0.1	88.4	4.5	5.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0
15-11-6-20 W3M 6070	0.6	86.1	7.9	0.0	1.1	0.0	0.7	0.0	0.3	0.0	0.0
15-11-6-20 W3M 6141	0.3	73.7	15.8	3.0	0.0	0.3	0.1	0.1	0.0	0.0	0.0
15-11-6-20 W3M 6161	0.2	94.3	0.0	3.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0

Concentrations determined using LPNORM (De Caritat *et al,* 1994); Q=quartz, Cal=calcite, Do=dolomite, Anhy=Anhydrite. Py=pyrite, Ksp=K-Feldspar, K-Ill-K-illite, Kao=Kaolinite, Anat=anatase, Kut=Kutnohorite. Albite and Na-illite were included as fit parameters, but were not observed above zero.

3.6 Petrography and Mineral Chemistry

Optical microscopy and backscattered electron SEM analysis was used to complement and confirm the results of x-ray diffraction and modal analyses. SEM analysis provides the most accurate means of determining the presence of minor phases with abundances below XRD detection and the precision of least squares determination of modal abundance. In addition, areas chosen from synoptic backscattered electron images were analyzed using both EDS and WDS x-ray mapping, facilitating the location and analysis of silicate minerals. Calcite, dolomite and anhydrite are the major minerals found in petrographic analysis

(Table 1), consistent with XRD and XRF analysis (Figures 7 and 8). Each mineral displays a variety of habits. Dolomite is present as discrete euhedral grains growing in pores (3-10-14-14-W3M 5555, Figure

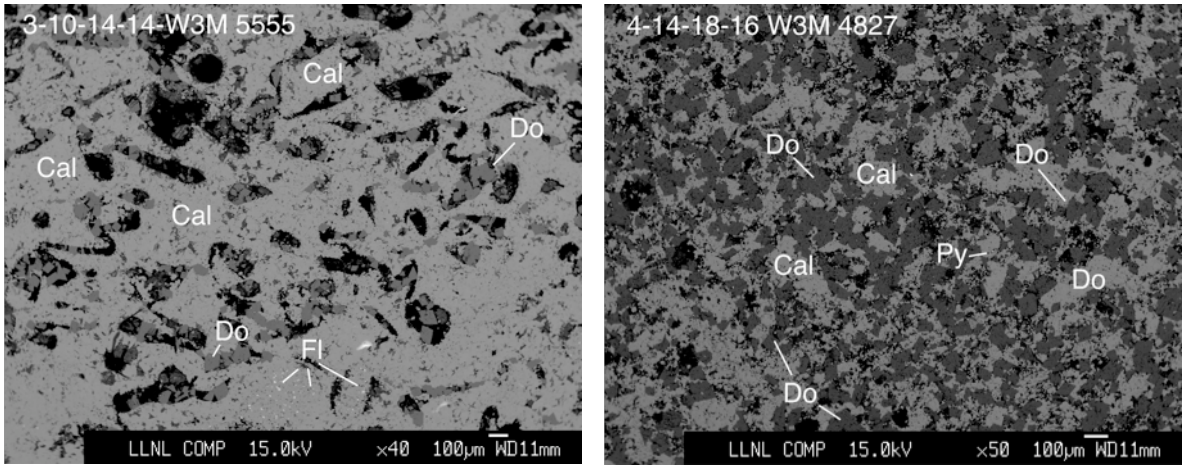


Figure 7. (a) Backscattered electron images of 3-10-14-14 W3M 5555 showing euhedral dolomite grains growing into open porosity. Small grains of fluorite (Fl) appear at the bottom of the image (b) 4-14-18-16 W3M 4827 Euhedral dolomite and calcite with trace pyrite.

7a), uniformly distributed euhedral grains (4-14-18-16 W3M 4827, Figure 7b) and as a secondary phase replacing large calcite (5-7-14-10 W3M 5288, Figure 8a) or rimming calcite (5-7-14-10 W3M 5413, Figure 8b). Calcite is typically more massive in habit and rimmed by reaction zones of dolomite. Anhydrite occurs as discrete grains with calcite, dolomite and fluorite inclusions (5288, 10-32-183 W3M 4596, Figure

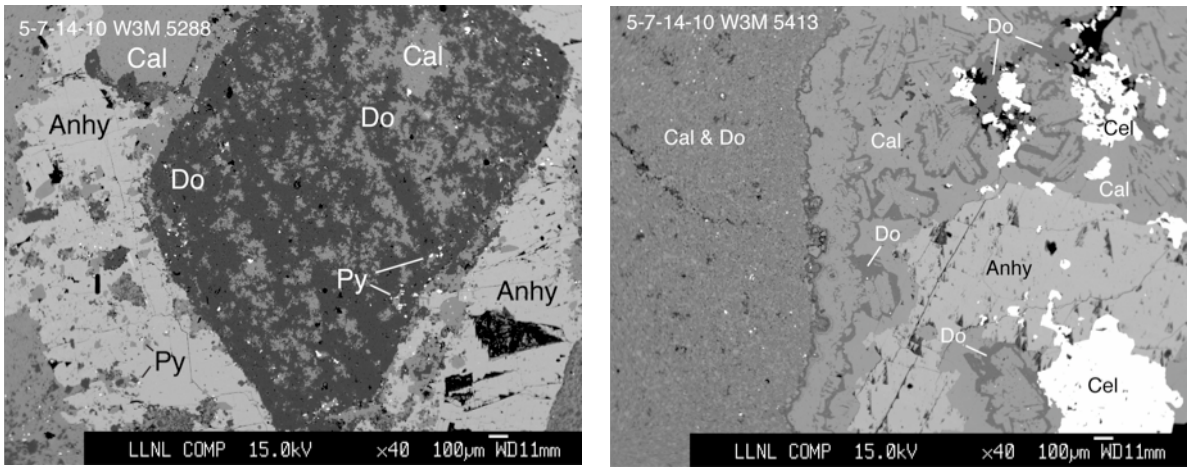


Figure 8. (a) Backscattered electron images of 5-7-14-10 W3M 5288 showing large calcite grain almost totally replaced by dolomite. (b) 5-7-14-10 W3M 5413 Dolmite shown replacing calcite. Anhydrite and celestine are the bright sulfate phases.

9a), and also as massive layers that are considered effective seals to gas and fluid migration (15-11-6-20 W3M 6014, Figure 9b) (Lake and Whittaker, 2004). Pyrite and fluorite are common in many of the samples studies, and 2 samples contain celestine ($SrSO_3$) that is commonly associated with anhydrite. (Figure 8b).

Mineral trapping of geologic CO_2 is largely dependent upon the supplies of alkaline earth cations from dissolution of silicate minerals. "Hot spots" in the Si x-ray maps were used to locate silicate minerals in these samples. The only silicate phases found were quartz, K-feldspar and possibly kaolinite. Quartz

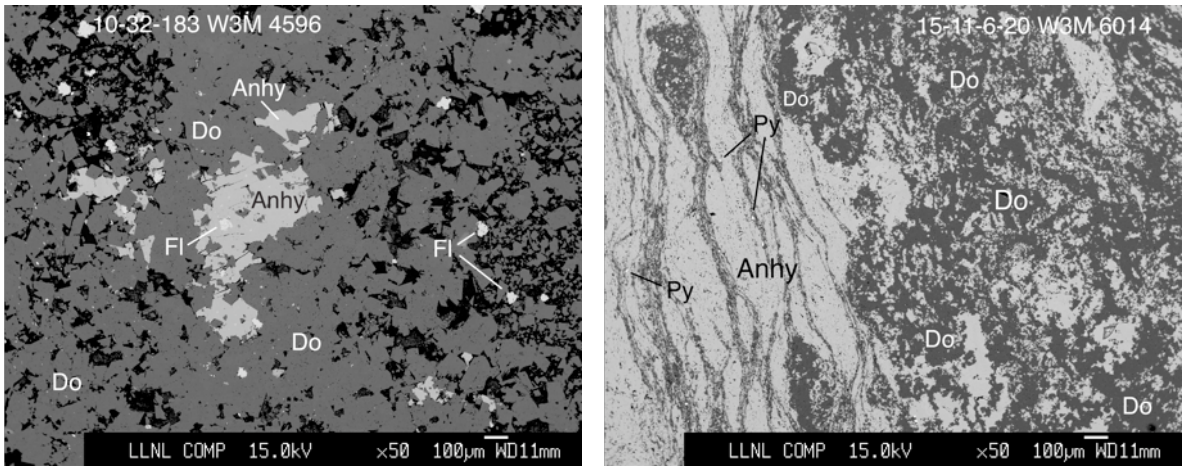


Figure 9. (a) Backscattered electron images of 10-32-183 W3M 4596 showing euhedral dolomite grains associated with anhydrite and fluorite. Anhydrite enclosed fluorite in grain at center of view. (b) 15-11-6-20 W3M 6014 Dense anhydrite-dolomite assemblage characteristic of aquitard layers.

appeared as small (> 10 μm), presumably detrital grains (Figure 10), while K-feldspar was found both in the matrix and associated with anhydrite (Figure 11), suggesting an authigenic origin. The low abundance of silicate phases, and especially the absence of those containing alkaline earths, precludes mineral trapping of CO_2 in these lithologies.

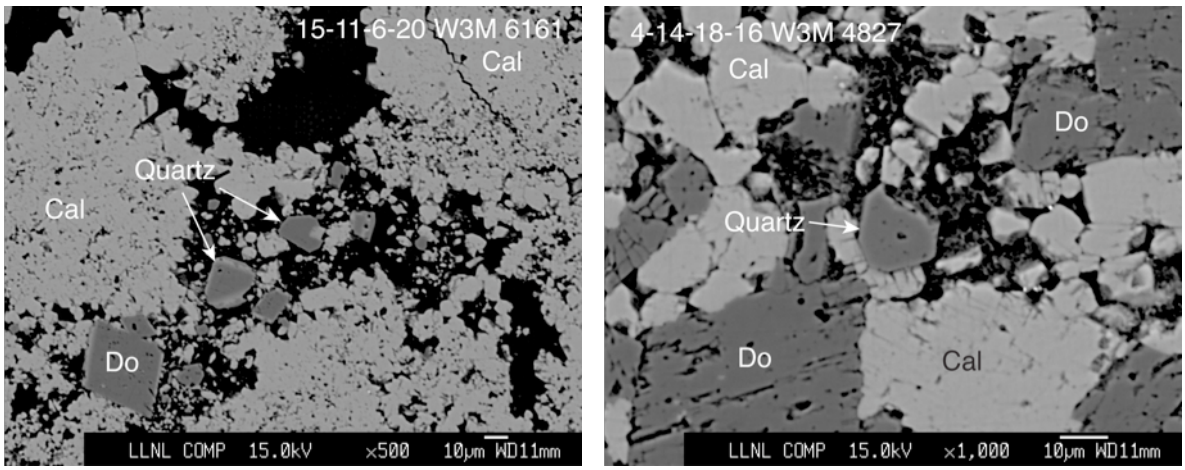


Figure 10. (a) Backscattered electron images of 15-11-6-29 W3M 6161 showing quartz grains. (b) Quartz in 4-14-18-26 W3M 6014.

Sample analysis locations were chosen from the synoptic and small area backscattered electron maps. The analyses from carbonate and sulfate minerals are given in Appendices X and XX, respectively. Calcite contains very low concentrations of impurities and dolomite analyses lie largely on the dolomite-ankerite join, with dolomite the predominate component (Figure 12). Anhydrite compositions are similarly

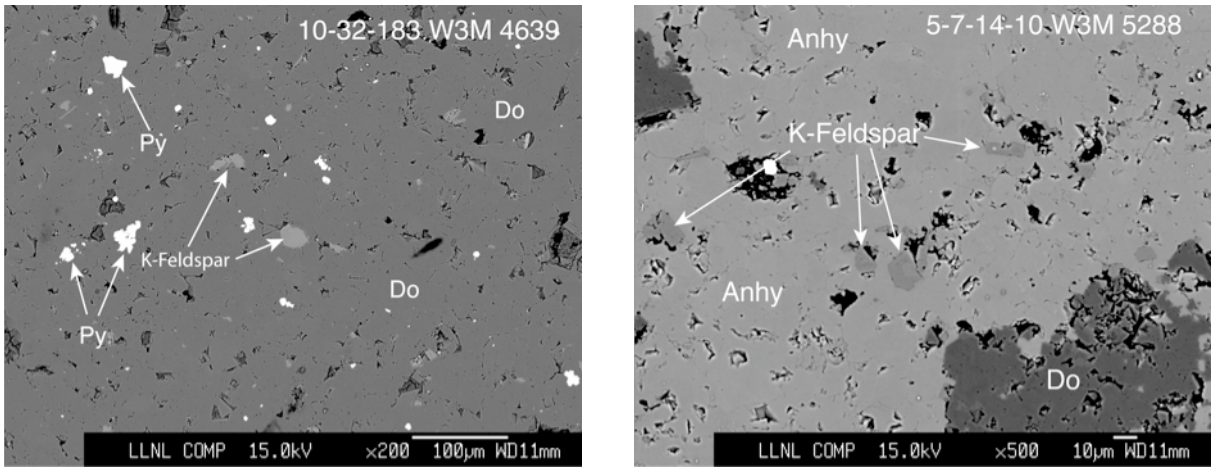


Figure 11. Backscattered electron images displaying the location of K-feldspar crystals associated with dolomite (10-31-183-W3M 4639) and anhydrite (5-7-14-10-W3M 5288).

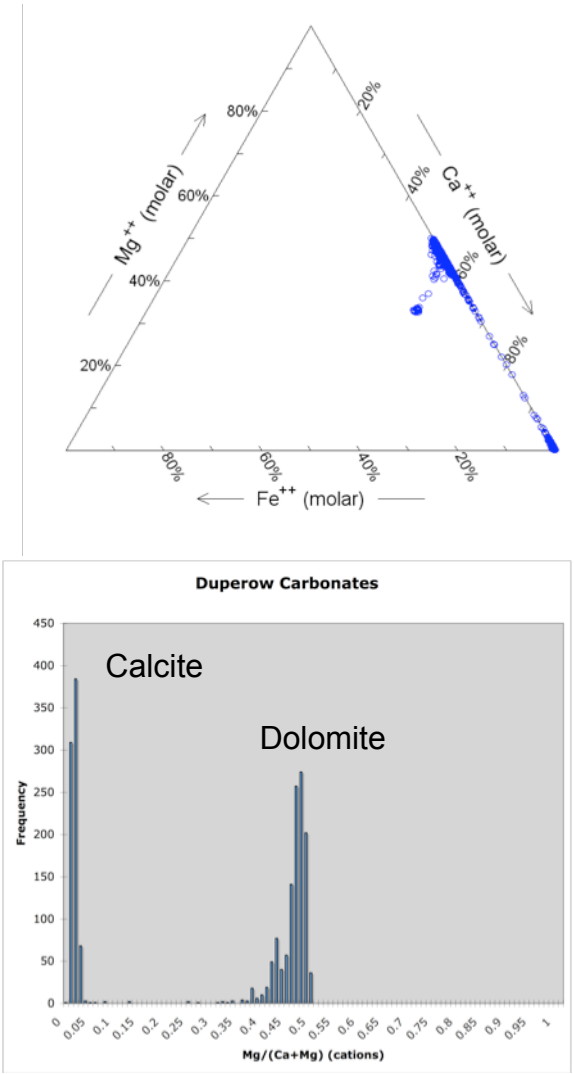


Figure 12. Electron microprobe analyses of carbonate minerals from the Duperow reservoir cast as cations (a) Ca-Mg-Fe ternary. (b) histogram of carbonate analyses projected onto the Mg-Ca binary.

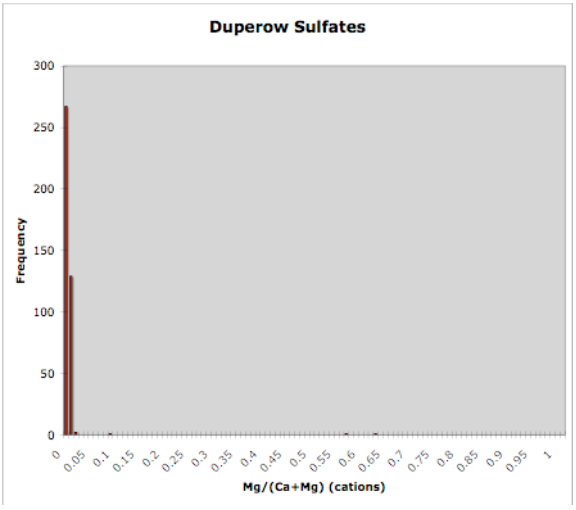


Figure 13. Electron microprobe analyses of sulfate minerals from the Duperow reservoir cast as cations (a) Ca-Mg-Fe ternary. (b) histogram of sulfate analyses projected onto the Mg-Ca binary.

restricted, displaying only minor variability (Figure 13). Some "anhydrite" analyses have low analytical

totals, and may indicated localized alteration to gypsum in some samples. Dolomite is the only phase to show significant zoning with is prevalent near pores with the rim compositions higher in ankerite (Figure 14).

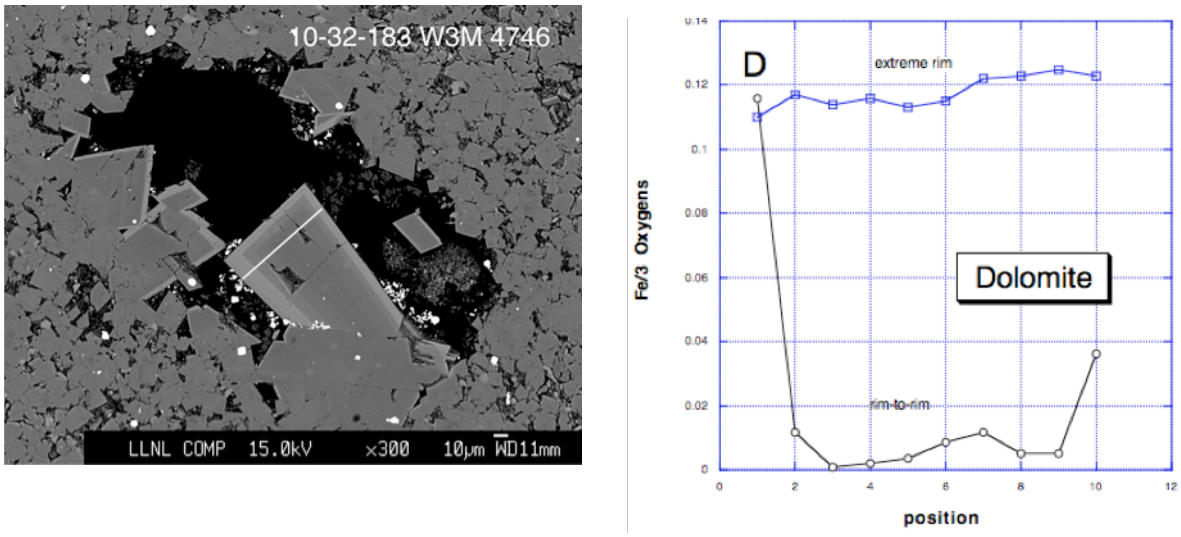
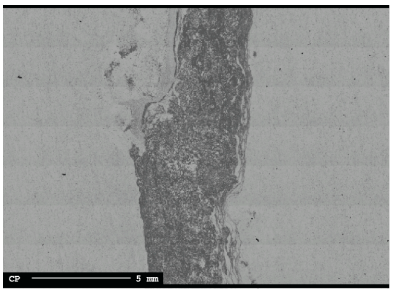


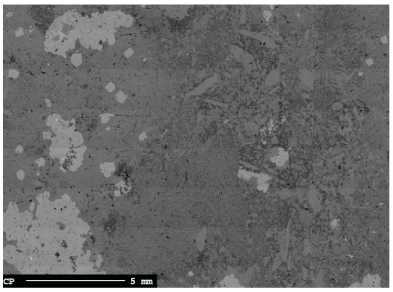
Figure 14. Zoned dolomite growing into a pore in sample 10-32-183 W3M 4746. The white line shows the trace of a rim-to-rim profile (left panel) illustrating the increase in ankerite component at the sample rim.

3.7 Well 15-11-6-20 W3M

Samples from the Eastend well 15-11-6-20 W3M provides the best opportunity to correlate gas accumulations with sample petrography. The deepest samples investigated here contain ~9.6 mol% CO_2. Higher in the section the CO_2 concentration drops to ~2.8 mol%, finally dropping to below detection (Table 1). The synoptic backscattered electron maps for these samples are shown in Figure 15. Pores in these samples are filled with epoxy and show up as dark regions in the backscattered electron maps. The gas-bearing samples display easily recognized porosity and variable proportions of calcite, dolomite and anhydrite. Samples 15-11-6-20 W3M 6029 and 15-11-6-20 W3M 6014 do not have detectable gas accumulations, display minimal porosity and, especially in the case of 15-11-6-20 W3M 6014, have high modal concentrations of anhydrite. Higher concentrations of CO_2, ~82 mol%, and are texturally similar to the gas-bearing samples from the lower sections of 15-11-6-20 W3M (Figure 15).

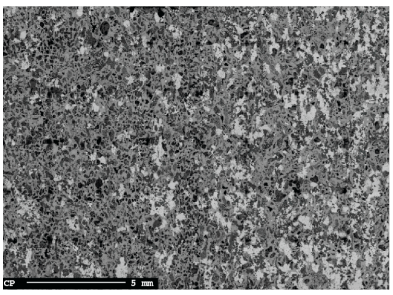


15-11-6-20 W3M 6014 CO_2 n.d.

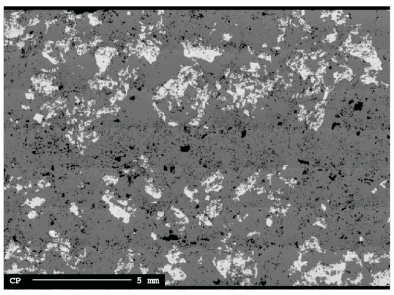


15-11-6-20 W3M 6029 CO_2 n.d.

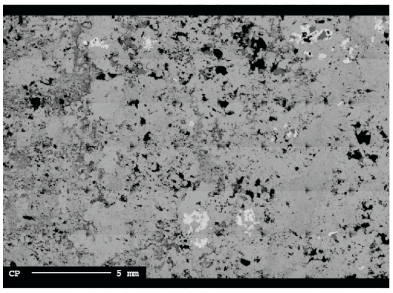
Figure 15. Backscattered electron "synoptic" maps of samples from CO_2-bearing and CO_2-free horizons. Porosity is indicated by the dark, epoxy-filled regions. Samples on the left are from well 15-11-6-20 W3M in the Eastend region. The inert gases from the porous samples taken at 6161'and 6141' contain approximately 9.6 mol% CO_2 , while the dense, anhydrite-rich samples at 6029' and 6014' had no detectable gas. Samples on the right are from well 4-31-3-26 in the Battle Creek area, and contain gases with approximately 82 mol % CO_2 . These samples also display significant porosity. Hence, there is a corrleation between gas storage and porosity, with dense, anhydrite-rich samples constituting seals to gas migration.



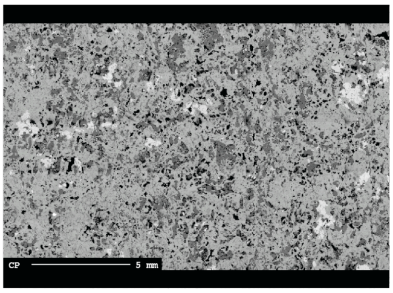
15-11-6-20 W3M 6141 CO_2 9.6%



4-31-3-26 W3M 5163 CO_2 82%



15-11-6-20 W3M 6161 CO_2 9.6%



4-31-3-26 W3M 5627 CO_2 82%

4. Acknowledgements

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344 and supported by the IEA GHG Weyburn CO_2 Monitoring and Storage Project. We gratefully acknowledge of Steve Whittaker and Erik Nickel for their assistance in accessing samples, log and well bore data.

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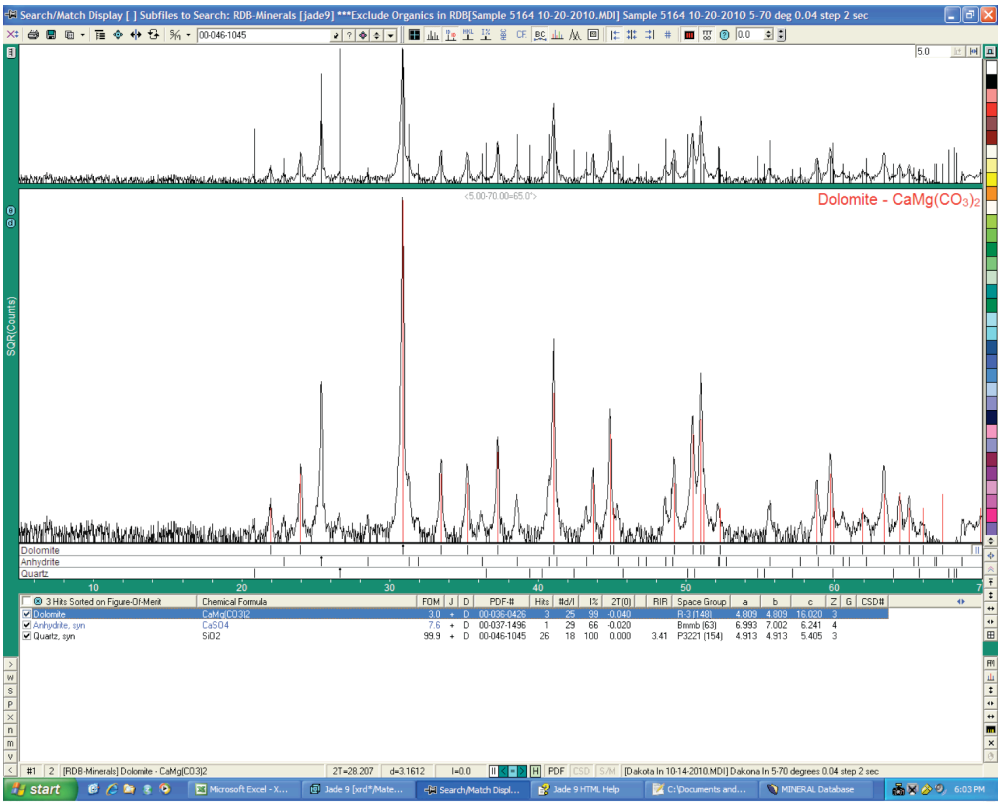
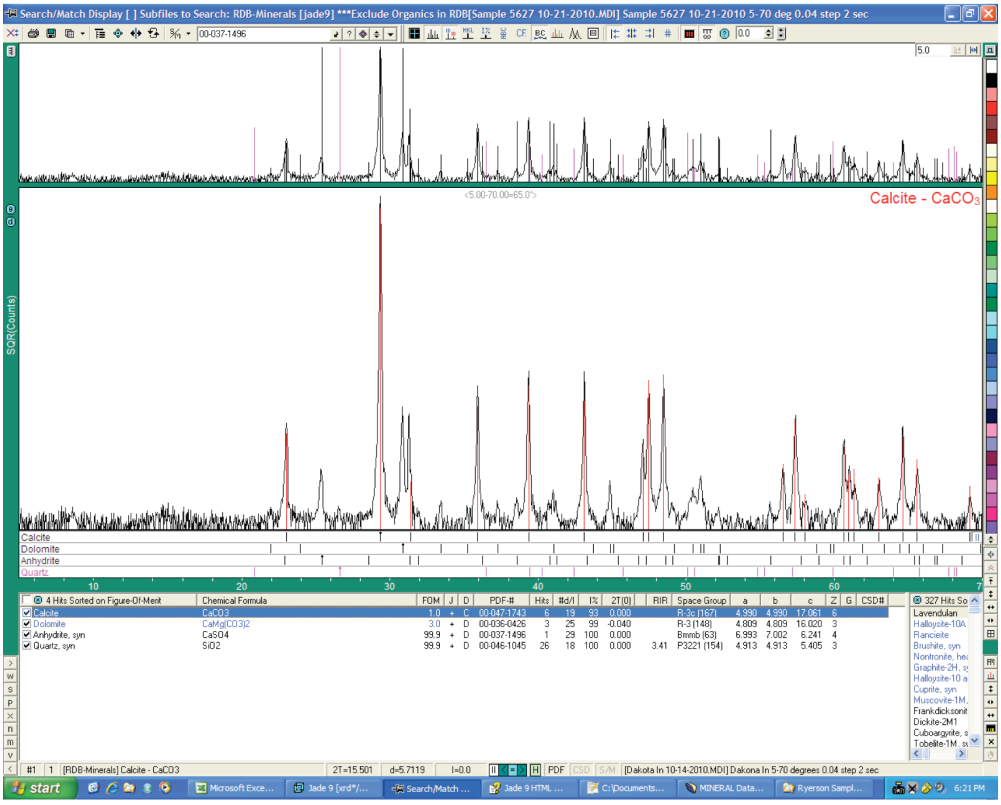
Appendix A

X-ray Diffraction Patterns



4-31-3-26 W3M 5164



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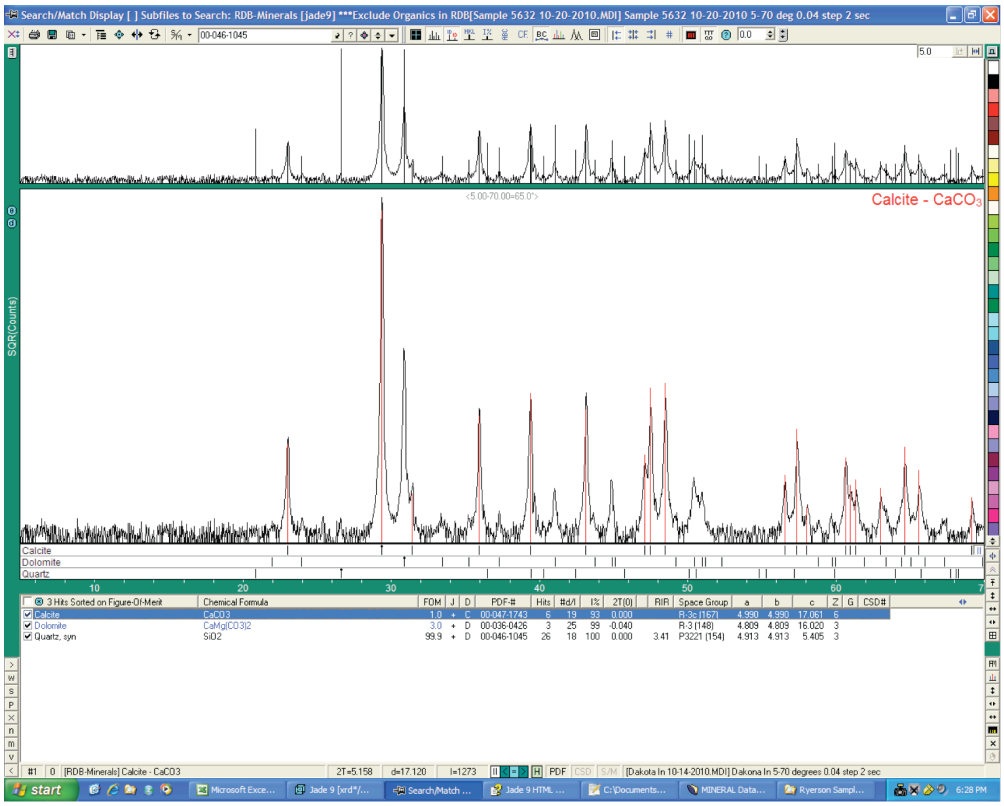

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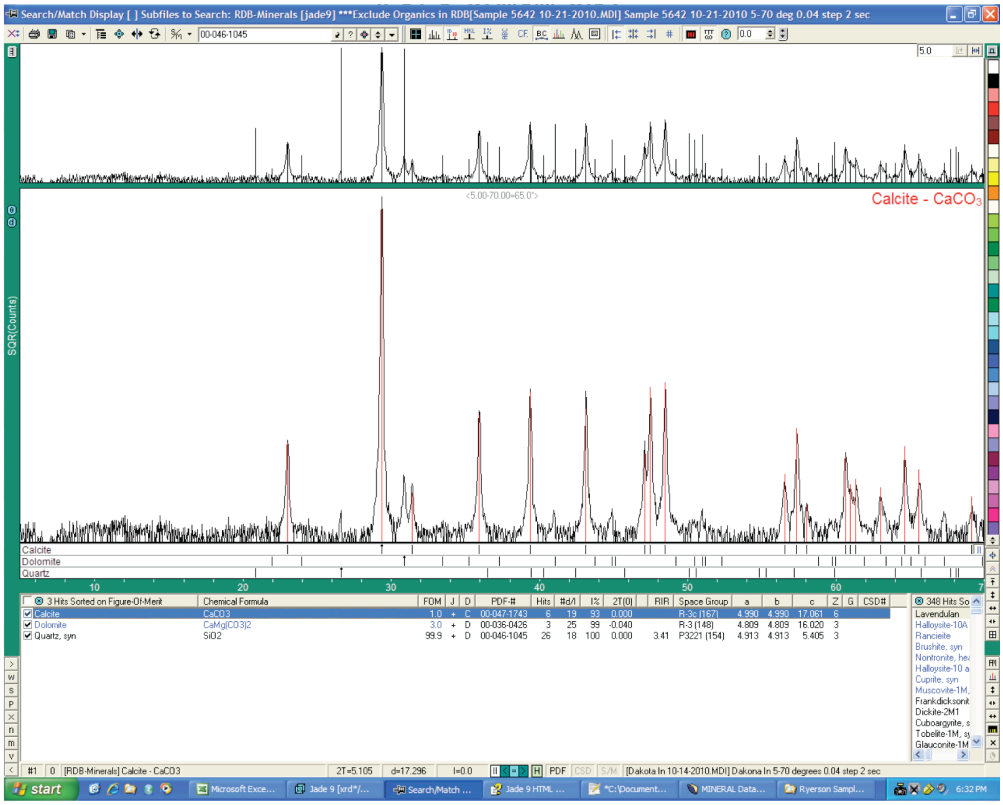

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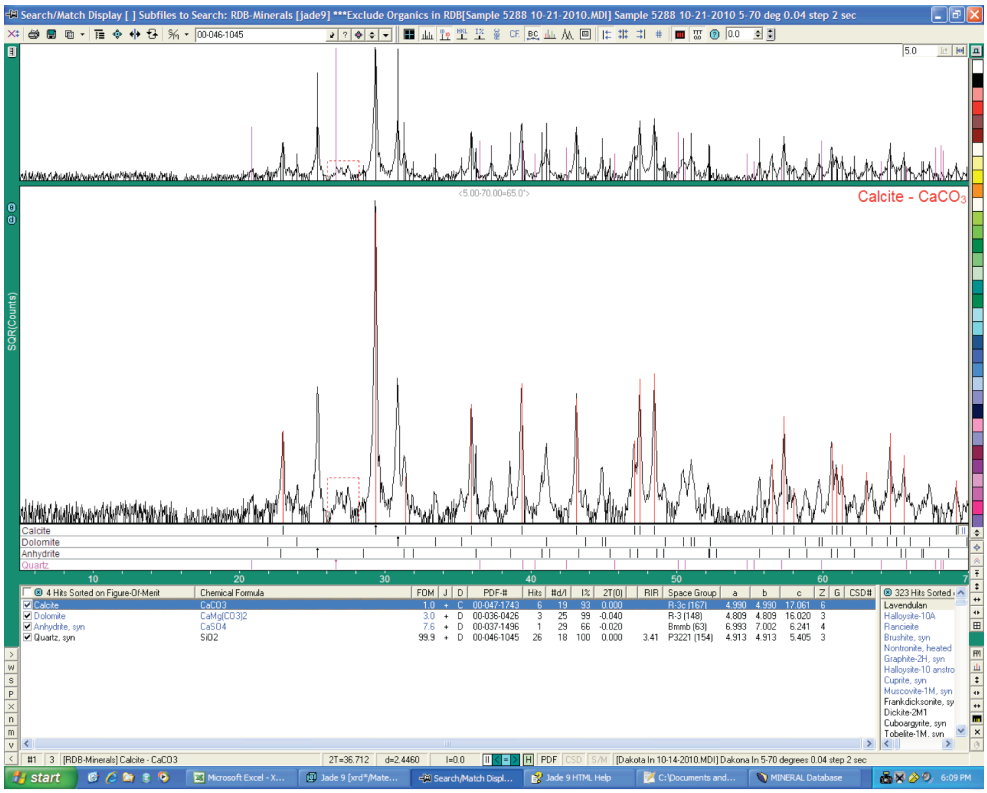
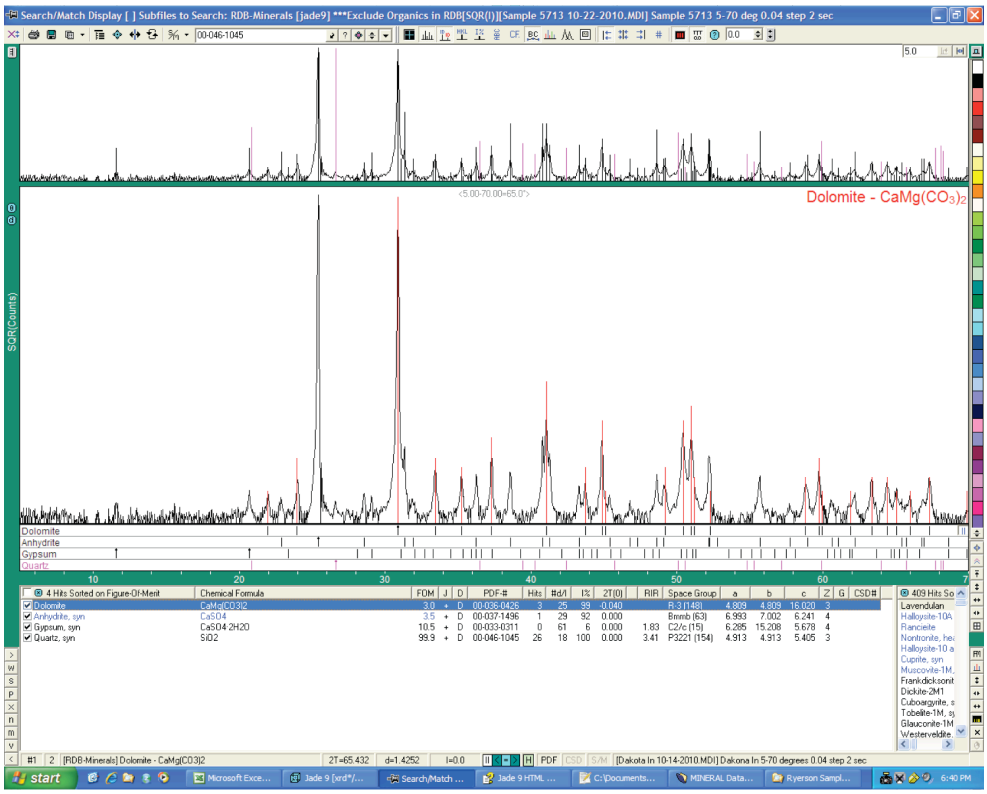


5-7-14-10 W3M 5288



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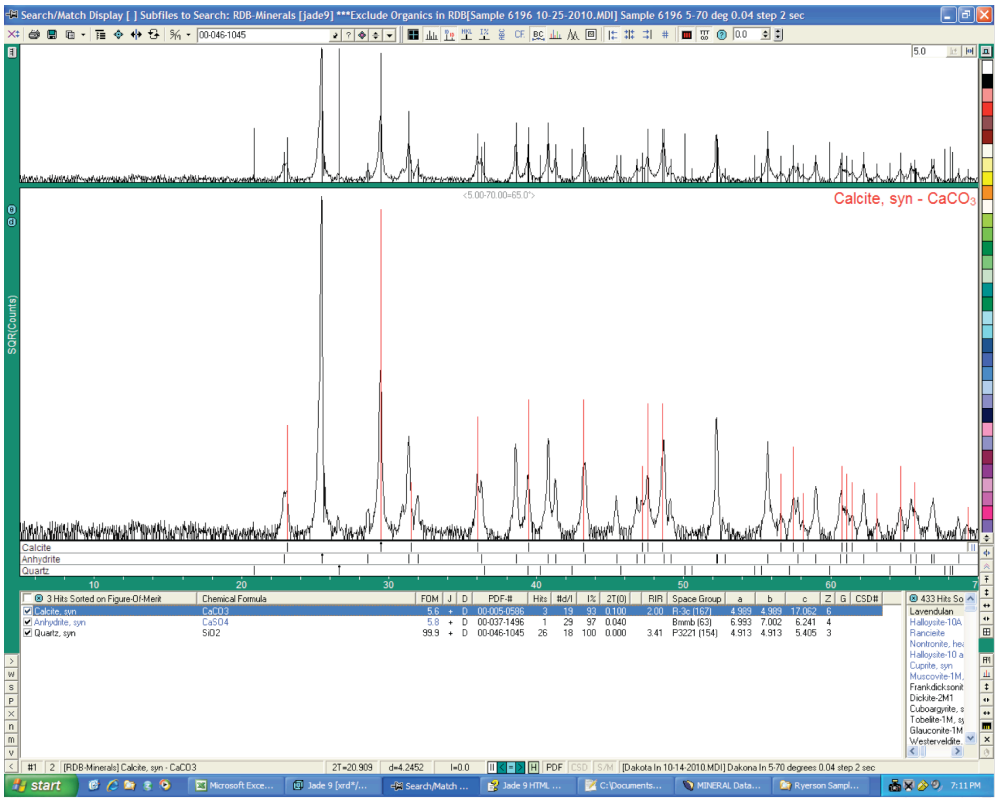

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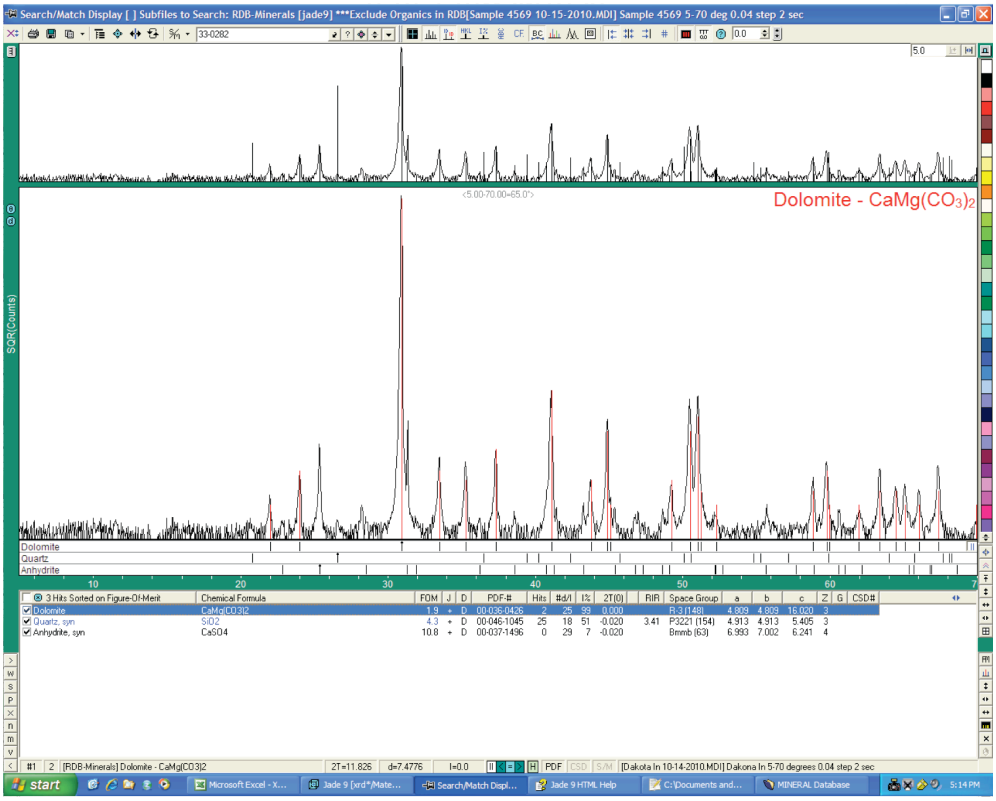

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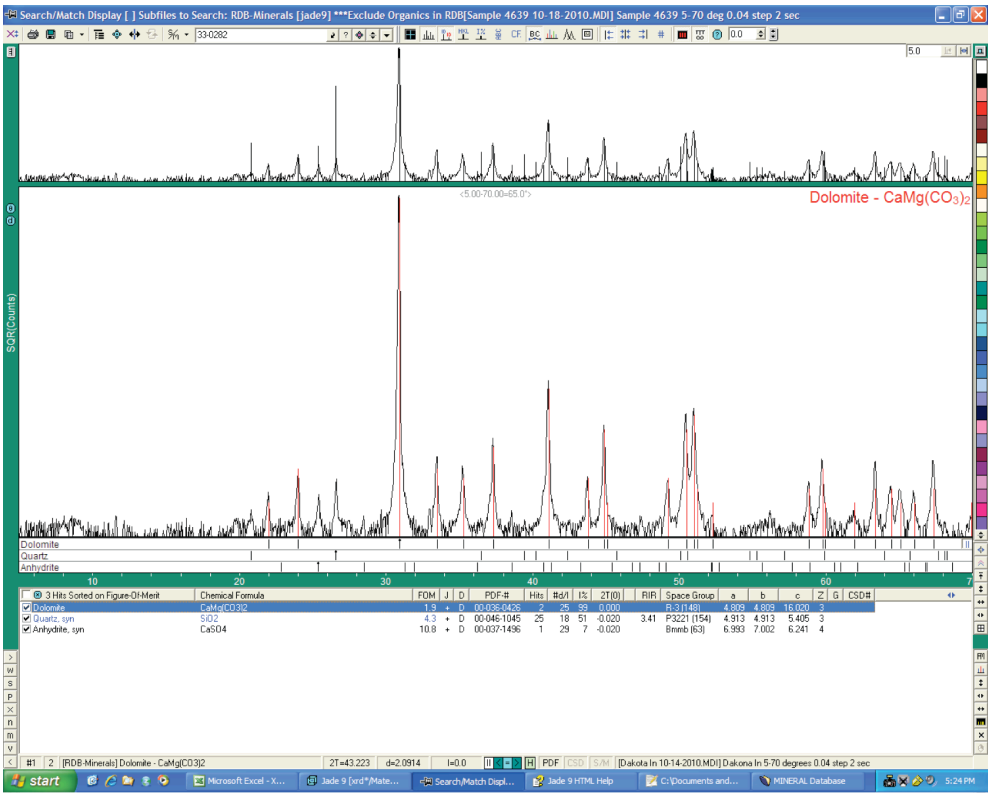

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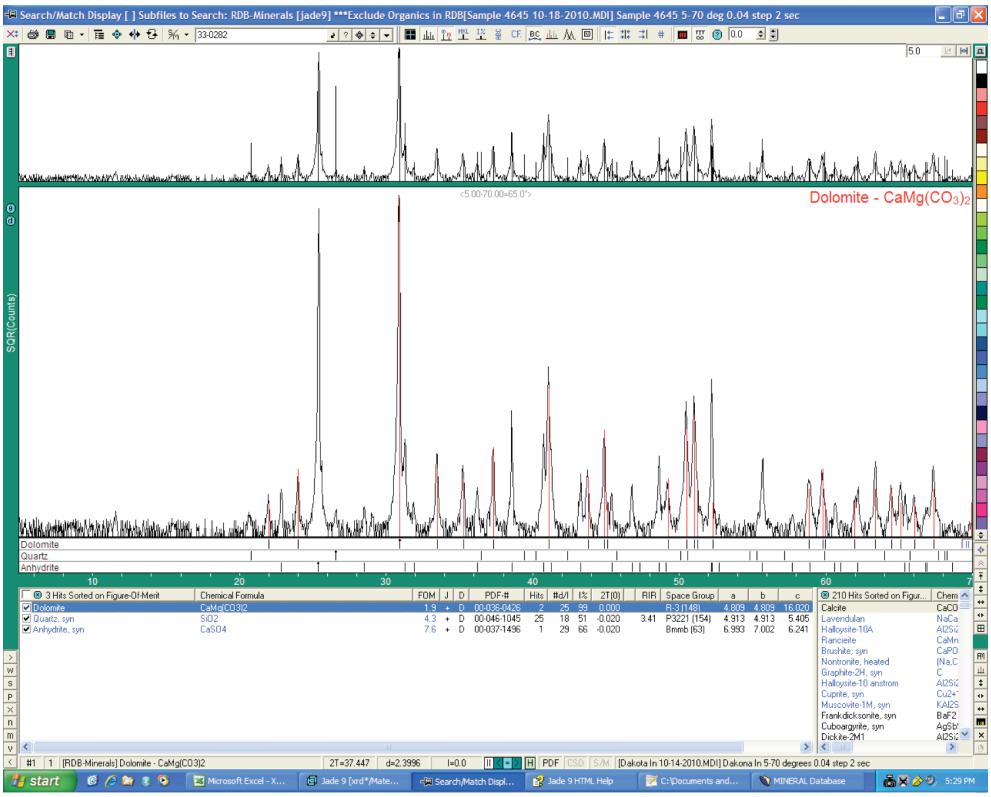

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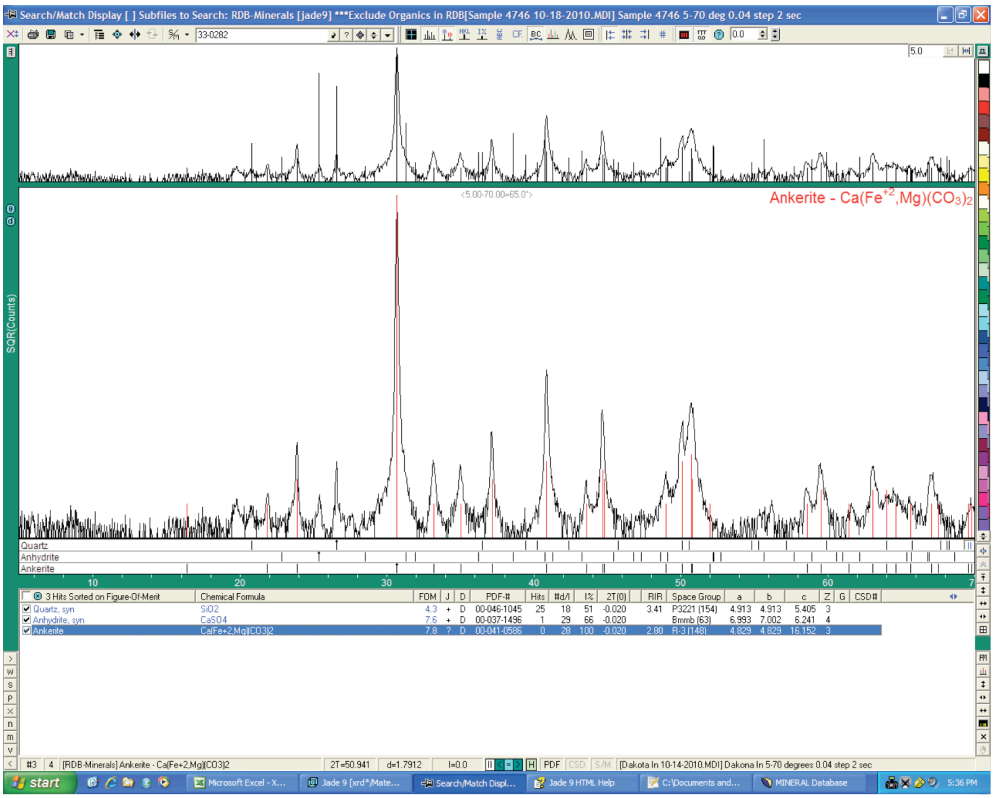

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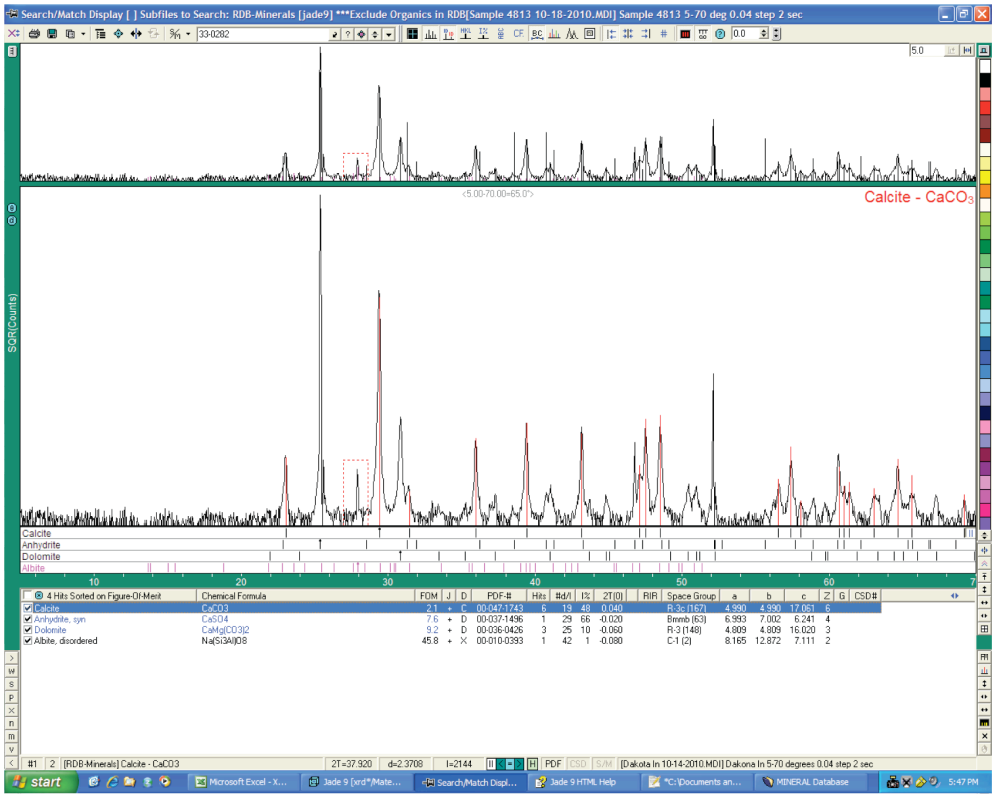

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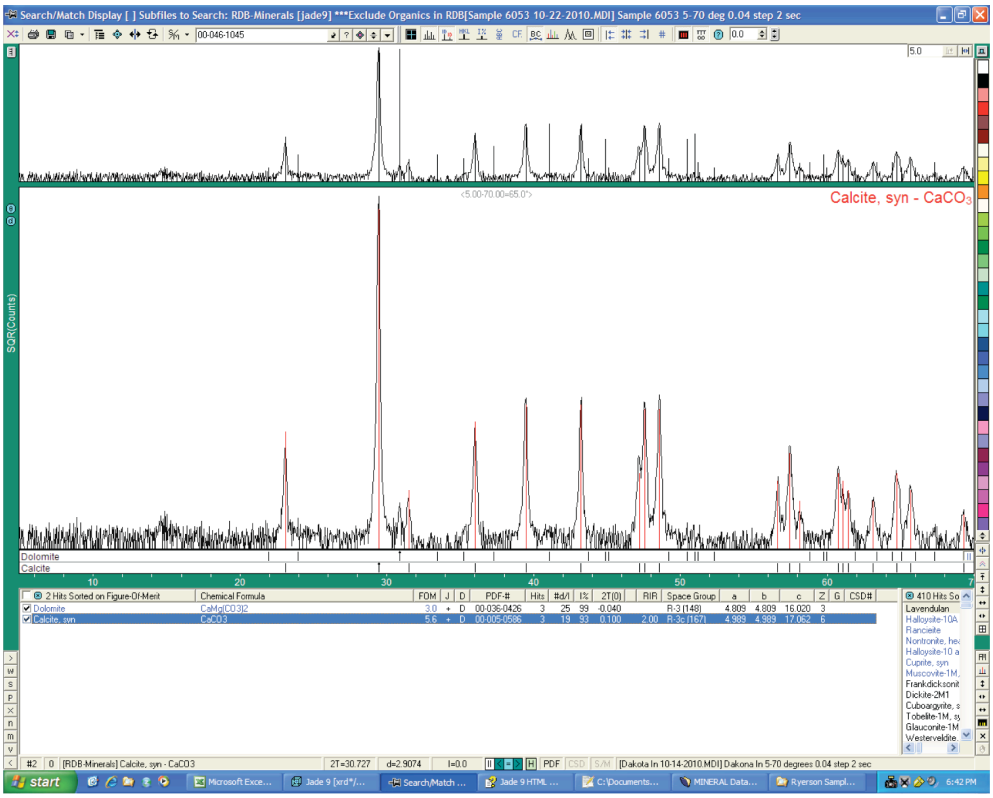

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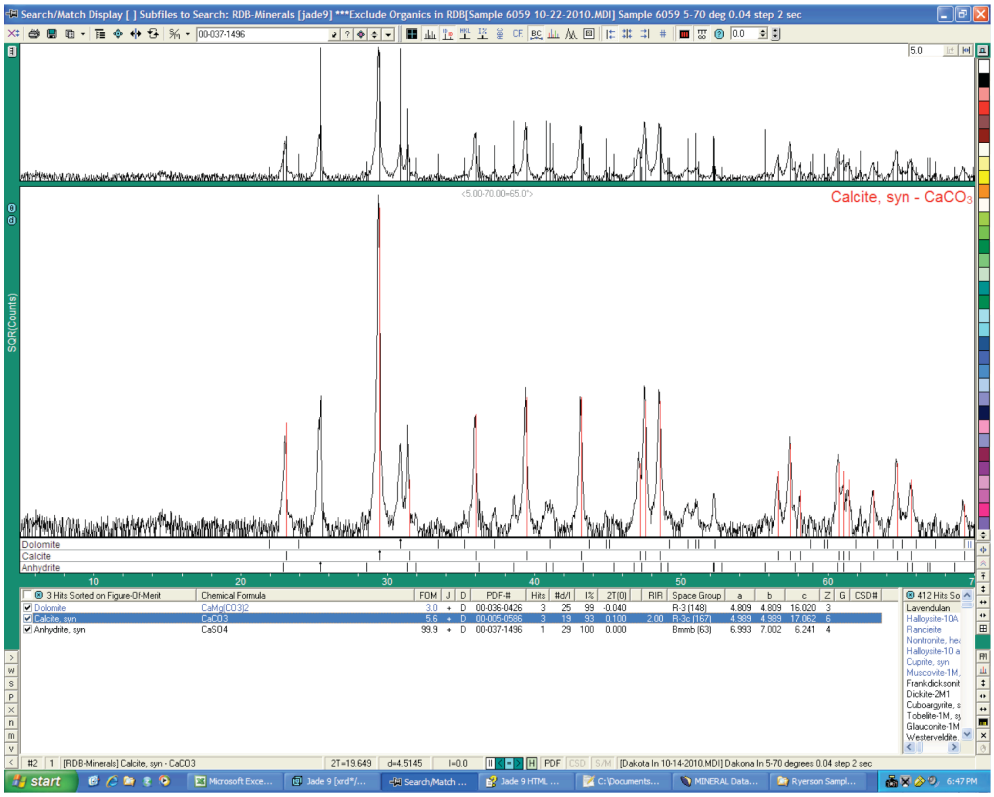

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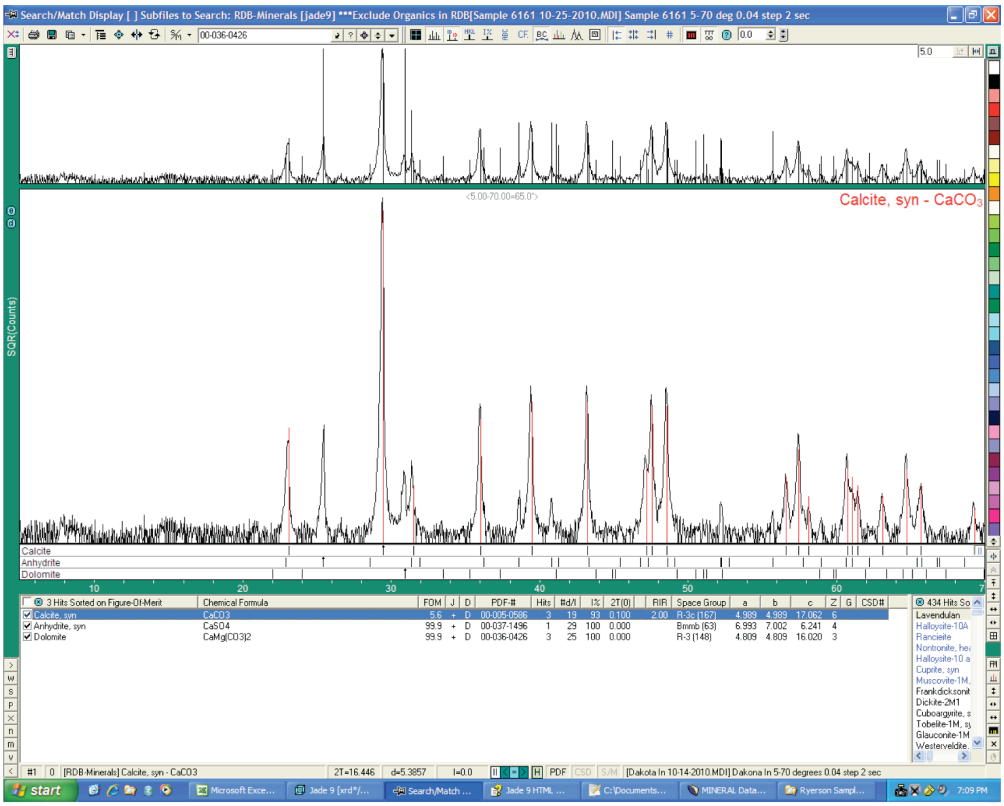

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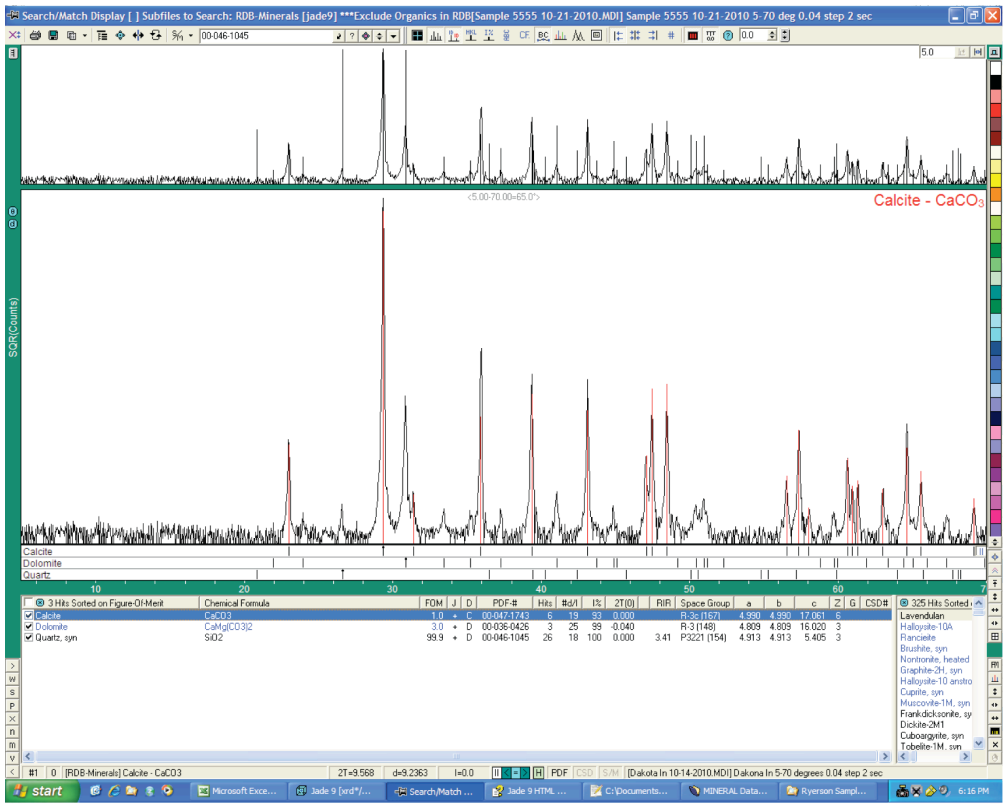
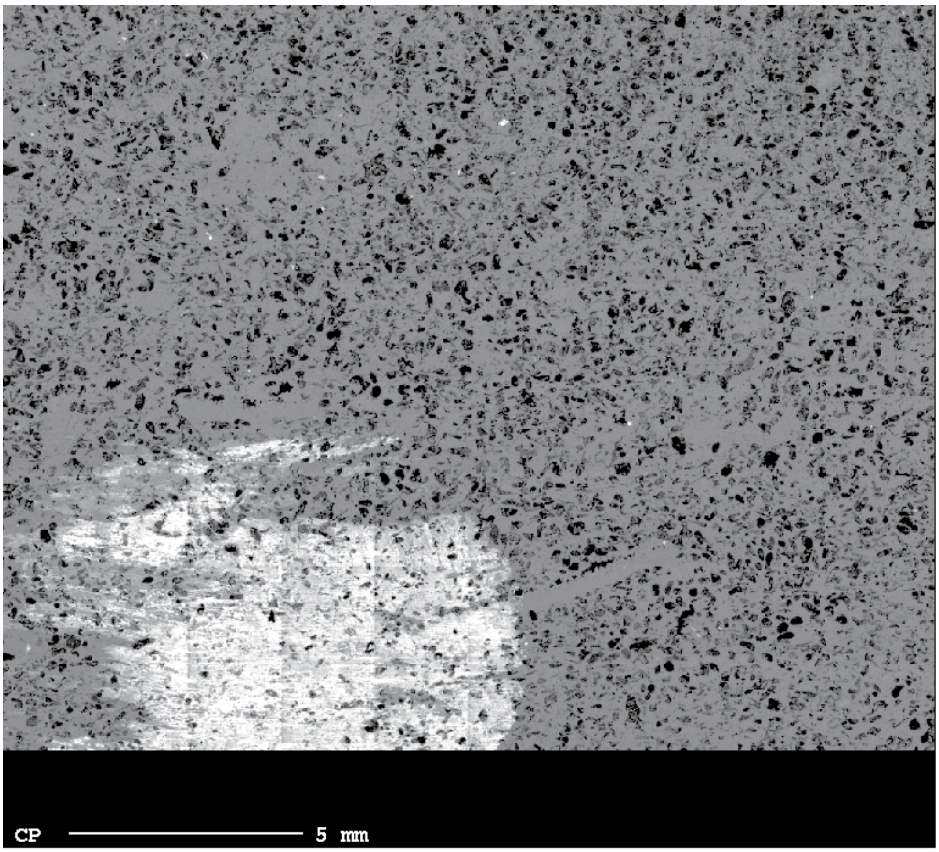


3-10-14-14-W3M 5555

Appendix B

Synoptic Backscattered Electron Images of Thin Sections



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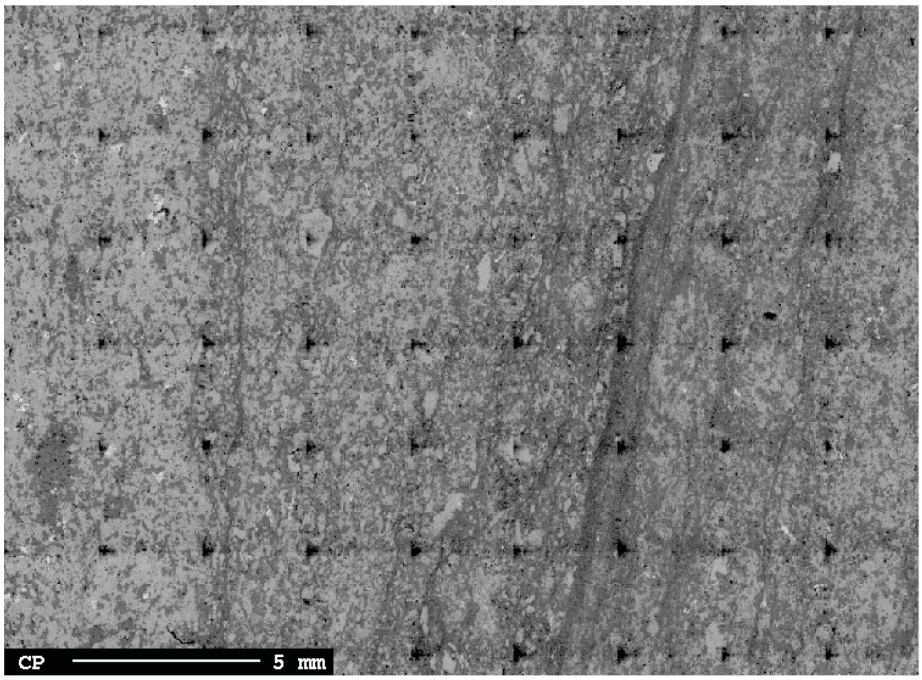

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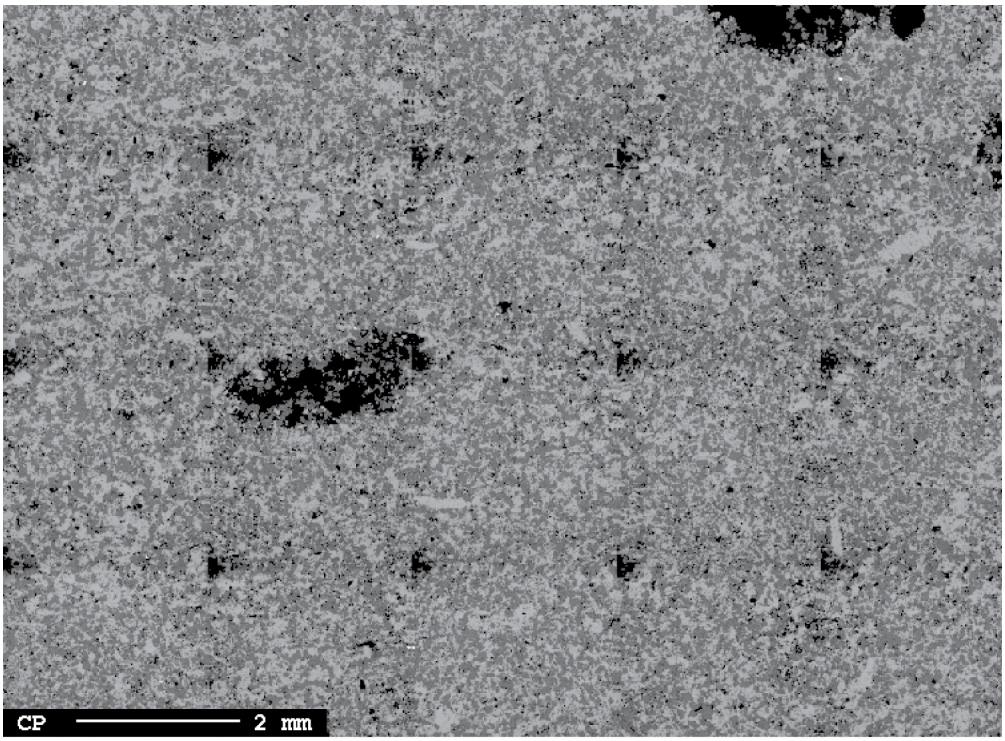

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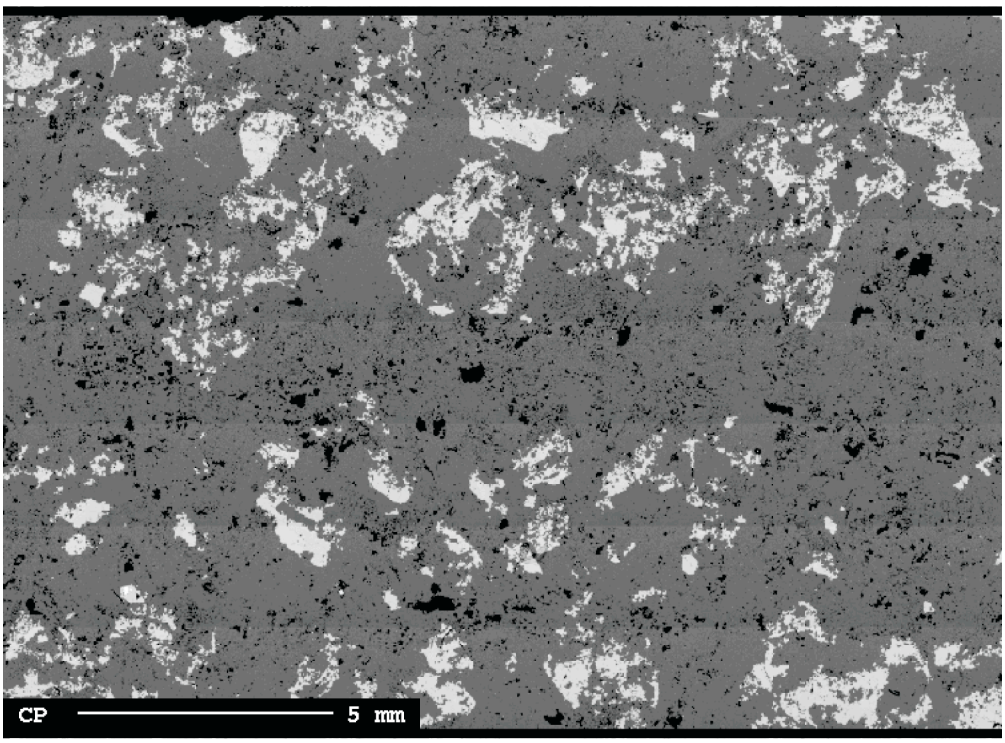

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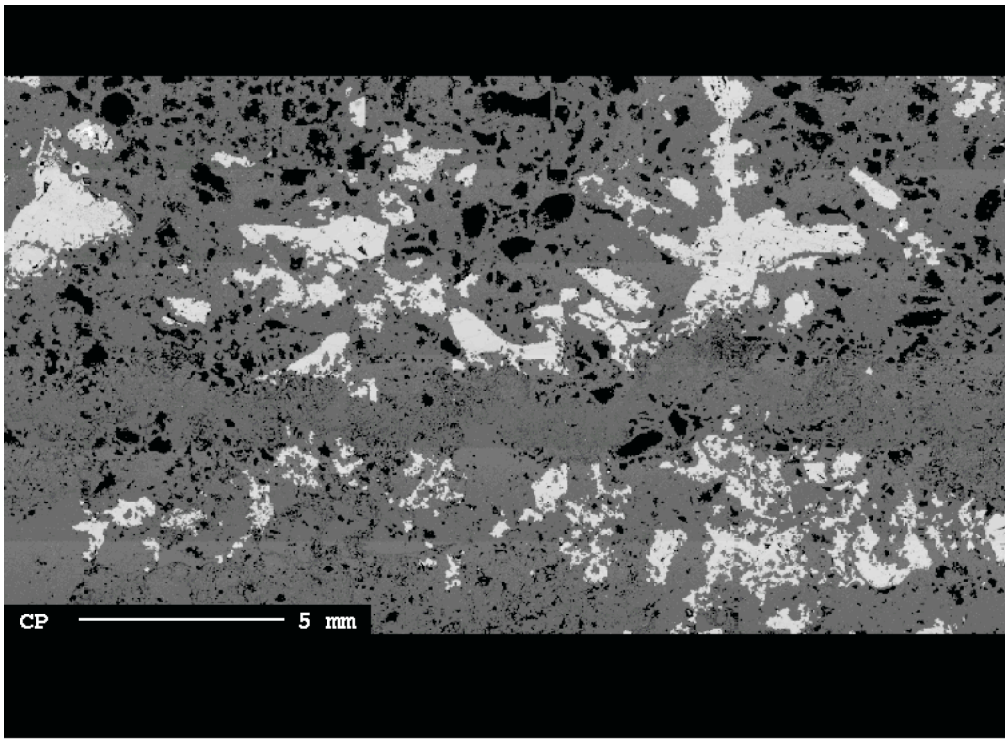

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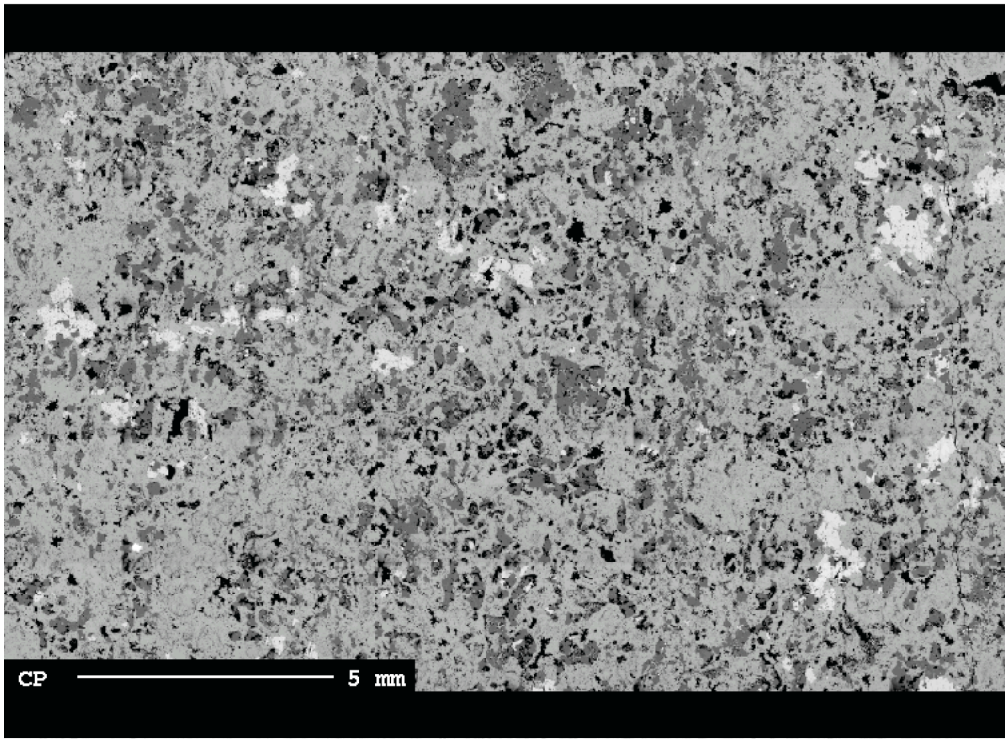

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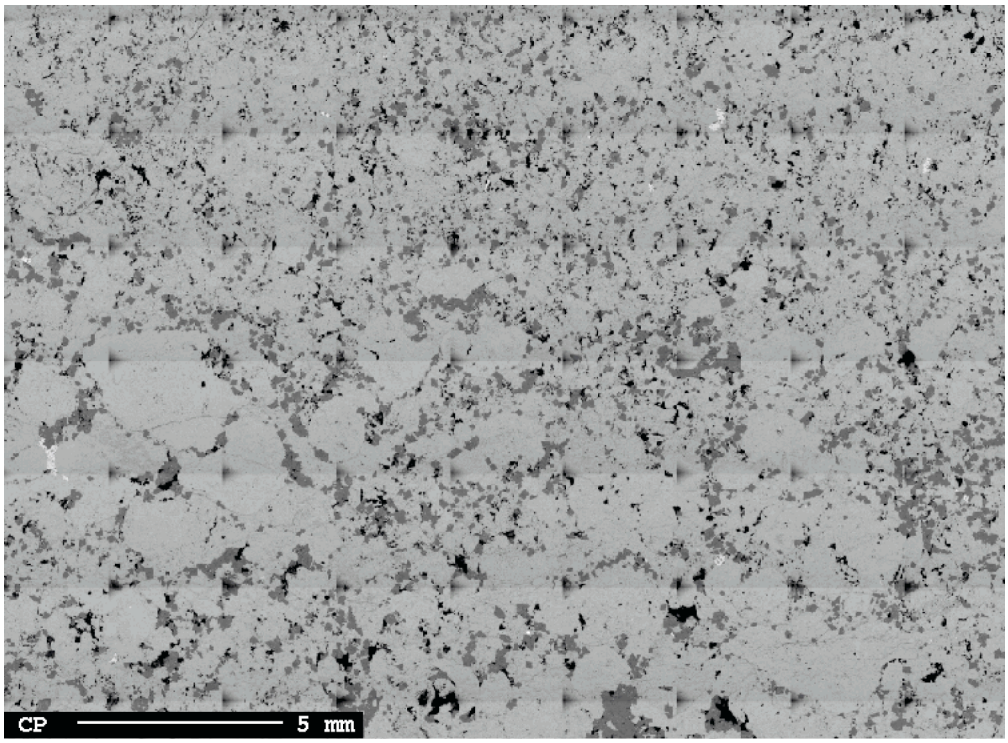

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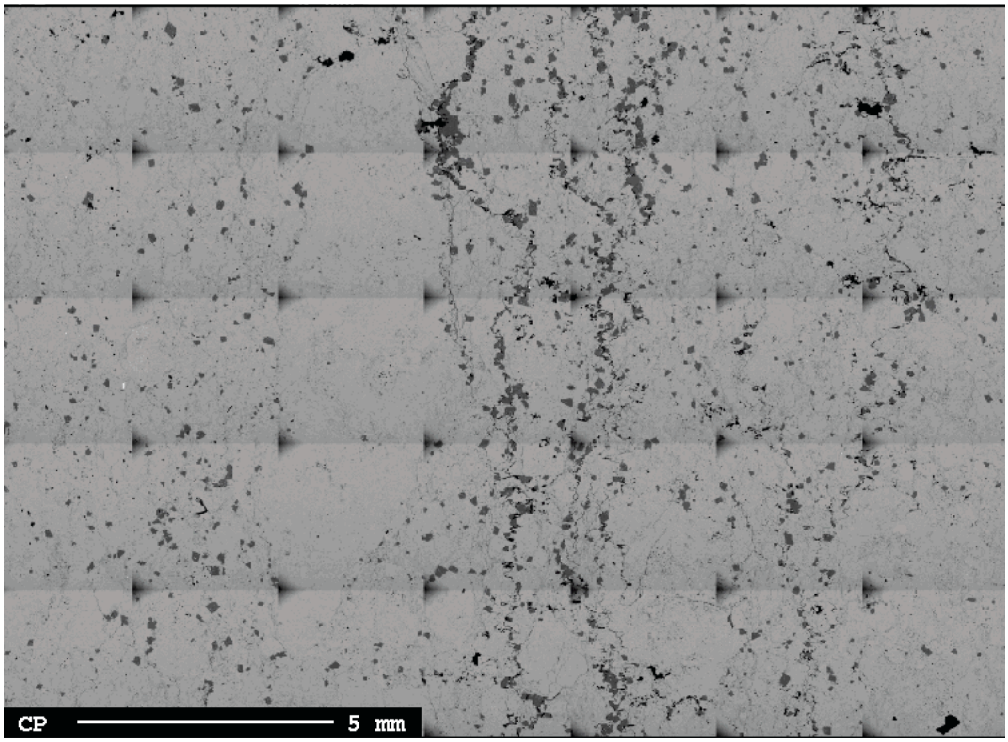

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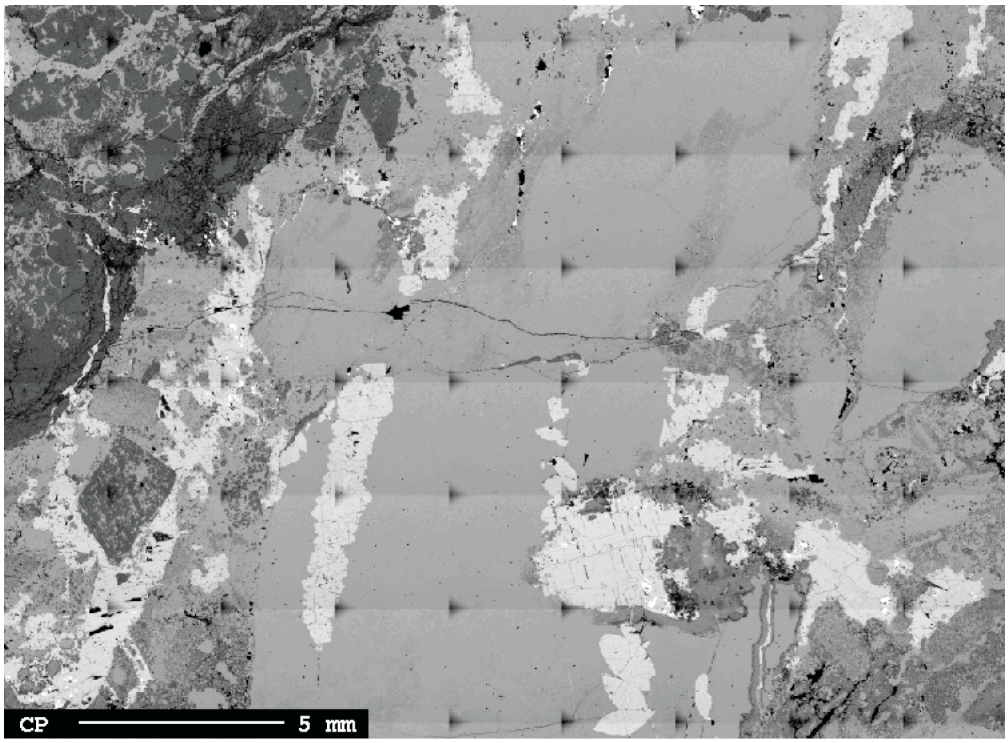

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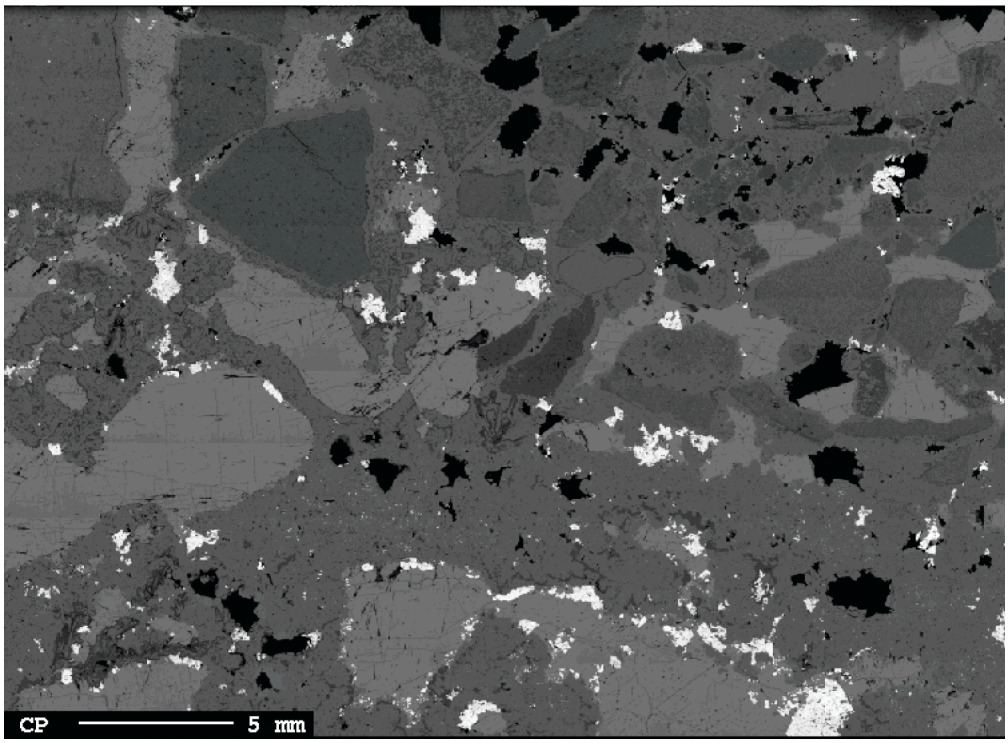

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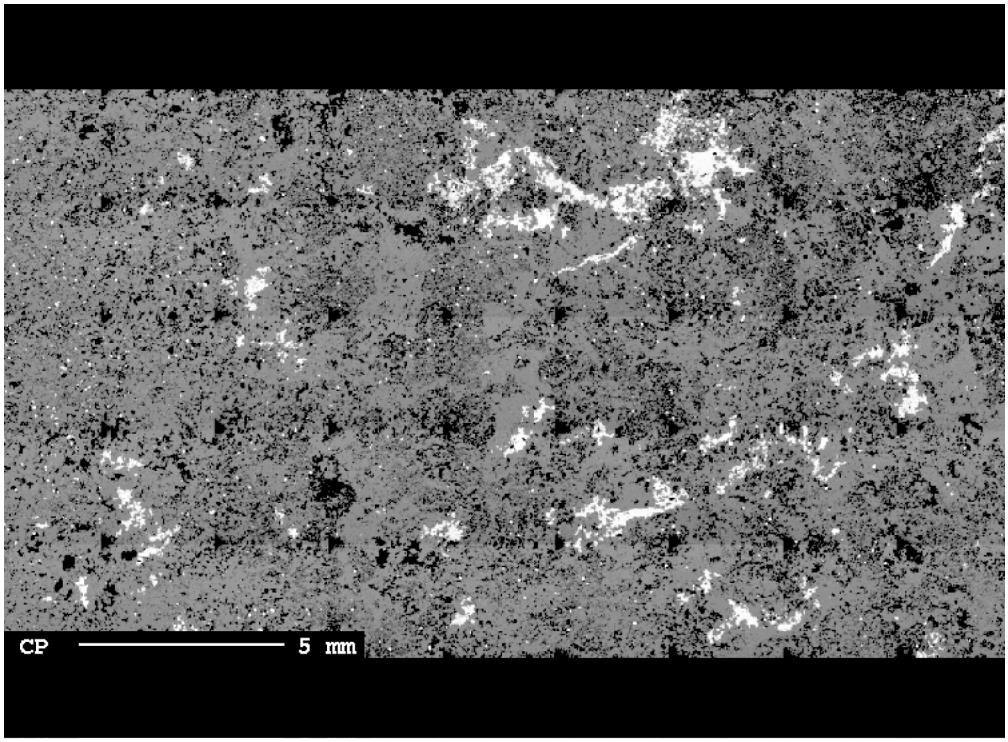

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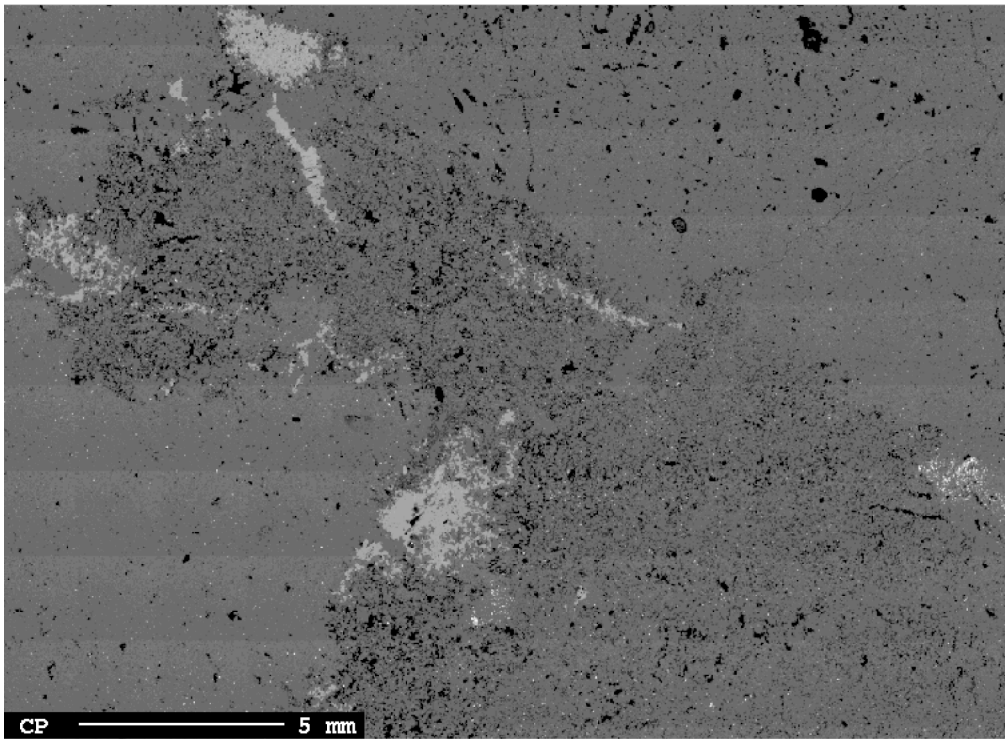

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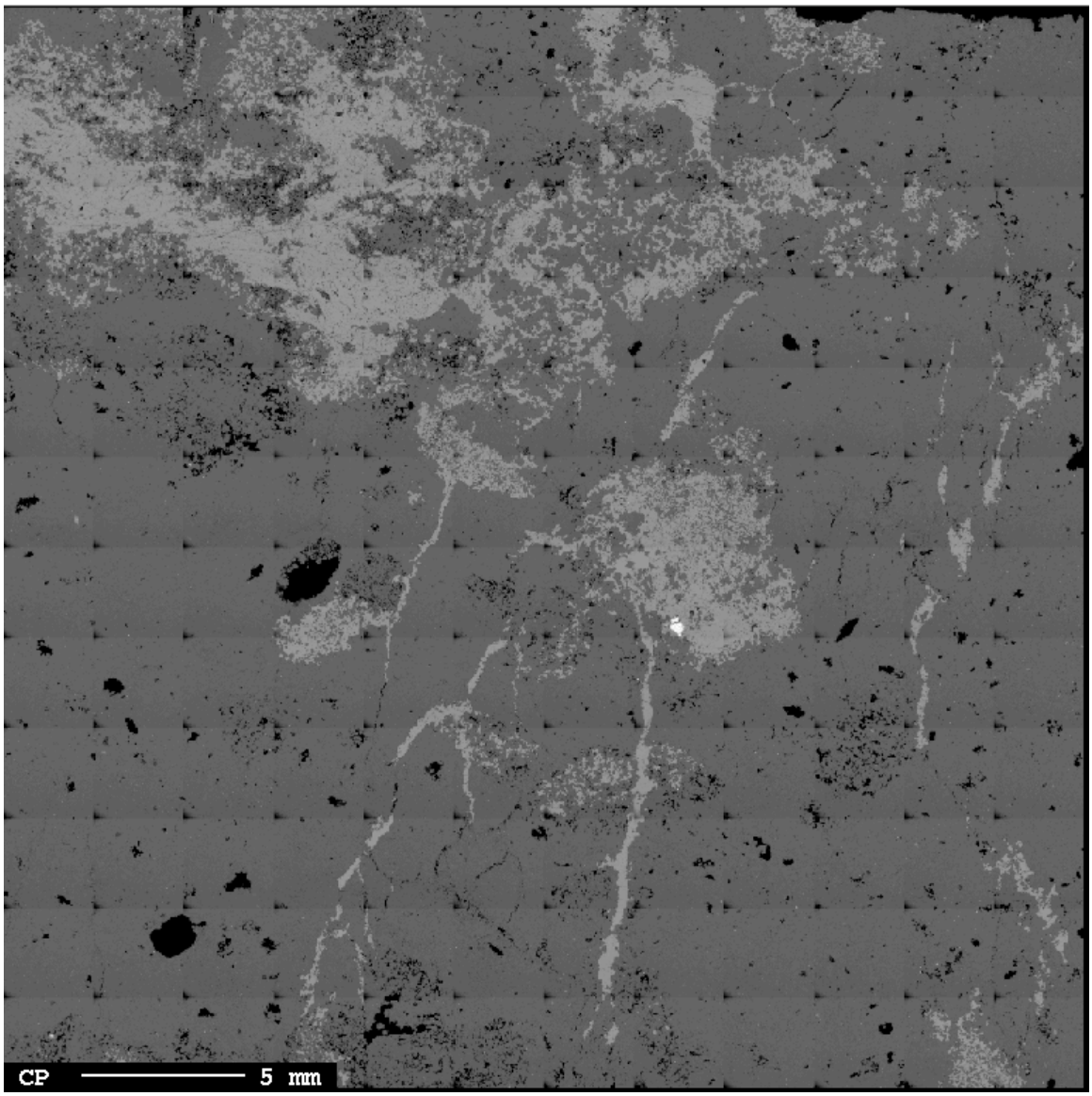

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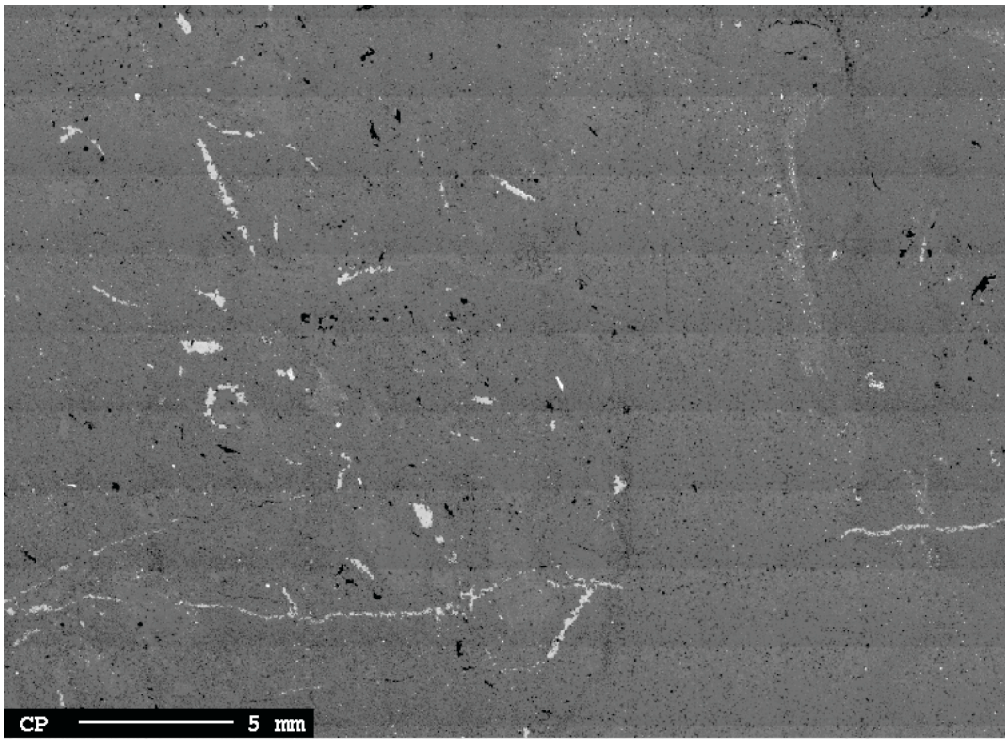

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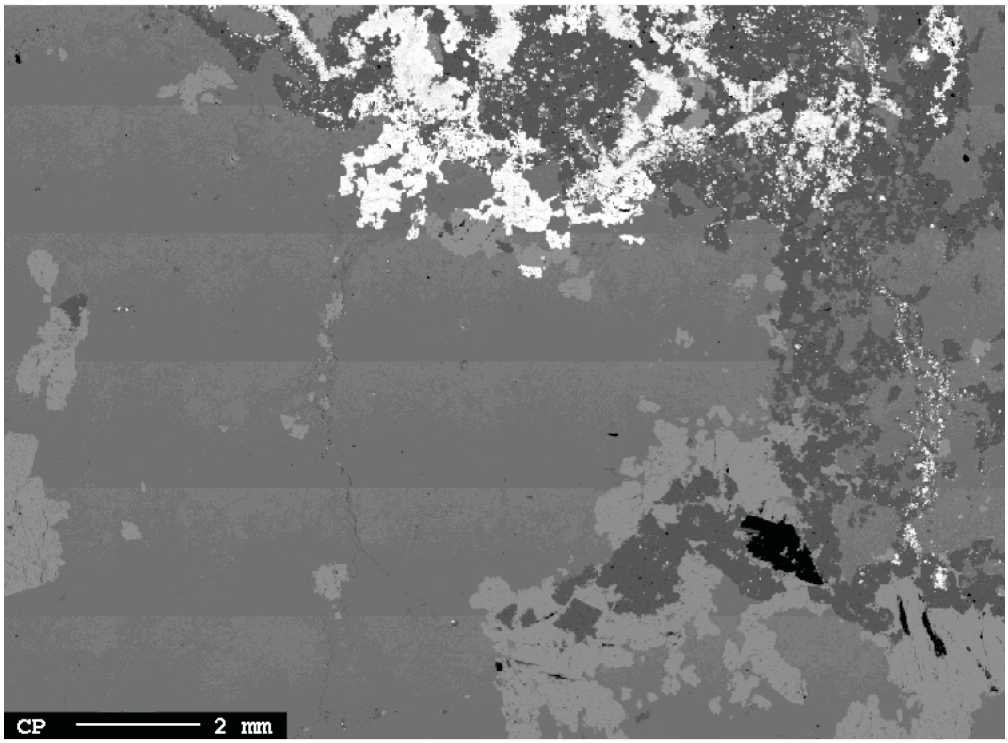

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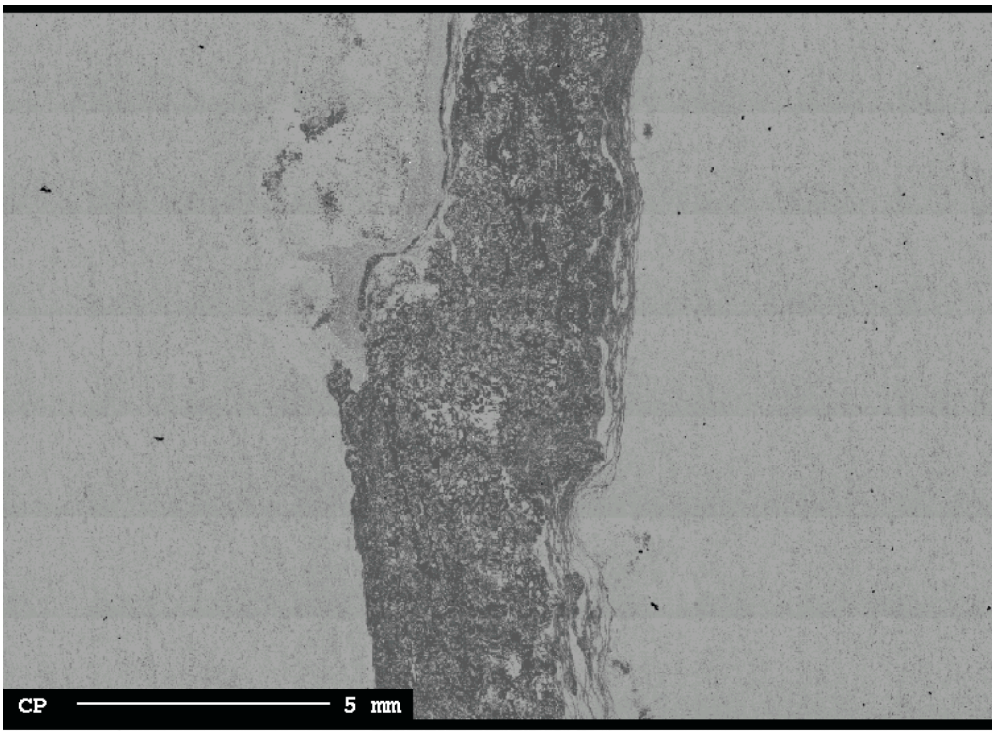

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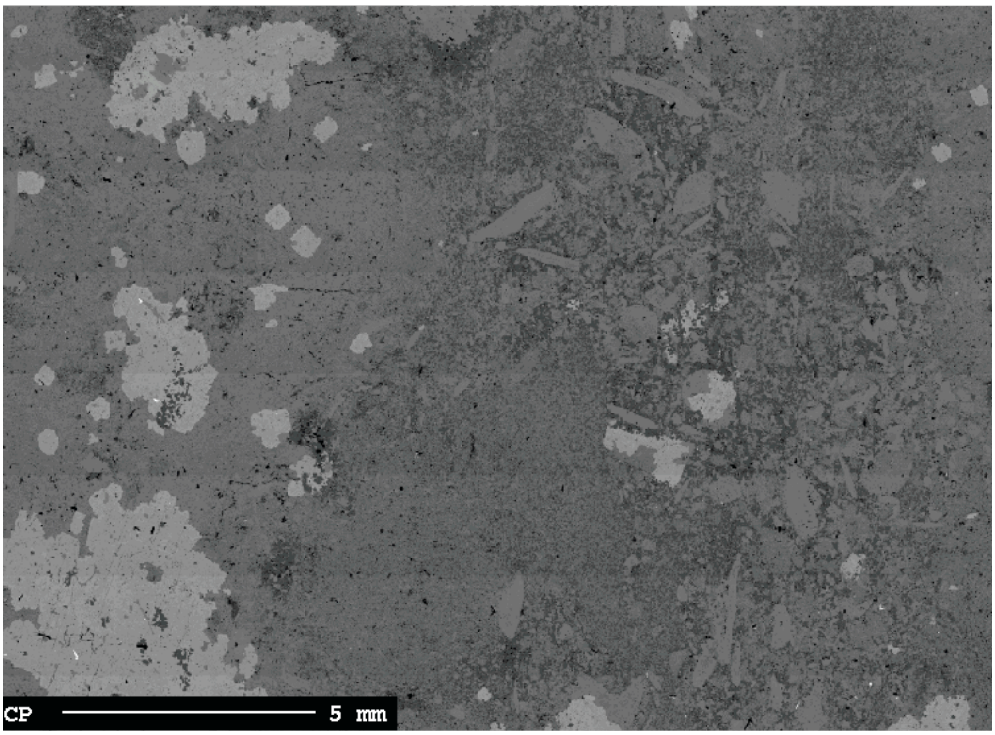

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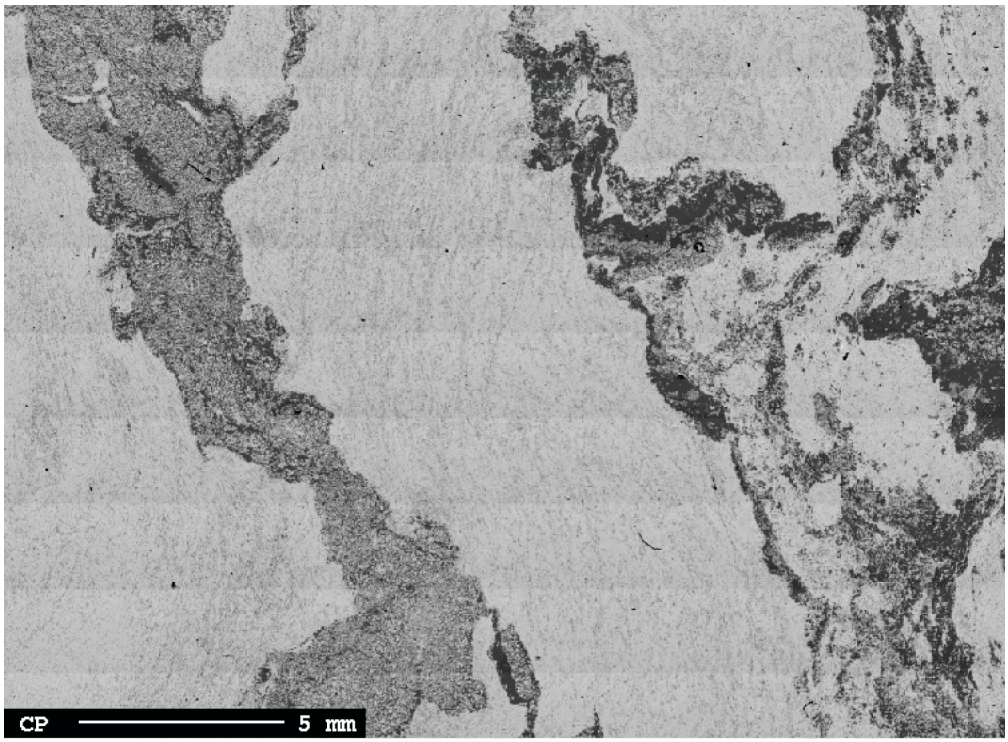

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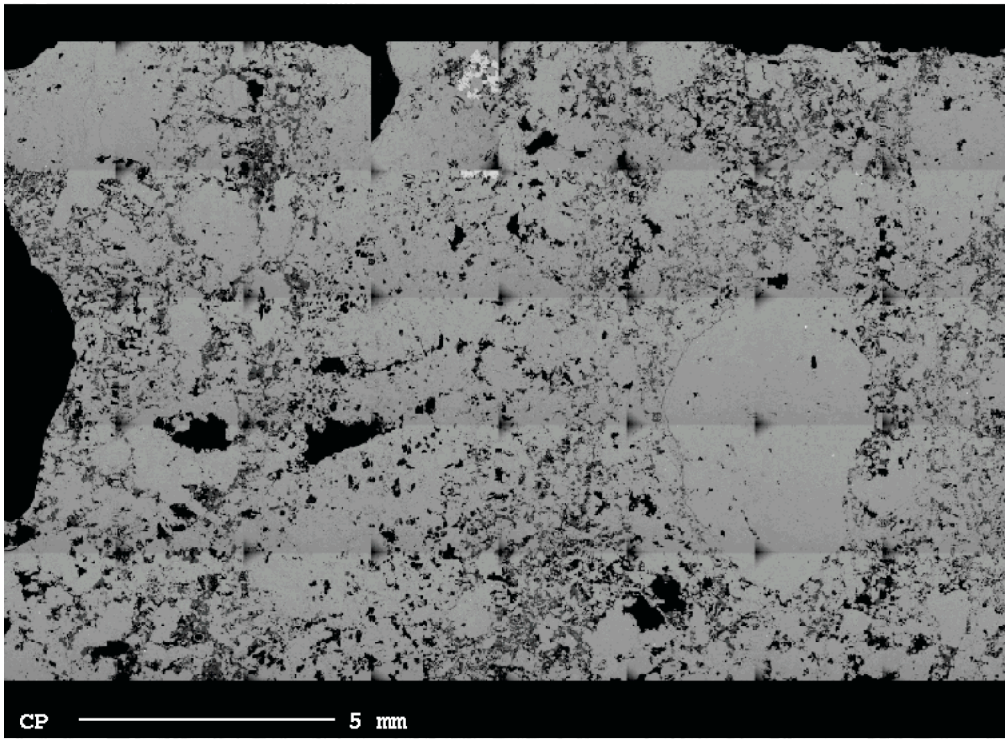

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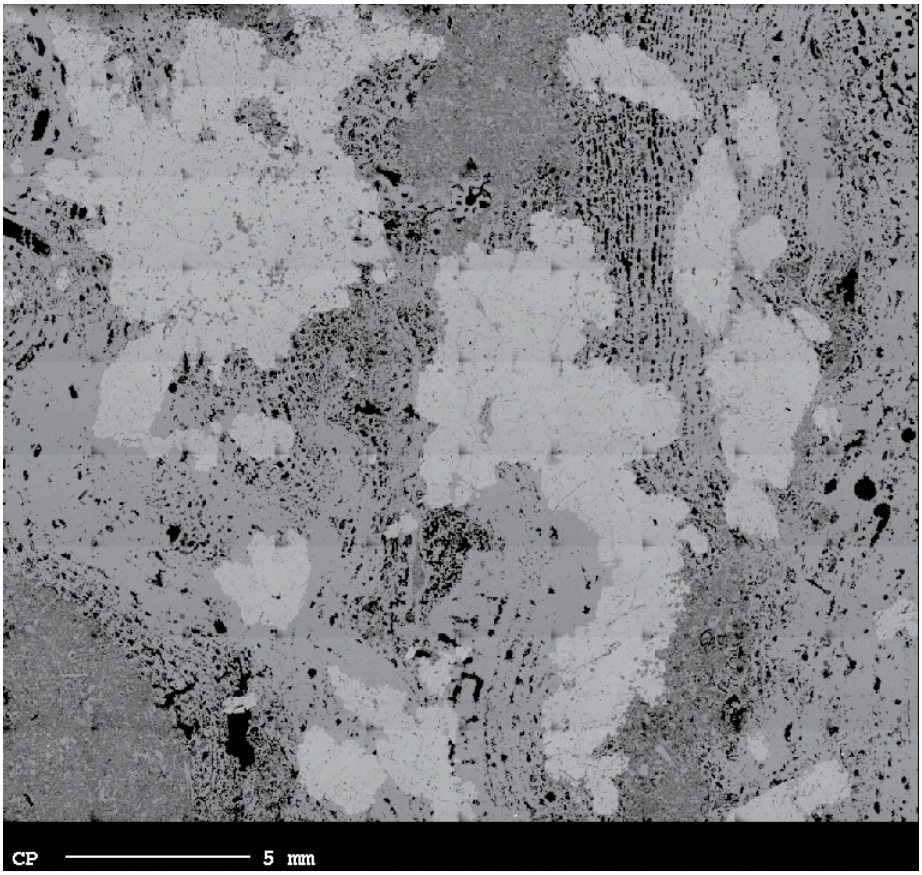

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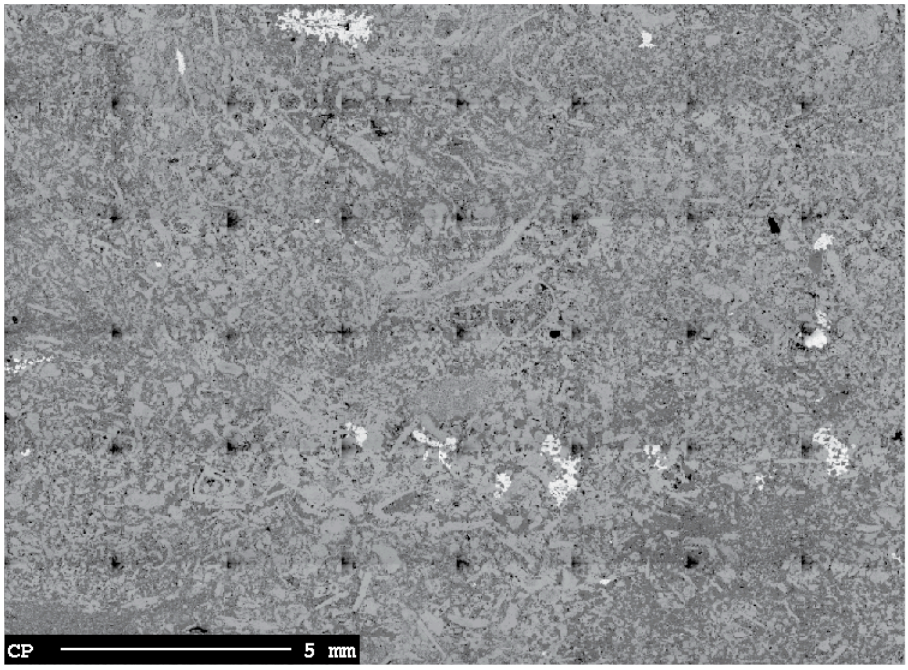

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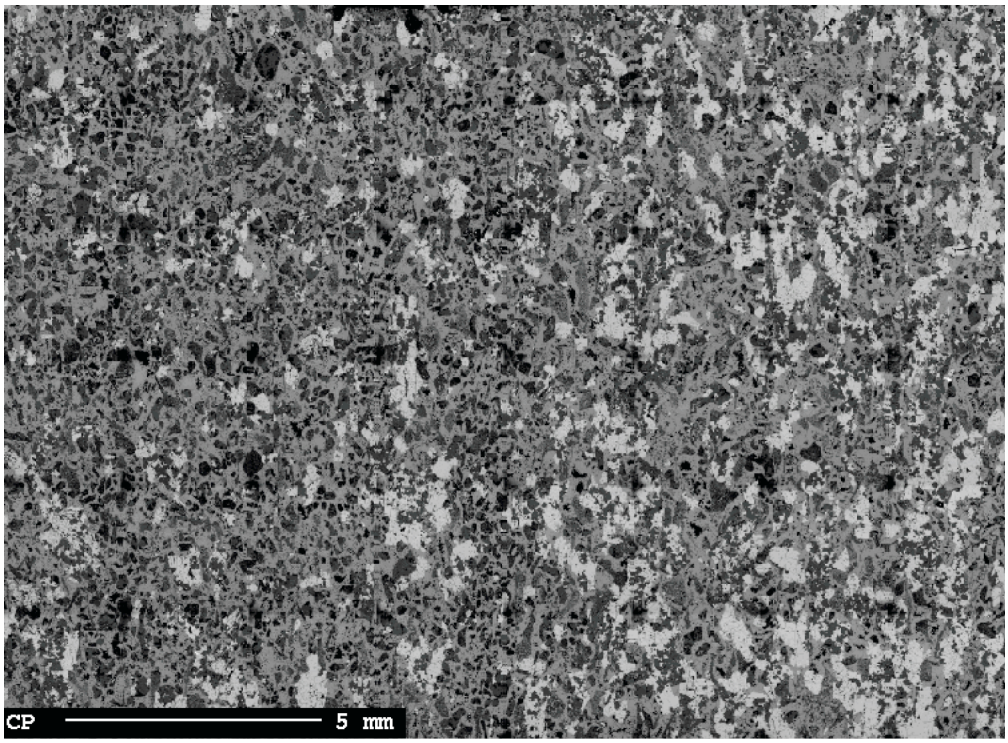

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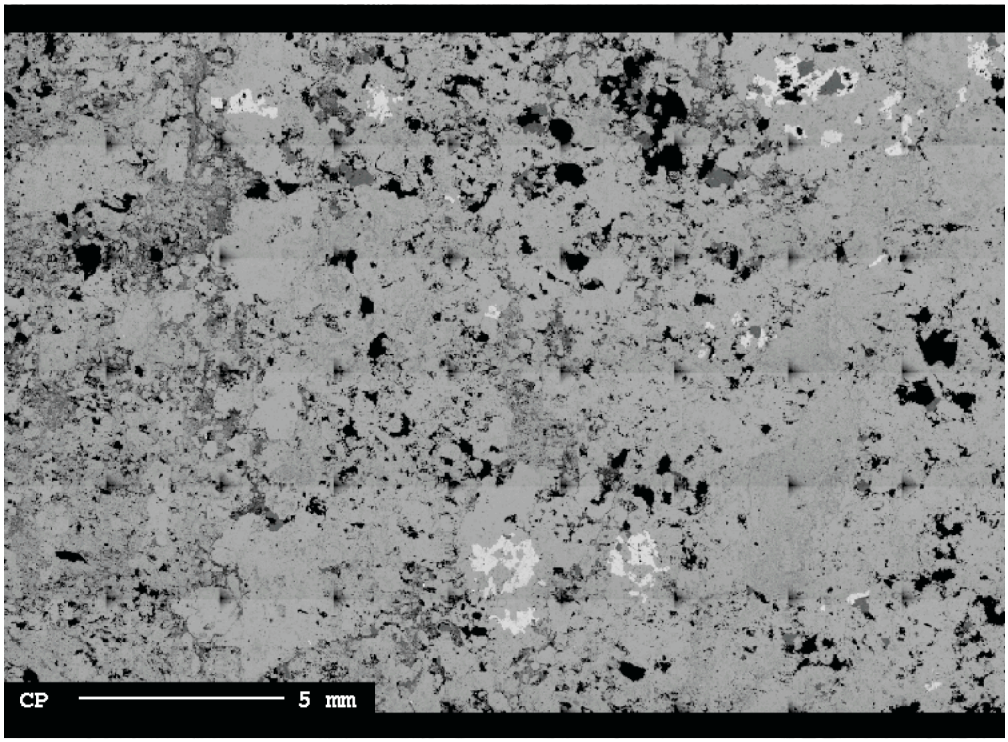
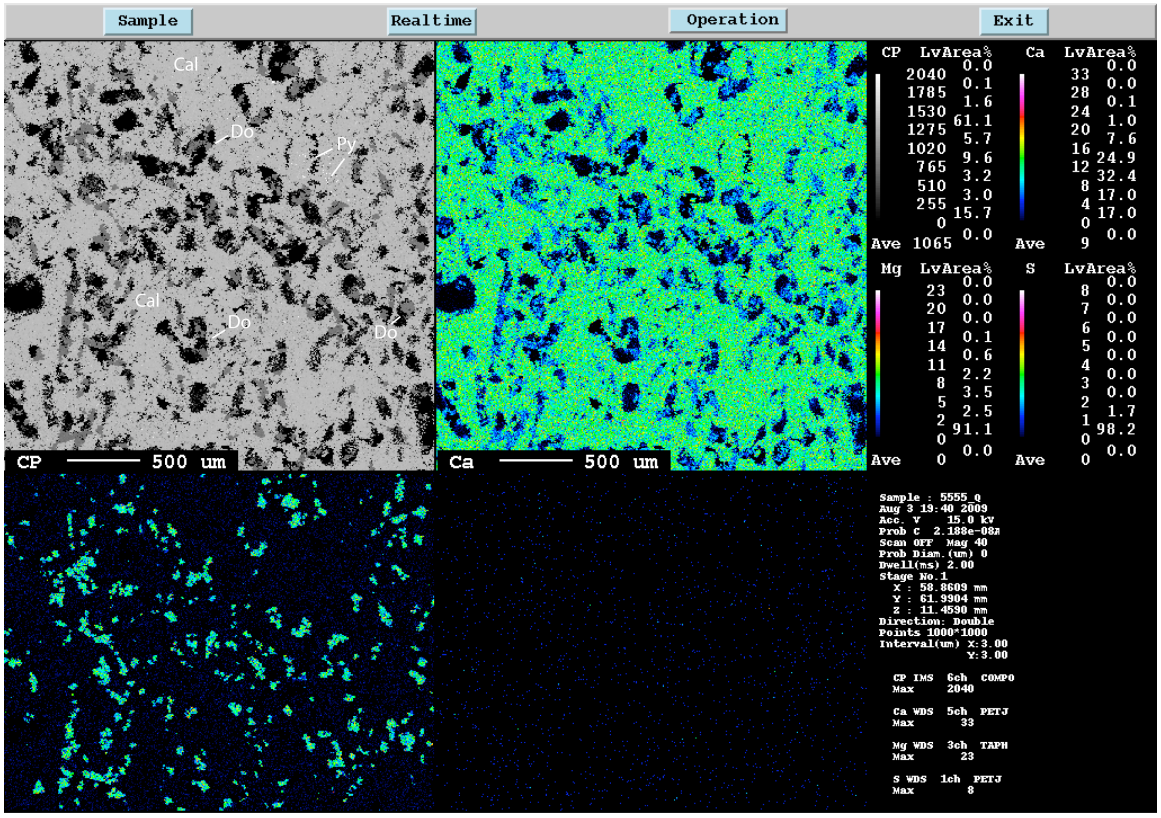


15-11-6-20 W3M 6161

Appendix C

Backscattered electron and x-ray images of analysis areas



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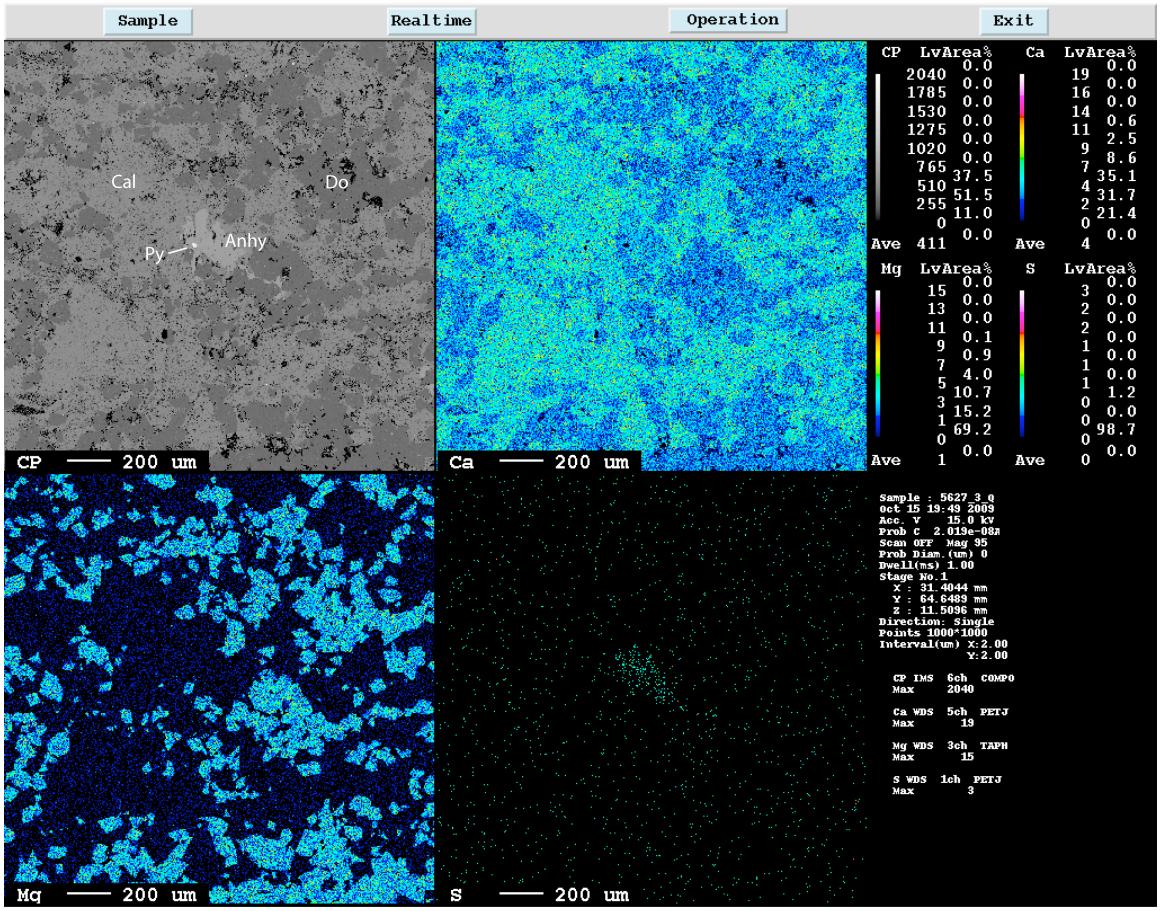

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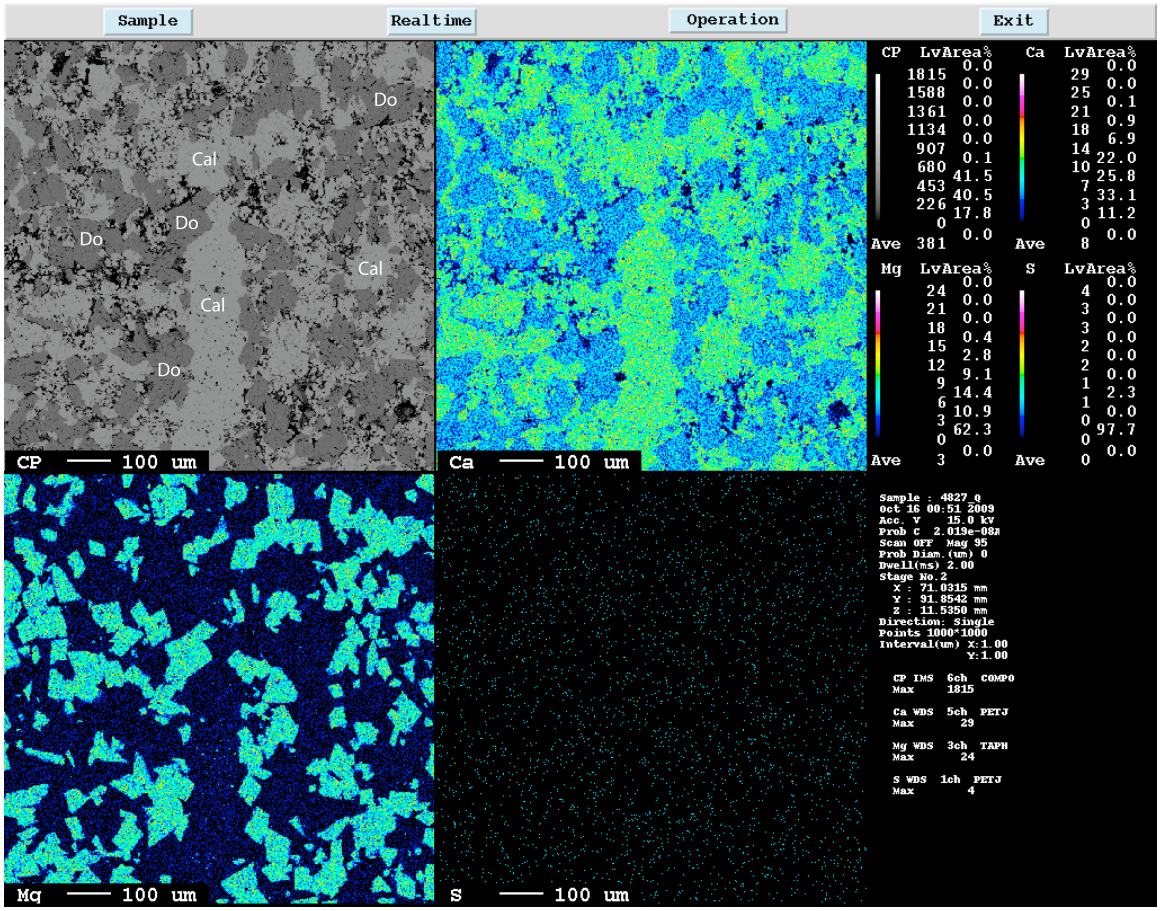

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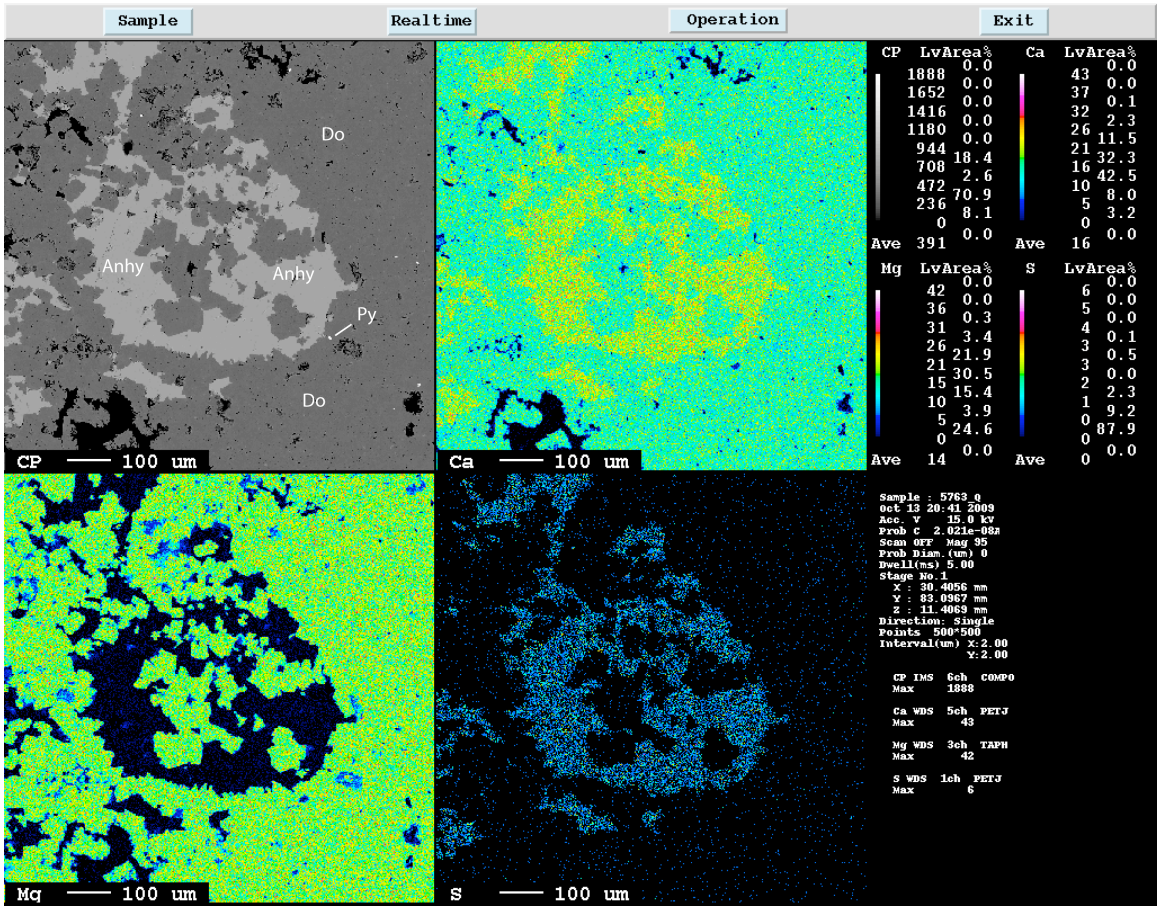

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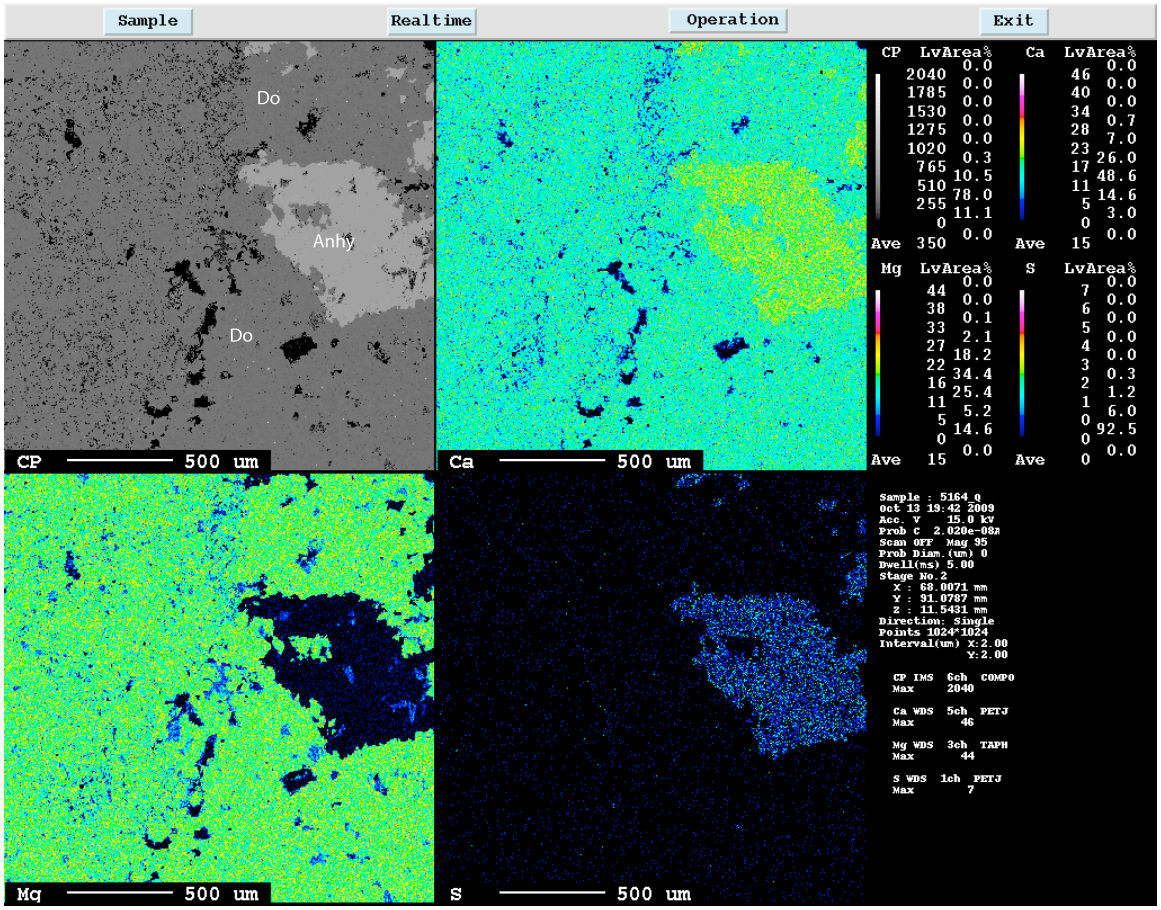

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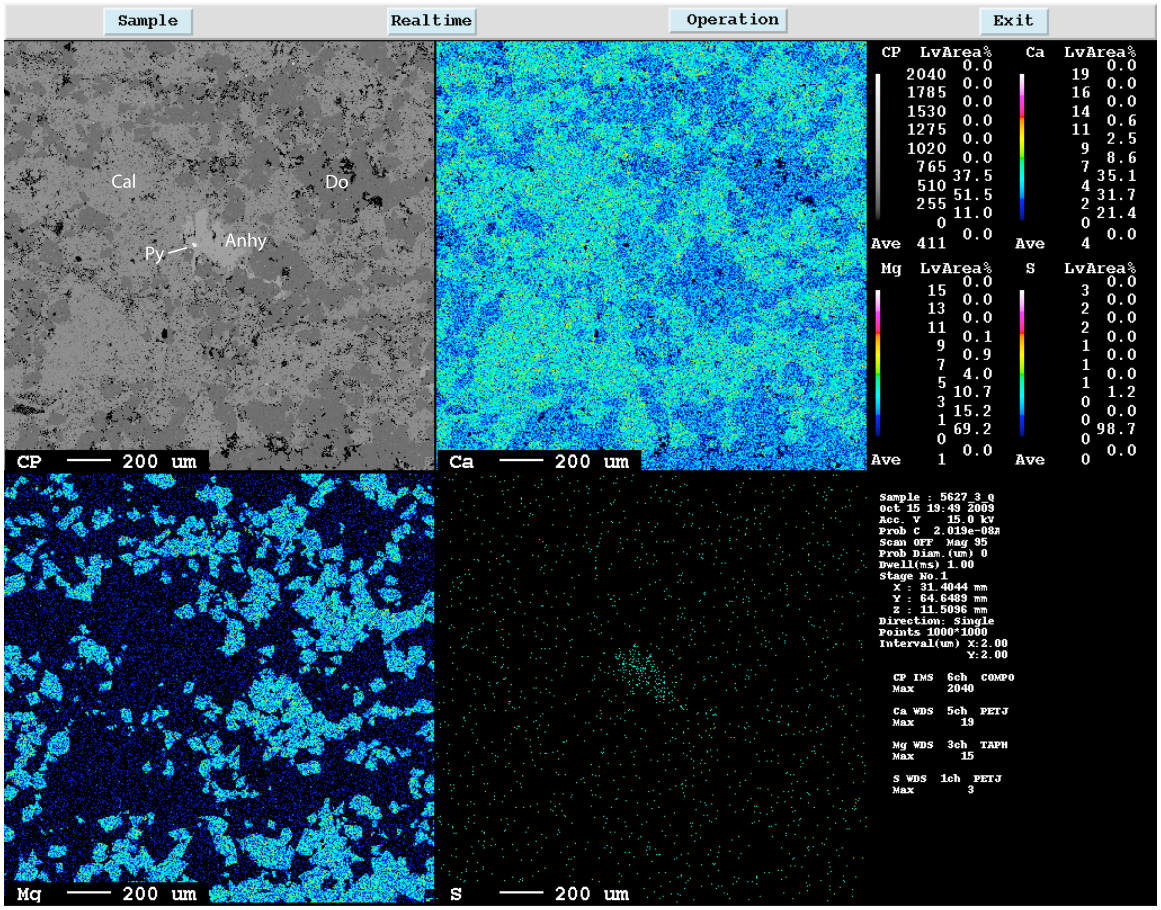

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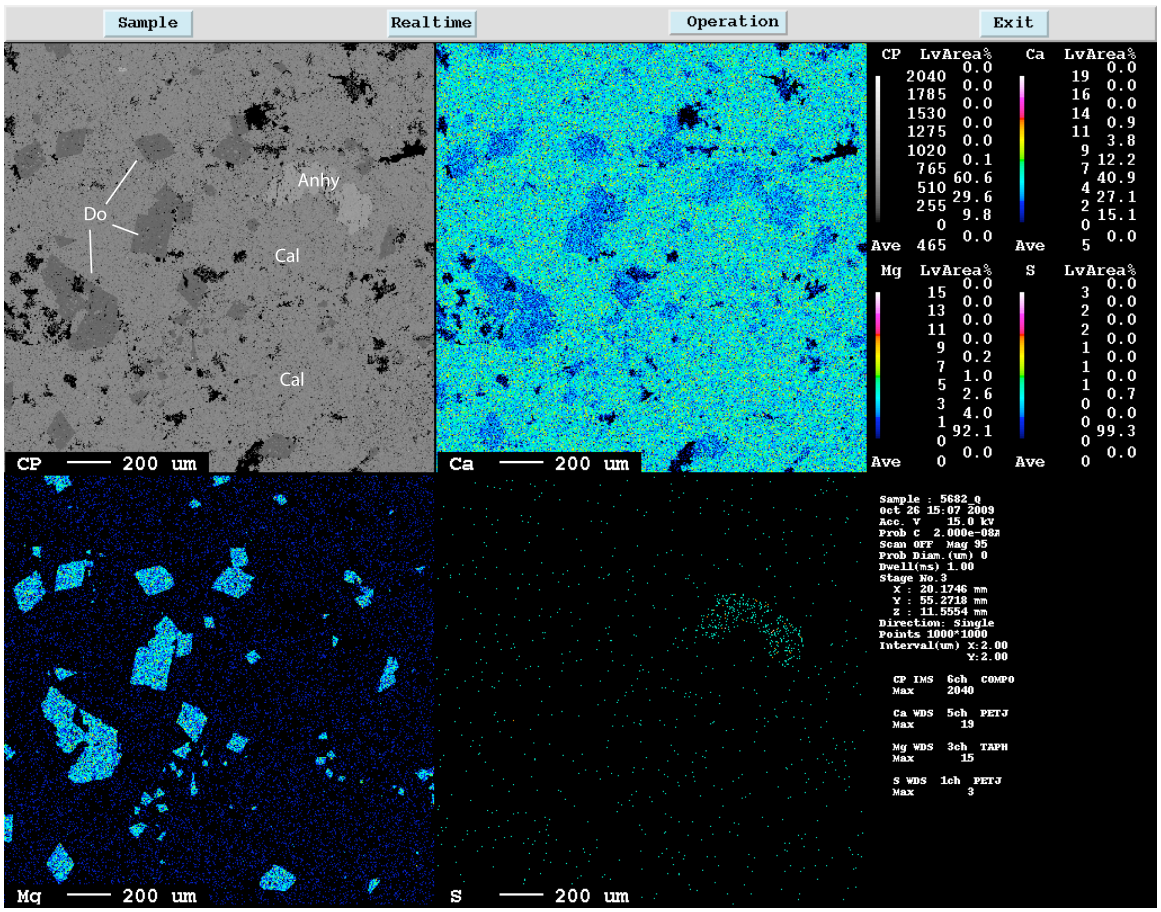

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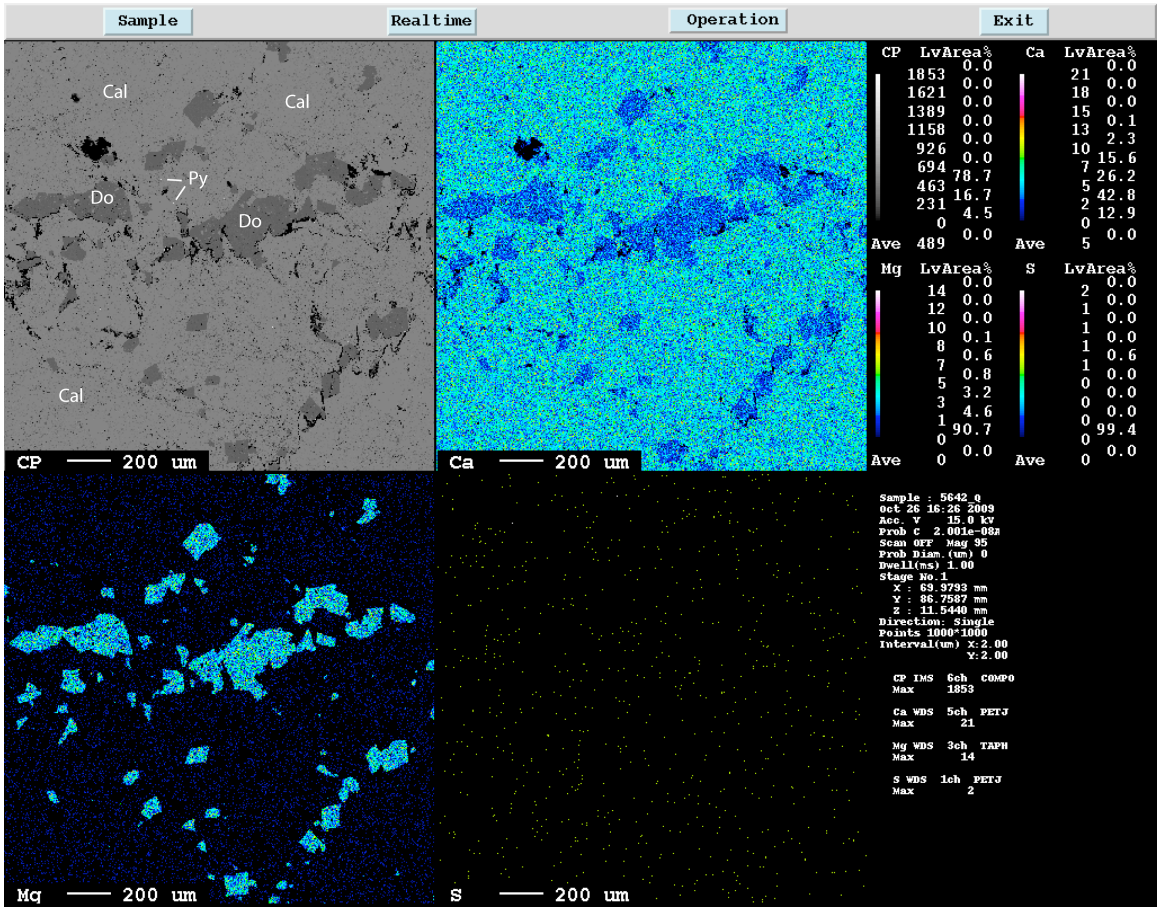

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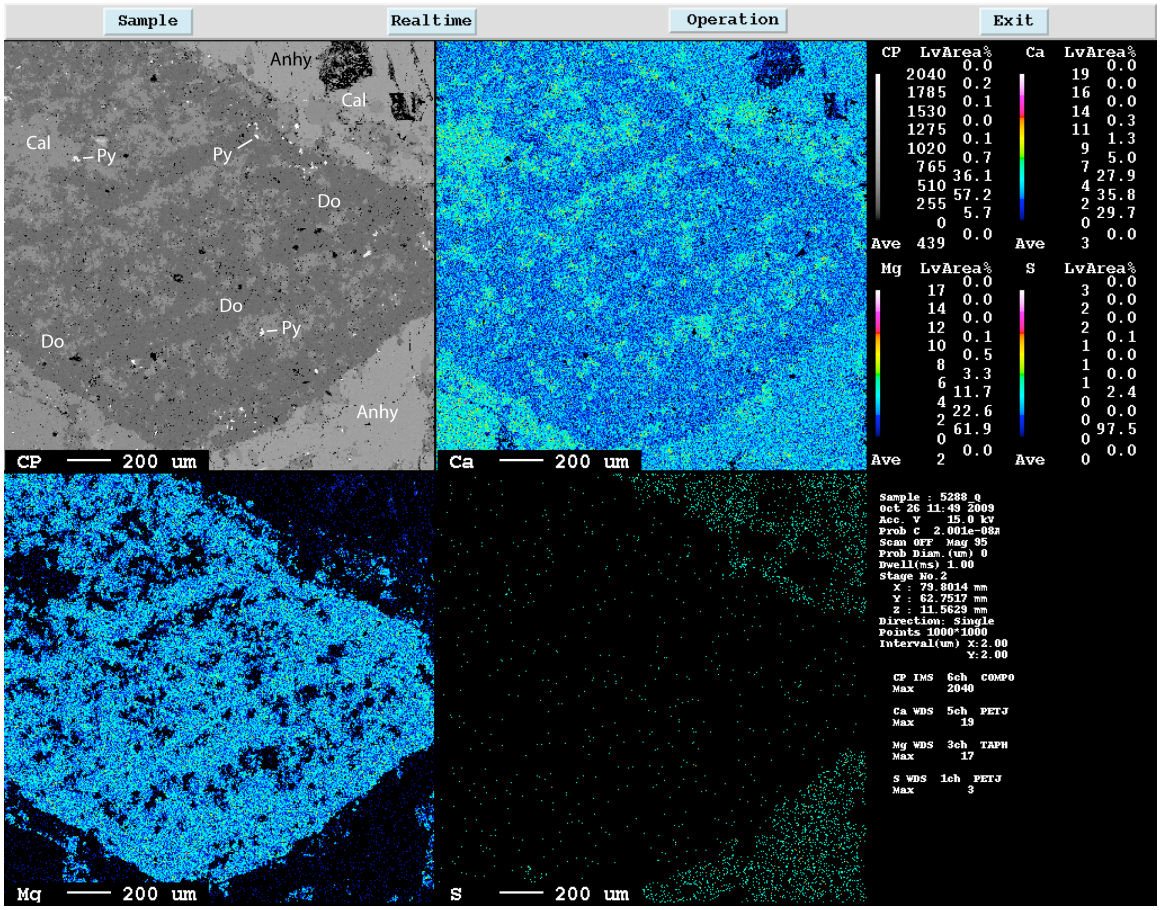

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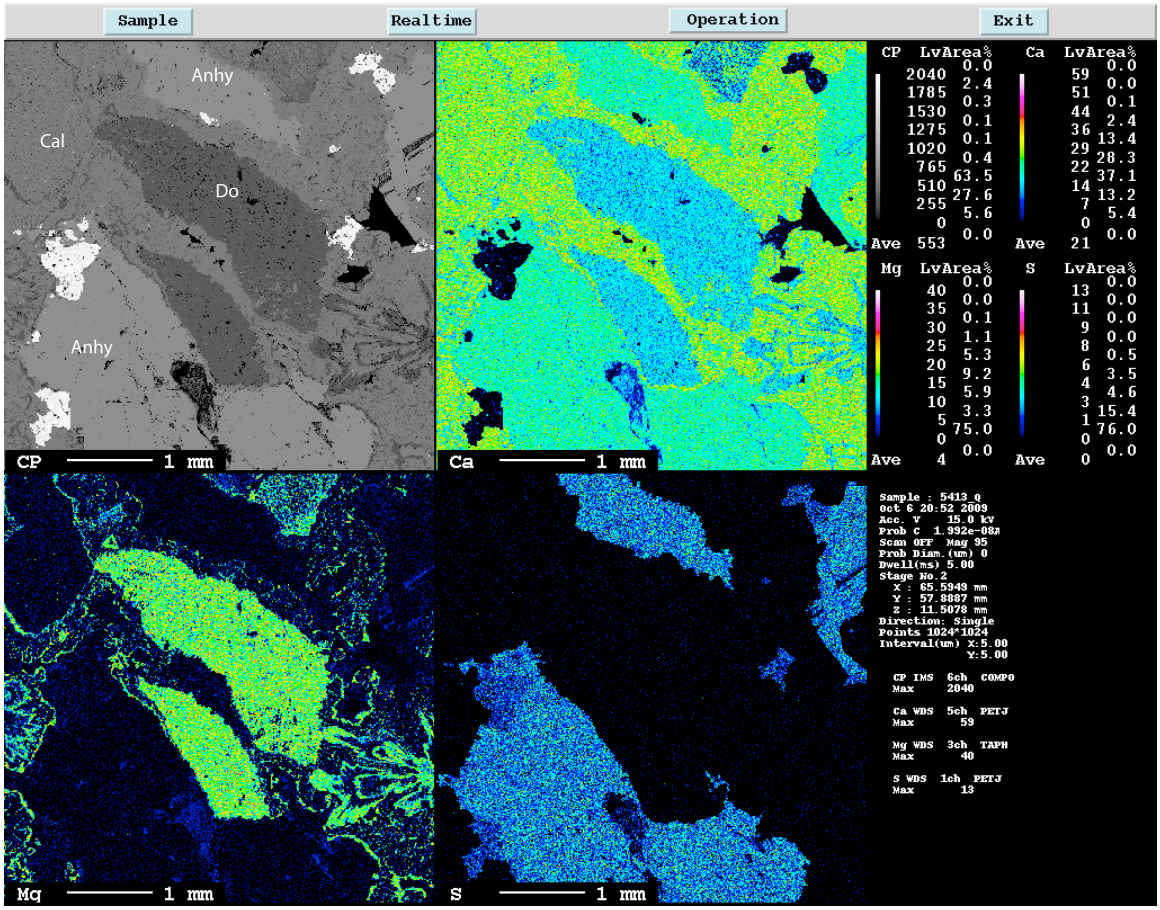

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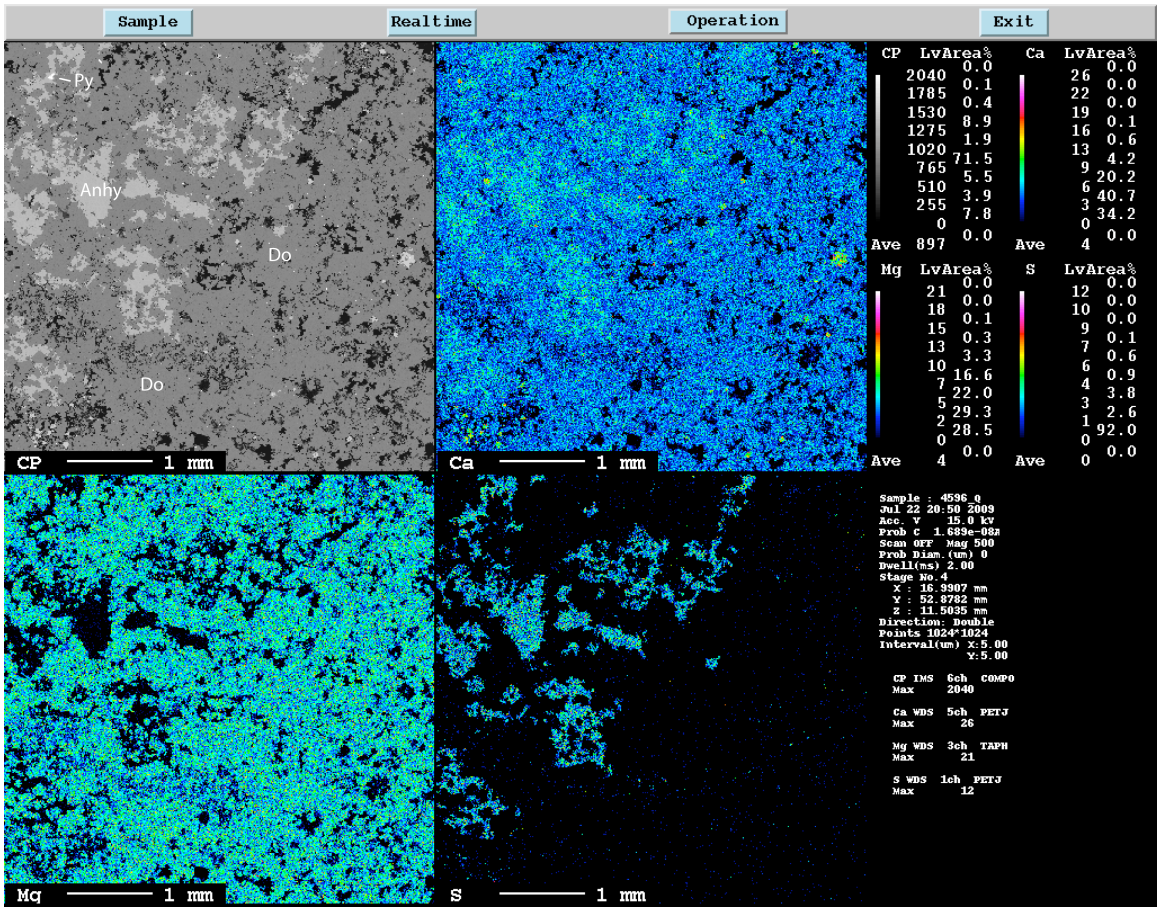

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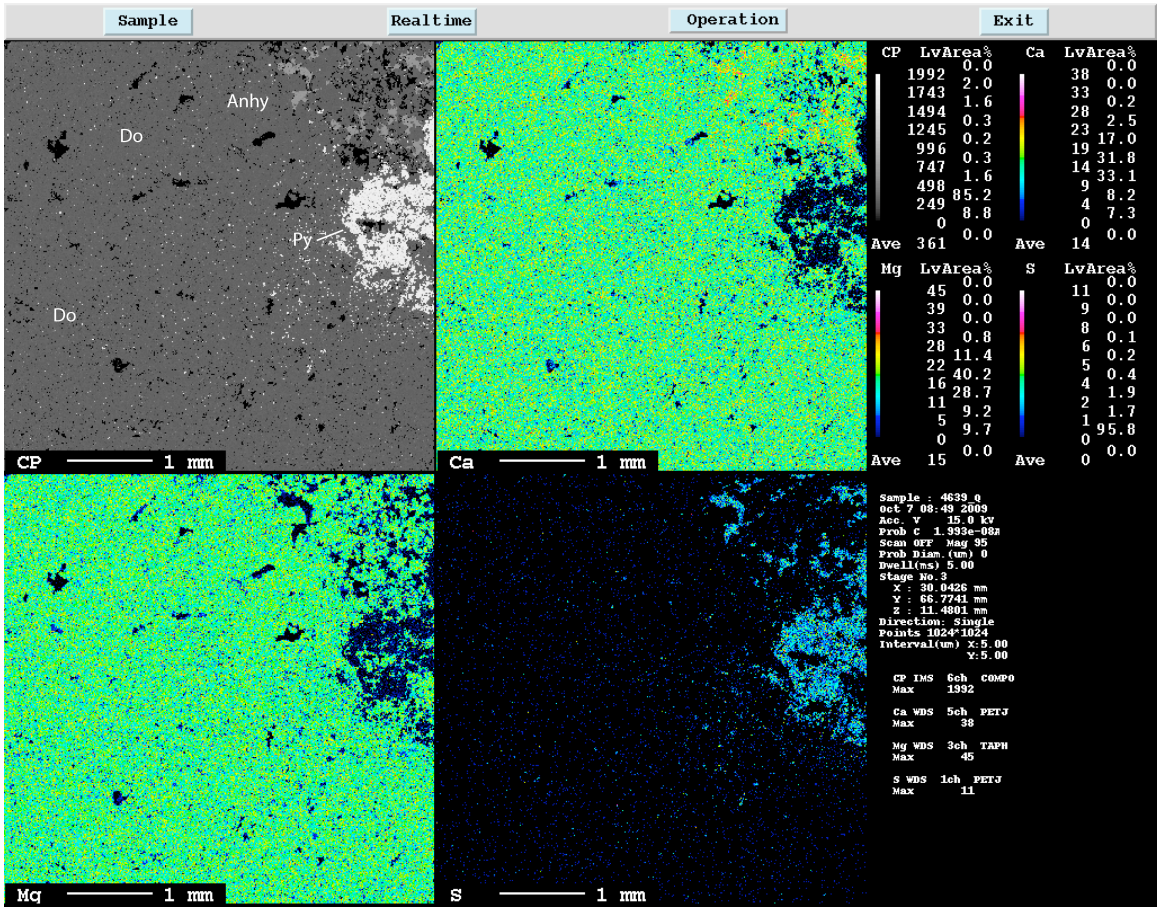

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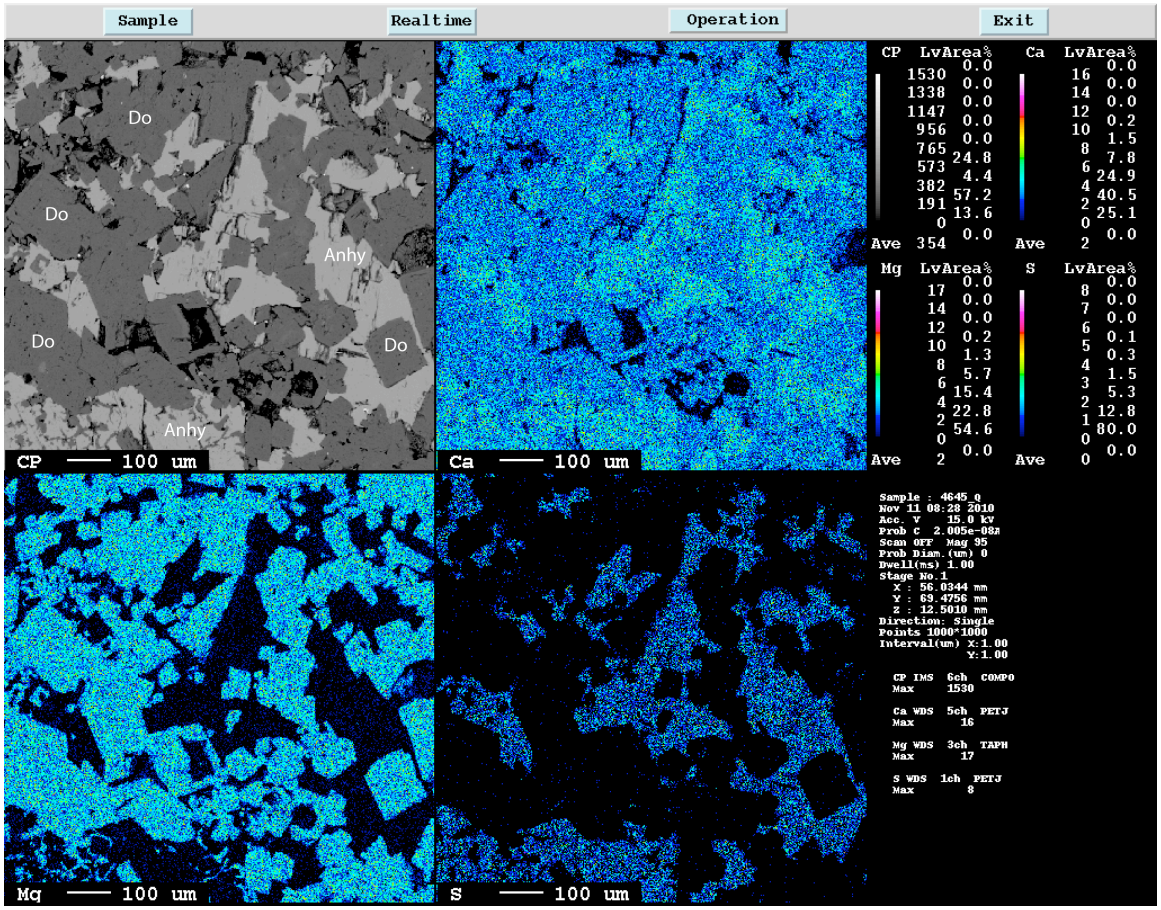

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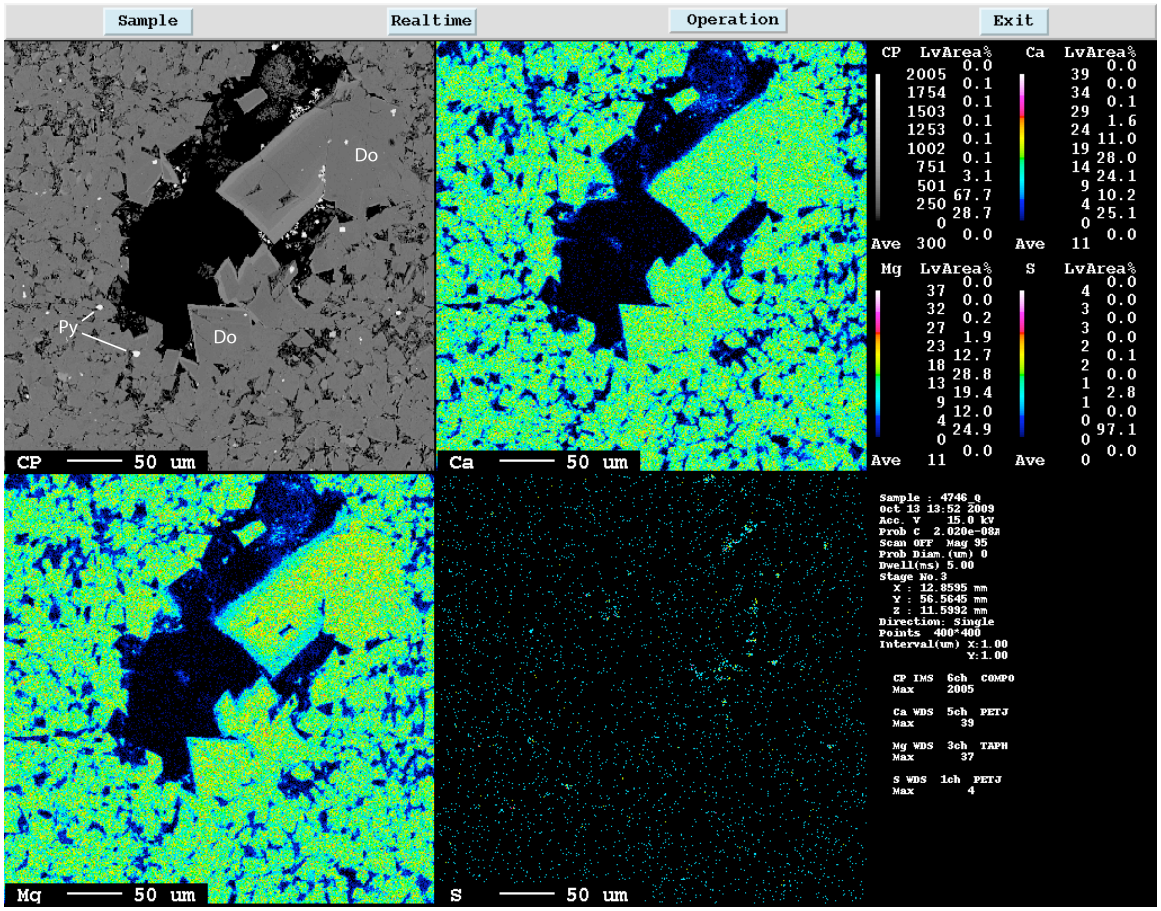

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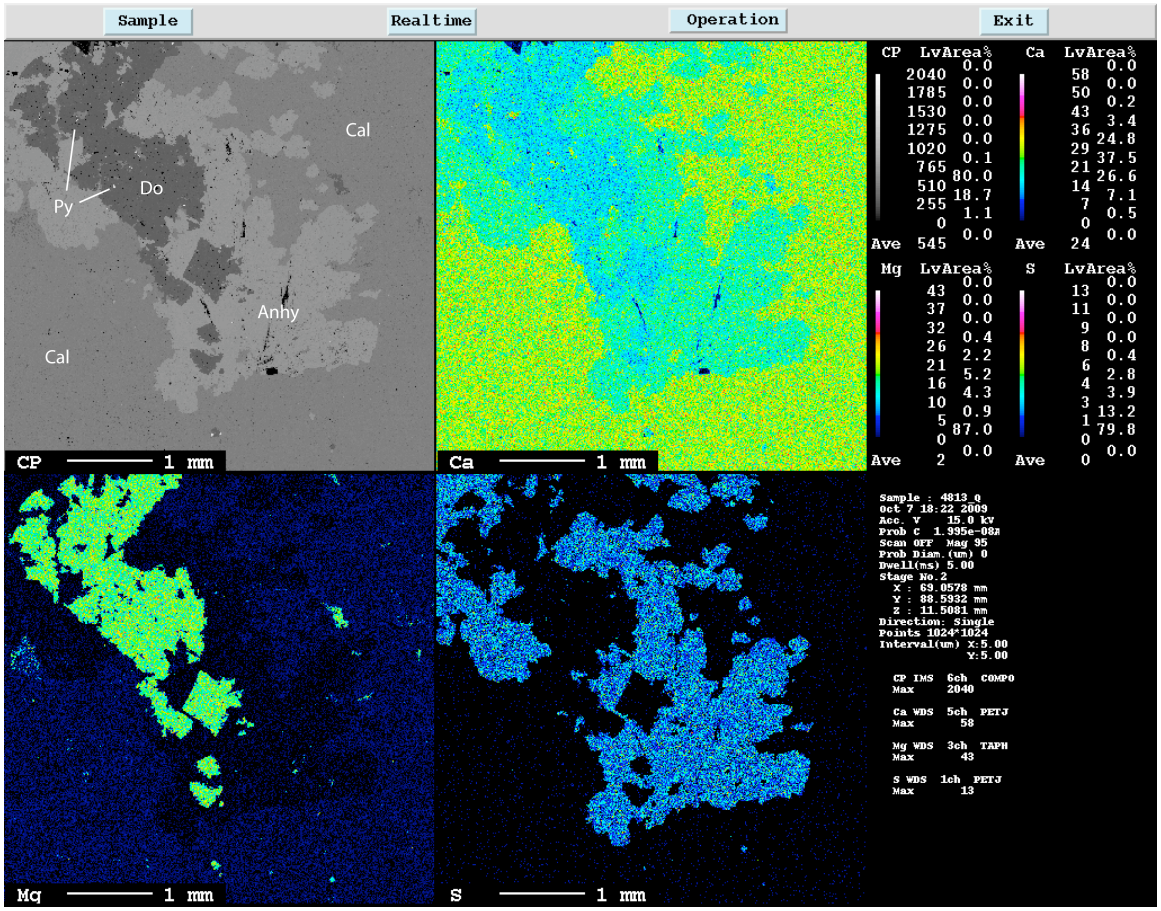

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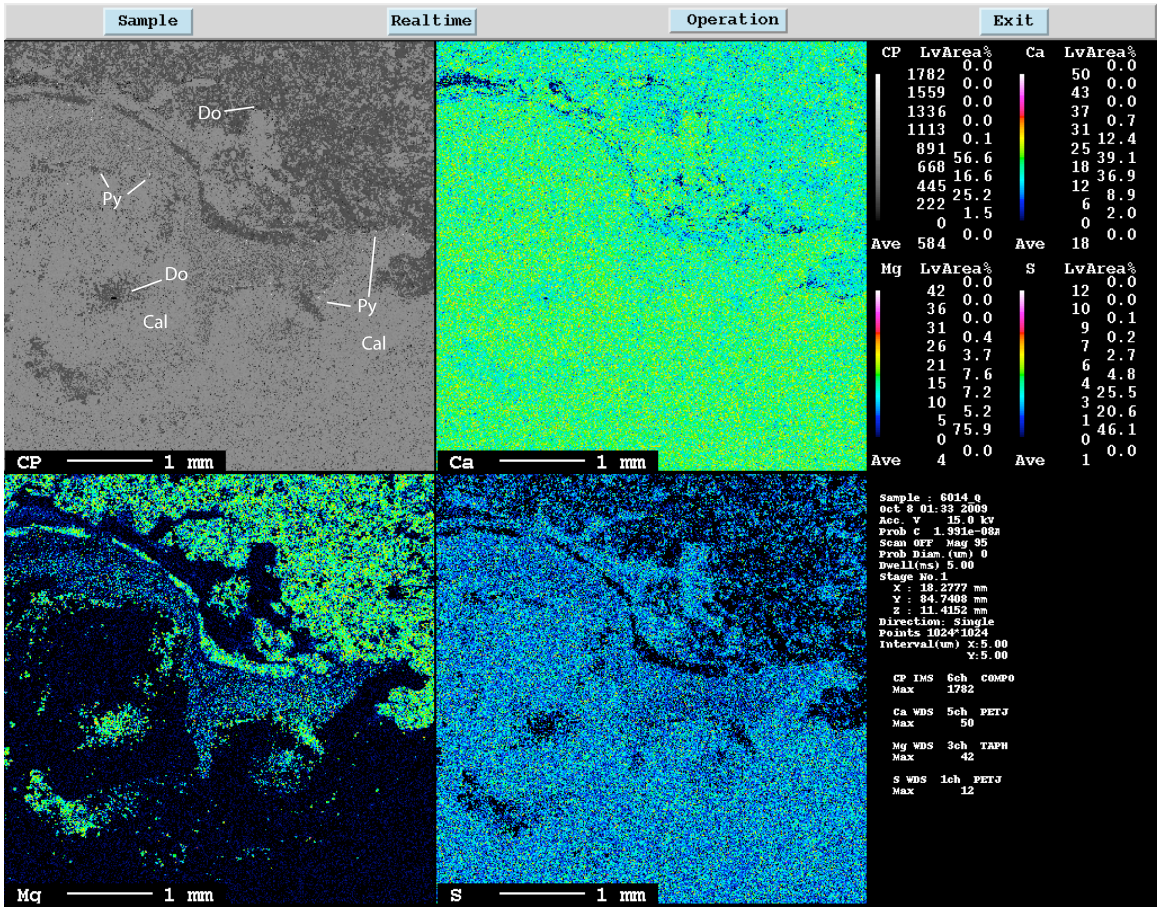

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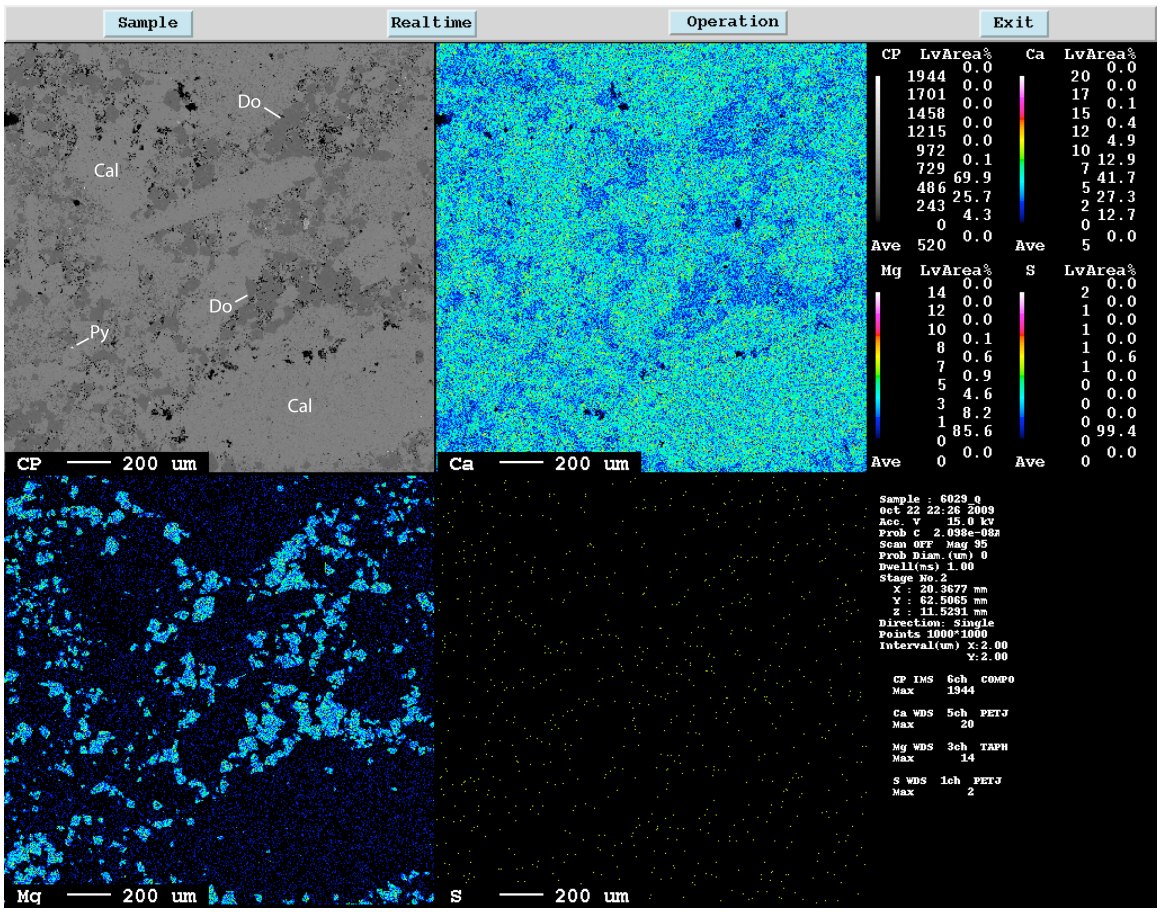

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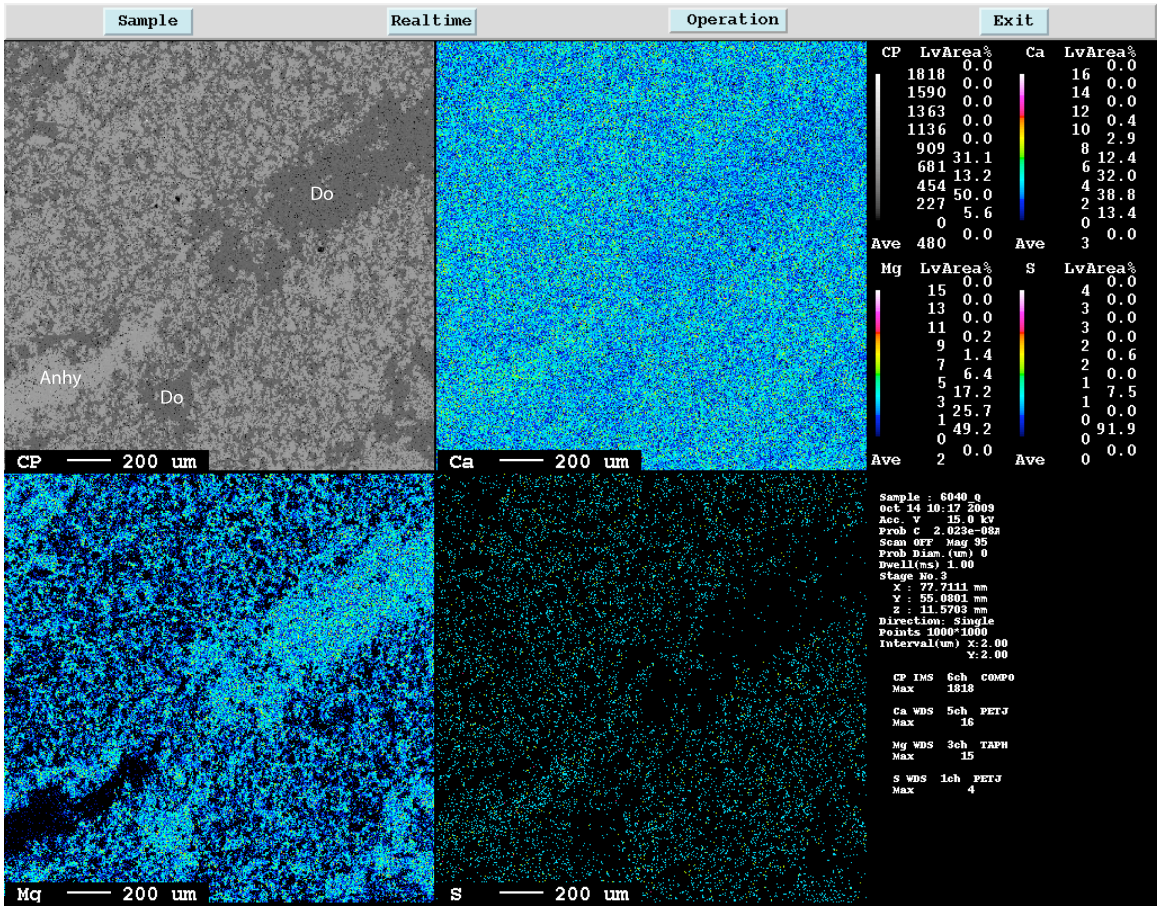

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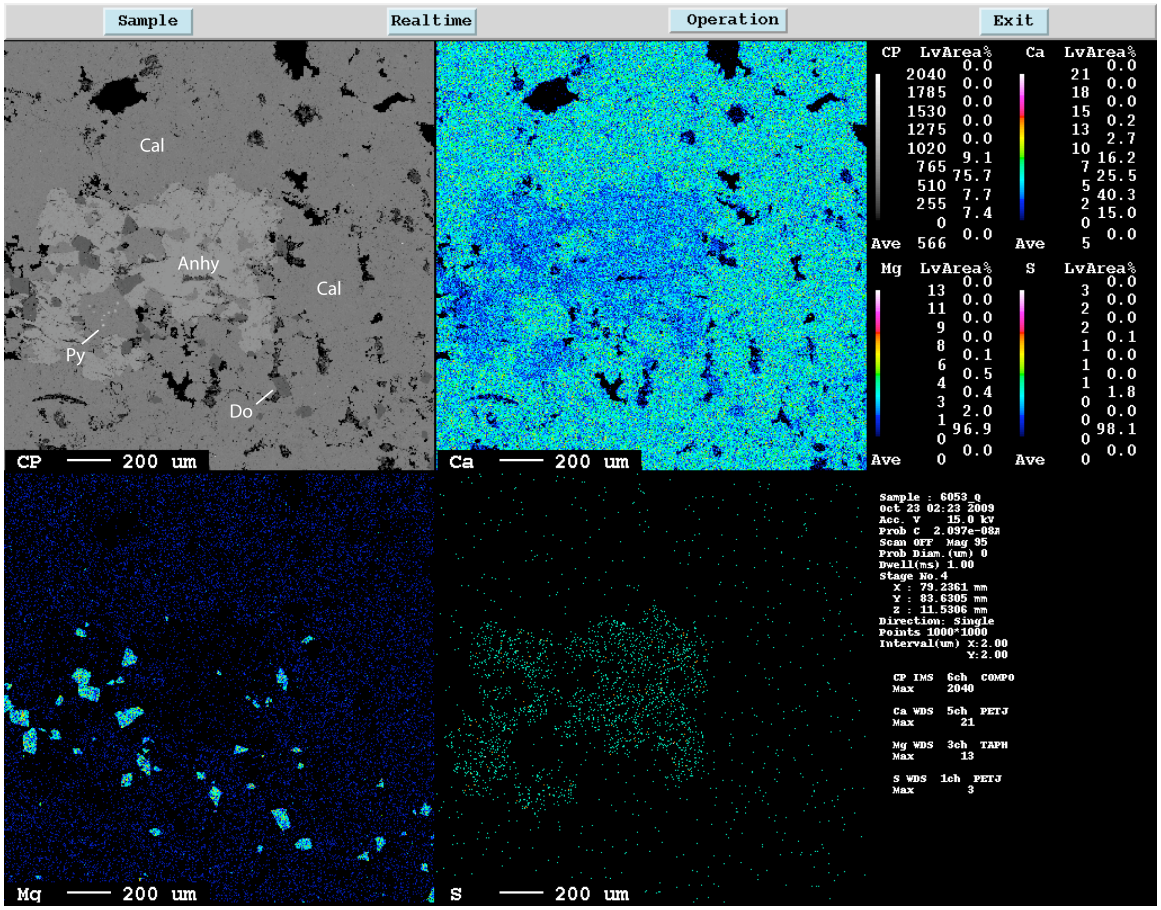

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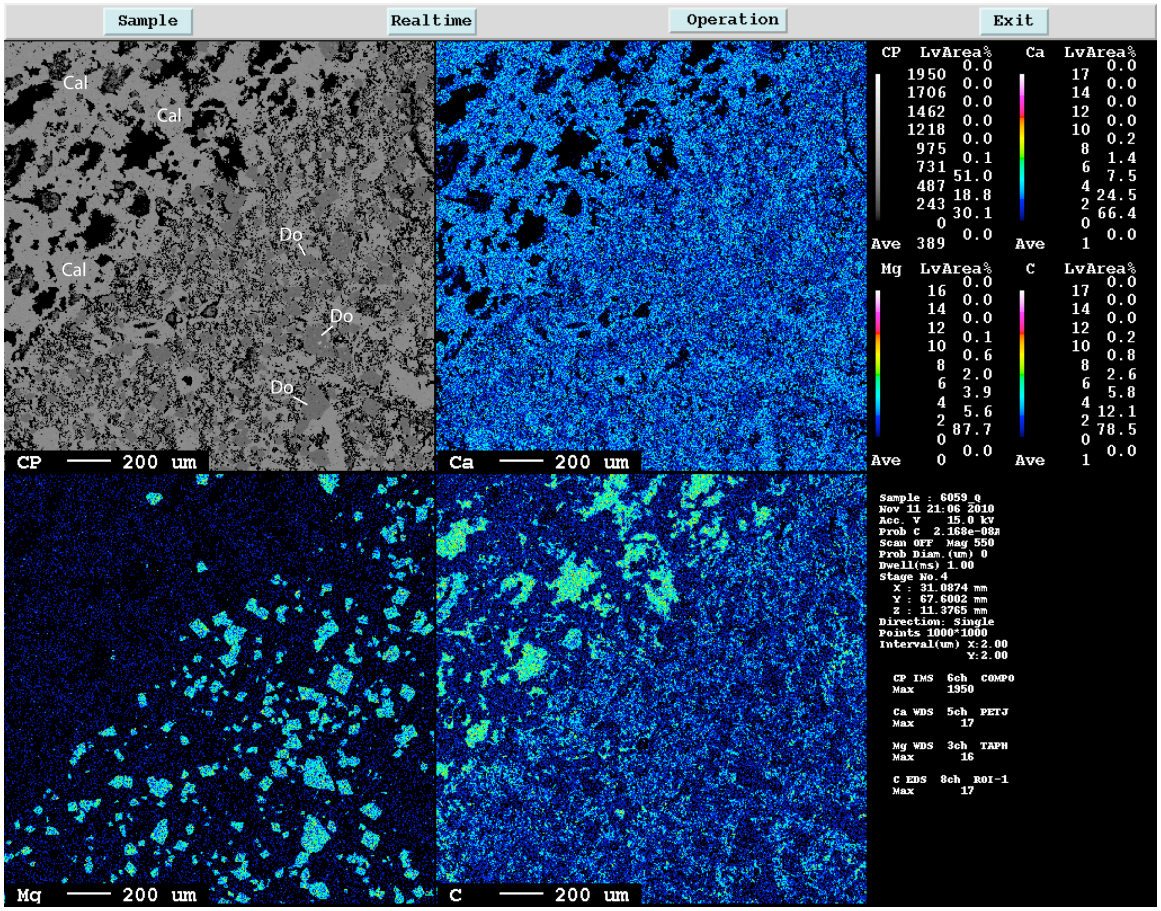

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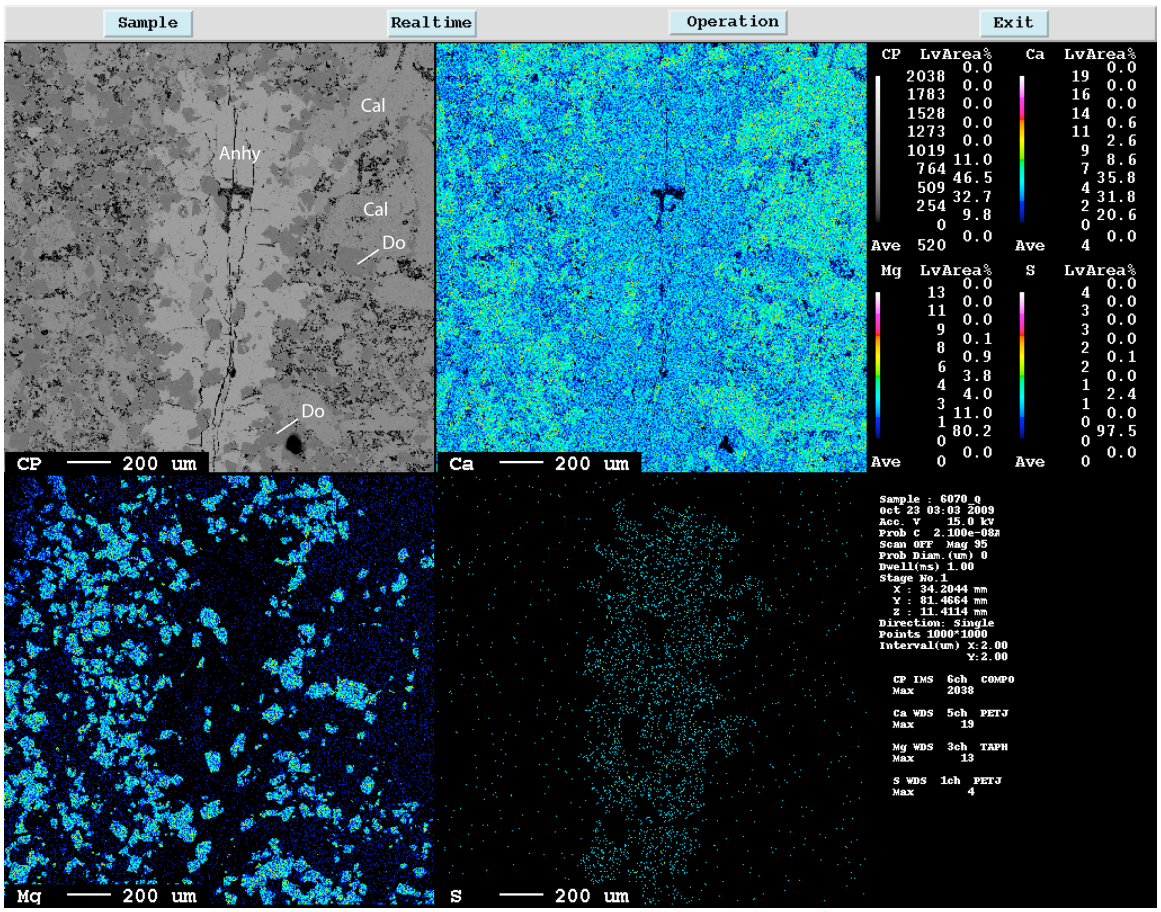

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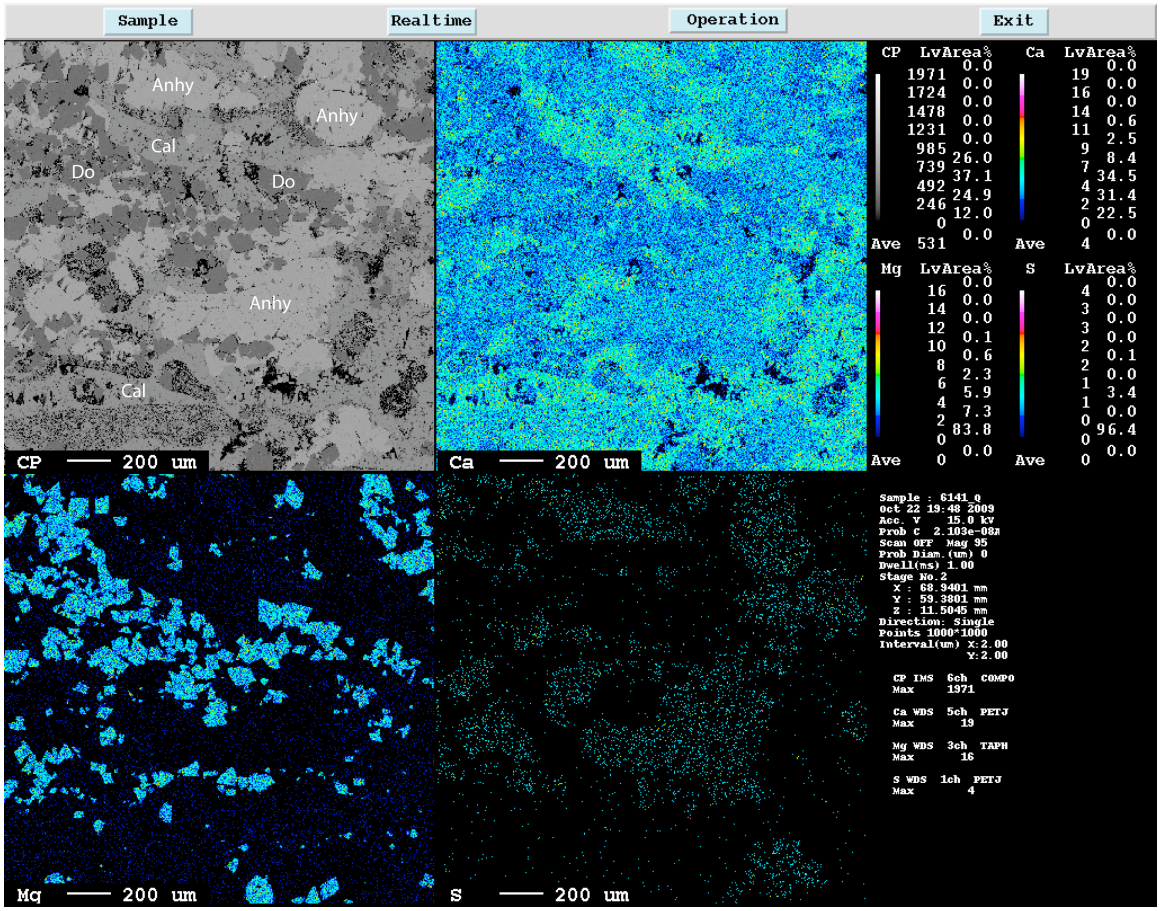

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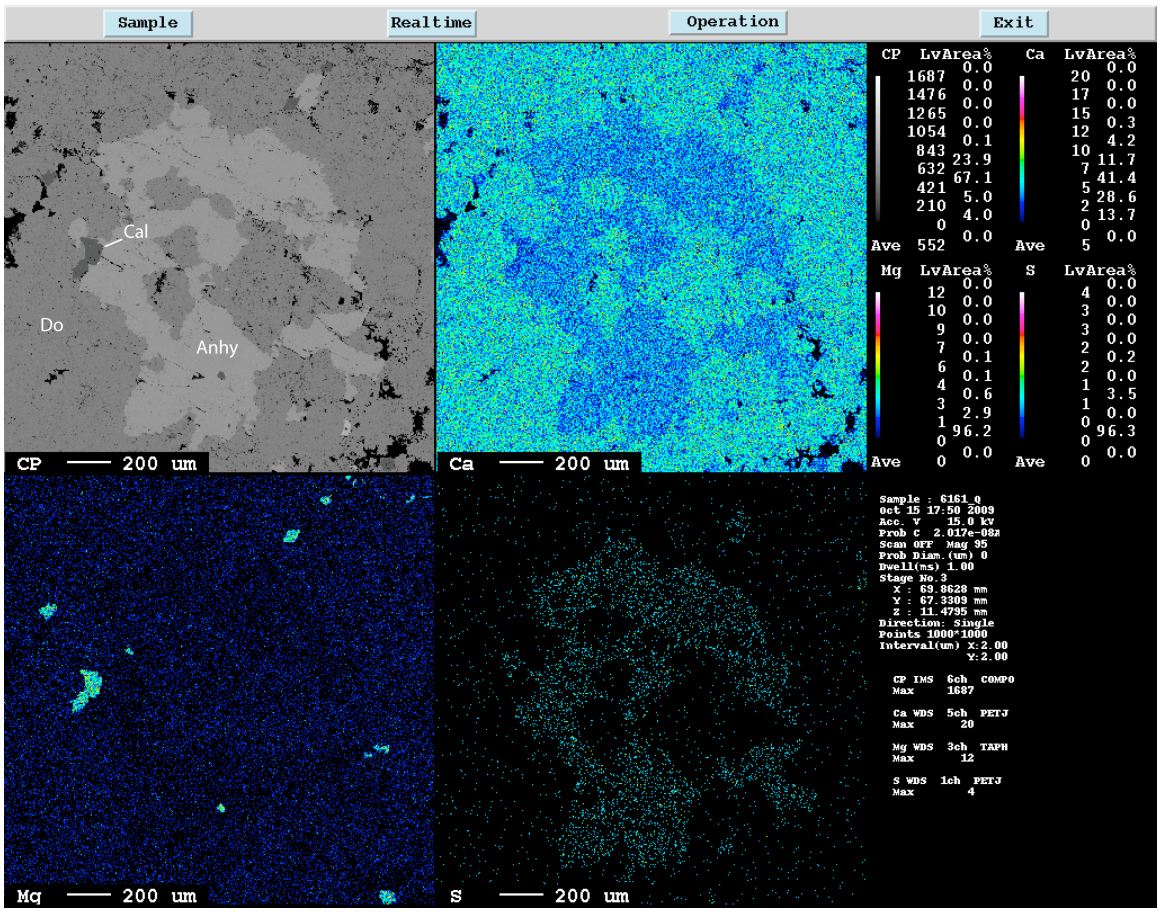

15-11-6-20 W3M 6161

Appendix D

Electron microprobe analysis (wt%)of carbonate minerals
from the Duperow Reservoir

3-10-14-14-W3M 5627	No.	SO2	SrO	MgO	MnO	CaO	FeO	CO2	Total
	6	0.00	0.00	19.76	0.03	32.51	0.02	47.11	99.43
	7	0.06	0.08	19.84	0.00	31.96	0.00	46.88	98.82
	8	0.07	0.08	15.08	0.00	38.06	0.07	46.52	99.88
	9	0.09	0.07	19.56	0.02	31.94	0.01	46.62	98.31
	10	0.29	0.03	19.18	0.02	32.18	0.07	46.75	98.52
	12	0.06	0.00	20.04	0.11	32.01	0.01	47.19	99.43
	13	0.04	0.00	19.35	0.00	31.60	0.15	46.09	97.24
	14	0.08	0.04	19.66	0.00	32.37	0.00	47.02	99.17
	15	0.05	0.05	19.91	0.00	32.34	0.00	47.22	99.56
	16	0.01	0.00	19.65	0.00	31.82	0.01	46.44	97.93
	17	0.02	0.11	19.79	0.03	32.15	0.09	46.99	99.17
	18	0.00	0.04	19.76	0.01	32.16	0.07	46.88	98.92
	19	0.04	0.03	20.46	0.00	31.67	0.01	47.28	99.49
	21	0.00	0.00	15.59	0.00	36.68	0.04	45.83	98.14
	23	0.10	0.04	19.79	0.00	32.53	0.03	47.34	99.83
	24	0.03	0.09	19.78	0.00	32.16	0.00	46.92	98.98
	25	0.04	0.00	19.65	0.00	32.07	0.00	46.69	98.46
	27	0.04	0.00	20.25	0.00	31.42	0.00	46.83	98.54
	28	0.01	0.00	19.91	0.03	32.14	0.09	47.06	99.25
	29	0.05	0.00	19.89	0.00	31.76	0.00	46.72	98.42
	30	0.10	0.00	18.94	0.00	31.08	0.02	45.25	95.39
	31	0.11	0.04	20.34	0.00	31.93	0.00	47.46	99.88
	32	0.03	0.00	19.10	0.04	31.20	0.08	45.46	95.91
	33	0.09	0.01	14.28	0.00	39.20	0.05	46.54	100.18
	34	0.20	0.00	19.53	0.00	31.38	0.00	46.27	97.38
	35	0.11	0.01	19.61	0.00	31.11	0.38	46.25	97.47
	36	0.17	0.03	17.94	0.00	34.13	0.10	46.72	99.08
	37	0.12	0.00	20.11	0.00	32.50	0.00	47.66	100.39
	38	0.00	0.02	19.50	0.03	32.43	0.00	46.77	98.76
	39	0.00	0.06	18.97	0.00	33.25	0.00	46.83	99.11
	40	0.00	0.00	19.73	0.04	31.76	0.00	46.49	98.02
	41	0.01	0.03	19.82	0.00	31.74	0.04	46.60	98.24
	42	0.10	0.06	19.75	0.00	32.13	0.00	46.98	99.03
	43	0.01	0.00	16.48	0.02	35.43	0.00	45.83	97.77
	44	0.15	0.02	19.79	0.00	32.40	0.06	47.33	99.75
	45	0.23	0.10	19.63	0.00	31.80	0.00	46.81	98.57
	46	0.01	0.04	19.39	0.00	32.71	0.04	46.89	99.07
	47	0.11	0.00	0.41	0.00	56.27	0.00	44.80	101.60
	48	0.00	0.00	0.31	0.00	55.82	0.00	44.14	100.27
	49	0.21	0.00	0.27	0.00	55.24	0.00	43.99	99.71
	50	0.13	0.07	0.41	0.00	55.49	0.03	44.26	100.40
	51	0.02	0.00	0.36	0.04	55.78	0.00	44.22	100.42
	52	0.05	0.00	0.25	0.00	55.74	0.02	44.11	100.17
	53	0.00	0.00	0.20	0.00	56.53	0.00	44.58	101.31
	54	0.00	0.03	0.26	0.06	55.62	0.02	44.00	100.00
	55	0.02	0.00	0.37	0.00	55.40	0.00	43.92	99.71
	56	0.12	0.00	0.25	0.00	56.41	0.02	44.75	101.54

57	0.00	0.00	0.27	0.00	55.50	0.03	43.87	99.67
58	0.14	0.04	0.42	0.00	55.45	0.00	44.23	100.28
59	0.00	0.04	0.41	0.00	55.65	0.04	44.16	100.30
60	0.12	0.08	0.30	0.00	55.87	0.00	44.41	100.78
61	0.09	0.00	0.30	0.04	55.70	0.00	44.21	100.34
62	0.13	0.05	0.46	0.00	54.99	0.01	43.89	99.52
63	0.09	0.14	0.27	0.00	55.62	0.01	44.17	100.31
64	0.03	0.00	0.35	0.00	56.46	0.03	44.76	101.63
65	0.04	0.07	19.13	0.03	32.39	0.04	46.45	98.15
68	0.11	0.01	19.98	0.00	32.17	0.00	47.25	99.52
69	0.01	0.10	19.35	0.00	32.04	0.00	46.33	97.83
70	0.03	0.12	19.72	0.00	31.97	0.00	46.71	98.54
71	0.01	0.06	10.33	0.04	43.59	0.05	45.60	99.69
72	0.02	0.03	19.61	0.00	31.40	0.00	46.10	97.16
73	0.08	0.04	19.79	0.00	32.23	0.05	47.08	99.27
74	0.00	0.00	19.65	0.01	32.49	0.00	46.96	99.11
75	0.14	0.00	19.96	0.00	32.03	0.00	47.15	99.28
77	0.02	0.03	20.09	0.02	31.98	0.05	47.12	99.31
78	0.13	0.00	18.96	0.01	32.13	0.00	46.13	97.36
79	0.00	0.05	19.29	0.02	32.49	0.01	46.60	98.47
85	0.00	0.02	0.29	0.00	55.78	0.00	44.10	100.19
86	0.03	0.00	0.29	0.04	55.61	0.05	44.07	100.09
87	0.00	0.00	2.20	0.00	52.97	0.11	44.04	99.32
88	0.11	0.00	0.27	0.00	55.76	0.08	44.28	100.50
89	0.09	0.00	0.45	0.00	55.72	0.05	44.41	100.73
90	0.09	0.02	0.33	0.00	55.93	0.00	44.42	100.79
91	0.05	0.06	0.26	0.07	55.93	0.03	44.35	100.75
92	0.09	0.02	0.31	0.01	55.63	0.01	44.15	100.21
93	0.10	0.00	0.29	0.00	55.91	0.00	44.36	100.66
94	0.14	0.02	0.27	0.03	55.53	0.00	44.13	100.11
95	0.13	0.08	0.41	0.00	55.71	0.00	44.41	100.73
97	0.09	0.00	0.30	0.00	56.39	0.07	44.78	101.63
98	0.00	0.06	0.27	0.04	56.01	0.03	44.31	100.71
99	0.16	0.06	0.41	0.06	55.40	0.06	44.28	100.43
100	0.01	0.03	0.37	0.00	58.02	0.00	45.97	104.40
101	0.08	0.09	0.34	0.00	56.17	0.03	44.64	101.35
102	0.07	0.00	0.22	0.00	55.52	0.02	43.95	99.78
103	0.01	0.17	0.29	0.00	55.94	0.06	44.33	100.79
104	0.00	0.05	0.36	0.07	56.40	0.03	44.74	101.65
105	0.09	0.02	0.16	0.04	56.19	0.05	44.49	101.04
106	0.10	0.08	0.31	0.00	55.25	0.05	43.92	99.70
107	0.09	0.07	0.43	0.01	55.74	0.00	44.41	100.77
109	0.00	0.05	0.31	0.00	55.61	0.00	44.00	99.97
110	0.15	0.05	0.37	0.03	55.09	0.00	43.92	99.60
111	0.07	0.00	0.53	0.02	55.73	0.00	44.43	100.77
112	0.00	0.03	0.47	0.06	55.94	0.00	44.46	100.95
113	0.01	0.00	0.28	0.00	56.17	0.01	44.42	100.90
114	0.17	0.00	0.31	0.00	56.10	0.10	44.71	101.39
115	0.11	0.00	0.35	0.00	55.40	0.03	44.07	99.97

116	0.11	0.03	0.27	0.00	55.95	0.00	44.41	100.77
117	0.26	0.00	19.68	0.00	32.00	0.08	47.08	99.10
118	0.03	0.03	0.32	0.00	55.60	0.03	44.07	100.09
119	0.01	0.03	0.31	0.00	56.13	0.00	44.43	100.92
120	0.04	0.06	0.29	0.00	55.84	0.00	44.23	100.46
121	0.14	0.00	0.23	0.00	55.57	0.00	44.10	100.04
122	0.10	0.03	0.33	0.00	56.07	0.00	44.54	101.07
123	0.10	0.00	0.46	0.00	55.67	0.04	44.39	100.66
124	0.00	0.02	0.41	0.01	56.08	0.03	44.49	101.04
125	0.21	0.00	0.30	0.00	55.82	0.00	44.48	100.81
126	0.26	0.00	0.41	0.00	55.39	0.04	44.37	100.47
127	0.03	0.02	0.31	0.00	55.73	0.00	44.13	100.23
128	0.05	0.00	0.40	0.04	55.78	0.03	44.33	100.63
129	0.17	0.00	0.42	0.03	56.23	0.03	44.91	101.79
130	0.15	0.00	0.34	0.03	55.93	0.06	44.56	101.07
131	0.07	0.12	0.35	0.00	56.12	0.00	44.60	101.27
132	0.05	0.01	0.26	0.00	55.52	0.05	43.97	99.85
133	0.11	0.08	0.49	0.00	56.02	0.03	44.73	101.46
134	0.00	0.07	19.99	0.00	31.84	0.00	46.84	98.74
135	0.00	0.06	19.76	0.00	32.07	0.04	46.80	98.73
136	0.06	0.04	19.62	0.00	32.48	0.06	47.07	99.33
137	0.13	0.00	19.54	0.00	32.38	0.06	46.99	99.09
138	0.20	0.00	19.73	0.02	32.54	0.00	47.43	99.93
139	0.04	0.00	19.01	0.00	32.00	0.07	45.97	97.09
140	0.00	0.10	17.72	0.00	34.26	0.06	46.31	98.45
141	0.03	0.00	19.97	0.01	32.55	0.03	47.42	100.01
142	0.00	0.04	19.09	0.04	33.19	0.06	46.97	99.39
143	0.00	0.00	19.51	0.00	32.07	0.01	46.48	98.07
144	0.05	0.00	19.40	0.00	31.70	0.00	46.14	97.29
145	0.13	0.00	19.61	0.02	32.05	0.02	46.80	98.62
146	0.07	0.15	15.93	0.03	36.33	0.05	46.13	98.69
147	0.07	0.00	19.71	0.01	32.31	0.01	47.00	99.11
148	0.00	0.05	18.32	0.00	33.99	0.03	46.72	99.11
150	0.08	0.00	19.39	0.06	32.03	0.00	46.47	98.02
151	0.00	0.00	19.90	0.00	31.96	0.06	46.85	98.77
152	0.00	0.00	20.15	0.01	32.01	0.00	47.13	99.31
153	0.00	0.04	19.88	0.00	31.71	0.00	46.61	98.24
154	0.17	0.00	19.62	0.01	31.88	0.06	46.75	98.48
157	0.24	0.04	19.62	0.00	31.46	0.22	46.66	98.25
159	0.00	0.11	19.55	0.00	32.37	0.01	46.81	98.85
160	0.12	0.00	19.67	0.00	32.88	0.04	47.50	100.21
161	0.00	0.01	19.43	0.05	32.58	0.00	46.82	98.89
162	0.08	0.00	19.84	0.02	32.96	0.00	47.69	100.60

	No.	SO2	SrO	MgO	MnO	CaO	FeO	CO2	Total
4-14-18-A20816 W3M 4827	2	0.12	0.00	17.49	0.00	34.53	0.06	46.42	98.62
	3	0.03	0.00	21.20	0.01	29.87	0.01	46.65	97.76
	4	0.04	0.00	20.67	0.02	30.10	0.00	46.25	97.07
	5	0.01	0.04	20.85	0.00	30.27	0.07	46.60	97.84

6	0.00	0.00	20.67	0.02	31.66	0.01	47.43	99.79
7	0.06	0.00	20.67	0.02	30.58	0.01	46.67	98.00
8	0.13	0.00	20.27	0.07	31.93	0.00	47.43	99.82
9	0.01	0.02	20.22	0.02	30.68	0.00	46.19	97.14
10	0.00	0.01	20.84	0.03	30.63	0.01	46.82	98.34
11	0.00	0.00	21.02	0.00	30.84	0.00	47.15	99.01
12	0.00	0.00	20.58	0.00	30.36	0.00	46.30	97.24
13	0.00	0.06	20.76	0.06	30.51	0.00	46.67	98.06
14	0.00	0.11	19.88	0.01	31.78	0.00	46.69	98.47
15	0.00	0.03	19.91	0.00	32.41	0.01	47.19	99.55
16	0.06	0.00	19.87	0.00	31.01	0.05	46.16	97.15
17	0.00	0.01	20.78	0.04	30.61	0.00	46.73	98.17
18	0.00	0.00	20.76	0.02	30.92	0.02	46.96	98.69
19	0.06	0.01	20.65	0.06	30.27	0.01	46.46	97.53
20	0.03	0.00	20.42	0.00	30.92	0.16	46.70	98.23
21	0.00	0.00	20.80	0.01	29.96	0.00	46.22	96.99
22	0.17	0.00	20.72	0.01	30.47	0.05	46.85	98.27
23	0.13	0.07	0.18	0.02	56.24	0.04	44.61	101.30
24	0.01	0.00	0.23	0.00	55.76	0.00	44.02	100.01
25	0.01	0.00	0.23	0.01	56.79	0.00	44.85	101.89
26	0.01	0.00	0.10	0.00	56.16	0.00	44.19	100.46
27	0.00	0.00	0.17	0.00	56.71	0.07	44.74	101.69
28	0.05	0.05	0.17	0.00	56.29	0.01	44.48	101.05
29	0.06	0.07	0.31	0.00	56.53	0.03	44.85	101.85
30	0.12	0.00	0.15	0.09	55.99	0.07	44.40	100.82
31	0.10	0.00	0.44	0.00	55.10	0.02	43.89	99.55
32	0.02	0.00	0.16	0.00	56.09	0.00	44.22	100.49
33	0.07	0.07	0.04	0.05	55.82	0.01	44.02	100.07
34	0.00	0.03	0.21	0.00	56.33	0.03	44.47	101.07
35	0.01	0.05	0.28	0.00	55.18	0.00	43.65	99.17
36	0.00	0.00	0.36	0.00	56.07	0.04	44.41	100.87
38	0.02	0.09	0.16	0.04	56.38	0.00	44.52	101.21
39	0.03	0.00	0.03	0.01	56.08	0.00	44.10	100.25
40	0.00	0.00	0.10	0.03	55.80	0.00	43.91	99.83
41	0.09	0.00	0.23	0.00	56.52	0.01	44.77	101.62
42	0.16	0.01	0.25	0.04	55.59	0.00	44.20	100.25
43	0.04	0.00	0.07	0.05	56.26	0.00	44.33	100.76
44	0.00	0.16	0.23	0.00	55.66	0.01	44.01	100.08
45	0.04	0.00	0.17	0.00	55.65	0.03	43.94	99.83
46	0.07	0.04	0.30	0.00	55.91	0.00	44.35	100.68
47	0.05	0.10	0.24	0.00	55.81	0.00	44.20	100.41
48	0.00	0.00	0.25	0.01	55.91	0.03	44.17	100.37
49	0.05	0.00	0.42	0.00	55.30	0.00	43.94	99.71
50	0.03	0.00	0.25	0.01	56.54	0.00	44.71	101.55
51	0.01	0.00	0.29	0.00	56.01	0.01	44.29	100.61
52	0.03	0.00	0.31	0.01	56.21	0.01	44.50	101.06
53	0.09	0.00	0.22	0.00	55.49	0.00	43.94	99.74
54	0.00	0.04	0.15	0.00	56.26	0.01	44.34	100.80
55	0.15	0.00	0.25	0.02	56.30	0.00	44.72	101.44

56	0.10	0.02	0.21	0.01	55.52	0.00	43.98	99.84
57	0.00	0.00	0.05	0.01	55.77	0.00	43.84	99.68
58	0.00	0.01	0.19	0.00	56.47	0.02	44.53	101.21
60	0.00	0.00	0.11	0.00	56.15	0.10	44.25	100.61
61	0.10	0.01	20.14	0.00	31.74	0.00	47.06	99.05
62	0.04	0.01	19.10	0.05	29.50	0.05	44.12	92.86
63	0.10	0.07	20.84	0.00	30.85	0.00	47.16	99.02
64	0.06	0.00	21.06	0.02	30.51	0.05	47.08	98.77
66	0.06	0.08	20.76	0.01	30.86	0.03	47.04	98.84
67	0.10	0.08	20.78	0.07	30.60	0.02	46.96	98.60
68	0.08	0.19	19.94	0.01	31.31	0.01	46.57	98.11
69	0.00	0.03	20.92	0.01	30.53	0.04	46.84	98.37
70	0.06	0.00	20.89	0.00	30.88	0.01	47.15	99.00
71	0.00	0.00	20.85	0.03	31.10	0.00	47.19	99.17
72	0.00	0.05	20.82	0.00	30.65	0.09	46.85	98.45
73	0.05	0.00	20.57	0.02	31.43	0.01	47.23	99.31
75	0.01	0.04	0.22	0.00	56.63	0.00	44.72	101.62
76	0.00	0.00	0.09	0.01	56.62	0.02	44.55	101.29
77	0.01	0.01	0.19	0.00	56.04	0.04	44.22	100.51
78	0.09	0.15	0.15	0.02	56.44	0.00	44.70	101.56
79	0.15	0.04	0.08	0.00	55.46	0.00	43.89	99.63
80	0.07	0.12	0.27	0.03	55.96	0.03	44.42	100.90
82	0.13	0.17	20.62	0.00	30.48	0.03	46.74	98.17
83	0.03	0.01	21.06	0.05	30.32	0.02	46.88	98.36
84	0.04	0.05	19.84	0.03	31.27	0.09	46.36	97.67
85	0.00	0.00	20.21	0.00	31.48	0.01	46.79	98.49
86	0.03	0.11	20.70	0.00	30.97	0.00	47.00	98.81
89	0.00	0.00	0.87	0.04	55.30	0.00	44.37	100.58
92	0.00	0.00	19.75	0.04	30.61	0.03	45.63	96.06
93	0.08	0.03	21.19	0.03	30.93	0.06	47.61	99.94
94	0.00	0.00	19.75	0.03	32.23	0.01	46.88	98.89
95	0.00	0.04	20.65	0.01	31.45	0.00	47.24	99.39
96	0.05	0.02	20.90	0.00	31.01	0.00	47.24	99.22
97	0.00	0.06	19.74	0.01	32.11	0.00	46.79	98.71

	No.	SO2	SrO	MgO	MnO	CaO	FeO	CO2	Total
4-31-3-26 W3M 5163	18	0.05	0.00	20.90	0.04	30.09	0.65	46.94	98.67
	19	0.02	0.00	21.23	0.00	30.49	0.15	47.24	99.14
	20	0.06	0.00	20.64	0.08	30.03	0.36	46.47	97.64
	21	0.07	0.13	21.06	0.05	31.20	0.09	47.73	100.32
	22	0.08	0.03	21.08	0.02	30.30	0.06	46.99	98.56
	23	0.03	0.00	20.97	0.01	30.97	0.07	47.31	99.37
	24	0.01	0.06	20.98	0.08	30.26	0.03	46.76	98.18
	25	0.19	0.07	20.97	0.00	30.64	0.07	47.31	99.24
	26	0.07	0.00	20.93	0.01	30.31	0.10	46.82	98.24
	27	0.07	0.10	20.74	0.04	30.71	0.15	47.03	98.84
	28	0.00	0.00	20.85	0.02	30.79	0.10	46.99	98.75
	29	0.00	0.01	20.74	0.00	31.00	0.09	47.03	98.87
	30	0.04	0.12	21.27	0.05	30.71	0.03	47.49	99.71

31	0.00	0.06	20.96	0.00	30.64	0.07	47.00	98.74
32	0.08	0.00	21.08	0.02	31.16	0.10	47.69	100.14
33	0.15	0.05	20.60	0.03	30.99	0.08	47.14	99.04
34	0.00	0.01	21.05	0.05	31.00	0.00	47.34	99.45
35	0.05	0.07	21.06	0.06	30.55	0.09	47.17	99.05
36	0.06	0.09	20.66	0.03	30.70	0.09	46.87	98.51
38	0.04	0.03	21.00	0.05	30.91	0.09	47.33	99.43
39	0.14	0.05	21.06	0.00	30.36	0.09	47.12	98.82
40	0.11	0.03	21.20	0.06	30.99	0.15	47.78	100.32
41	0.06	0.00	21.03	0.08	30.92	0.26	47.54	99.89
42	0.08	0.07	20.86	0.04	30.32	0.29	46.93	98.58
43	0.00	0.00	21.24	0.05	30.60	0.05	47.27	99.21
44	0.00	0.00	20.58	0.02	30.55	0.11	46.52	97.78
45	0.00	0.00	20.84	0.03	30.01	0.04	46.35	97.27
46	0.02	0.00	20.48	0.05	30.15	0.35	46.30	97.35
47	0.09	0.00	21.15	0.02	30.27	0.06	47.05	98.64
48	0.00	0.06	21.44	0.00	31.09	0.10	47.89	100.58
49	0.00	0.00	21.01	0.00	30.58	0.09	46.99	98.67
50	0.00	0.00	20.76	0.02	30.79	0.07	46.89	98.53
51	0.35	0.06	20.85	0.03	30.68	0.04	47.49	99.50
52	0.00	0.00	20.95	0.00	30.76	0.11	47.08	98.90
53	0.09	0.00	20.93	0.00	30.52	0.29	47.14	98.97
54	0.09	0.01	21.00	0.00	30.82	0.12	47.33	99.36
55	0.00	0.00	20.94	0.02	30.56	0.11	46.93	98.56
56	0.06	0.05	20.76	0.00	29.97	0.34	46.51	97.69
57	0.01	0.03	20.63	0.03	30.94	0.08	46.91	98.63
58	0.01	0.00	21.26	0.01	30.46	0.08	47.20	99.02
59	0.12	0.00	20.97	0.05	30.49	0.13	47.13	98.89
60	0.04	0.00	20.62	0.00	30.62	0.32	46.81	98.41
61	0.12	0.00	20.39	0.05	30.54	0.22	46.59	97.90
62	0.00	0.00	20.61	0.00	30.26	0.14	46.34	97.35
63	0.01	0.01	20.77	0.00	30.34	0.24	46.66	98.04
64	0.17	0.11	21.08	0.05	30.99	0.11	47.77	100.28
65	0.06	0.07	21.06	0.02	31.25	0.13	47.74	100.33
66	0.06	0.06	20.59	0.01	30.82	0.04	46.81	98.38
67	0.04	0.01	21.26	0.08	30.81	0.06	47.54	99.80
68	0.07	0.00	20.70	0.04	30.67	0.19	46.93	98.60
69	0.19	0.03	20.84	0.07	30.75	0.06	47.29	99.23
70	0.01	0.00	21.12	0.03	30.70	0.13	47.28	99.28
71	0.03	0.09	21.40	0.00	30.43	0.06	47.36	99.36
72	0.11	0.00	21.10	0.06	30.57	0.10	47.29	99.22
73	0.08	0.04	21.14	0.03	30.49	0.13	47.26	99.17
74	0.04	0.01	20.89	0.02	30.76	0.09	47.09	98.89
75	0.00	0.01	21.17	0.03	30.49	0.03	47.08	98.81
76	0.14	0.00	21.04	0.01	29.80	0.01	46.60	97.60
77	0.05	0.06	20.87	0.02	30.60	0.11	46.99	98.70
78	0.09	0.10	21.05	0.01	30.61	0.06	47.24	99.16
79	0.11	0.00	21.37	0.00	30.74	0.09	47.70	100.01
80	0.10	0.00	20.98	0.00	30.56	0.07	47.09	98.80

81	0.08	0.00	21.02	0.02	30.73	0.06	47.25	99.16
82	0.00	0.10	20.96	0.04	30.63	0.08	47.04	98.85
83	0.08	0.01	20.63	0.00	30.48	0.06	46.61	97.87
84	0.17	0.00	20.67	0.01	30.62	0.22	47.01	98.70
85	0.03	0.03	20.88	0.06	30.82	0.12	47.16	99.10
86	0.22	0.05	20.69	0.04	30.42	0.07	46.92	98.42
87	0.08	0.00	20.84	0.03	30.36	0.11	46.79	98.21
88	0.00	0.05	20.16	0.03	30.99	0.30	46.54	98.06
89	0.00	0.00	21.05	0.00	30.23	0.10	46.77	98.15
90	0.03	0.03	20.75	0.04	30.56	0.10	46.78	98.28
91	0.08	0.05	21.53	0.01	30.38	0.08	47.56	99.70
93	0.11	0.08	20.80	0.05	30.60	0.07	47.02	98.73
94	0.08	0.13	20.62	0.01	30.33	0.55	46.85	98.57
95	0.14	0.00	20.75	0.00	30.38	0.33	46.92	98.52
96	0.13	0.04	21.16	0.02	30.82	0.17	47.63	99.97
97	0.07	0.02	21.08	0.00	30.09	0.09	46.82	98.18
98	0.00	0.01	21.15	0.02	30.89	0.08	47.40	99.55
100	0.00	0.00	20.74	0.01	30.53	0.12	46.67	98.06
102	0.02	0.00	21.00	0.03	30.71	0.10	47.15	99.01
103	0.02	0.02	21.15	0.00	30.59	0.05	47.16	98.99
104	0.08	0.01	20.91	0.00	30.98	0.07	47.32	99.37
107	0.01	0.03	20.97	0.00	30.78	0.05	47.12	98.97
108	0.09	0.00	21.08	0.06	29.96	0.15	46.79	98.12

	No.	SO2	SrO	MgO	MnO	CaO	FeO	CO2	Total
4-31-3-26 W3M 5164	20	0.00	0.04	20.65	0.02	30.27	0.05	46.36	97.39
	21	0.17	0.00	19.95	0.00	30.73	0.12	46.25	97.22
	22	0.09	0.03	20.76	0.09	31.06	0.12	47.34	99.49
	23	0.25	0.00	20.60	0.09	30.82	0.09	47.19	99.03
	24	0.21	0.05	20.70	0.07	31.09	0.08	47.46	99.66
	25	0.06	0.16	20.65	0.03	30.71	0.05	46.86	98.52
	26	0.07	0.00	20.49	0.03	31.42	0.15	47.26	99.42
	27	0.03	0.00	20.56	0.05	30.91	0.12	46.86	98.52
	28	0.13	0.11	20.80	0.00	30.85	0.06	47.21	99.16
	29	0.04	0.00	20.58	0.03	30.82	0.08	46.80	98.36
	30	0.18	0.00	20.16	0.03	31.20	0.14	46.88	98.58
	31	0.08	0.00	20.66	0.04	30.75	0.10	46.91	98.54
	32	0.00	0.00	20.56	0.02	30.90	0.08	46.76	98.32
	34	0.04	0.06	20.34	0.02	30.77	0.06	46.50	97.79
	35	0.03	0.00	20.54	0.02	30.18	0.12	46.24	97.12
	36	0.03	0.00	20.00	0.01	30.63	0.09	45.98	96.73
	37	0.05	0.01	20.71	0.00	30.28	0.11	46.52	97.67
	38	0.09	0.00	20.42	0.00	30.43	0.07	46.37	97.39
	39	0.18	0.09	20.89	0.03	30.49	0.09	47.14	98.91
	40	0.11	0.00	20.96	0.00	30.92	0.06	47.37	99.43
	41	0.00	0.00	21.16	0.00	30.59	0.03	47.13	98.91
	43	0.18	0.16	20.61	0.01	30.56	0.10	46.91	98.52
	44	0.06	0.06	20.49	0.02	31.56	0.06	47.32	99.57
	45	0.11	0.00	20.97	0.00	30.54	0.17	47.15	98.94

46	0.11	0.00	20.46	0.00	30.60	0.13	46.61	97.91
47	0.01	0.00	20.66	0.00	30.99	0.09	46.94	98.68
48	0.07	0.16	20.50	0.05	30.60	0.02	46.62	98.02
64	0.11	0.00	20.29	0.05	30.76	0.07	46.54	97.81
65	0.15	0.00	20.63	0.02	30.75	0.12	47.00	98.67
66	0.01	0.01	20.88	0.01	30.89	0.20	47.18	99.17
67	0.00	0.16	20.88	0.03	31.02	0.10	47.29	99.49
68	0.19	0.00	20.54	0.02	31.18	0.09	47.27	99.30
69	0.08	0.00	20.87	0.01	30.33	0.19	46.84	98.32
70	0.14	0.00	20.58	0.04	30.79	0.07	46.93	98.55
71	0.08	0.00	21.22	0.00	30.42	0.07	47.23	99.02
72	0.01	0.00	20.80	0.01	31.33	0.00	47.33	99.48
73	0.08	0.01	20.38	0.00	31.49	0.07	47.15	99.18
74	0.09	0.00	20.68	0.01	30.13	0.16	46.48	97.55
75	0.06	0.00	20.54	0.03	30.78	0.11	46.76	98.27
76	0.00	0.00	20.55	0.05	31.06	0.19	46.96	98.82
77	0.06	0.02	20.75	0.02	31.23	0.13	47.36	99.56
78	0.12	0.10	20.58	0.00	31.37	0.07	47.37	99.61
79	0.07	0.05	20.66	0.01	31.28	0.11	47.31	99.48
80	0.04	0.00	20.32	0.00	30.47	0.14	46.26	97.24
81	0.04	0.00	20.45	0.03	30.59	0.11	46.48	97.70
82	0.00	0.07	20.49	0.00	31.38	0.12	47.10	99.15
83	0.06	0.08	20.61	0.00	31.17	0.06	47.13	99.11
85	0.04	0.00	20.81	0.02	31.49	0.05	47.54	99.95
86	0.10	0.00	20.46	0.00	30.87	0.06	46.78	98.28
87	0.25	0.08	20.24	0.04	30.99	0.01	46.90	98.51
88	0.08	0.00	20.31	0.04	30.52	0.15	46.38	97.48
89	0.10	0.12	19.89	0.03	30.71	0.13	46.13	97.11
90	0.08	0.00	20.44	0.06	30.90	0.12	46.81	98.41
91	0.08	0.01	20.27	0.00	30.55	0.08	46.30	97.29
92	0.01	0.00	20.65	0.00	30.64	0.05	46.64	97.99
93	0.02	0.00	20.99	0.00	30.45	0.12	46.92	98.50
94	0.23	0.01	20.48	0.08	30.99	0.08	47.17	99.04
95	0.07	0.07	20.41	0.05	31.16	0.07	46.95	98.77
96	0.00	0.12	20.95	0.00	30.87	0.11	47.21	99.25
97	0.12	0.00	20.42	0.01	30.99	0.04	46.84	98.42
98	0.11	0.15	20.61	0.06	31.02	0.12	47.18	99.24
99	0.10	0.00	20.54	0.00	30.15	0.08	46.31	97.19
100	0.06	0.03	20.23	0.04	29.64	0.85	46.01	96.86
101	0.00	0.10	21.02	0.05	31.09	0.15	47.52	99.94
102	0.00	0.00	21.11	0.04	30.53	0.14	47.11	98.93
103	0.12	0.16	20.50	0.10	30.62	0.13	46.82	98.45
104	0.10	0.03	19.84	0.10	30.08	1.07	46.17	97.39
105	0.12	0.04	20.69	0.00	30.67	0.09	46.93	98.55
106	0.13	0.02	21.05	0.00	30.72	0.19	47.42	99.52
107	0.02	0.00	21.08	0.03	30.87	0.21	47.42	99.63
108	0.06	0.02	20.55	0.06	30.82	0.12	46.84	98.47
109	0.12	0.06	20.84	0.00	30.89	0.13	47.29	99.33
110	0.01	0.00	20.65	0.02	31.27	0.12	47.19	99.26

111	0.33	0.00	20.60	0.03	30.31	0.11	46.91	98.29
112	0.06	0.20	21.12	0.02	31.44	0.10	47.99	100.93
113	0.00	0.01	20.76	0.00	30.70	0.13	46.84	98.45
114	0.07	0.00	20.83	0.02	31.21	0.09	47.42	99.65
115	0.06	0.00	20.75	0.00	30.65	0.15	46.90	98.51
116	0.05	0.05	20.96	0.03	30.50	0.16	47.04	98.78
117	0.00	0.01	20.91	0.00	31.00	0.08	47.21	99.21
118	0.00	0.09	20.94	0.03	30.16	0.16	46.68	98.06
119	0.15	0.08	20.24	0.03	31.20	0.06	46.92	98.68
120	0.01	0.00	20.67	0.01	30.94	0.15	46.97	98.76
121	0.07	0.12	20.55	0.04	30.17	0.08	46.35	97.37
122	0.03	0.07	20.45	0.00	31.28	0.11	47.02	98.95
123	0.08	0.00	20.17	0.00	30.63	0.08	46.25	97.22
124	0.06	0.09	20.72	0.00	30.26	0.13	46.60	97.87
125	0.08	0.00	20.98	0.04	30.81	0.45	47.52	99.88
126	0.12	0.03	20.60	0.02	31.06	0.08	47.13	99.03
127	0.08	0.00	20.86	0.00	30.75	0.11	47.11	98.91
128	0.05	0.05	20.68	0.07	30.74	0.22	46.99	98.81
129	0.13	0.00	20.69	0.00	31.00	0.10	47.18	99.09

	No.	SO2	SrO	MgO	MnO	CaO	FeO	CO2	Total
4-31-3-26 W3M 5627	19	0.03	0.00	20.16	0.08	32.92	0.02	47.95	101.15
	20	0.00	0.04	19.78	0.00	33.12	0.05	47.63	100.61
	21	0.00	0.00	19.78	0.02	33.15	0.01	47.63	100.59
	22	0.57	0.00	20.19	0.03	31.79	0.02	47.96	100.56
	23	0.05	0.09	19.88	0.00	33.00	0.00	47.72	100.74
	24	0.06	0.00	20.08	0.00	32.52	0.02	47.57	100.26
	25	0.00	0.00	19.92	0.00	32.57	0.02	47.33	99.84
	26	0.08	0.09	20.64	0.00	32.40	0.00	48.13	101.34
	27	0.09	0.00	20.06	0.01	32.08	0.00	47.24	99.49
	28	0.24	0.00	19.66	0.07	32.74	0.00	47.60	100.31
	29	0.15	0.08	20.37	0.01	31.67	0.00	47.38	99.65
	30	0.04	0.03	20.37	0.00	32.26	0.04	47.64	100.37
	31	0.16	0.00	20.22	0.00	32.56	0.04	47.92	100.90
	32	0.00	0.00	20.23	0.04	32.58	0.00	47.68	100.53
	33	0.00	0.06	19.89	0.02	32.47	0.04	47.26	99.74
	34	0.04	0.07	20.44	0.03	32.00	0.03	47.56	100.17
	35	0.02	0.00	20.43	0.05	32.35	0.01	47.77	100.63
	36	0.06	0.00	15.90	0.00	38.45	0.00	47.64	102.05
	37	0.01	0.07	19.29	0.03	32.98	0.02	47.03	99.44
	38	0.00	0.00	20.13	0.00	32.82	0.00	47.74	100.69
	39	0.00	0.01	20.11	0.00	33.06	0.00	47.91	101.09
	40	0.03	0.00	19.97	0.00	32.35	0.00	47.24	99.59
	41	0.09	0.00	0.26	0.01	57.10	0.01	45.25	102.72
	42	0.08	0.00	0.47	0.04	56.60	0.00	45.10	102.30
	43	0.34	0.00	0.24	0.00	55.87	0.00	44.68	101.14
	44	0.07	0.00	0.39	0.00	56.67	0.04	45.04	102.21
	53	0.10	0.10	0.29	0.00	56.45	0.04	44.86	101.84
	55	0.30	0.00	0.37	0.03	56.50	0.02	45.27	102.49

56	0.05	0.00	0.42	0.01	57.38	0.00	45.59	103.46
58	0.10	0.08	0.42	0.00	56.39	0.00	44.91	101.90
60	0.00	0.02	0.54	0.00	57.04	0.02	45.37	102.99
61	0.00	0.00	20.16	0.03	32.01	0.00	47.15	99.35
62	0.09	0.00	19.72	0.00	32.93	0.00	47.51	100.25
63	0.00	0.04	20.34	0.00	32.49	0.03	47.75	100.65
64	0.03	0.07	20.43	0.03	32.72	0.00	48.08	101.36
65	0.00	0.00	19.49	0.00	31.79	0.76	46.69	98.73
66	0.00	0.02	19.86	0.04	32.07	0.00	46.89	98.88
67	0.00	0.00	20.01	0.00	32.02	0.04	47.01	99.08
68	0.13	0.00	20.16	0.00	31.95	0.00	47.30	99.54
69	0.11	0.12	20.23	0.00	32.30	0.00	47.68	100.45
70	0.00	0.07	20.20	0.04	32.75	0.08	47.86	101.01
71	0.00	0.01	20.34	0.02	32.41	0.00	47.66	100.44
72	0.14	0.00	20.28	0.00	32.24	0.01	47.67	100.34
73	0.06	0.02	20.37	0.06	32.51	0.00	47.89	100.91
74	0.00	0.00	20.30	0.03	32.51	0.05	47.73	100.61
75	0.00	0.00	20.46	0.00	32.58	0.04	47.94	101.02
76	0.11	0.03	20.38	0.01	32.08	0.00	47.64	100.26
77	0.01	0.00	20.28	0.00	32.15	0.05	47.41	99.89
78	0.00	0.00	20.07	0.00	32.38	0.05	47.35	99.85
79	0.06	0.01	20.08	0.00	32.73	0.00	47.71	100.59
80	0.00	0.02	20.39	0.00	32.48	0.00	47.76	100.65
81	0.23	0.02	20.06	0.00	32.55	0.00	47.83	100.69
82	0.00	0.00	19.95	0.00	32.81	0.00	47.53	100.29
83	0.06	0.08	20.00	0.03	32.57	0.02	47.56	100.32
84	0.54	0.00	19.94	0.02	32.67	0.02	48.33	101.52
85	0.59	0.05	0.28	0.00	56.63	0.00	45.75	103.30
86	0.30	0.00	0.24	0.00	57.06	0.00	45.53	103.13
87	0.17	0.02	0.19	0.00	56.45	0.00	44.80	101.64
88	0.05	0.00	0.20	0.02	57.19	0.00	45.19	102.65
89	0.19	0.03	0.56	0.00	56.53	0.03	45.30	102.63
90	0.16	0.00	0.52	0.00	56.25	0.02	44.99	101.94
95	0.07	0.00	0.35	0.00	56.44	0.05	44.82	101.72
96	0.04	0.04	0.54	0.02	57.81	0.01	46.05	104.50
97	0.00	0.02	0.16	0.05	56.79	0.00	44.79	101.81
98	0.49	0.02	0.39	0.03	56.34	0.05	45.50	102.82
102	0.12	0.00	0.33	0.00	56.77	0.02	45.13	102.37
104	0.00	0.10	0.14	0.00	56.69	0.00	44.69	101.62
105	0.00	0.00	0.28	0.02	56.64	0.00	44.77	101.71
153	0.18	0.00	0.34	0.02	56.31	0.01	44.87	101.73
154	0.01	0.07	0.43	0.00	57.06	0.01	45.30	102.88
155	0.03	0.00	0.19	0.02	57.23	0.02	45.19	102.67
156	0.25	0.02	0.62	0.05	56.22	0.03	45.26	102.44
157	0.00	0.06	0.30	0.00	57.05	0.07	45.16	102.64
158	0.32	0.15	0.27	0.00	57.32	0.06	45.89	104.00
159	0.08	0.05	0.46	0.01	56.70	0.00	45.15	102.44
161	0.13	0.04	0.21	0.00	56.96	0.00	45.17	102.51
163	0.09	0.07	0.42	0.05	56.85	0.00	45.27	102.75

165	0.10	0.00	0.35	0.05	56.19	0.00	44.68	101.37
167	0.01	0.01	0.24	0.03	57.06	0.05	45.10	102.49
172	0.00	0.05	20.40	0.00	32.09	0.00	47.47	100.01
173	0.00	0.02	20.34	0.03	31.71	0.04	47.15	99.30
174	0.09	0.06	20.33	0.00	33.04	0.02	48.30	101.84
175	0.21	0.00	19.96	0.00	32.66	0.00	47.77	100.60
176	0.11	0.01	20.02	0.00	32.30	0.01	47.41	99.87
177	0.00	0.00	19.91	0.05	32.60	0.06	47.38	100.00
178	0.06	0.01	19.91	0.00	32.71	0.02	47.52	100.23
179	0.09	0.00	19.98	0.08	31.93	0.01	47.07	99.16
180	0.00	0.00	19.96	0.03	32.09	0.02	47.01	99.11
181	0.02	0.02	19.87	0.00	31.89	0.05	46.80	98.65
182	0.00	0.00	20.01	0.02	32.42	0.00	47.31	99.76
183	0.00	0.13	20.75	0.00	32.54	0.00	48.25	101.67
184	0.00	0.00	20.16	0.06	32.38	0.00	47.45	100.05
185	0.00	0.00	20.48	0.04	32.88	0.04	48.21	101.65
186	0.00	0.00	20.14	0.00	32.49	0.02	47.50	100.15
187	0.00	0.00	19.92	0.06	33.23	0.00	47.87	101.08
188	0.42	0.00	19.98	0.01	32.75	0.06	48.24	101.45
189	0.25	0.00	20.24	0.01	33.01	0.01	48.43	101.95
190	0.00	0.01	19.79	0.00	33.09	0.01	47.58	100.48
191	0.15	0.12	20.30	0.03	32.22	0.00	47.76	100.58

	No.	SO2	SrO	MgO	MnO	CaO	FeO	CO2	Total
4-31-3-26 W3M 5632	1	0.00	0.00	20.24	0.01	32.43	0.02	47.56	100.27
	2	0.30	0.02	19.52	0.03	32.71	0.02	47.51	100.10
	3	0.05	0.09	19.76	0.00	32.59	0.02	47.28	99.80
	4	0.00	0.00	20.22	0.02	32.85	0.01	47.88	100.98
	5	0.00	0.05	20.28	0.08	32.63	0.00	47.82	100.86
	6	0.09	0.07	19.97	0.04	32.25	0.02	47.32	99.75
	7	0.09	0.00	20.60	0.00	31.85	0.03	47.67	100.25
	8	0.00	0.00	19.70	0.00	33.22	0.05	47.62	100.59
	9	0.00	0.04	14.52	0.02	39.82	0.00	47.13	101.53
	10	0.00	0.11	19.68	0.01	32.80	0.00	47.28	99.88
	11	0.00	0.04	20.05	0.00	32.41	0.00	47.35	99.85
	12	0.09	0.08	19.80	0.00	33.07	0.00	47.74	100.78
	13	0.37	0.00	20.16	0.04	32.53	0.00	48.17	101.26
	14	0.48	0.04	20.13	0.01	32.59	0.03	48.38	101.66
	15	0.00	0.02	19.59	0.04	33.12	0.00	47.42	100.19
	16	0.03	0.00	19.07	0.00	34.08	0.00	47.60	100.78
	17	0.40	0.00	19.63	0.00	33.28	0.02	48.22	101.55
	18	0.00	0.03	0.26	0.00	57.19	0.01	45.18	102.67
	21	0.00	0.15	0.45	0.00	56.96	0.04	45.28	102.88
	22	0.13	0.00	0.26	0.06	56.20	0.00	44.63	101.27
	23	0.29	0.00	0.41	0.01	56.43	0.03	45.24	102.41
	24	0.06	0.05	0.43	0.00	56.11	0.00	44.63	101.28
	25	0.12	0.01	0.42	0.00	56.53	0.10	45.08	102.26
	26	0.18	0.01	0.57	0.00	56.36	0.00	45.17	102.30
	27	0.13	0.00	0.46	0.00	56.01	0.01	44.67	101.28

31	0.51	0.00	19.69	0.02	32.88	0.03	48.17	101.29
32	0.00	0.02	19.83	0.00	32.12	0.07	46.90	98.94
33	0.28	0.00	19.95	0.01	32.14	0.02	47.49	99.90
34	0.00	0.00	19.62	0.00	33.03	0.01	47.35	100.01
35	0.01	0.00	19.62	0.02	32.97	0.00	47.33	99.96
36	0.23	0.06	19.51	0.00	32.39	0.07	47.16	99.42
37	0.04	0.00	20.21	0.00	32.60	0.00	47.72	100.57
38	0.20	0.00	19.41	0.00	33.83	0.02	48.09	101.55
39	0.00	0.06	19.61	0.00	33.67	0.00	47.86	101.20
40	0.17	0.02	18.79	0.03	33.17	0.00	46.85	99.02
41	0.21	0.03	19.58	0.02	33.35	0.00	47.91	101.09
42	0.16	0.00	20.03	0.00	32.02	0.08	47.31	99.60
43	0.00	0.02	19.69	0.01	31.93	0.00	46.57	98.22
44	0.01	0.00	19.42	0.00	32.56	0.08	46.82	98.89
45	0.00	0.00	20.14	0.04	32.81	0.03	47.79	100.82
46	0.00	0.00	20.32	0.02	33.24	0.00	48.28	101.86
47	0.51	0.02	19.74	0.00	32.45	0.00	47.87	100.59
48	0.00	0.02	19.88	0.12	32.51	0.02	47.31	99.86
49	0.00	0.04	0.57	0.05	56.74	0.02	45.21	102.62
50	0.31	0.00	0.63	0.03	56.23	0.00	45.34	102.54
51	0.46	0.00	0.56	0.00	56.35	0.00	45.58	102.95
52	0.33	0.03	0.40	0.04	56.69	0.07	45.54	103.10
53	0.00	0.06	0.65	0.00	55.96	0.03	44.67	101.38
54	0.04	0.00	0.47	0.04	57.38	0.00	45.64	103.57
55	0.08	0.01	0.39	0.04	56.73	0.00	45.11	102.37
56	0.12	0.10	0.44	0.00	56.56	0.00	45.10	102.32
57	0.35	0.02	0.51	0.00	56.46	0.02	45.46	102.82
58	0.07	0.00	0.57	0.01	56.35	0.03	44.99	102.01
59	0.18	0.13	0.35	0.00	56.83	0.00	45.33	102.81
60	0.37	0.00	0.71	0.00	56.25	0.00	45.54	102.88
63	0.11	0.10	0.56	0.07	56.05	0.00	44.86	101.74
64	0.14	0.07	0.60	0.02	56.34	0.00	45.14	102.31
68	0.27	0.03	0.24	0.03	55.90	0.05	44.63	101.14
70	0.19	0.00	0.29	0.01	56.30	0.03	44.84	101.66
71	0.00	0.10	0.24	0.02	56.95	0.00	45.01	102.32
72	0.06	0.00	0.42	0.02	57.08	0.00	45.37	102.95
74	0.00	0.11	0.44	0.00	55.89	0.00	44.40	100.85
75	0.04	0.00	0.33	0.00	56.45	0.01	44.74	101.58
76	0.19	0.05	0.57	0.03	56.50	0.00	45.32	102.66
77	0.00	0.00	19.69	0.00	33.06	0.00	47.44	100.19
78	0.09	0.05	19.77	0.00	32.69	0.01	47.41	100.02
79	0.17	0.08	19.70	0.00	32.40	0.00	47.25	99.60
80	0.00	0.00	19.90	0.07	32.27	0.03	47.12	99.39
81	0.06	0.00	19.81	0.00	32.28	0.01	47.06	99.22
82	0.02	0.00	20.11	0.04	32.97	0.00	47.89	101.03
83	0.00	0.00	20.43	0.00	31.94	0.00	47.38	99.75
84	0.00	0.14	19.48	0.03	33.25	0.00	47.43	100.33
85	0.00	0.03	19.27	0.00	33.56	0.00	47.40	100.26
86	0.37	0.00	20.00	0.01	32.24	0.00	47.75	100.37

87	0.10	0.04	19.74	0.00	32.59	0.00	47.31	99.78
88	0.16	0.01	15.95	0.04	37.07	0.00	46.81	100.05
89	0.00	0.00	19.64	0.03	33.16	0.02	47.50	100.35
90	0.29	0.00	18.68	0.00	30.71	0.09	45.02	94.78
91	0.45	0.00	19.46	0.01	33.25	0.02	48.10	101.29
100	0.03	0.00	20.43	0.00	32.02	0.03	47.50	100.01
101	0.00	0.00	19.91	0.03	32.65	0.00	47.38	99.97
102	0.06	0.00	20.03	0.00	32.40	0.00	47.39	99.88
103	0.01	0.03	20.25	0.06	32.48	0.00	47.67	100.51
104	0.41	0.07	19.80	0.01	33.30	0.01	48.48	102.09
105	0.17	0.14	19.65	0.01	32.70	0.00	47.46	100.13
106	0.15	0.12	19.78	0.01	32.81	0.00	47.65	100.52
107	0.39	0.00	17.53	0.00	36.09	0.02	48.12	102.15
108	0.12	0.00	15.12	0.01	38.62	0.00	47.02	100.89
109	0.00	0.00	20.19	0.00	32.39	0.04	47.48	100.10
110	0.41	0.08	19.24	0.00	31.93	0.04	46.79	98.48
111	0.19	0.06	19.83	0.02	33.17	0.00	48.02	101.29
112	0.00	0.02	20.11	0.00	32.53	0.04	47.52	100.22
113	0.32	0.00	19.77	0.04	33.50	0.03	48.45	102.12
114	0.00	0.00	1.57	0.02	55.22	0.01	45.07	101.89
115	0.46	0.00	20.13	0.00	32.36	0.10	48.19	101.24
116	0.00	0.09	20.58	0.00	32.23	0.00	47.80	100.70
117	0.08	0.16	20.16	0.03	32.92	0.02	48.09	101.46
118	0.08	0.00	19.86	0.01	33.09	0.02	47.79	100.84
119	0.11	0.00	0.22	0.00	56.30	0.00	44.60	101.22
120	0.17	0.00	0.33	0.01	56.27	0.03	44.83	101.65
121	0.00	0.01	0.29	0.03	56.46	0.06	44.69	101.55
122	0.07	0.00	0.32	0.05	56.61	0.07	44.97	102.09
125	0.02	0.11	0.20	0.02	57.19	0.06	45.23	102.82
126	0.00	0.00	0.59	0.00	56.47	0.02	44.98	102.06
127	0.07	0.00	0.45	0.00	56.69	0.01	45.10	102.32
128	0.00	0.07	0.37	0.00	56.51	0.01	44.80	101.77
129	0.31	0.03	0.61	0.02	56.25	0.00	45.34	102.55
131	0.00	0.03	0.39	0.00	57.11	0.00	45.26	102.79
133	0.00	0.00	0.32	0.00	56.82	0.00	44.94	102.08
134	0.10	0.11	0.33	0.00	56.56	0.01	44.96	102.07
135	0.00	0.02	0.50	0.01	56.84	0.03	45.18	102.57
137	0.00	0.06	0.33	0.01	56.64	0.00	44.84	101.88
138	0.38	0.04	0.64	0.00	56.16	0.00	45.42	102.63
139	0.05	0.10	0.56	0.00	56.09	0.00	44.77	101.58
140	0.00	0.00	0.58	0.00	56.47	0.00	44.96	102.01
141	0.57	0.00	0.38	0.00	56.39	0.04	45.63	103.00
142	0.00	0.01	0.55	0.00	56.94	0.00	45.29	102.79
143	0.38	0.03	0.55	0.00	56.26	0.00	45.38	102.59
145	0.10	0.00	0.26	0.03	57.18	0.00	45.34	102.91
147	0.08	0.07	0.31	0.01	57.08	0.00	45.31	102.86

	No.	SO2	SrO	MgO	MnO	CaO	FeO	CO2	Total
4-31-3-A70826 W3M 5642	1	1.03	0.09	19.62	0.00	33.09	0.00	49.13	102.96

2	0.00	0.00	18.63	0.04	34.91	0.00	47.77	101.35
3	0.00	0.06	19.85	0.02	32.28	0.00	47.04	99.25
4	0.11	0.00	19.82	0.04	32.56	0.00	47.39	99.92
5	0.00	0.00	20.21	0.00	32.08	0.01	47.25	99.55
6	0.01	0.03	20.11	0.00	32.23	0.05	47.31	99.74
7	0.00	0.00	20.02	0.01	32.13	0.00	47.07	99.23
8	0.06	0.05	19.88	0.00	32.33	0.09	47.25	99.66
9	0.15	0.00	19.92	0.00	33.26	0.00	48.10	101.43
10	0.16	0.00	20.04	0.01	32.59	0.08	47.78	100.66
11	0.25	0.00	19.72	0.03	32.71	0.00	47.63	100.34
12	0.00	0.00	19.90	0.00	33.27	0.02	47.85	101.04
13	0.00	0.03	19.91	0.02	32.88	0.00	47.57	100.41
14	0.15	0.00	10.60	0.04	44.29	0.05	46.65	101.79
15	0.38	0.01	13.32	0.03	41.11	0.03	47.48	102.36
16	0.00	0.00	20.21	0.02	32.41	0.09	47.57	100.30
17	0.00	0.00	19.96	0.01	33.02	0.04	47.73	100.76
18	0.00	0.00	19.97	0.04	32.32	0.00	47.20	99.54
19	0.13	0.04	13.03	0.00	41.48	0.05	47.05	101.78
20	0.00	0.09	20.04	0.00	32.11	0.07	47.17	99.49
21	0.00	0.00	20.16	0.00	32.37	0.00	47.41	99.94
22	0.06	0.11	19.81	0.00	33.44	0.00	48.02	101.44
23	0.00	0.00	19.60	0.01	33.04	0.00	47.33	99.98
24	0.00	0.01	19.95	0.00	32.68	0.01	47.43	100.07
25	0.00	0.06	19.91	0.06	32.49	0.05	47.33	99.90
26	0.14	0.00	0.29	0.06	56.34	0.02	44.80	101.64
28	0.00	0.00	0.17	0.00	57.01	0.00	44.93	102.11
30	0.25	0.00	0.41	0.01	56.59	0.00	45.27	102.52
32	0.10	0.01	0.34	0.00	56.71	0.02	45.06	102.24
33	0.05	0.11	0.23	0.00	56.76	0.05	44.96	102.16
34	0.08	0.07	0.22	0.00	56.88	0.00	45.04	102.29
36	0.03	0.14	0.49	0.00	56.34	0.03	44.88	101.91
37	0.01	0.00	0.41	0.00	56.72	0.00	44.97	102.11
39	0.00	0.00	0.24	0.01	57.32	0.00	45.25	102.82
41	0.03	0.14	0.56	0.02	56.72	0.02	45.25	102.74
42	0.00	0.01	0.38	0.04	56.77	0.00	45.00	102.20
43	0.00	0.01	0.46	0.01	57.70	0.05	45.83	104.06
44	0.06	0.00	0.31	0.02	56.44	0.05	44.78	101.66
46	0.22	0.00	0.43	0.00	56.52	0.02	45.20	102.39
47	0.09	0.02	0.31	0.03	56.44	0.00	44.81	101.70
48	0.00	0.00	0.31	0.00	56.90	0.00	45.00	102.22
51	0.20	0.00	19.25	0.01	33.32	0.03	47.53	100.34
53	0.23	0.07	0.53	0.02	56.54	0.01	45.39	102.80
56	0.00	0.13	0.29	0.00	56.14	0.00	44.43	100.99
58	0.14	0.06	0.08	0.03	57.22	0.00	45.26	102.79
59	0.00	0.00	0.27	0.00	56.94	0.00	44.98	102.19
61	0.00	0.00	0.34	0.01	56.72	0.04	44.92	102.03
63	0.00	0.10	0.31	0.00	57.13	0.01	45.21	102.75
64	0.16	0.00	0.40	0.00	56.38	0.00	44.95	101.89
65	0.00	0.00	20.06	0.05	32.48	0.00	47.42	100.01

66	0.00	0.00	18.22	0.01	35.01	0.00	47.37	100.61
67	0.09	0.00	19.87	0.03	32.78	0.01	47.58	100.36
68	0.54	0.17	20.07	0.00	32.95	0.00	48.75	102.49
69	0.00	0.00	14.07	0.01	40.39	0.00	47.07	101.54
70	0.00	0.00	18.72	0.05	34.53	0.00	47.56	100.86
71	0.24	0.00	20.09	0.02	32.04	0.05	47.52	99.96
72	0.00	0.02	20.16	0.00	32.54	0.02	47.57	100.31
73	0.00	0.00	19.90	0.00	33.52	0.00	48.04	101.46
74	0.00	0.00	20.03	0.00	32.41	0.03	47.33	99.80
75	0.00	0.00	19.98	0.00	32.63	0.00	47.42	100.03
76	0.04	0.04	20.19	0.02	32.56	0.00	47.68	100.52
77	0.14	0.11	14.20	0.00	39.33	0.00	46.65	100.43
78	0.69	0.00	20.19	0.00	32.58	0.05	48.79	102.31
79	0.00	0.00	20.35	0.00	32.39	0.03	47.66	100.43
80	0.00	0.00	20.16	0.07	32.59	0.00	47.63	100.45
81	0.00	0.03	20.15	0.00	32.45	0.00	47.48	100.10
82	0.05	0.00	0.42	0.01	57.00	0.00	45.28	102.76
83	0.10	0.00	0.37	0.01	56.57	0.04	44.99	102.08
87	0.00	0.02	0.51	0.10	56.58	0.03	45.05	102.28
89	0.43	0.00	0.36	0.00	56.31	0.00	45.29	102.39
92	0.26	0.00	0.70	0.00	55.98	0.00	45.12	102.06
93	0.16	0.00	0.34	0.00	56.16	0.00	44.70	101.36
94	0.00	0.05	0.45	0.00	56.68	0.00	44.99	102.17
95	0.03	0.00	0.25	0.04	56.89	0.00	45.00	102.21
96	0.09	0.04	0.27	0.00	57.48	0.03	45.58	103.48
97	0.00	0.06	0.35	0.00	56.94	0.04	45.11	102.49
98	0.00	0.00	0.62	0.01	56.72	0.06	45.24	102.65
99	0.15	0.02	0.37	0.00	56.89	0.01	45.32	102.77
102	0.00	0.08	0.25	0.02	56.93	0.04	45.02	102.35
103	0.00	0.03	0.53	0.00	56.31	0.00	44.78	101.65
104	0.00	0.02	20.24	0.00	32.31	0.01	47.47	100.05
105	0.00	0.08	20.02	0.01	32.62	0.03	47.51	100.27
106	0.00	0.00	19.71	0.02	33.57	0.01	47.88	101.19
107	0.15	0.00	19.62	0.00	32.45	0.32	47.33	99.87
108	0.00	0.00	20.01	0.00	32.93	0.00	47.69	100.63
109	0.14	0.00	19.73	0.05	33.08	0.05	47.79	100.84
110	0.44	0.00	19.92	0.00	32.32	0.02	47.86	100.57
111	0.00	0.00	19.39	0.01	33.42	0.00	47.40	100.22
112	0.02	0.00	19.50	0.00	33.41	0.00	47.55	100.49
113	0.00	0.01	20.34	0.01	32.07	0.03	47.40	99.87
114	0.00	0.00	0.53	0.01	56.76	0.00	45.13	102.43
115	0.16	0.00	0.12	0.00	56.96	0.02	45.12	102.39
116	0.16	0.00	20.29	0.00	32.30	0.00	47.77	100.52
117	0.11	0.00	19.80	0.03	32.29	0.00	47.16	99.39
118	0.00	0.00	19.85	0.03	32.88	0.00	47.50	100.26
119	0.68	0.00	20.20	0.00	31.63	0.37	48.23	101.11
120	0.00	0.04	19.22	0.00	33.62	0.00	47.39	100.27
121	0.00	0.08	19.68	0.05	33.36	0.03	47.74	100.94
122	0.47	0.00	19.88	0.00	33.35	0.07	48.69	102.45

123	0.11	0.00	20.00	0.05	32.75	0.05	47.79	100.75
124	0.00	0.00	19.95	0.01	32.94	0.06	47.67	100.63
125	0.00	0.03	19.99	0.00	32.23	0.00	47.13	99.38
126	0.14	0.00	19.79	0.00	32.92	0.05	47.71	100.61
127	0.00	0.00	20.12	0.00	32.86	0.04	47.78	100.80
128	0.00	0.05	19.23	0.02	33.03	0.90	47.50	100.73
129	0.00	0.07	18.38	0.00	34.37	0.00	47.07	99.90
130	0.00	0.09	19.67	0.07	32.31	0.00	46.92	99.06
131	0.03	0.00	20.08	0.02	32.74	0.00	47.68	100.55
132	0.04	0.00	20.70	0.02	32.30	0.05	48.05	101.15
133	0.33	0.00	17.64	0.02	35.74	0.00	47.86	101.59
134	0.23	0.05	19.60	0.02	31.76	0.00	46.74	98.40
135	0.06	0.00	19.54	0.02	32.83	0.00	47.22	99.68
136	0.00	0.01	19.95	0.00	32.42	0.00	47.23	99.61
137	0.00	0.05	19.74	0.03	32.48	0.00	47.08	99.37
138	0.01	0.07	19.67	0.00	32.93	0.00	47.36	100.03
139	0.04	0.00	20.04	0.05	32.40	0.00	47.40	99.93
140	0.29	0.05	0.73	0.07	55.89	0.06	45.23	102.32
141	0.11	0.08	0.20	0.00	57.09	0.01	45.25	102.74
143	0.00	0.02	0.27	0.00	56.93	0.00	44.98	102.20
145	0.12	0.09	0.37	0.03	56.67	0.00	45.13	102.41
146	0.00	0.03	0.31	0.02	56.63	0.05	44.84	101.87
148	0.00	0.05	0.19	0.01	54.57	0.00	43.07	97.90
155	0.30	0.07	0.88	0.00	56.11	0.01	45.52	102.88
156	0.00	0.00	0.29	0.05	56.77	0.00	44.90	102.01
157	0.00	0.00	0.39	0.00	56.80	0.00	45.00	102.19
158	0.25	0.02	0.63	0.00	57.02	0.01	45.86	103.79
159	0.00	0.01	0.15	0.04	57.27	0.02	45.15	102.64
160	0.00	0.08	0.40	0.01	57.04	0.01	45.24	102.78
161	0.00	0.00	0.40	0.00	56.50	0.01	44.78	101.69
163	0.00	0.03	0.21	0.04	56.98	0.00	44.99	102.25
164	0.00	0.00	0.44	0.00	56.80	0.00	45.06	102.30
165	0.00	0.00	0.06	0.00	57.10	0.00	44.87	102.03
166	0.00	0.05	0.40	0.00	57.35	0.02	45.48	103.30
167	0.08	0.05	0.27	0.00	57.10	0.00	45.27	102.77
168	0.00	0.06	0.30	0.00	53.00	0.03	41.97	95.36

	No.	SO2	SrO	MgO	MnO	CaO	FeO	CO2	Total
5-7-14-10 W3M 5288	1	0.38	0.00	20.28	0.00	31.42	0.50	47.74	100.32
	2	0.01	0.00	20.00	0.00	31.69	0.38	46.97	99.06
	3	0.00	0.08	20.32	0.04	31.66	0.38	47.32	99.80
	4	0.10	0.08	20.19	0.01	31.21	0.46	47.02	99.06
	5	0.42	0.00	20.60	0.01	32.52	0.24	48.87	102.66
	6	0.00	0.00	20.58	0.04	32.42	0.46	48.21	101.71
	7	0.22	0.00	20.85	0.01	32.44	0.39	48.83	102.74
	8	0.29	0.00	20.47	0.00	32.25	0.42	48.39	101.82
	9	0.00	0.00	20.48	0.02	32.38	0.51	48.11	101.51
	10	0.00	0.05	20.49	0.04	31.57	0.35	47.40	99.90
	11	0.08	0.09	20.33	0.06	31.76	0.49	47.63	100.43

12	0.12	0.00	21.13	0.05	31.98	0.44	48.67	102.39
13	0.27	0.03	20.81	0.06	32.43	0.42	48.93	102.95
14	0.00	0.07	20.38	0.00	32.03	0.39	47.66	100.53
15	0.04	0.01	20.37	0.04	31.93	0.53	47.72	100.64
16	0.12	0.01	20.39	0.00	32.19	0.35	47.94	100.99
17	0.04	0.00	20.45	0.06	31.71	0.42	47.57	100.25
18	0.08	0.03	20.51	0.00	31.91	0.39	47.82	100.74
19	0.00	0.09	20.43	0.06	32.26	0.46	47.99	101.29
20	0.03	0.00	19.99	0.02	31.82	0.52	47.17	99.55
22	0.06	0.05	21.44	0.04	31.31	0.40	48.37	101.67
23	0.20	0.11	21.80	0.00	30.95	0.41	48.71	102.17
33	0.00	0.15	0.01	0.00	56.60	0.07	44.54	101.38
40	0.00	0.00	0.10	0.00	55.16	0.10	43.46	98.81
41	0.10	0.05	0.00	0.00	55.99	0.05	44.16	100.35
44	0.00	0.00	20.51	0.02	32.63	0.27	48.19	101.62
48	0.36	0.27	0.14	0.00	54.21	0.02	43.42	98.41
51	0.04	0.17	0.22	0.02	55.33	0.01	43.82	99.61
56	0.00	0.19	0.15	0.06	54.37	0.00	42.94	97.70
65	0.08	0.28	0.09	0.00	56.84	0.00	44.96	102.26
69	0.03	0.00	20.19	0.02	31.67	0.54	47.28	99.73
70	0.45	0.00	20.32	0.07	31.42	0.66	48.04	100.96
71	0.00	0.08	20.68	0.03	32.29	0.14	48.05	101.26
72	0.21	0.07	19.68	0.00	31.75	0.73	47.22	99.65
73	0.54	0.09	20.16	0.01	32.06	0.29	48.28	101.43
74	0.00	0.02	20.78	0.00	32.13	0.18	48.02	101.14
75	0.06	0.04	20.51	0.00	31.93	0.22	47.71	100.47
76	0.08	0.25	20.07	0.04	31.11	0.89	47.14	99.58
77	0.06	0.01	20.46	0.04	31.05	0.60	47.20	99.42
78	0.00	0.00	20.66	0.01	31.76	0.19	47.61	100.23
80	0.35	0.04	20.54	0.06	31.63	0.13	47.96	100.70
116	0.05	0.13	0.23	0.03	55.47	0.00	43.94	99.85
122	0.31	0.33	20.67	0.00	31.44	0.25	48.04	101.03
123	0.08	0.18	20.53	0.02	31.95	0.26	47.88	100.91
124	0.47	0.25	20.59	0.02	31.78	0.24	48.46	101.81
125	0.00	0.00	20.33	0.01	31.53	0.69	47.37	99.93
126	0.17	0.00	19.82	0.00	30.61	0.74	46.40	97.74
127	0.00	0.10	20.51	0.00	31.30	0.71	47.44	100.06
128	0.42	0.01	20.37	0.06	31.26	0.64	47.89	100.64
129	0.13	0.14	20.44	0.00	31.27	0.55	47.46	99.99
130	0.11	0.04	20.00	0.00	32.09	0.57	47.56	100.37
131	0.05	0.13	0.09	0.00	54.01	0.10	42.69	97.08
142	0.37	0.01	0.18	0.07	55.66	0.09	44.58	100.95
145	0.01	0.17	0.22	0.02	55.38	0.06	43.83	99.68
146	0.21	0.07	0.05	0.05	56.29	0.00	44.64	101.31
149	0.64	0.17	0.08	0.04	53.91	0.00	43.55	98.39
151	0.12	0.00	21.23	0.00	31.54	0.50	48.44	101.83
152	0.48	0.02	20.81	0.01	31.42	0.45	48.45	101.63
153	0.13	0.00	20.52	0.03	32.32	0.35	48.21	101.55
154	0.00	0.00	21.37	0.01	31.76	0.07	48.30	101.50

155	0.12	0.02	20.75	0.04	31.38	0.32	47.71	100.34
156	0.00	0.11	19.66	0.02	31.41	1.34	47.00	99.54
157	0.05	0.00	20.39	0.04	30.93	0.20	46.76	98.37
158	0.00	0.00	21.26	0.03	32.07	0.20	48.52	102.07
159	0.00	0.00	20.67	0.00	31.58	0.37	47.57	100.19
160	0.00	0.12	20.71	0.01	32.20	0.12	48.01	101.18
161	0.08	0.06	20.64	0.00	31.68	0.25	47.70	100.41

	No.	SO2	SrO	MgO	MnO	CaO	FeO	CO2	Total
5-7-14-10 W3M 5413	21	0.06	0.26	0.20	0.01	56.36	0.00	44.67	101.56
	23	0.03	0.18	0.08	0.00	56.37	0.00	44.44	101.09
	25	0.00	0.09	0.13	0.01	55.84	0.00	44.00	100.06
	26	0.14	0.24	0.06	0.00	56.38	0.00	44.65	101.48
	27	0.12	0.14	0.55	0.05	56.25	0.00	45.04	102.15
	28	0.05	0.10	0.02	0.02	56.83	0.00	44.76	101.77
	29	0.07	0.00	0.14	0.02	56.56	0.06	44.71	101.57
	30	0.03	0.12	0.21	0.00	56.02	0.00	44.29	100.67
	31	0.07	0.25	0.27	0.00	55.49	0.07	44.11	100.27
	32	0.02	0.35	0.17	0.00	56.24	0.03	44.52	101.32
	33	0.00	0.24	0.23	0.00	56.20	0.00	44.46	101.13
	34	0.00	0.11	19.65	0.00	30.82	0.49	45.99	97.06
	37	0.00	0.15	20.44	0.00	31.36	0.07	47.03	99.05
	38	0.00	0.22	20.00	0.00	30.81	0.16	46.20	97.38
	40	0.00	0.07	20.24	0.00	30.24	0.69	46.29	97.53
	43	0.02	0.12	20.01	0.05	30.67	0.29	46.21	97.37
	44	0.02	0.14	20.05	0.01	31.07	0.18	46.49	97.97
	46	0.00	0.02	20.16	0.02	30.43	0.56	46.26	97.45
	47	0.07	0.00	20.18	0.00	31.13	0.18	46.69	98.25
	48	0.08	0.00	20.19	0.06	31.27	0.36	46.97	98.94
	49	0.08	0.00	20.35	0.00	30.36	0.22	46.32	97.35
	50	0.03	0.00	20.27	0.02	30.10	0.65	46.20	97.26
	51	0.02	0.00	20.35	0.02	29.95	0.74	46.22	97.29
	52	0.00	0.14	0.10	0.06	55.74	0.09	44.00	100.12
	53	0.05	0.18	0.08	0.03	56.19	0.01	44.38	100.94
	54	0.00	0.18	0.15	0.02	56.19	0.03	44.37	100.94
	55	0.00	0.18	0.09	0.03	55.83	0.05	44.04	100.22
	56	0.01	0.09	0.10	0.04	55.75	0.00	43.94	99.93
	57	0.05	0.18	0.21	0.01	56.14	0.05	44.48	101.12
	58	0.05	0.06	0.07	0.04	55.48	0.31	43.94	99.96
	59	0.03	0.21	0.20	0.03	57.17	0.02	45.25	102.91
	60	0.02	0.27	0.21	0.00	56.07	0.05	44.41	101.02
	61	0.00	0.86	0.36	0.01	55.29	0.02	44.16	100.70
	62	0.03	0.19	0.14	0.00	55.80	0.08	44.12	100.36
	75	0.07	0.26	0.14	0.02	56.30	0.03	44.60	101.41
	76	0.03	0.20	0.05	0.01	56.15	0.02	44.28	100.74
	77	0.00	0.22	0.12	0.00	56.07	0.05	44.26	100.72
	78	0.04	0.09	0.11	0.06	55.41	0.27	43.92	99.90
	79	0.00	0.00	0.29	0.00	55.71	0.05	44.06	100.11
	80	0.03	0.02	0.26	0.00	55.96	0.06	44.29	100.62

	81	0.05	0.10	0.20	0.00	56.24	0.00	44.48	101.07
	82	0.11	0.43	0.08	0.01	55.60	0.00	44.09	100.32
	83	0.00	0.07	20.66	0.01	30.60	0.22	46.73	98.29
	84	0.00	0.03	20.43	0.00	30.20	0.44	46.28	97.38
10-32-183 W3M 4639	12	0.00	0.03	20.54	0.01	30.86	0.09	46.71	98.24
	14	0.09	0.00	20.00	0.02	31.52	0.00	46.73	98.36
	15	0.08	0.19	20.58	0.01	30.60	0.18	46.82	98.46
	16	0.08	0.00	20.41	0.00	30.75	0.10	46.61	97.95
	17	0.13	0.00	20.23	0.04	31.37	0.05	46.99	98.81
	19	0.07	0.00	20.18	0.02	30.76	0.12	46.39	97.54
	20	0.05	0.03	20.15	0.03	31.37	0.07	46.77	98.47
	21	0.00	0.00	20.25	0.01	31.38	0.02	46.75	98.41
	22	0.09	0.00	20.04	0.01	30.96	0.09	46.38	97.57
	23	0.07	0.06	20.25	0.06	30.93	0.06	46.60	98.03
	24	0.00	0.03	20.68	0.02	30.92	0.13	46.94	98.72
	25	0.06	0.02	20.15	0.04	31.20	0.24	46.75	98.45
	26	0.00	0.04	20.48	0.00	31.37	0.03	47.02	98.94
	27	0.08	0.11	20.39	0.03	31.62	0.06	47.32	99.62
	28	0.08	0.00	19.88	0.04	30.59	0.17	45.97	96.73
	29	0.00	0.00	20.35	0.00	31.28	0.06	46.80	98.49
	30	0.00	0.00	19.97	0.00	30.92	0.17	46.18	97.24
	31	0.11	0.00	19.96	0.00	31.12	0.08	46.44	97.71
	32	0.05	0.09	20.21	0.01	31.41	0.07	46.89	98.73
	42	0.11	0.00	20.33	0.08	31.32	0.04	47.04	98.92
	43	0.04	0.04	19.96	0.05	31.61	0.05	46.74	98.49
	44	0.09	0.06	19.88	0.02	31.46	0.04	46.61	98.16
	45	0.09	0.11	19.95	0.02	31.79	0.08	46.99	99.03
	46	0.13	0.10	19.70	0.02	31.90	0.06	46.84	98.75
	47	0.01	0.02	20.50	0.02	30.55	0.04	46.43	97.57
	49	0.12	0.00	20.66	0.00	31.58	0.07	47.58	100.01
	50	0.06	0.01	20.43	0.03	30.65	0.12	46.56	97.87
	51	0.04	0.05	20.27	0.00	30.85	0.00	46.42	97.63
	52	0.08	0.02	20.35	0.06	31.20	0.03	46.91	98.66
	53	0.00	0.00	20.13	0.04	32.02	0.01	47.14	99.34
	54	0.03	0.00	20.14	0.00	31.54	0.19	46.90	98.80
	55	0.00	0.00	20.19	0.01	31.50	0.01	46.77	98.48
	56	0.00	0.11	20.14	0.02	31.08	0.09	46.50	97.94
	57	0.13	0.05	20.08	0.09	31.05	0.08	46.63	98.11
	58	0.00	0.00	20.37	0.02	30.54	0.08	46.27	97.28
	59	0.08	0.05	20.26	0.00	30.50	0.04	46.22	97.15
	61	0.06	0.08	20.58	0.00	31.41	0.00	47.24	99.37
	62	0.11	0.01	20.26	0.05	31.50	0.04	47.09	99.07
	63	0.09	0.03	20.26	0.02	30.96	0.01	46.61	97.98
	64	0.07	0.09	20.08	0.00	30.98	0.14	46.47	97.82
	67	0.06	0.00	20.14	0.02	31.22	0.07	46.65	98.16
	68	0.13	0.00	20.07	0.03	30.59	0.22	46.28	97.31
	69	0.13	0.06	20.07	0.00	30.62	0.18	46.30	97.37
	71	0.00	0.03	20.40	0.01	31.18	0.02	46.78	98.43

	72	0.04	0.00	20.41	0.00	31.60	0.03	47.16	99.24
	76	0.14	0.00	20.10	0.00	31.53	0.01	46.92	98.70
	79	0.13	0.03	20.35	0.01	31.02	0.34	46.99	98.86

	No.	SO2	SrO	MgO	MnO	CaO	FeO	CO2	Total
10-32-183 W3M 4645	1	0.11	0.00	20.82	0.03	30.68	0.13	47.09	98.86
	2	0.00	0.00	21.03	0.03	29.73	0.03	46.33	97.16
	3	0.05	0.00	20.11	0.05	29.55	0.05	45.30	95.12
	4	0.00	0.01	20.82	0.08	29.66	0.05	46.10	96.73
	8	0.00	0.00	20.57	0.01	30.00	0.04	46.04	96.66
	9	0.14	0.05	20.57	0.04	29.72	0.06	46.11	96.69
	10	0.00	0.01	20.87	0.01	30.35	0.07	46.65	97.96
	11	0.03	0.01	20.84	0.05	30.27	0.06	46.63	97.89
	12	0.06	0.00	20.75	0.05	29.86	0.12	46.29	97.13
	13	0.02	0.12	20.74	0.08	30.47	0.00	46.69	98.12
	14	0.00	0.12	20.67	0.10	30.36	0.16	46.61	98.02
	16	0.04	0.04	20.69	0.02	30.27	0.02	46.45	97.53
	17	0.02	0.05	20.82	0.04	30.08	0.06	46.45	97.51
	18	0.09	0.00	20.67	0.10	30.02	0.07	46.38	97.32
	20	0.13	0.04	20.53	0.10	30.47	0.00	46.62	97.89
	21	0.00	0.00	21.17	0.08	30.29	0.09	47.00	98.64
	22	0.24	0.05	20.47	0.03	29.98	0.09	46.38	97.25
	23	0.08	0.06	20.77	0.17	30.19	0.00	46.63	97.90
	24	0.06	0.00	20.65	0.04	30.23	0.07	46.43	97.47
	25	0.05	0.00	20.26	0.09	30.99	0.06	46.63	98.08

	No.	SO2	SrO	MgO	MnO	CaO	FeO	CO2	Total
10-32-183 W3M 4746	2	0.01	0.00	19.18	0.04	32.16	0.08	46.27	97.74
	3	0.04	0.00	19.91	0.06	32.00	0.11	47.02	99.14
	5	0.14	0.00	19.68	0.14	32.06	0.10	47.02	99.14
	6	0.13	0.02	19.07	0.09	31.96	0.15	46.27	97.69
	8	0.10	0.00	19.45	0.11	31.79	0.04	46.45	97.95
	9	0.08	0.00	19.42	0.12	31.80	0.04	46.40	97.86
	11	0.04	0.00	13.44	0.17	31.50	8.47	44.75	98.37
	12	0.00	0.08	18.77	0.03	31.42	0.87	45.73	96.89
	13	0.00	0.04	19.56	0.11	32.00	0.06	46.59	98.35
	14	0.08	0.01	19.10	0.16	31.82	0.15	46.16	97.49
	16	1.04	0.02	19.20	0.14	31.61	0.69	48.00	100.69
	17	1.86	0.02	18.81	0.09	31.88	0.92	49.25	102.83
	18	0.61	0.04	18.98	0.08	31.86	0.38	47.04	98.99
	19	0.04	0.00	19.64	0.03	31.68	0.39	46.63	98.41
	20	0.00	0.00	17.28	0.03	31.81	2.66	45.49	97.27
	21	0.04	0.00	13.82	0.14	31.61	8.10	45.02	98.73
	22	0.00	0.07	13.55	0.11	31.39	8.54	44.76	98.42
	23	0.02	0.00	13.67	0.15	31.74	8.41	45.11	99.10
	24	0.10	0.09	13.24	0.15	31.53	8.48	44.70	98.29
	25	0.02	0.00	13.73	0.14	31.65	8.34	45.06	98.94
	26	0.08	0.00	13.32	0.12	31.31	8.38	44.46	97.67
	27	0.00	0.00	13.15	0.08	30.93	8.80	44.07	97.03

28	0.00	0.07	13.46	0.11	31.17	9.02	44.78	98.60
29	0.00	0.04	13.47	0.14	31.47	9.22	45.16	99.50
30	0.00	0.01	13.14	0.09	31.06	8.90	44.23	97.43
31	0.05	0.07	19.15	0.07	32.90	0.06	46.93	99.24
32	0.15	0.00	19.18	0.10	31.89	0.06	46.31	97.69
34	0.04	0.00	18.85	0.11	32.28	0.19	46.16	97.63
36	0.08	0.00	18.34	0.16	33.24	0.09	46.39	98.30
37	0.00	0.00	18.59	0.10	32.52	0.15	45.97	97.33
38	0.07	0.05	18.64	0.12	32.52	0.12	46.16	97.68
39	0.28	0.15	18.71	0.07	32.49	0.27	46.65	98.62
40	0.08	0.02	19.15	0.09	31.56	0.17	45.99	97.07
41	0.00	0.03	13.71	0.12	31.34	8.37	44.79	98.36
42	0.00	0.00	13.50	0.11	30.99	9.04	44.66	98.30
43	0.00	0.03	18.72	0.12	31.74	0.83	45.95	97.40
44	0.04	0.04	19.28	0.11	31.82	0.07	46.21	97.56
45	0.01	0.02	19.46	0.07	32.18	0.22	46.70	98.66
46	0.06	0.00	19.03	0.11	32.58	0.04	46.53	98.35
47	0.00	0.00	19.04	0.12	32.31	0.07	46.26	97.81
48	0.14	0.03	18.52	0.19	32.96	0.07	46.50	98.41
49	0.12	0.00	18.60	0.11	33.04	0.06	46.54	98.47
50	0.00	0.04	18.50	0.11	32.51	0.53	46.12	97.81
51	0.00	0.00	18.87	0.13	33.03	0.04	46.63	98.70
52	0.03	0.00	19.44	0.14	32.34	0.11	46.81	98.87
53	0.16	0.12	18.79	0.19	33.21	0.17	47.11	99.75
54	0.15	0.01	19.13	0.12	32.88	0.07	47.07	99.43
55	0.09	0.00	18.00	0.03	33.47	0.24	46.23	98.06
56	0.00	0.00	18.68	0.17	32.84	0.14	46.36	98.19
57	0.13	0.14	18.52	0.12	33.07	0.29	46.69	98.95
58	0.05	0.00	18.40	0.13	32.89	0.21	46.19	97.87
59	0.07	0.04	18.77	0.04	32.99	0.27	46.71	98.89
60	0.05	0.00	13.63	0.07	31.63	8.55	45.07	99.00
61	0.14	0.00	17.19	0.11	31.59	3.36	45.92	98.31
62	0.00	0.00	19.31	0.06	31.65	0.19	46.08	97.29
63	0.04	0.00	19.02	0.12	32.47	0.09	46.44	98.18
64	0.00	0.00	14.93	0.18	31.78	6.74	45.48	99.11
65	0.02	0.08	17.01	0.05	31.97	3.03	45.62	97.78
66	0.00	0.07	16.78	0.11	32.03	3.50	45.71	98.20
67	0.00	0.00	17.65	0.07	31.50	2.74	45.71	97.67
68	0.00	0.00	17.31	0.09	32.15	2.60	45.77	97.92
69	0.00	0.04	18.24	0.06	31.85	1.52	45.89	97.60
70	0.17	0.00	19.02	0.15	31.58	0.16	46.03	97.12
71	0.06	0.06	17.25	0.00	32.61	0.47	44.83	95.27
72	0.04	0.10	18.76	0.10	32.16	0.11	45.95	97.22
73	0.06	0.00	19.53	0.04	31.76	0.13	46.45	97.97
74	0.06	0.00	19.36	0.04	31.76	0.09	46.25	97.56
75	0.09	0.08	18.45	0.10	33.09	0.23	46.50	98.54
76	0.14	0.02	17.86	0.08	33.75	0.33	46.48	98.66
77	0.00	0.06	19.94	0.17	31.05	0.03	46.29	97.54
78	0.10	0.00	17.78	0.01	33.66	0.13	46.09	97.78

79	0.02	0.05	17.65	0.00	33.49	0.31	45.79	97.31
80	0.00	0.00	18.18	0.20	32.96	0.44	46.11	97.90
81	0.10	0.03	18.85	0.13	32.56	0.09	46.44	98.19
82	0.08	0.00	19.45	0.05	32.70	0.10	47.12	99.50
83	0.13	0.03	18.23	0.20	33.00	0.46	46.42	98.47
84	0.05	0.00	18.34	0.02	33.62	0.22	46.64	98.89
85	0.07	0.09	18.34	0.07	32.90	0.15	46.13	97.75
86	0.11	0.00	18.80	0.09	32.99	0.13	46.74	98.87

	No.	SO2	SrO	MgO	MnO	CaO	FeO	CO2	Total
10-32-A1092183 W3M 4813	1	0.09	0.01	0.54	0.00	55.44	0.02	44.26	100.35
	2	0.11	0.00	0.42	0.00	55.52	0.00	44.21	100.26
	3	0.04	0.00	0.48	0.02	55.68	0.02	44.31	100.55
	4	0.15	0.08	0.57	0.00	55.00	0.00	44.06	99.86
	5	0.22	0.01	0.57	0.02	55.19	0.00	44.31	100.32
	6	0.25	0.03	0.51	0.01	55.34	0.01	44.43	100.58
	7	0.14	0.05	0.59	0.02	55.41	0.06	44.43	100.69
	8	0.24	0.12	0.53	0.01	55.44	0.00	44.55	100.90
	9	0.00	0.06	20.33	0.07	31.74	0.03	47.19	99.42
	10	0.00	0.05	20.35	0.09	31.78	0.04	47.26	99.57
	11	0.00	0.00	20.19	0.12	31.88	0.03	47.16	99.38
	12	1.61	0.00	19.87	0.05	31.53	0.14	49.21	102.41
	13	0.08	0.00	20.09	0.04	31.88	0.00	47.10	99.19
	14	0.03	0.01	20.41	0.06	31.32	0.04	46.98	98.85
	15	0.04	0.19	20.19	0.08	31.51	0.03	46.99	99.02
	16	0.09	0.09	20.20	0.08	31.91	0.03	47.36	99.77
	17	0.08	0.00	20.17	0.04	31.44	0.00	46.85	98.58
	18	0.08	0.00	20.21	0.10	31.71	0.00	47.14	99.24
	19	0.00	0.01	20.24	0.05	31.74	0.11	47.11	99.26
	20	0.04	0.00	20.34	0.03	30.83	0.04	46.51	97.78
	33	0.00	0.00	20.44	0.03	31.00	0.00	46.67	98.14
	34	0.04	0.03	20.42	0.04	31.05	0.07	46.81	98.46
	35	0.03	0.00	20.35	0.06	31.09	0.00	46.70	98.23
	36	0.16	0.00	20.42	0.06	31.07	0.00	46.98	98.69
	37	0.00	0.00	20.27	0.03	30.83	0.03	46.36	97.52
	38	0.02	0.00	20.14	0.06	31.46	0.00	46.75	98.43
	39	0.08	0.03	20.16	0.08	32.16	0.04	47.46	100.00
	40	0.00	0.09	20.22	0.04	31.07	0.04	46.55	98.01
	41	0.03	0.13	20.21	0.05	31.29	0.00	46.78	98.50
	42	0.04	0.01	20.26	0.05	30.95	0.01	46.52	97.85
	43	0.00	0.00	20.30	0.09	30.80	0.00	46.39	97.58
	44	0.05	0.00	19.60	0.06	30.98	0.01	45.84	96.54
	45	0.08	0.04	20.22	0.08	30.65	0.03	46.35	97.46
	46	0.25	0.01	0.68	0.02	54.49	0.02	43.94	99.41
	47	0.10	0.00	1.68	0.00	54.63	0.03	44.90	101.34
	48	0.17	0.06	0.81	0.00	54.59	0.02	44.05	99.71
	49	0.35	0.00	0.64	0.01	55.38	0.03	44.76	101.16
	50	0.34	0.00	0.70	0.00	55.20	0.02	44.65	100.91
	51	0.19	0.04	0.45	0.04	55.13	0.00	44.11	99.95

52	0.54	0.01	0.84	0.00	54.85	0.04	44.88	101.15
53	0.25	0.10	0.61	0.00	54.69	0.03	44.05	99.72
54	0.21	0.09	0.78	0.00	55.01	0.00	44.41	100.50
55	0.24	0.00	0.62	0.00	55.11	0.00	44.32	100.29
56	0.17	0.07	0.58	0.00	54.63	0.04	43.84	99.33
57	0.21	0.03	0.73	0.02	55.25	0.01	44.54	100.79
58	0.18	0.02	0.77	0.02	55.60	0.00	44.79	101.38
59	0.15	0.00	0.58	0.01	55.07	0.00	44.10	99.91
60	0.21	0.01	0.54	0.01	55.64	0.06	44.66	101.13
61	0.25	0.00	0.85	0.00	55.29	0.00	44.73	101.12
62	0.01	0.00	20.42	0.00	30.66	0.01	46.39	97.50
63	0.01	0.02	20.13	0.07	31.74	0.00	46.95	98.92
64	0.00	0.00	20.18	0.03	31.26	0.00	46.59	98.06
65	0.00	0.21	20.22	0.08	31.72	0.04	47.13	99.41
66	0.13	0.00	18.84	0.09	32.82	0.00	46.60	98.48
67	0.00	0.00	20.39	0.06	31.65	0.14	47.22	99.46
68	0.08	0.04	19.58	0.00	32.49	0.09	47.07	99.34
69	0.13	0.01	20.23	0.04	31.41	0.10	47.05	98.97
70	0.04	0.00	17.30	0.03	27.92	0.04	40.91	86.25
71	0.10	0.04	20.22	0.00	31.52	0.07	47.03	98.97
72	0.05	0.07	20.28	0.00	31.91	0.16	47.39	99.85
73	0.10	0.03	19.98	0.00	31.92	0.08	47.10	99.21
74	0.03	0.06	19.99	0.01	32.29	0.01	47.26	99.66
75	0.06	0.00	19.46	0.00	32.48	0.04	46.86	98.90
76	0.19	0.00	0.60	0.02	55.76	0.07	44.79	101.44
77	0.13	0.00	0.50	0.00	55.39	0.01	44.23	100.26
78	0.13	0.00	0.48	0.02	55.80	0.07	44.59	101.09
79	0.19	0.00	1.21	0.02	53.96	0.03	44.02	99.43
80	0.09	0.00	0.53	0.00	55.45	0.01	44.26	100.35
81	0.05	0.01	0.61	0.00	55.64	0.01	44.43	100.76
82	0.19	0.00	0.60	0.00	55.56	0.00	44.58	100.94
83	0.10	0.03	5.34	0.00	49.81	0.01	45.11	100.40
84	0.18	0.01	0.57	0.00	55.89	0.04	44.80	101.49
85	0.12	0.07	0.74	0.00	54.94	0.00	44.15	100.02
86	0.04	0.04	0.28	0.00	56.30	0.00	44.57	101.24
87	0.22	0.01	0.67	0.00	53.42	0.05	43.06	97.44
88	0.25	0.00	0.73	0.00	55.61	0.03	44.86	101.48
89	0.14	0.08	0.54	0.00	56.43	0.02	45.15	102.36
90	0.18	0.00	0.77	0.04	55.27	0.00	44.54	100.80
91	0.10	0.00	0.57	0.01	55.43	0.07	44.34	100.52
92	0.11	0.00	0.58	0.02	56.17	0.11	44.97	101.96
93	0.27	0.06	0.48	0.00	55.46	0.00	44.51	100.77
94	0.21	0.03	0.37	0.00	55.03	0.00	43.96	99.61
95	0.38	0.00	0.39	0.00	55.90	0.02	44.95	101.65
96	0.29	0.03	0.45	0.01	55.51	0.03	44.58	100.90
97	0.38	0.00	0.43	0.03	55.68	0.02	44.82	101.35
98	0.11	0.00	0.38	0.00	55.84	0.00	44.43	100.77
99	0.30	0.08	0.40	0.00	55.13	0.00	44.23	100.14
100	0.21	0.06	0.56	0.00	54.96	0.03	44.14	99.97

101	0.17	0.00	0.37	0.04	55.67	0.00	44.41	100.67
102	0.09	0.04	0.30	0.00	55.66	0.05	44.20	100.33
103	0.14	0.02	0.68	0.00	55.45	0.02	44.51	100.82
104	0.21	0.00	0.29	0.00	56.02	0.00	44.63	101.15
105	0.16	0.00	0.57	0.01	55.72	0.00	44.62	101.08
106	0.13	0.03	0.44	0.05	55.21	0.00	44.07	99.94
107	0.12	0.00	0.49	0.01	55.37	0.02	44.21	100.22
108	0.17	0.00	0.59	0.00	54.62	0.00	43.80	99.19
109	0.23	0.06	0.29	0.00	55.85	0.06	44.59	101.08
110	0.36	0.00	0.65	0.05	55.07	0.04	44.59	100.76
111	0.00	0.00	0.22	0.00	55.83	0.00	44.05	100.10
112	0.22	0.00	0.43	0.00	56.27	0.00	44.99	101.91
113	0.22	0.00	0.56	0.00	55.52	0.07	44.60	100.97
114	0.29	0.06	0.62	0.03	54.78	0.00	44.18	99.96
115	0.19	0.08	0.49	0.06	55.64	0.00	44.59	101.05
116	0.33	0.05	0.61	0.00	53.84	0.02	43.50	98.35
117	0.17	0.14	0.61	0.06	55.05	0.00	44.26	100.30
118	0.24	0.07	0.96	0.02	54.39	0.00	44.17	99.86
119	0.26	0.11	0.57	0.00	55.06	0.00	44.31	100.31
120	0.27	0.18	0.76	0.00	54.42	0.00	44.06	99.69
121	0.14	0.10	0.71	0.01	54.70	0.05	44.02	99.74
122	0.14	0.11	0.79	0.01	55.08	0.00	44.37	100.50
123	0.17	0.00	0.62	0.00	55.75	0.04	44.75	101.34
125	0.37	0.03	0.66	0.00	54.86	0.03	44.41	100.36
126	0.11	0.10	0.92	0.00	55.33	0.01	44.65	101.12

	No.	SO2	SrO	MgO	MnO	CaO	FeO	CO2	Total
15-11-6-A119620 W3M 6014	8	0.19	0.02	19.95	0.00	31.39	0.02	46.75	98.32
	9	0.05	0.09	20.50	0.00	31.23	0.07	47.05	98.99
	10	0.08	0.05	20.10	0.00	31.06	0.28	46.64	98.21
	11	0.00	0.02	20.12	0.02	30.63	0.12	46.10	97.02
	12	0.13	0.01	19.36	0.03	27.17	0.00	42.69	89.39
	13	0.00	0.08	20.72	0.00	31.36	0.02	47.28	99.46
	14	0.15	0.00	20.05	0.00	31.13	0.13	46.64	98.10
	15	0.06	0.08	20.47	0.04	31.13	0.06	46.97	98.80
	16	0.17	0.00	20.10	0.00	31.20	0.00	46.71	98.18
	17	0.08	0.03	20.16	0.01	31.49	0.02	46.88	98.67
	18	0.06	0.02	20.10	0.03	31.06	0.07	46.49	97.83
	19	0.15	0.00	20.24	0.00	31.71	0.00	47.22	99.32
	20	0.89	0.00	20.01	0.03	31.08	0.09	47.78	99.88
	21	0.09	0.00	20.30	0.02	31.47	0.04	47.05	98.97
	22	0.07	0.13	20.08	0.00	31.61	0.04	46.92	98.85
	23	0.06	0.00	20.40	0.00	31.13	0.00	46.79	98.38
	24	0.15	0.00	20.00	0.02	31.44	0.03	46.80	98.45
	25	0.00	0.00	20.14	0.00	31.71	0.02	46.89	98.76
	26	0.04	0.02	20.28	0.03	30.75	0.06	46.41	97.59
	27	0.00	0.04	20.41	0.04	31.41	0.07	47.02	98.99
	28	0.00	0.03	20.45	0.00	31.50	0.06	47.10	99.14
	29	0.10	0.07	20.71	0.00	31.75	0.04	47.75	100.42

30	0.08	0.00	20.39	0.07	31.22	0.04	46.96	98.76
31	0.08	0.00	20.55	0.00	30.54	0.35	46.74	98.26
32	0.17	0.00	20.26	0.01	31.56	0.07	47.21	99.27
33	0.16	0.03	20.51	0.00	31.17	0.00	47.13	99.00
34	0.15	0.00	20.33	0.05	31.48	0.03	47.19	99.22
35	0.17	0.00	20.05	0.01	31.40	0.00	46.83	98.46
36	0.06	0.00	20.45	0.01	31.76	0.07	47.41	99.77
37	0.01	0.01	20.20	0.02	31.34	0.05	46.70	98.33
38	0.00	0.00	20.04	0.04	31.49	0.09	46.67	98.33
39	0.08	0.00	20.16	0.00	31.10	0.00	46.54	97.88
40	0.09	0.01	20.44	0.00	31.42	0.04	47.16	99.16
42	0.00	0.11	20.20	0.02	30.83	0.01	46.31	97.47
43	0.20	0.08	20.42	0.00	31.23	0.00	47.17	99.10
44	0.14	0.01	20.34	0.00	29.97	0.24	46.11	96.81
45	0.22	0.00	20.38	0.00	31.64	0.07	47.50	99.81
46	0.10	0.03	20.33	0.02	31.10	0.02	46.81	98.41
47	0.06	0.02	20.07	0.00	31.04	0.02	46.40	97.61
48	0.04	0.01	20.14	0.00	31.34	0.01	46.66	98.20
49	0.17	0.12	20.46	0.00	31.14	0.07	47.15	99.11
50	0.17	0.01	20.32	0.02	31.45	0.00	47.16	99.13
51	0.05	0.00	20.29	0.00	31.88	0.06	47.28	99.55
67	0.01	0.00	20.19	0.00	30.75	0.03	46.22	97.21
68	0.13	0.02	20.28	0.00	29.39	0.15	45.53	95.51
69	0.05	0.00	20.08	0.00	31.36	0.01	46.63	98.13
70	0.00	0.12	20.16	0.05	31.50	0.00	46.82	98.65
71	0.20	0.06	20.51	0.00	31.30	0.00	47.31	99.38
72	0.11	0.00	20.91	0.00	30.49	0.03	46.96	98.50
73	0.01	0.12	20.46	0.00	31.18	0.05	46.90	98.72
74	0.30	0.02	19.94	0.02	31.72	0.04	47.20	99.23
75	0.12	0.04	20.32	0.00	30.93	0.00	46.68	98.09
76	0.70	0.07	20.16	0.03	31.69	0.01	48.10	100.77
77	0.22	0.00	20.14	0.03	31.23	0.00	46.88	98.50
78	0.24	0.00	20.15	0.00	30.66	0.02	46.48	97.56
79	0.10	0.00	20.51	0.00	31.22	0.03	47.08	98.95
81	0.20	0.01	19.97	0.02	31.05	0.03	46.53	97.81
82	0.06	0.01	20.44	0.03	30.80	0.08	46.65	98.07
83	0.00	0.00	20.27	0.01	30.89	0.03	46.40	97.60
85	0.14	0.00	20.64	0.03	31.10	0.06	47.23	99.20
86	0.05	0.00	20.88	0.06	31.29	0.10	47.53	99.91

	No.	SO2	SrO	MgO	MnO	CaO	FeO	CO2	Total
15-11-6-20 W3M 6029	17	0.12	0.00	16.85	0.02	35.37	0.00	46.38	98.75
	18	0.22	0.00	17.97	0.00	33.04	0.03	45.93	97.19
	19	0.06	0.07	17.19	0.03	34.41	0.02	45.93	97.70
	20	0.07	0.00	17.70	0.03	34.24	0.00	46.34	98.38
	21	0.00	0.00	18.89	0.00	32.69	0.09	46.33	98.00
	22	0.04	0.08	18.80	0.25	32.52	0.07	46.35	98.11
	23	0.05	0.00	16.86	0.04	34.95	0.06	45.98	97.94
	24	0.11	0.00	17.41	0.05	34.48	0.06	46.31	98.42

25	0.00	0.03	17.95	0.04	33.72	0.05	46.12	97.91
26	0.04	0.00	17.17	0.03	35.29	0.05	46.56	99.14
27	0.25	0.07	1.00	0.09	54.54	0.06	44.42	100.42
28	0.17	0.02	17.21	0.00	35.37	0.06	46.86	99.68
30	0.15	0.01	0.99	0.00	54.67	0.00	44.23	100.05
31	0.13	0.01	1.10	0.03	54.89	0.00	44.52	100.68
32	0.00	0.00	0.80	0.00	55.28	0.09	44.31	100.48
33	0.13	0.03	0.76	0.09	55.08	0.03	44.35	100.46
34	0.18	0.02	0.71	0.03	54.03	0.00	43.51	98.49
35	0.07	0.14	0.94	0.00	55.01	0.04	44.40	100.61
36	0.52	0.00	0.95	0.05	54.13	0.00	44.40	100.05
37	0.13	0.00	0.59	0.03	55.38	0.03	44.37	100.54
39	0.21	0.08	1.06	0.00	55.05	0.04	44.77	101.21
40	0.17	0.21	0.81	0.00	54.40	0.00	43.95	99.55
41	0.10	0.12	0.68	0.03	55.15	0.00	44.26	100.34
42	0.27	0.03	0.62	0.00	55.09	0.04	44.39	100.44
43	0.14	0.02	0.99	0.00	55.27	0.01	44.70	101.13
44	0.20	0.00	0.68	0.00	55.21	0.02	44.41	100.52
45	0.10	0.09	0.63	0.00	55.52	0.00	44.45	100.79
46	0.03	0.01	0.62	0.00	55.10	0.02	43.99	99.77
47	0.14	0.03	0.67	0.00	54.28	0.03	43.59	98.75
48	0.10	0.03	0.84	0.02	54.54	0.08	43.95	99.56
49	0.17	0.02	1.14	0.00	54.87	0.06	44.63	100.89
50	0.12	0.00	0.64	0.00	54.70	0.01	43.83	99.30
51	0.13	0.00	0.63	0.01	54.81	0.00	43.93	99.51
52	0.00	0.00	0.29	0.00	54.89	0.00	43.39	98.57
53	0.17	0.04	1.00	0.01	50.42	0.00	40.96	92.59
54	0.17	0.03	0.72	0.06	55.45	0.00	44.64	101.07
55	0.15	0.05	0.52	0.02	55.03	0.04	44.06	99.87
56	0.10	0.00	0.72	0.04	54.40	0.03	43.69	98.98
57	0.48	0.00	0.52	0.00	54.07	0.04	43.83	98.95
58	0.19	0.00	0.58	0.00	55.47	0.00	44.47	100.71
59	0.13	0.07	1.15	0.00	54.66	0.00	44.39	100.40
60	0.00	0.08	16.87	0.03	35.07	0.03	46.02	98.10
61	0.19	0.01	18.19	0.00	34.00	0.06	46.89	99.33
62	0.03	0.04	18.02	0.02	33.87	0.03	46.37	98.39
63	0.09	0.00	13.04	0.01	39.69	0.00	45.54	98.37
64	0.03	0.03	17.37	0.00	34.16	0.04	45.86	97.49
65	0.10	0.00	17.60	0.02	33.95	0.29	46.22	98.18
66	0.15	0.08	16.32	0.00	35.87	0.08	46.30	98.80
67	0.25	0.04	16.73	0.00	35.05	0.02	46.21	98.30
68	0.16	0.00	15.60	0.00	37.24	0.08	46.57	99.65
69	0.23	0.04	16.22	0.00	35.31	0.06	45.84	97.69
70	0.19	0.04	17.00	0.00	34.76	0.05	46.19	98.22
71	0.01	0.00	17.55	0.00	33.49	0.37	45.69	97.11
72	0.01	0.01	16.11	0.04	36.24	0.04	46.11	98.56
73	0.03	0.09	17.25	0.05	34.62	0.03	46.15	98.23
74	0.14	0.00	17.03	0.00	34.63	0.02	46.03	97.86
75	0.06	0.10	17.08	0.02	34.66	0.08	46.05	98.05

76	0.15	0.00	17.03	0.04	34.86	0.03	46.24	98.35
77	0.09	0.05	17.34	0.03	34.02	0.01	45.83	97.37
78	0.10	0.03	17.16	0.01	34.38	0.11	45.98	97.77
79	0.00	0.00	17.18	0.00	34.46	0.09	45.85	97.58
80	0.42	0.00	17.72	0.00	33.68	0.13	46.56	98.51
81	0.18	0.08	17.19	0.00	34.72	0.02	46.36	98.55
82	0.12	0.06	17.60	0.00	33.94	0.04	46.10	97.86
83	0.00	0.00	15.10	0.00	37.83	0.00	46.18	99.11
84	0.01	0.04	16.46	0.01	36.07	0.03	46.33	98.94
85	0.10	0.13	17.80	0.00	34.15	0.08	46.49	98.74
86	0.03	0.00	17.62	0.04	33.93	0.02	45.95	97.59
87	0.17	0.03	18.33	0.00	33.62	0.00	46.69	98.84
88	0.02	0.02	17.56	0.03	34.17	0.37	46.28	98.45
89	0.12	0.03	17.85	0.00	34.17	0.08	46.57	98.82
90	0.17	0.05	17.49	0.03	33.91	0.00	46.03	97.68
91	0.07	0.00	17.11	0.00	34.83	0.06	46.16	98.22
92	0.09	0.00	0.59	0.00	55.50	0.00	44.35	100.53
93	0.15	0.01	0.65	0.00	55.42	0.02	44.48	100.74
94	0.11	0.10	0.82	0.00	55.29	0.07	44.55	100.94
95	0.20	0.14	0.43	0.00	54.94	0.01	43.97	99.68
96	0.20	0.00	0.68	0.01	55.40	0.06	44.59	100.94
97	0.25	0.03	0.64	0.03	55.04	0.05	44.37	100.41
98	0.24	0.07	0.49	0.04	55.16	0.04	44.30	100.34
99	0.16	0.09	0.25	0.00	56.23	0.05	44.74	101.52
100	0.34	0.00	0.60	0.04	55.29	0.02	44.63	100.91
101	0.19	0.00	0.64	0.00	55.31	0.00	44.42	100.56
102	0.17	0.00	0.57	0.06	54.14	0.05	43.46	98.45
103	0.34	0.02	0.62	0.06	52.92	0.07	42.85	96.88
104	0.24	0.00	0.72	0.01	55.19	0.02	44.51	100.69
105	0.11	0.05	0.60	0.00	53.79	0.02	43.09	97.66
106	0.24	0.09	0.69	0.04	54.42	0.02	43.93	99.43
107	0.19	0.01	0.57	0.02	54.37	0.02	43.63	98.81
108	0.17	0.04	0.66	0.03	54.78	0.00	44.02	99.69
109	0.13	0.00	0.72	0.00	54.31	0.00	43.62	98.78
110	0.05	0.00	0.55	0.03	54.86	0.01	43.76	99.26
111	0.13	0.00	17.74	0.02	33.42	0.05	45.86	97.22
112	0.26	0.07	18.02	0.06	33.88	0.04	46.78	99.11
113	0.10	0.05	17.93	0.00	33.40	0.08	46.03	97.60
114	0.08	0.00	18.05	0.02	33.55	0.06	46.22	97.98
115	0.01	0.03	17.84	0.00	33.19	0.06	45.59	96.71
116	0.14	0.00	16.89	0.06	34.73	0.01	45.98	97.82
117	0.06	0.03	16.64	0.00	35.37	0.06	46.08	98.24
118	0.16	0.08	16.64	0.01	35.21	0.02	46.12	98.24
119	0.06	0.00	17.69	0.00	33.48	0.09	45.73	97.05
120	0.16	0.00	17.46	0.02	34.04	0.01	46.05	97.73
121	0.21	0.13	17.35	0.01	34.15	0.05	46.17	98.06
122	0.02	0.00	17.37	0.02	34.62	0.00	46.17	98.20
123	0.16	0.00	16.73	0.00	34.97	0.17	46.08	98.10
124	0.15	0.10	17.46	0.00	34.36	0.00	46.32	98.39

125	0.23	0.02	17.64	0.00	33.39	0.03	45.87	97.19
126	0.00	0.08	17.68	0.00	34.26	0.04	46.25	98.32
127	0.00	0.05	17.49	0.02	34.21	0.07	46.02	97.86
128	0.03	0.02	17.86	0.00	33.44	0.08	45.85	97.29
129	0.00	0.00	14.76	0.02	37.43	0.03	45.52	97.76
130	0.20	0.00	16.31	0.02	35.08	0.07	45.72	97.40
131	0.20	0.01	17.87	0.01	33.66	0.00	46.27	98.02
132	0.01	0.03	18.05	0.00	33.87	0.06	46.35	98.37
133	0.21	0.06	17.81	0.01	33.66	0.06	46.28	98.09
134	0.16	0.00	17.71	0.03	33.76	0.04	46.14	97.84
135	0.25	0.04	0.82	0.00	54.71	0.03	44.27	100.12
136	0.07	0.00	17.75	0.03	34.31	0.00	46.43	98.59
137	0.07	0.12	17.61	0.02	34.49	0.03	46.48	98.81
138	0.16	0.01	17.78	0.00	35.34	0.01	47.42	100.72
139	0.07	0.14	0.58	0.02	55.12	0.01	44.07	100.00
140	0.07	0.03	0.57	0.00	55.07	0.06	44.01	99.81
141	0.15	0.00	0.68	0.00	55.09	0.01	44.22	100.15
142	0.09	0.00	0.50	0.00	54.80	0.00	43.71	99.11
143	0.13	0.00	0.84	0.00	55.01	0.05	44.33	100.35
144	0.44	0.00	0.52	0.00	54.82	0.04	44.35	100.17
145	0.10	0.09	0.60	0.00	55.30	0.00	44.25	100.33
146	0.30	0.00	0.65	0.00	54.12	0.00	43.67	98.73
147	0.07	0.09	0.93	0.00	55.36	0.01	44.63	101.09
148	0.09	0.00	0.67	0.03	55.62	0.02	44.55	100.97
149	0.15	0.03	0.61	0.00	55.54	0.02	44.53	100.88
150	0.15	0.02	0.59	0.00	54.91	0.04	44.03	99.75
151	0.05	0.00	0.68	0.03	55.18	0.00	44.15	100.09
152	0.00	0.08	0.94	0.00	54.69	0.01	43.99	99.72
153	0.05	0.00	0.62	0.07	55.14	0.00	44.08	99.97
154	0.13	0.07	0.84	0.00	55.20	0.00	44.48	100.72
155	0.17	0.04	0.70	0.00	54.82	0.01	44.09	99.83
156	0.30	0.04	0.66	0.06	54.59	0.04	44.15	99.85
157	0.14	0.05	0.70	0.02	54.62	0.00	43.90	99.44
158	0.13	0.04	0.83	0.02	54.44	0.00	43.87	99.33
159	0.29	0.06	1.20	0.02	54.06	0.05	44.27	99.95
160	0.15	0.00	0.53	0.03	54.89	0.00	43.93	99.54
161	0.21	0.00	0.58	0.06	55.42	0.01	44.51	100.79

	No.	SO2	SrO	MgO	MnO	CaO	FeO	CO2	Total
15-11-6-A140020 W3M 6040	1	0.12	0.00	20.41	0.05	31.46	0.05	47.23	99.32
	2	0.12	0.01	20.72	0.00	31.26	0.04	47.39	99.54
	4	0.24	0.05	20.42	0.01	31.34	0.09	47.37	99.51
	5	0.09	0.00	20.35	0.05	31.51	0.00	47.12	99.12
	7	0.19	0.06	20.52	0.00	30.81	0.05	46.96	98.59
	8	0.28	0.00	20.47	0.00	30.94	0.05	47.12	98.86
	10	0.35	0.00	20.37	0.03	31.40	0.07	47.52	99.74
	13	0.31	0.00	20.37	0.03	31.05	0.01	47.14	98.91
	14	0.41	0.02	19.65	0.01	30.67	0.05	46.25	97.05
	15	0.17	0.00	20.78	0.00	30.79	0.09	47.20	99.03

16	0.18	0.00	20.12	0.00	31.35	0.06	46.90	98.61
17	0.17	0.07	20.78	0.00	30.98	0.00	47.31	99.31
18	0.20	0.00	20.55	0.00	31.40	0.12	47.47	99.73
19	0.22	0.02	20.59	0.00	31.08	0.10	47.30	99.30
70	0.34	0.05	20.17	0.06	30.65	0.09	46.75	98.11
71	0.22	0.00	20.29	0.00	31.30	0.00	47.07	98.88
72	0.19	0.00	20.58	0.00	31.17	0.03	47.27	99.25
73	0.34	0.08	20.35	0.02	30.92	0.00	47.10	98.82
74	0.56	0.00	19.97	0.00	30.13	0.01	46.38	97.06
75	0.20	0.00	20.41	0.04	30.92	0.11	46.99	98.68
76	0.31	0.00	20.32	0.02	31.07	0.02	47.11	98.86
77	0.37	0.00	20.09	0.04	30.60	0.06	46.63	97.79
78	0.11	0.00	20.46	0.05	30.81	0.00	46.72	98.14
79	0.12	0.03	20.43	0.00	30.97	0.00	46.82	98.37
80	0.18	0.07	21.19	0.00	31.22	0.03	47.97	100.65
81	0.21	0.02	20.18	0.01	31.06	0.00	46.77	98.24
82	0.06	0.07	20.98	0.03	30.85	0.00	47.26	99.25
83	0.35	0.06	20.24	0.00	30.98	0.11	47.08	98.82
84	0.06	0.00	20.36	0.01	30.92	0.00	46.59	97.93
85	0.06	0.03	20.52	0.00	31.36	0.00	47.12	99.09
86	0.20	0.00	20.36	0.00	31.09	0.15	47.05	98.85
87	0.18	0.01	20.40	0.02	30.99	0.03	46.93	98.56
88	0.04	0.01	20.81	0.02	31.69	0.01	47.68	100.26
89	0.13	0.07	20.40	0.00	31.03	0.00	46.87	98.50
91	0.05	0.00	20.72	0.00	30.46	0.00	46.61	97.84
92	0.16	0.00	20.30	0.00	30.78	0.04	46.61	97.89
93	0.57	0.05	19.76	0.00	30.86	0.00	46.77	98.01
94	0.08	0.06	20.40	0.05	30.76	0.06	46.65	98.07

	No.	SO2	SrO	MgO	MnO	CaO	FeO	CO2	Total
15-11-6-A134820 W3M 6053	1	0.03	0.00	0.41	0.00	55.51	0.06	44.10	100.12
	2	0.27	0.00	0.58	0.00	53.30	0.12	42.99	97.26
	3	0.17	0.05	0.61	0.00	55.61	0.02	44.63	101.10
	4	0.15	0.04	0.61	0.03	54.35	0.05	43.63	98.86
	5	0.22	0.02	0.54	0.00	54.99	0.07	44.16	100.00
	6	0.23	0.00	0.59	0.00	54.60	0.04	43.90	99.36
	7	0.16	0.18	0.53	0.00	51.10	0.00	41.02	92.99
	8	0.11	0.00	0.53	0.00	54.99	0.06	43.95	99.64
	9	0.31	0.10	0.41	0.00	54.71	0.00	43.95	99.48
	10	0.00	0.16	0.44	0.03	55.77	0.03	44.35	100.78
	11	0.22	0.00	0.84	0.00	54.58	0.06	44.15	99.85
	12	0.21	0.07	0.67	0.01	54.78	0.00	44.10	99.84
	13	0.17	0.12	0.63	0.00	55.16	0.04	44.33	100.45
	14	0.28	0.06	0.73	0.00	54.78	0.05	44.32	100.23
	15	0.26	0.08	0.60	0.00	54.49	0.05	43.91	99.39
	16	0.16	0.00	0.44	0.00	55.72	0.00	44.47	100.79
	17	0.20	0.00	0.76	0.00	55.24	0.06	44.55	100.81
	18	0.01	0.06	0.71	0.01	54.82	0.00	43.84	99.46
	19	0.19	0.04	0.59	0.01	55.02	0.02	44.16	100.02

20	0.00	0.08	20.06	0.00	32.12	0.00	47.14	99.40
21	0.00	0.00	20.15	0.04	31.20	0.00	46.51	97.90
22	0.10	0.00	20.15	0.04	30.94	0.03	46.49	97.75
23	0.01	0.00	20.30	0.00	31.58	0.02	46.98	98.89
24	0.06	0.00	19.75	0.01	31.34	0.00	46.27	97.43
26	0.01	0.00	20.05	0.00	31.73	0.00	46.82	98.62
27	0.01	0.00	20.11	0.00	31.75	0.03	46.92	98.83
28	0.02	0.09	19.71	0.00	31.73	0.01	46.50	98.06
29	0.09	0.01	0.52	0.03	55.07	0.04	43.97	99.73
30	0.27	0.11	0.65	0.00	54.61	0.04	44.08	99.76
31	0.08	0.00	0.44	0.02	54.80	0.00	43.63	98.97
32	0.17	0.00	0.44	0.00	55.45	0.00	44.27	100.33
33	0.04	0.00	0.51	0.02	55.04	0.02	43.84	99.47
34	0.17	0.00	0.69	0.01	54.49	0.03	43.82	99.21
35	0.14	0.12	0.65	0.05	55.51	0.00	44.58	101.04
36	0.17	0.13	0.62	0.00	55.05	0.01	44.22	100.20
37	0.24	0.00	0.60	0.00	54.84	0.00	44.10	99.79
38	0.15	0.00	0.73	0.01	54.73	0.03	44.02	99.67
39	0.21	0.04	0.61	0.00	55.24	0.04	44.41	100.55
40	0.23	0.02	0.67	0.00	54.70	0.07	44.08	99.77
41	0.17	0.00	0.80	0.01	54.56	0.02	43.98	99.54
42	0.22	0.01	0.72	0.00	55.58	0.02	44.79	101.34
43	0.13	0.00	0.72	0.04	54.28	0.06	43.66	98.89
44	0.00	0.00	20.01	0.02	31.80	0.00	46.82	98.65
45	0.03	0.00	20.12	0.02	31.50	0.00	46.76	98.44
46	0.10	0.05	19.74	0.03	30.96	0.04	46.07	96.99
47	0.05	0.00	20.33	0.00	31.25	0.07	46.85	98.55
48	0.08	0.00	18.58	0.03	31.86	0.05	45.48	96.09
49	0.15	0.04	19.90	0.00	31.61	0.03	46.80	98.52
50	0.11	0.01	4.92	0.00	48.76	0.07	43.87	97.74
51	0.07	0.08	0.46	0.01	55.03	0.04	43.87	99.56
52	0.14	0.02	0.60	0.01	55.40	0.00	44.38	100.55
53	0.11	0.11	0.50	0.01	55.81	0.06	44.63	101.24
54	0.11	0.00	0.64	0.01	55.06	0.00	44.10	99.92
55	0.05	0.01	0.33	0.00	55.76	0.00	44.20	100.35
56	0.23	0.07	0.69	0.00	55.02	0.00	44.33	100.34
57	0.09	0.00	0.56	0.07	54.84	0.05	43.88	99.49
58	0.17	0.01	0.62	0.03	55.78	0.01	44.76	101.38
59	0.26	0.10	0.80	0.00	55.04	0.00	44.54	100.74
60	0.15	0.00	0.64	0.04	55.18	0.02	44.28	100.31
61	0.22	0.00	0.84	0.02	54.53	0.04	44.11	99.76
62	0.18	0.06	0.51	0.00	55.31	0.00	44.29	100.36
63	0.22	0.21	0.67	0.01	54.47	0.00	43.93	99.51
64	0.13	0.02	0.44	0.00	54.90	0.05	43.81	99.34
65	0.16	0.09	0.83	0.00	55.35	0.02	44.66	101.11
66	0.15	0.04	0.82	0.01	54.57	0.00	43.99	99.58
67	0.21	0.05	0.70	0.02	54.52	0.00	43.92	99.41
68	0.23	0.00	0.65	0.00	54.06	0.03	43.54	98.51
69	0.03	0.00	0.34	0.00	54.83	0.02	43.47	98.69

70	0.15	0.00	0.40	0.00	55.27	0.03	44.08	99.93
71	0.08	0.00	0.57	0.00	55.39	0.02	44.23	100.29
72	0.07	0.01	0.48	0.01	54.99	0.00	43.82	99.39
73	0.07	0.04	0.44	0.00	55.72	0.03	44.36	100.66
74	0.11	0.04	0.63	0.01	54.06	0.04	43.35	98.24
75	0.06	0.00	20.04	0.03	32.46	0.00	47.47	100.06
76	0.00	0.00	20.11	0.00	31.49	0.01	46.68	98.29
77	0.00	0.02	19.94	0.00	31.38	0.00	46.41	97.75
78	0.06	0.01	20.07	0.00	31.88	0.00	47.03	99.05
79	0.00	0.08	19.96	0.00	31.18	0.00	46.30	97.52
80	0.06	0.07	19.99	0.00	31.61	0.00	46.76	98.50
81	0.14	0.00	20.17	0.03	31.71	0.02	47.16	99.23
82	0.00	0.00	19.96	0.04	31.94	0.00	46.88	98.82
83	0.16	0.00	20.24	0.00	30.65	0.05	46.44	97.54
84	0.17	0.00	0.81	0.00	54.30	0.03	43.80	99.12
85	0.31	0.11	0.75	0.00	54.64	0.00	44.27	100.09
86	0.17	0.05	0.56	0.03	54.74	0.00	43.90	99.45
87	0.09	0.05	0.67	0.00	55.11	0.00	44.14	100.06
88	0.26	0.03	0.52	0.00	55.00	0.02	44.18	100.00
89	0.22	0.12	0.78	0.03	55.00	0.00	44.44	100.59
90	0.16	0.10	0.85	0.03	55.03	0.02	44.45	100.64
91	0.16	0.00	0.45	0.01	55.11	0.00	44.01	99.74
92	0.26	0.05	0.40	0.00	55.36	0.09	44.40	100.57
93	0.14	0.03	0.80	0.01	54.45	0.00	43.85	99.27
94	0.18	0.07	0.72	0.02	54.75	0.05	44.12	99.91
95	0.07	0.00	0.49	0.02	55.28	0.00	44.05	99.91
96	0.07	0.00	0.40	0.00	55.75	0.01	44.31	100.54
97	0.24	0.00	0.59	0.02	53.84	0.00	43.30	97.99
98	0.17	0.00	0.79	0.00	54.99	0.02	44.31	100.28
99	0.07	0.06	0.52	0.00	54.88	0.00	43.78	99.32
100	0.15	0.00	0.57	0.00	54.75	0.01	43.85	99.33
101	0.30	0.09	0.62	0.03	54.87	0.00	44.29	100.20
102	0.13	0.00	0.67	0.06	54.99	0.00	44.13	99.98
103	0.28	0.11	0.83	0.00	54.37	0.00	44.09	99.68
104	0.09	0.01	0.66	0.01	54.47	0.01	43.64	98.90
105	0.32	0.00	0.94	0.00	54.62	0.00	44.42	100.31
106	0.21	0.00	0.76	0.02	54.62	0.04	44.08	99.74
107	0.34	0.08	0.86	0.00	54.71	0.04	44.49	100.52
108	0.28	0.08	0.53	0.02	55.48	0.00	44.63	101.02
109	0.20	0.00	0.48	0.02	55.36	0.01	44.31	100.38
112	0.08	0.02	19.97	0.02	31.76	0.01	46.90	98.77
113	0.00	0.00	20.01	0.01	31.59	0.00	46.65	98.26
114	0.05	0.11	19.71	0.02	32.07	0.02	46.83	98.80
115	0.00	0.04	19.94	0.02	31.90	0.02	46.84	98.76
116	0.00	0.05	20.32	0.03	31.38	0.00	46.85	98.63
117	0.10	0.00	19.93	0.00	31.82	0.00	46.90	98.75
118	0.11	0.13	20.24	0.01	31.96	0.08	47.47	100.00
119	0.06	0.00	20.07	0.02	31.10	0.00	46.42	97.66

	No.	SO2	SrO	MgO	MnO	CaO	FeO	CO2	Total
15-11-6-20 W3M 6059	7	0.08	0.05	19.85	0.00	32.07	0.00	47.00	99.05
	8	0.00	0.00	0.38	0.01	54.61	0.06	43.31	98.37
	9	0.05	0.14	0.42	0.00	55.73	0.07	44.37	100.77
	10	0.00	0.03	0.53	0.04	56.35	0.11	44.91	101.97
	11	0.12	0.07	0.35	0.02	56.24	0.04	44.79	101.63
	12	0.01	0.00	0.33	0.03	55.05	0.07	43.64	99.13
	13	0.06	0.00	0.32	0.00	55.37	0.08	43.94	99.76
	14	0.00	0.00	0.38	0.08	55.20	0.06	43.82	99.54
	15	0.00	0.00	0.24	0.00	55.50	0.05	43.84	99.63
	16	0.13	0.02	0.52	0.04	55.24	0.04	44.19	100.18
	17	0.14	0.03	0.26	0.00	55.56	0.00	44.12	100.10
	18	0.00	0.02	20.06	0.00	31.62	0.00	46.72	98.42
	19	0.00	0.03	19.98	0.00	31.55	0.00	46.59	98.15
	20	0.00	0.00	19.88	0.00	31.79	0.00	46.65	98.32
	21	0.00	0.03	19.89	0.00	32.00	0.00	46.85	98.77
	22	0.00	0.01	18.56	0.00	32.90	0.00	46.08	97.55
	23	0.00	0.00	19.51	0.00	31.56	0.00	46.07	97.14
	24	0.04	0.03	0.52	0.00	55.16	0.00	43.94	99.69
	25	0.03	0.14	0.26	0.00	55.34	0.00	43.83	99.61
	26	0.01	0.06	0.24	0.00	55.49	0.00	43.86	99.67
	27	0.04	0.00	19.90	0.04	32.08	0.17	47.09	99.32
	28	0.02	0.00	20.52	0.00	31.41	0.00	47.10	99.05
	29	0.02	0.00	19.61	0.02	32.17	0.03	46.73	98.58
	30	0.01	0.00	20.32	0.00	31.71	0.02	47.09	99.14
	31	0.06	0.00	19.68	0.00	31.68	0.04	46.47	97.93
	32	0.02	0.00	20.26	0.00	30.82	0.04	46.36	97.49
	33	0.06	0.00	19.73	0.00	31.32	0.03	46.23	97.37
	34	0.07	0.04	19.89	0.00	31.06	0.04	46.25	97.34
	35	0.00	0.01	20.02	0.02	31.04	0.02	46.25	97.36
	36	0.00	0.00	20.31	0.00	31.11	0.01	46.60	98.03
	37	0.00	0.10	20.47	0.02	31.37	0.00	47.02	98.98
	38	0.00	0.11	0.44	0.05	54.90	0.00	43.63	99.12
	39	0.07	0.13	0.49	0.06	55.06	0.04	43.96	99.80
	40	0.03	0.09	0.36	0.04	55.05	0.03	43.74	99.36
	41	0.01	0.11	0.28	0.02	55.78	0.05	44.18	100.42
	42	0.03	0.13	0.34	0.06	55.33	0.03	43.96	99.88
	43	0.00	0.08	0.55	0.04	55.38	0.05	44.15	100.25
	44	0.12	0.07	0.38	0.05	55.04	0.06	43.90	99.62
	45	0.04	0.07	0.68	0.00	54.76	0.04	43.84	99.43
	46	0.03	0.09	0.40	0.01	55.55	0.06	44.17	100.32

	No.	SO2	SrO	MgO	MnO	CaO	FeO	CO2	Total
15-11-6020 W3M 6070	12	0.04	0.00	0.43	0.00	56.37	0.00	44.77	101.61
	13	0.18	0.00	0.94	0.06	55.09	0.05	44.62	100.93
	14	0.11	0.07	0.87	0.00	54.34	0.00	43.80	99.19
	15	0.15	0.00	0.62	0.00	54.75	0.00	43.89	99.41
	16	0.10	0.00	0.83	0.00	54.72	0.00	44.01	99.66
	17	0.03	0.01	0.55	0.00	55.54	0.00	44.24	100.37

18	0.00	0.12	0.63	0.02	55.11	0.01	44.00	99.89
19	0.04	0.00	0.56	0.05	55.98	0.00	44.64	101.27
20	0.10	0.00	0.74	0.00	55.01	0.06	44.18	100.09
21	0.17	0.00	0.75	0.03	55.14	0.02	44.38	100.47
22	0.19	0.00	0.76	0.07	55.66	0.01	44.88	101.58
23	0.07	0.06	0.79	0.01	55.52	0.03	44.59	101.06
24	0.12	0.02	0.66	0.04	55.20	0.02	44.29	100.35
25	0.00	0.08	18.77	0.00	32.58	0.24	46.25	97.93
26	0.17	0.13	17.91	0.00	33.39	0.00	46.09	97.69
27	0.13	0.08	17.84	0.00	34.14	0.00	46.52	98.71
28	0.21	0.00	18.15	0.04	32.78	0.00	45.91	97.09
29	0.00	0.00	17.88	0.05	33.92	0.42	46.44	98.71
30	0.17	0.00	14.28	0.00	25.75	0.02	36.08	76.29
31	0.09	0.15	18.22	0.04	33.74	0.00	46.61	98.85
32	0.08	0.12	17.80	0.00	34.27	0.06	46.55	98.88
33	0.00	0.00	18.67	0.04	33.16	0.18	46.54	98.59
34	0.03	0.08	17.74	0.00	34.19	0.09	46.35	98.49
35	0.00	0.04	17.56	0.02	33.38	0.36	45.61	96.97
36	0.12	0.00	17.42	0.00	33.72	0.48	45.97	97.71
37	0.24	0.05	11.23	0.05	42.45	0.00	46.02	100.04
38	0.17	0.04	17.95	0.00	33.14	0.00	45.89	97.18
39	0.17	0.10	17.18	0.06	34.94	0.03	46.55	99.03
40	0.14	0.02	18.39	0.00	33.34	0.08	46.53	98.50
41	0.12	0.03	18.32	0.00	32.83	0.03	46.00	97.34
42	0.29	0.00	17.85	0.02	33.23	0.00	46.06	97.45
43	0.06	0.04	17.56	0.00	34.05	0.06	46.05	97.82
44	0.17	0.00	18.77	0.02	32.09	0.55	46.30	97.89
45	0.15	0.00	17.65	0.00	34.04	0.03	46.25	98.12
46	0.02	0.03	18.16	0.00	33.68	0.18	46.42	98.49
47	0.25	0.18	17.74	0.01	34.01	0.05	46.58	98.82
48	0.08	0.00	0.46	0.00	55.29	0.00	44.02	99.85
49	0.01	0.15	0.84	0.00	54.97	0.02	44.15	100.14
50	0.09	0.08	0.26	0.00	55.95	0.08	44.43	100.89
51	0.07	0.00	0.42	0.02	55.94	0.06	44.51	101.01
52	0.06	0.12	0.53	0.00	55.43	0.05	44.26	100.45
53	0.03	0.12	0.96	0.03	55.53	0.02	44.75	101.44
54	0.06	0.00	0.59	0.00	55.43	0.00	44.25	100.33
55	0.07	0.05	0.75	0.00	55.49	0.00	44.51	100.87
56	0.14	0.00	0.73	0.00	54.89	0.04	44.13	99.93
57	0.17	0.04	0.37	0.05	55.68	0.00	44.42	100.73
58	0.01	0.05	0.35	0.05	55.89	0.00	44.32	100.68
59	0.00	0.01	19.45	0.03	32.45	0.00	46.73	98.67
60	0.06	0.00	18.21	0.00	32.10	1.31	45.97	97.65
61	0.19	0.01	0.41	0.03	55.93	0.01	44.68	101.26
62	0.09	0.07	0.49	0.01	55.60	0.04	44.38	100.68
63	0.03	0.00	0.70	0.00	55.63	0.07	44.52	100.95
64	0.07	0.00	0.83	0.00	55.11	0.03	44.29	100.34
65	0.11	0.05	0.67	0.00	54.81	0.02	43.97	99.64
66	0.01	0.00	1.05	0.01	55.28	0.04	44.57	100.96

67	0.00	0.00	0.45	0.00	56.07	0.00	44.50	101.02
68	0.03	0.07	0.36	0.00	56.12	0.00	44.53	101.12
69	0.00	0.01	0.42	0.00	55.50	0.00	44.01	99.94
70	0.18	0.00	0.36	0.05	55.51	0.03	44.30	100.42
71	0.03	0.02	0.82	0.06	54.82	0.00	44.00	99.75
72	0.03	0.09	0.30	0.05	55.37	0.01	43.89	99.73
73	0.12	0.00	0.59	0.01	54.97	0.00	43.99	99.68
74	0.00	0.00	0.73	0.02	54.52	0.02	43.60	98.88
75	0.00	0.00	18.08	0.02	32.49	1.42	46.13	98.14
76	0.01	0.01	18.27	0.02	31.95	1.46	45.95	97.67
77	0.03	0.00	18.07	0.03	31.53	1.39	45.39	96.43
78	0.02	0.02	0.20	0.01	56.36	0.00	44.50	101.11
79	0.02	0.07	17.66	0.00	34.44	0.17	46.48	98.85
80	0.10	0.10	16.93	0.04	34.47	0.00	45.76	97.39
81	0.11	0.14	17.51	0.04	33.93	0.27	46.17	98.17
82	0.07	0.00	17.65	0.00	33.86	0.63	46.34	98.55
83	0.00	0.02	18.72	0.00	32.68	0.30	46.27	97.99
84	0.15	0.11	17.43	0.00	34.74	0.00	46.60	99.03
85	0.23	0.01	18.29	0.01	33.48	0.06	46.67	98.75
86	0.18	0.03	18.43	0.07	31.71	0.85	45.88	97.14
87	0.00	0.08	17.98	0.01	33.51	0.21	46.10	97.88
88	0.00	0.00	17.60	0.00	34.65	0.11	46.48	98.84
89	0.06	0.06	18.07	0.04	33.08	0.40	46.07	97.78
90	0.27	0.00	18.10	0.00	33.86	0.04	46.81	99.08
91	0.06	0.07	17.98	0.00	34.45	0.01	46.80	99.37
92	0.14	0.00	18.30	0.00	33.03	0.00	46.14	97.61
93	0.00	0.04	18.05	0.00	33.91	0.11	46.40	98.51
94	0.00	0.01	18.28	0.05	32.70	0.92	46.21	98.16
96	0.01	0.00	17.80	0.05	33.79	0.27	46.16	98.07
97	0.01	0.00	18.83	0.00	32.88	0.59	46.74	99.04
98	0.00	0.03	18.41	0.00	32.12	0.82	45.82	97.20
108	0.08	0.01	16.39	0.00	35.11	0.21	45.72	97.53
110	0.09	0.06	18.58	0.02	31.89	0.76	45.96	97.35
111	0.10	0.10	18.13	0.05	33.49	0.29	46.49	98.65
112	0.22	0.05	17.72	0.00	33.84	0.00	46.28	98.11
113	0.04	0.00	17.82	0.00	34.64	0.09	46.77	99.36
114	0.01	0.00	18.52	0.01	32.28	0.78	46.05	97.65
115	0.12	0.00	18.53	0.03	33.04	0.03	46.39	98.14
116	0.23	0.00	18.03	0.00	33.60	0.04	46.45	98.35
117	0.05	0.00	17.77	0.00	33.67	0.20	46.04	97.73
118	0.08	0.06	17.94	0.00	33.80	0.01	46.29	98.19
119	0.00	0.00	17.79	0.07	34.33	0.09	46.47	98.75
120	0.03	0.02	17.66	0.00	34.06	0.03	46.10	97.90
121	0.13	0.03	17.39	0.00	34.25	0.15	46.20	98.15
122	0.11	0.05	18.05	0.04	32.85	0.34	45.93	97.38
123	0.00	0.04	18.55	0.06	32.82	0.89	46.61	98.97
124	0.03	0.00	17.40	0.00	34.05	0.54	46.10	98.12
125	0.01	0.06	18.14	0.00	33.99	0.10	46.59	98.89
126	0.00	0.08	1.21	0.00	54.19	0.02	43.90	99.41

127	0.01	0.03	15.72	0.02	36.61	0.03	45.94	98.35
128	0.01	0.04	17.41	0.00	34.37	0.04	46.04	97.91
129	0.00	0.06	17.01	0.05	33.47	1.92	46.07	98.58
130	0.23	0.07	17.64	0.02	33.17	0.07	45.76	96.96
131	0.01	0.04	0.17	0.00	55.69	0.00	43.92	99.83
132	0.00	0.11	0.38	0.04	55.61	0.08	44.18	100.40
133	0.05	0.04	0.40	0.01	54.34	0.01	43.20	98.06
134	0.07	0.03	0.51	0.04	54.93	0.04	43.85	99.47
135	0.26	0.07	0.89	0.00	54.39	0.00	44.12	99.73
136	0.12	0.00	0.61	0.01	55.33	0.04	44.32	100.43
137	0.61	0.13	0.90	0.04	53.98	0.21	44.56	100.43
138	0.11	0.10	0.82	0.00	54.74	0.00	44.08	99.85
139	0.18	0.03	0.95	0.00	54.77	0.01	44.34	100.28
140	0.06	0.04	0.84	0.04	55.39	0.02	44.54	100.93
141	0.00	0.06	1.04	0.01	54.82	0.03	44.21	100.17
142	0.13	0.07	0.76	0.00	55.28	0.00	44.45	100.69
143	0.11	0.07	0.66	0.00	56.15	0.01	45.00	101.99
144	0.07	0.00	0.53	0.01	54.75	0.25	43.81	99.41
145	0.13	0.02	0.88	0.00	54.67	0.00	44.10	99.81
146	0.01	0.17	0.73	0.00	55.15	0.00	44.18	100.24
147	0.22	0.03	0.57	0.00	55.73	0.00	44.74	101.29
148	0.07	0.00	0.34	0.00	55.93	0.03	44.39	100.75
158	0.00	0.11	0.59	0.00	54.83	0.00	43.72	99.25
159	0.08	0.00	0.69	0.01	54.91	0.02	43.99	99.70
160	0.00	0.00	0.29	0.01	55.58	0.07	43.99	99.95
161	0.06	0.05	0.41	0.05	55.20	0.02	43.94	99.73
162	0.09	0.02	0.48	0.00	55.25	0.06	44.07	99.97
163	0.05	0.00	1.05	0.00	54.01	0.06	43.65	98.82
164	0.07	0.00	0.70	0.06	55.51	0.04	44.51	100.90
165	0.21	0.11	0.97	0.00	54.48	0.00	44.19	99.95
166	0.11	0.12	0.92	0.04	54.00	0.10	43.70	98.99
167	0.07	0.03	0.71	0.02	55.18	0.02	44.23	100.26
168	0.22	0.00	0.56	0.00	54.87	0.02	44.05	99.72
169	0.13	0.08	0.83	0.01	54.86	0.00	44.21	100.12
170	0.19	0.00	0.69	0.07	54.72	0.00	44.06	99.73
171	0.11	0.13	0.84	0.00	54.17	0.00	43.67	98.93
172	0.11	0.00	0.79	0.00	54.02	0.01	43.45	98.38
173	0.17	0.00	0.84	0.00	55.12	0.05	44.48	100.66
174	0.19	0.13	0.80	0.00	54.22	0.03	43.81	99.17
175	0.07	0.10	0.74	0.00	55.29	0.04	44.39	100.64
176	0.35	0.01	3.08	0.02	52.36	0.05	45.09	100.97
177	0.05	0.00	0.55	0.02	55.77	0.00	44.45	100.83
178	0.23	0.23	0.98	0.02	54.16	0.03	44.07	99.71
179	0.15	0.00	1.05	0.00	54.35	0.07	44.08	99.69
180	0.20	0.02	0.58	0.00	54.92	0.00	44.07	99.79
181	0.03	0.12	0.98	0.00	54.99	0.01	44.34	100.48
182	0.13	0.01	0.88	0.00	55.20	0.03	44.52	100.77
183	0.00	0.00	0.47	0.02	55.29	0.02	43.93	99.74
184	0.16	0.09	18.08	0.01	34.00	0.00	46.73	99.07

185	0.12	0.02	18.35	0.00	33.60	0.04	46.63	98.76
186	0.19	0.00	17.78	0.00	33.80	0.00	46.26	98.03
187	0.23	0.00	17.80	0.00	33.04	0.05	45.77	96.88
188	0.12	0.09	17.95	0.00	33.37	0.03	46.05	97.61
189	0.19	0.00	17.82	0.02	34.64	0.04	46.99	99.70
190	0.20	0.01	17.60	0.00	34.41	0.02	46.55	98.78
191	0.21	0.00	17.95	0.00	33.57	0.06	46.33	98.12
192	0.12	0.05	17.96	0.00	33.13	0.07	45.87	97.20
193	0.23	0.17	17.58	0.02	33.93	0.07	46.32	98.32
194	0.10	0.10	15.81	0.00	37.00	0.16	46.60	99.76
195	0.08	0.08	18.14	0.02	33.30	0.17	46.22	98.01
196	0.06	0.00	18.20	0.03	33.04	0.61	46.28	98.21
197	0.01	0.08	17.93	0.00	33.49	0.37	46.15	98.03
198	0.29	0.00	16.26	0.02	34.70	0.00	45.47	96.74
199	0.17	0.04	17.89	0.02	33.33	0.00	46.00	97.45
200	0.17	0.00	18.17	0.00	33.83	0.00	46.67	98.84
201	0.14	0.14	17.96	0.01	34.12	0.00	46.69	99.06
202	0.00	0.02	17.70	0.00	34.25	0.12	46.29	98.38
203	0.14	0.00	17.82	0.00	33.82	0.09	46.30	98.18
204	0.10	0.06	16.25	0.04	35.56	0.04	45.89	97.93
205	0.08	0.28	2.98	0.00	52.47	0.00	44.68	100.49
206	0.08	0.12	17.40	0.03	34.22	0.03	46.07	97.95
207	0.03	0.00	18.01	0.00	34.05	0.00	46.43	98.52
208	0.11	0.00	18.00	0.00	32.67	0.37	45.70	96.85
209	0.25	0.00	17.99	0.00	33.37	0.09	46.29	97.99
210	0.14	0.19	17.83	0.00	33.83	0.00	46.34	98.34
211	0.24	0.08	16.07	0.01	35.77	0.03	46.07	98.27
212	0.25	0.08	17.84	0.00	33.85	0.03	46.50	98.54
213	0.25	0.00	17.95	0.02	33.35	0.00	46.20	97.77
214	0.13	0.00	17.67	0.05	34.11	0.15	46.40	98.51
215	0.21	0.00	17.76	0.00	33.66	0.08	46.21	97.93
216	0.23	0.02	17.57	0.00	34.02	0.01	46.27	98.11
217	0.08	0.15	18.06	0.00	32.90	0.12	45.80	97.10
218	0.15	0.07	17.70	0.03	34.19	0.00	46.45	98.59
219	0.13	0.00	17.99	0.01	33.46	0.10	46.19	97.88
220	0.05	0.05	17.58	0.01	34.04	0.00	46.01	97.74
221	0.19	0.00	17.74	0.00	33.56	0.09	46.07	97.64
222	0.21	0.05	17.61	0.05	33.96	0.05	46.30	98.22
223	0.30	0.08	17.64	0.00	34.17	0.00	46.61	98.80
225	0.05	0.00	18.39	0.00	33.14	0.23	46.30	98.11
226	0.00	0.00	17.76	0.00	33.77	0.16	45.99	97.68
227	0.00	0.00	18.34	0.07	34.72	0.18	47.43	100.74

	No.	SO2	SrO	MgO	MnO	CaO	FeO	CO2	Total
15-11-6-A179620 W3M 6141	20	0.00	0.00	0.28	0.00	55.59	0.00	43.94	99.82
	21	0.07	0.00	0.19	0.04	55.70	0.01	44.06	100.06
	22	0.02	0.00	0.14	0.07	55.76	0.00	43.99	99.98
	23	0.05	0.12	0.59	0.00	54.66	0.00	43.68	99.10
	24	0.08	0.03	0.36	0.00	55.20	0.00	43.86	99.53

25	0.05	0.03	0.34	0.00	55.40	0.00	43.95	99.78
26	0.00	0.00	0.40	0.04	56.39	0.00	44.72	101.55
27	0.04	0.05	0.44	0.00	55.64	0.00	44.23	100.40
28	0.05	0.00	0.15	0.00	56.28	0.00	44.43	100.92
29	0.11	0.00	0.25	0.01	55.95	0.05	44.42	100.80
30	0.14	0.11	0.27	0.07	55.32	0.02	44.05	99.98
33	0.07	0.00	18.61	0.00	32.95	0.00	46.29	97.92
34	0.00	0.00	20.05	0.05	31.15	0.00	46.38	97.63
35	0.03	0.00	20.08	0.00	30.89	0.11	46.28	97.39
36	0.15	0.04	19.39	0.09	32.35	0.03	46.90	98.96
37	0.00	0.00	21.05	0.00	30.85	0.05	47.23	99.18
38	0.02	0.05	20.13	0.01	31.90	0.00	47.08	99.20
39	0.00	0.00	20.35	0.00	31.79	0.03	47.19	99.36
40	0.06	0.00	20.68	0.00	30.76	0.01	46.81	98.31
41	0.06	0.00	20.74	0.00	31.61	0.03	47.56	100.00
42	0.03	0.06	20.40	0.00	31.44	0.01	47.03	98.97
43	0.07	0.00	20.07	0.00	31.86	0.15	47.13	99.28
44	0.06	0.00	19.99	0.04	31.37	0.07	46.61	98.13
45	0.23	0.06	20.11	0.00	31.22	0.12	46.93	98.66
46	0.01	0.00	20.05	0.00	31.37	0.07	46.58	98.09
47	0.12	0.12	18.07	0.03	34.13	0.09	46.84	99.41
48	0.10	0.10	20.32	0.00	30.57	0.04	46.41	97.54
49	0.01	0.00	19.91	0.00	31.00	0.10	46.14	97.16
50	0.06	0.03	19.73	0.00	31.58	0.01	46.43	97.84
51	0.12	0.00	19.86	0.00	31.32	0.00	46.47	97.77
52	0.11	0.00	18.84	0.04	32.92	0.09	46.67	98.68
53	0.10	0.00	19.70	0.00	31.76	0.04	46.62	98.22
54	0.03	0.00	19.95	0.04	31.38	0.09	46.55	98.05
55	0.05	0.13	20.04	0.04	31.78	0.09	47.03	99.15
56	0.07	0.06	19.89	0.00	31.80	0.00	46.81	98.63
57	0.10	0.09	20.04	0.00	31.58	0.04	46.89	98.74
58	0.01	0.12	19.55	0.04	31.70	0.18	46.42	98.02
59	0.05	0.03	19.64	0.03	31.35	0.12	46.24	97.46
60	0.00	0.00	20.90	0.04	30.59	0.08	46.90	98.51
61	0.00	0.02	18.82	0.00	32.64	0.03	46.18	97.69
62	0.01	0.06	19.29	0.04	32.12	0.03	46.37	97.93
63	0.15	0.11	20.40	0.04	30.53	0.06	46.58	97.86
64	0.00	0.06	19.79	0.00	31.13	0.00	46.06	97.04
65	0.02	0.00	18.30	0.00	32.96	0.07	45.93	97.28
66	0.00	0.07	19.81	0.10	31.58	0.01	46.51	98.07
67	0.00	0.00	19.80	0.00	31.59	0.00	46.41	97.80
68	0.01	0.00	20.04	0.03	31.63	0.00	46.74	98.45
69	0.11	0.02	19.90	0.01	31.12	0.06	46.37	97.58
70	0.00	0.03	20.04	0.05	31.06	0.05	46.33	97.56
71	0.00	0.01	17.26	0.00	35.23	0.09	46.55	99.14
72	0.00	0.07	0.17	0.01	55.97	0.00	44.15	100.37
73	0.00	0.00	0.26	0.05	55.59	0.00	43.94	99.83
74	0.12	0.00	0.17	0.00	55.49	0.02	43.95	99.75
75	0.00	0.13	0.37	0.00	55.36	0.06	43.94	99.85

76	0.07	0.02	0.27	0.06	55.49	0.00	44.00	99.91
77	0.00	0.00	0.12	0.04	55.25	0.00	43.51	98.92
78	0.00	0.05	0.43	0.01	55.32	0.05	43.94	99.80
79	0.06	0.07	0.41	0.00	55.42	0.00	44.07	100.03
80	0.13	0.00	0.26	0.00	55.78	0.03	44.30	100.51
81	0.03	0.06	0.21	0.01	55.96	0.00	44.23	100.49
82	0.13	0.00	19.88	0.01	31.54	0.05	46.71	98.32
83	0.10	0.00	0.55	0.00	54.83	0.00	43.80	99.28
84	0.05	0.05	0.24	0.03	55.89	0.00	44.25	100.51
85	0.10	0.02	0.52	0.00	55.90	0.00	44.61	101.15
97	0.06	0.00	0.30	0.03	55.98	0.00	44.38	100.75
98	0.14	0.07	0.35	0.03	55.64	0.10	44.39	100.72
99	0.29	0.25	0.33	0.00	56.20	0.00	45.04	102.10
100	0.00	0.00	0.46	0.01	55.57	0.01	44.12	100.17
101	0.14	0.00	0.41	0.00	55.45	0.01	44.19	100.19
102	0.12	0.11	0.46	0.00	51.79	0.05	41.42	93.94
103	0.22	0.00	0.43	0.00	55.56	0.00	44.43	100.63
104	0.05	0.00	0.49	0.02	56.07	0.02	44.64	101.29
105	0.06	0.02	0.18	0.00	55.88	0.00	44.16	100.30
106	0.00	0.01	0.45	0.01	55.48	0.01	44.05	100.01
107	0.27	0.16	0.54	0.00	55.63	0.00	44.75	101.34
108	0.00	0.00	0.19	0.03	56.31	0.00	44.42	100.95
109	0.00	0.07	20.12	0.00	32.22	0.10	47.34	99.85
110	0.00	0.00	18.19	0.11	33.69	0.04	46.39	98.42
111	0.05	0.01	20.02	0.00	32.20	0.13	47.29	99.69
112	0.10	0.00	19.81	0.00	31.42	0.03	46.46	97.82
113	0.00	0.00	19.28	0.04	32.36	0.11	46.53	98.32
114	0.00	0.00	20.57	0.02	30.62	0.00	46.50	97.71
115	0.00	0.00	19.90	0.04	31.68	0.04	46.64	98.30
116	0.00	0.03	20.42	0.00	30.60	0.01	46.33	97.39
117	0.00	0.09	20.09	0.03	31.20	0.05	46.51	97.97
118	0.10	0.04	19.02	0.04	31.88	0.08	46.04	97.20
119	0.00	0.04	19.38	0.00	32.21	0.06	46.50	98.19
120	0.08	0.10	19.76	0.00	32.32	0.03	47.12	99.40
121	0.00	0.00	19.87	0.00	31.17	0.11	46.22	97.37
122	0.00	0.02	20.57	0.00	30.79	0.03	46.65	98.06
123	0.15	0.00	18.15	0.01	33.31	0.06	46.25	97.93
134	0.00	0.00	19.71	0.00	31.30	0.15	46.17	97.33
135	0.08	0.00	19.74	0.04	31.48	0.04	46.45	97.84
136	0.10	0.00	20.01	0.00	31.22	0.06	46.56	97.95
137	0.04	0.03	20.01	0.01	31.15	0.13	46.46	97.83
138	0.17	0.03	19.77	0.01	30.93	0.05	46.18	97.13
139	0.03	0.05	20.68	0.00	30.10	0.00	46.28	97.14
141	0.01	0.08	19.98	0.00	31.43	0.01	46.53	98.04
142	0.00	0.00	20.57	0.00	30.79	0.06	46.67	98.10
143	0.12	0.04	20.44	0.01	31.21	0.06	47.08	98.97
144	0.00	0.07	19.91	0.00	31.76	0.06	46.73	98.53
145	0.00	0.00	20.26	0.05	31.24	0.03	46.69	98.27
146	0.05	0.01	19.79	0.00	32.36	0.00	47.09	99.30

	147	0.13	0.00	20.46	0.04	31.06	0.11	47.02	98.82
	148	0.11	0.11	0.29	0.00	55.79	0.00	44.34	100.65
	149	0.00	0.00	0.26	0.00	56.34	0.00	44.50	101.10
	150	0.11	0.15	0.26	0.03	55.86	0.00	44.37	100.77
	151	0.00	0.10	0.25	0.03	55.90	0.02	44.22	100.52
	152	0.00	0.00	0.38	0.03	55.53	0.05	44.04	100.03
	153	0.05	0.00	0.37	0.01	56.21	0.00	44.62	101.26
	154	0.00	0.06	0.14	0.02	55.93	0.04	44.11	100.30
	155	0.05	0.00	0.20	0.01	55.78	0.05	44.13	100.23
	156	0.06	0.00	0.25	0.01	55.70	0.00	44.09	100.11
	157	0.00	0.05	0.44	0.00	55.76	0.00	44.26	100.51
	158	0.08	0.00	0.36	0.00	55.72	0.06	44.28	100.49
	159	0.05	0.00	0.21	0.01	55.63	0.03	43.99	99.91
15-11-6-A198820 W3M 6161	1	0.06	0.01	19.86	0.02	32.19	0.00	47.07	99.22
	2	0.00	0.00	20.44	0.00	31.07	0.09	46.76	98.36
	3	0.06	0.00	19.41	0.04	32.39	0.03	46.75	98.68
	4	0.01	0.00	20.05	0.00	31.47	0.12	46.67	98.31
	5	0.12	0.00	20.02	0.00	31.62	0.00	46.88	98.64
	6	0.00	0.00	20.56	0.02	30.81	0.00	46.64	98.03
	7	0.00	0.00	19.35	0.00	32.53	0.00	46.65	98.53
	8	0.01	0.00	19.29	0.04	32.69	0.00	46.74	98.76
	9	0.00	0.02	20.63	0.01	30.98	0.04	46.87	98.55
	10	0.02	0.05	19.70	0.01	31.17	0.17	46.14	97.27
	11	0.17	0.11	19.42	0.04	32.42	0.05	47.02	99.22
	12	0.04	0.00	19.51	0.03	32.77	0.02	47.12	99.50
	13	0.00	0.00	19.11	0.00	32.95	0.03	46.74	98.83
	14	0.06	0.00	20.80	0.00	31.49	0.03	47.54	99.92
	15	0.00	0.02	19.38	0.00	32.59	0.03	46.76	98.77
	16	0.02	0.00	20.30	0.00	30.98	0.02	46.52	97.84
	17	0.01	0.02	19.22	0.00	33.04	0.03	46.96	99.28
	18	0.00	0.06	19.92	0.02	31.93	0.06	46.88	98.87
	19	0.11	0.01	18.65	0.00	33.92	0.00	47.16	99.85
	20	0.06	0.08	20.13	0.00	31.36	0.03	46.74	98.40
	21	0.00	0.06	20.91	0.00	31.80	0.00	47.81	100.58
	22	0.12	0.00	0.41	0.00	55.35	0.04	44.11	100.03
	23	0.01	0.00	0.48	0.00	55.32	0.02	43.96	99.79
	24	0.04	0.15	0.50	0.01	55.80	0.00	44.46	100.95
	25	0.21	0.08	0.38	0.01	55.67	0.00	44.49	100.84
	26	0.08	0.00	0.37	0.00	55.38	0.10	44.06	99.99
	27	0.01	0.02	0.49	0.00	55.65	0.03	44.26	100.46
	28	0.03	0.02	0.49	0.00	55.42	0.02	44.09	100.06
	29	0.07	0.00	0.42	0.00	55.68	0.01	44.28	100.46
	30	0.12	0.00	0.34	0.00	56.03	0.02	44.56	101.07
	31	0.01	0.00	0.26	0.00	55.95	0.02	44.23	100.47
	32	0.15	0.00	0.85	0.01	54.86	0.00	44.24	100.12
	33	0.15	0.07	0.83	0.00	55.54	0.01	44.77	101.37
	34	0.05	0.01	0.63	0.00	55.82	0.02	44.61	101.15
	35	0.07	0.00	0.63	0.03	55.40	0.03	44.31	100.47

36	0.00	0.00	0.72	0.00	55.53	0.00	44.36	100.61
37	0.07	0.00	0.68	0.00	55.39	0.00	44.32	100.46
38	0.09	0.00	0.75	0.02	55.68	0.00	44.68	101.22
39	0.13	0.10	0.61	0.01	55.24	0.05	44.30	100.43
40	0.16	0.06	0.72	0.00	54.87	0.02	44.16	99.99
41	0.09	0.04	0.60	0.00	55.29	0.04	44.23	100.28
42	0.19	0.03	0.76	0.01	54.89	0.00	44.23	100.11
43	0.11	0.00	0.64	0.00	55.15	0.01	44.17	100.08
44	0.05	0.00	0.68	0.00	55.37	0.00	44.28	100.38
45	0.15	0.00	0.67	0.00	56.15	0.04	45.06	102.07
46	0.07	0.00	0.55	0.00	55.45	0.02	44.25	100.34
47	0.09	0.13	0.46	0.00	55.54	0.01	44.31	100.55
48	0.15	0.00	0.71	0.03	55.07	0.04	44.29	100.30
49	0.03	0.00	0.73	0.00	56.02	0.00	44.81	101.59
50	0.15	0.01	0.69	0.00	55.48	0.00	44.54	100.87
51	0.16	0.00	0.84	0.00	54.61	0.02	44.05	99.68
52	0.15	0.09	0.71	0.04	55.86	0.01	44.93	101.79
53	0.09	0.01	0.48	0.01	55.82	0.04	44.50	100.94
54	0.39	0.10	0.63	0.00	55.58	0.00	44.98	101.67
55	0.13	0.06	0.45	0.00	55.85	0.01	44.56	101.05
56	0.19	0.02	0.69	0.00	54.93	0.00	44.19	100.02
57	0.21	0.11	0.69	0.00	55.45	0.00	44.67	101.13
58	0.23	0.00	0.77	0.03	55.21	0.00	44.57	100.81
59	0.07	0.11	0.72	0.02	55.17	0.03	44.28	100.40
60	0.03	0.00	0.39	0.03	56.45	0.01	44.80	101.72
61	0.10	0.00	19.93	0.05	31.82	0.06	46.96	98.91
62	0.00	0.01	20.43	0.05	31.58	0.03	47.15	99.25
63	0.04	0.14	20.59	0.00	31.58	0.08	47.43	99.86
64	0.06	0.00	19.53	0.01	31.86	0.00	46.42	97.87
65	0.00	0.00	19.75	0.00	32.15	0.05	46.82	98.77
66	0.01	0.00	19.90	0.05	32.17	0.08	47.07	99.28
67	0.00	0.00	19.81	0.00	32.11	0.03	46.85	98.80
68	0.35	0.03	0.84	0.00	54.84	0.00	44.53	100.58
69	0.01	0.00	0.45	0.05	55.78	0.05	44.35	100.69
70	0.03	0.00	0.72	0.00	55.63	0.00	44.50	100.89
71	0.09	0.03	0.62	0.04	55.57	0.00	44.49	100.85
72	0.10	0.00	0.58	0.00	55.68	0.00	44.49	100.85
73	0.05	0.18	0.41	0.00	56.58	0.04	45.03	102.28
74	0.23	0.00	0.63	0.05	55.36	0.03	44.56	100.86
89	0.06	0.03	19.27	0.06	33.23	0.00	47.27	99.92
90	0.00	0.01	19.51	0.00	32.55	0.03	46.87	98.98
91	0.05	0.02	19.73	0.00	32.35	0.01	47.02	99.17
92	0.00	0.00	20.18	0.01	31.84	0.02	47.04	99.09
93	0.00	0.00	18.99	0.00	33.08	0.00	46.70	98.77
94	0.13	0.00	20.20	0.00	31.82	0.16	47.34	99.65
95	0.02	0.00	20.11	0.00	31.74	0.09	46.96	98.92
96	0.00	0.00	20.00	0.00	32.09	0.05	47.04	99.18
97	0.29	0.05	0.45	0.00	55.54	0.00	44.58	100.91
98	0.31	0.00	0.78	0.00	55.30	0.00	44.77	101.16

99	0.11	0.01	0.46	0.05	55.15	0.04	44.03	99.86
100	0.15	0.03	0.40	0.07	55.52	0.03	44.34	100.55
101	0.19	0.09	0.63	0.00	55.44	0.06	44.60	101.02
102	0.13	0.09	0.30	0.02	55.85	0.02	44.43	100.83
103	0.13	0.07	0.36	0.00	56.06	0.00	44.64	101.27
104	0.12	0.13	0.40	0.05	55.45	0.00	44.23	100.37
105	0.11	0.04	0.43	0.00	55.29	0.02	44.08	99.98
106	0.06	0.05	0.42	0.01	55.59	0.06	44.25	100.45
107	0.17	0.00	0.43	0.00	55.47	0.00	44.28	100.35
108	0.09	0.00	0.52	0.01	55.06	0.03	43.96	99.68
109	0.11	0.02	0.74	0.01	55.19	0.01	44.33	100.42
110	0.17	0.00	0.54	0.00	55.04	0.02	44.08	99.85
111	0.29	0.08	0.63	0.00	54.85	0.00	44.25	100.10
112	0.03	0.00	0.52	0.00	55.72	0.03	44.35	100.65
119	0.00	0.07	19.83	0.02	32.14	0.00	46.91	98.97
120	0.11	0.10	18.99	0.02	33.35	0.00	47.15	99.72
121	0.02	0.00	18.67	0.00	33.67	0.00	46.85	99.21
122	0.13	0.05	19.77	0.04	30.89	0.20	46.20	97.28
123	0.00	0.06	19.59	0.01	32.46	0.07	46.94	99.13
124	0.01	0.00	18.40	0.00	33.63	0.00	46.49	98.53
125	0.03	0.01	19.42	0.02	32.44	0.02	46.74	98.68
126	0.02	0.00	20.52	0.00	31.15	0.03	46.91	98.63
127	0.00	0.00	20.36	0.03	31.72	0.01	47.14	99.25
128	0.00	0.00	19.98	0.04	31.64	0.00	46.67	98.33
129	0.00	0.00	20.13	0.01	31.98	0.06	47.12	99.30
130	0.15	0.07	0.60	0.00	54.90	0.00	44.03	99.76
131	0.09	0.05	0.28	0.00	56.35	0.00	44.69	101.45
132	0.07	0.00	0.55	0.00	55.63	0.00	44.38	100.64
133	0.56	0.06	0.32	0.03	54.74	0.05	44.31	100.07
134	0.25	0.08	0.84	0.01	54.97	0.00	44.51	100.66
135	0.17	0.06	0.62	0.02	55.14	0.04	44.29	100.33
136	0.00	0.02	0.34	0.02	55.88	0.09	44.30	100.65
137	0.01	0.07	0.23	0.04	56.20	0.00	44.41	100.95
138	0.17	0.04	0.50	0.07	56.22	0.00	45.02	102.04
139	0.21	0.10	0.60	0.00	55.15	0.00	44.33	100.39
140	0.12	0.00	0.58	0.02	55.59	0.00	44.48	100.80
141	0.07	0.00	0.40	0.00	56.01	0.00	44.50	100.98
142	0.03	0.00	0.59	0.03	55.73	0.00	44.46	100.85
143	0.18	0.00	0.80	0.01	55.80	0.00	44.97	101.76
144	0.13	0.03	0.57	0.00	55.75	0.00	44.60	101.07
145	0.14	0.01	0.64	0.00	55.38	0.00	44.39	100.56
146	0.03	0.07	0.33	0.00	50.03	0.01	39.71	90.18
147	0.10	0.00	0.38	0.00	55.32	0.01	44.00	99.81
148	0.08	0.00	0.61	0.02	55.92	0.00	44.70	101.33
149	0.23	0.04	0.45	0.00	55.88	0.00	44.73	101.32
150	0.18	0.03	0.66	0.01	54.97	0.02	44.19	100.06
151	0.33	0.00	0.63	0.00	55.61	0.00	44.88	101.46
152	0.09	0.00	0.63	0.00	55.38	0.01	44.30	100.41
153	0.03	0.03	0.67	0.06	54.69	0.01	43.77	99.27

154	0.07	0.05	0.33	0.00	55.04	0.00	43.70	99.20
155	0.03	0.06	0.34	0.00	56.26	0.01	44.61	101.31
156	0.15	0.07	0.61	0.04	55.52	0.03	44.56	100.98
157	0.00	0.00	0.48	0.00	55.35	0.04	43.99	99.86
158	0.00	0.00	0.31	0.00	55.43	0.00	43.83	99.57

Appendix E

Electron microprobe analysis (wt%) of sulfate minerals
from the Duperow Reservoir

3-10-14-14-W3M
5627

No.	SO2	SrO	MgO	MnO	CaO	FeO	Total
1	59.56	0.37	0.01	0.02	40.62	0.01	100.59
2	59.85	0.40	0.00	0.01	41.16	0.03	101.45
3	60.41	0.79	0.00	0.02	40.47	0.00	101.69
4	60.03	0.50	0.00	0.00	41.13	0.06	101.72
5	60.63	0.18	0.00	0.01	40.34	0.00	101.16
80	59.64	0.38	0.00	0.01	40.44	0.06	100.52
81	58.46	0.75	0.00	0.06	40.67	0.00	99.93
82	59.80	0.27	0.00	0.01	40.95	0.00	101.02
83	59.74	0.09	0.00	0.02	41.62	0.00	101.47
84	60.30	0.45	0.02	0.03	40.87	0.02	101.69

4-31-3-26 W3M
5164

No.	SO2	SrO	MgO	MnO	CaO	FeO	Total
1	60.33	1.00	0.00	0.02	40.21	0.02	101.58
2	60.63	0.85	0.00	0.01	40.51	0.04	102.04
3	60.58	0.84	0.00	0.03	40.48	0.00	101.93
4	59.68	0.80	0.00	0.00	40.46	0.08	101.01
5	59.73	0.66	0.02	0.02	40.58	0.04	101.05
6	58.94	0.77	0.00	0.00	40.20	0.03	99.94
7	60.54	0.75	0.00	0.00	40.43	0.00	101.72
8	37.76	0.45	2.63	0.00	37.33	0.10	78.27
9	59.43	1.19	0.02	0.01	40.56	0.02	101.22
10	59.68	0.98	0.00	0.00	41.04	0.00	101.70
11	61.00	0.15	0.00	0.02	40.74	0.01	101.92
12	61.74	0.17	0.00	0.01	41.02	0.00	102.94
13	60.25	0.42	0.00	0.06	40.49	0.01	101.22
14	58.98	0.68	0.00	0.00	40.18	0.00	99.84
15	60.73	0.04	0.00	0.02	40.92	0.01	101.72
16	58.62	0.02	0.03	0.00	42.05	0.00	100.72
17	60.25	0.47	0.00	0.01	40.61	0.01	101.35
18	60.57	0.00	0.00	0.00	41.44	0.00	102.01
19	59.96	0.13	0.00	0.00	40.71	0.00	100.80
49	60.09	0.03	0.00	0.04	41.06	0.00	101.22
50	59.48	0.13	0.00	0.00	40.90	0.07	100.58
51	61.18	0.59	0.03	0.01	40.68	0.02	102.50
52	60.25	0.28	0.00	0.02	40.85	0.05	101.45
53	58.58	0.20	0.00	0.02	40.59	0.02	99.41
54	60.35	0.00	0.00	0.00	40.39	0.01	100.75
55	61.24	0.04	0.01	0.00	41.18	0.00	102.47
56	56.92	0.27	0.30	0.02	40.09	0.00	97.60
57	60.83	0.13	0.00	0.02	41.22	0.00	102.20
58	58.67	0.26	0.00	0.02	40.51	0.00	99.46
59	60.45	0.14	0.04	0.00	40.79	0.00	101.42
60	60.42	0.30	0.02	0.00	41.08	0.03	101.85
61	60.07	0.13	0.00	0.01	40.96	0.00	101.17
62	61.54	0.38	0.02	0.00	40.35	0.00	102.29

63	59.41	0.19	0.01	0.00	41.04	0.06	100.71

4-31-3-26 W3M
5627

No.	SO2	SrO	MgO	MnO	CaO	FeO	Total
1	60.88	0.21	0.02	0.01	41.78	0.00	102.90
2	59.38	0.79	0.03	0.03	41.38	0.00	101.61
3	60.18	0.34	0.02	0.02	41.43	0.03	102.01
4	58.18	0.78	0.03	0.00	41.21	0.01	100.22
5	60.02	0.08	0.01	0.00	41.08	0.00	101.20
6	59.02	0.29	0.01	0.03	41.84	0.00	101.18
7	57.96	0.51	0.01	0.00	41.65	0.00	100.14
8	58.70	0.57	0.02	0.01	40.98	0.00	100.28
9	59.74	0.15	0.03	0.03	41.78	0.08	101.80
10	58.84	0.30	0.03	0.04	41.73	0.00	100.94
11	58.87	0.13	0.03	0.03	42.00	0.00	101.05
12	58.18	0.51	0.02	0.06	41.14	0.00	99.91
13	59.56	0.21	0.04	0.01	41.81	0.06	101.69
14	59.77	0.12	0.01	0.03	41.85	0.03	101.81
15	58.81	0.22	0.00	0.00	41.99	0.03	101.05
16	59.33	0.20	0.00	0.00	41.95	0.00	101.48
17	58.43	0.50	0.00	0.02	41.93	0.00	100.89
18	0.16	0.00	0.43	0.00	56.55	0.00	57.14
106	59.48	0.18	0.00	0.02	41.27	0.00	100.95
107	59.92	0.18	0.00	0.00	42.49	0.02	102.61
108	60.28	0.25	0.00	0.00	42.64	0.01	103.18
109	59.42	0.11	0.00	0.00	42.39	0.03	101.95
110	58.56	0.25	0.00	0.00	42.81	0.01	101.63
111	59.62	0.12	0.00	0.00	42.43	0.00	102.17
112	59.05	0.51	0.00	0.01	41.53	0.00	101.10
113	60.04	0.18	0.00	0.00	42.31	0.00	102.53
114	58.47	0.16	0.02	0.00	42.16	0.00	100.80
115	59.73	0.26	0.00	0.00	42.10	0.00	102.09
116	58.48	0.22	0.00	0.03	42.60	0.00	101.34
192	59.20	0.45	0.02	0.02	41.32	0.00	101.01
193	58.83	0.28	0.02	0.02	41.71	0.00	100.86
194	59.24	0.05	0.02	0.00	41.85	0.01	101.18
195	59.19	0.00	0.00	0.02	41.62	0.00	100.83
196	59.73	0.06	0.00	0.00	42.18	0.00	101.97
197	59.74	0.34	0.00	0.00	41.70	0.00	101.78
198	59.17	0.22	0.00	0.00	41.87	0.02	101.28
199	60.01	0.30	0.00	0.00	41.96	0.00	102.27
200	60.30	0.08	0.00	0.00	42.75	0.00	103.13
201	59.44	0.38	0.00	0.00	41.78	0.05	101.65
202	59.80	0.19	0.00	0.00	41.88	0.01	101.89
203	59.09	0.23	0.00	0.00	41.88	0.03	101.23
204	59.62	0.09	0.00	0.00	42.26	0.00	101.97
205	59.76	0.17	0.00	0.01	42.13	0.00	102.07
206	0.23	0.09	0.29	0.00	56.34	0.00	56.95
207	60.13	0.65	0.02	0.00	41.70	0.04	102.54

208	60.11	0.47	0.00	0.00	41.63	0.05	102.26
209	58.76	0.32	0.00	0.00	41.94	0.08	101.10
210	58.38	0.14	0.00	0.02	41.76	0.05	100.36
211	59.95	0.19	0.00	0.00	41.83	0.01	101.98
212	59.67	0.46	0.00	0.00	41.06	0.00	101.19
213	59.91	0.09	0.00	0.00	42.26	0.00	102.26
214	15.98	0.00	0.24	0.00	53.70	0.00	69.92
215	58.72	0.07	0.00	0.00	42.18	0.00	100.97
216	59.75	0.36	0.00	0.00	41.90	0.00	102.01

4-31-3-26 W3M
5632

No.	SO2	SrO	MgO	MnO	CaO	FeO	Total
92	54.00	0.78	0.00	0.01	41.48	0.03	96.30
93	55.91	0.34	0.01	0.00	41.74	0.00	98.00
94	53.34	0.08	0.00	0.04	41.69	0.00	95.15
95	54.70	0.24	0.00	0.00	41.48	0.00	96.42
96	53.45	0.63	0.04	0.00	40.89	0.00	95.01
97	55.22	0.15	0.00	0.01	41.69	0.00	97.07
98	54.56	0.21	0.02	0.04	41.17	0.00	96.01
99	54.89	0.03	0.00	0.04	41.57	0.03	96.56
148	54.95	0.12	0.00	0.01	41.14	0.00	96.22
149	55.30	0.26	0.00	0.01	41.74	0.04	97.35
150	55.48	0.23	0.00	0.00	41.38	0.00	97.09
151	55.02	0.13	0.00	0.05	42.01	0.00	97.21
152	55.25	0.47	0.00	0.03	41.67	0.07	97.50
153	55.56	0.42	0.01	0.00	41.20	0.00	97.19
154	54.26	0.24	0.01	0.00	42.76	0.00	97.26

5-7-14-10 W3M
5288

No.	SO3	SrO	MgO	MnO	CaO	FeO	Total
81	55.93	0.43	-	-	41.88	0.06	98.30
82	56.05	0.27	-	-	40.94	-	97.26
83	55.40	0.46	-	0.01	41.63	0.03	97.53
84	55.10	0.44	-	0.03	41.30	0.01	96.88
85	55.28	0.31	-	0.01	41.40	-	96.99
86	53.69	0.45	0.04	-	41.88	-	96.06
87	54.63	0.36	-	0.00	41.10	-	96.10
88	55.82	0.28	0.01	-	41.37	0.03	97.51
89	55.98	0.27	-	0.04	41.49	-	97.79
90	55.58	0.33	0.01	-	41.19	-	97.11
91	54.74	0.38	-	0.04	41.14	-	96.30
92	55.19	0.43	-	0.01	41.00	0.03	96.66
93	54.12	0.40	-	-	40.96	-	95.48
95	55.51	0.30	0.03	0.04	41.23	-	97.11
98	54.54	0.53	0.00	0.02	41.20	-	96.29

	99	56.08	0.15	-	0.01	41.79	-	98.03
	100	55.13	0.17	-	0.02	41.74	-	97.06
	101	54.50	0.13	-	0.01	40.90	-	95.54
	102	54.57	0.12	-	0.00	42.39	-	97.09
	103	55.41	0.77	-	-	40.91	0.00	97.10
	104	55.91	0.14	-	-	41.06	0.03	97.14
	105	54.80	0.09	0.04	-	41.70	-	96.63
	106	56.13	0.16	0.02	-	41.04	-	97.35
	107	55.92	0.84	-	-	40.58	-	97.34
	108	56.22	0.75	0.01	0.05	40.58	-	97.61
	109	56.88	0.27	-	0.03	41.85	0.07	99.09
	110	55.35	0.11	-	0.00	40.99	0.01	96.46
	111	54.44	0.25	-	-	41.50	-	96.19
	112	55.02	0.41	0.00	-	41.58	-	97.01
	114	54.96	0.07	-	-	41.88	-	96.91

5-7-14-10 W3M
5413

No.	SO2	SrO	MgO	MnO	CaO	FeO	Total
1	57.91	0.64	0.02	0.02	40.31	0.01	98.91
2	56.24	0.56	0.00	0.00	40.74	0.00	97.54
3	58.10	0.88	0.01	0.00	40.74	0.00	99.73
4	56.69	0.83	0.02	0.02	40.07	0.00	97.62
5	57.41	0.63	0.00	0.05	39.73	0.04	97.86
6	57.20	0.77	0.00	0.02	40.15	0.01	98.14
7	56.72	0.09	0.03	0.04	40.72	0.08	97.67
8	57.44	0.35	0.00	0.00	41.14	0.00	98.93
9	47.32	54.83	0.00	0.01	0.05	0.00	102.21
11	46.94	53.00	0.00	0.00	0.12	0.00	100.06
12	46.42	53.56	0.00	0.00	0.12	0.00	100.10
15	45.74	54.80	0.00	0.00	0.06	0.00	100.60
16	45.85	53.90	0.00	0.00	0.08	0.00	99.83
19	46.26	53.33	0.00	0.02	0.07	0.00	99.68
20	45.74	52.05	0.00	0.00	0.12	0.00	97.91
63	56.11	0.45	0.00	0.00	40.60	0.00	97.16
64	58.22	0.54	0.00	0.00	41.01	0.01	99.78
65	57.07	0.45	0.00	0.00	40.79	0.00	98.31
66	57.65	0.33	0.00	0.00	40.33	0.00	98.31
67	57.33	0.45	0.00	0.00	40.42	0.00	98.20
68	57.58	0.25	0.00	0.01	40.49	0.00	98.33
69	57.06	1.28	0.00	0.00	39.87	0.00	98.21
70	56.92	0.46	0.00	0.00	40.50	0.00	97.88
71	46.40	53.72	0.17	0.16	0.18	0.19	100.82
72	46.06	52.99	0.15	0.13	0.12	0.15	99.59
73	45.89	53.17	0.00	0.00	0.14	0.04	99.25
74	45.88	52.61	0.00	0.00	0.16	0.01	98.66

10-32-183 W3M
4596

No.	SO2	SrO	MgO	MnO	CaO	FeO	Total

1	59.72	0.46	0.00	0.00	40.87	0.00	101.05
2	59.20	0.42	0.02	0.01	41.10	0.00	100.75
3	58.97	0.34	0.04	0.00	40.75	0.02	100.12
4	59.74	0.42	0.00	0.00	41.07	0.00	101.23
5	59.59	0.60	0.04	0.00	41.28	0.00	101.51
6	58.71	0.44	0.00	0.00	41.05	0.00	100.20
7	60.05	0.36	0.00	0.00	40.98	0.06	101.45
8	60.33	0.39	0.00	0.00	40.95	0.00	101.67
9	60.17	0.16	0.00	0.01	41.40	0.05	101.80
10	59.91	0.16	0.00	0.00	40.79	0.00	100.86
11	59.70	0.51	0.03	0.00	40.47	0.00	100.71
12	60.18	0.46	0.02	0.00	40.98	0.14	101.78
13	59.86	0.51	0.00	0.00	41.21	0.25	101.83
14	60.05	0.36	0.00	0.00	41.11	0.00	101.52
15	59.85	0.56	0.00	0.00	40.83	0.07	101.30
16	58.91	0.48	0.00	0.02	40.63	0.19	100.23
17	60.30	0.48	0.00	0.00	41.09	0.00	101.87
18	59.24	0.37	0.00	0.01	41.29	0.03	100.94
19	60.11	0.37	0.00	0.00	40.86	0.27	101.61
20	58.90	0.52	0.00	0.00	41.31	0.00	100.73
54	60.52	0.13	0.03	0.00	41.33	0.00	102.01
55	60.68	0.34	0.02	0.00	40.15	0.00	101.19
56	60.06	0.28	0.00	0.02	40.91	0.00	101.27
57	58.86	0.19	0.00	0.00	41.06	0.00	100.11
58	59.65	0.39	0.00	0.06	41.15	0.00	101.25
59	59.74	0.23	0.00	0.01	40.49	0.05	100.52
60	60.90	0.72	0.00	0.00	40.96	0.02	102.60
61	59.60	0.36	0.04	0.00	41.15	0.00	101.16
62	61.77	0.24	0.00	0.02	41.17	0.03	103.22
63	58.43	0.34	0.00	0.01	41.01	0.04	99.83
64	60.28	0.00	0.02	0.00	41.23	0.00	101.54
65	57.96	0.51	0.02	0.00	40.59	0.02	99.09
66	59.17	0.04	0.05	0.01	41.01	0.02	100.30
113	59.36	0.70	0.00	0.00	40.71	0.00	100.77
114	58.74	0.67	0.00	0.00	40.68	0.06	100.16
115	59.81	0.35	0.01	0.00	40.09	0.05	100.31
116	60.37	0.58	0.01	0.00	40.88	0.03	101.87
117	59.26	0.66	0.04	0.00	40.92	0.03	100.90
118	60.37	0.35	0.00	0.00	40.60	0.01	101.33
119	60.17	0.00	0.00	0.00	41.49	0.01	101.67
120	60.84	0.07	0.00	0.02	41.09	0.07	102.09
121	60.01	0.26	0.00	0.01	40.75	0.02	101.05
122	58.10	0.38	0.00	0.01	40.49	0.09	99.06
123	58.86	0.17	0.01	0.01	40.99	0.00	100.04

10-32-183 W3M
4639

No.	SO2	SrO	MgO	MnO	CaO	FeO	Total
1	57.23	0.69	0.00	0.00	40.67	0.00	98.59
2	58.51	0.48	0.01	0.00	40.77	0.00	99.77

	3	56.87	0.82	0.00	0.00	40.39	0.04	98.12
	4	57.53	0.90	0.00	0.00	39.83	0.00	98.27
	5	58.53	0.75	0.00	0.03	40.40	0.00	99.71
	6	58.47	0.84	0.00	0.00	40.88	0.06	100.25
	7	57.67	0.89	0.00	0.00	40.39	0.00	98.95
	8	58.37	0.71	0.00	0.00	40.31	0.06	99.45
	9	58.78	0.72	0.00	0.01	40.36	0.00	99.87
	10	58.79	0.91	0.00	0.02	40.66	0.00	100.38
	11	56.57	0.83	0.00	0.00	40.61	0.00	98.01
	33	57.07	0.32	0.00	0.05	40.54	0.04	98.01
	34	58.39	0.73	0.00	0.02	40.24	0.01	99.40
	35	53.77	0.09	0.00	0.00	39.56	0.00	93.42
	36	57.34	0.47	0.00	0.05	39.72	0.00	97.57
	37	58.29	0.77	0.00	0.00	40.69	0.03	99.78
	38	58.09	0.72	0.00	0.00	40.57	0.00	99.38
	39	55.68	0.58	0.01	0.04	40.39	0.08	96.79
	40	57.51	0.61	0.00	0.00	40.80	0.02	98.94
	41	57.59	0.48	0.00	0.03	40.34	0.00	98.44
10-32-183 W3M 4645	26	57.99	0.03	0.00	0.00	41.70	0.02	99.74
	27	58.75	0.02	0.00	0.00	41.19	0.05	100.01
	28	58.81	0.08	0.00	0.00	41.86	0.04	100.79
	29	58.45	0.84	0.00	0.00	40.66	0.00	99.95
	30	58.02	0.83	0.00	0.01	40.84	0.05	99.75
	31	59.41	0.05	0.00	0.00	41.29	0.07	100.82
	32	57.91	0.83	0.02	0.00	40.86	0.03	99.66
	33	58.29	0.82	0.00	0.00	40.21	0.08	99.40
	34	58.04	0.37	0.00	0.04	41.03	0.03	99.51
	35	57.97	0.13	0.00	0.00	41.36	0.03	99.49
	36	58.23	0.07	0.01	0.00	41.69	0.02	100.03
	37	58.51	0.15	0.03	0.02	41.53	0.06	100.30
	38	58.60	0.16	0.00	0.01	41.14	0.04	99.96
	39	57.97	0.81	0.03	0.00	40.73	0.05	99.59
	40	58.44	0.86	0.02	0.00	40.74	0.02	100.08
	41	57.67	0.75	0.03	0.00	40.67	0.03	99.15

10-32-183 W3M 4746	No.	SO2	SrO	MgO	MnO	CaO	FeO	Total
	87	58.87	0.67	0.00	0.00	40.36	0.00	99.90
	88	61.22	0.64	0.00	0.02	40.95	0.00	102.83
	89	59.99	0.77	0.01	0.00	40.31	0.00	101.08
	90	59.81	0.05	0.01	0.00	41.64	0.01	101.52
	91	60.12	0.56	0.04	0.00	40.62	0.00	101.34
	92	59.70	0.65	0.00	0.00	40.90	0.00	101.25

93	59.34	0.09	0.00	0.00	41.08	0.00	100.51
94	60.34	0.19	0.01	0.00	41.78	0.06	102.38
95	59.36	0.83	0.00	0.00	40.76	0.00	100.95
96	59.67	0.16	0.03	0.03	41.31	0.08	101.28
97	59.67	0.64	0.00	0.00	40.91	0.00	101.22
98	59.49	0.89	0.01	0.02	40.95	0.00	101.37
99	59.40	0.03	0.01	0.00	41.13	0.00	100.57
100	60.21	0.12	0.00	0.00	41.10	0.04	101.47
101	58.95	0.17	0.00	0.01	40.57	0.00	99.71
102	60.80	0.31	0.01	0.04	41.36	0.11	102.62
103	58.29	0.18	0.00	0.00	41.38	0.02	99.86
104	59.92	0.27	0.00	0.01	41.22	0.04	101.45
105	59.24	0.27	0.00	0.03	40.82	0.00	100.36
106	59.09	0.06	0.00	0.00	40.75	0.05	99.95

10-32-183 W3M
4813

No.	SO2	SrO	MgO	MnO	CaO	FeO	Total
21	56.71	0.06	0.00	0.00	41.02	0.00	97.79
22	56.75	0.22	0.00	0.02	41.16	0.00	98.15
23	56.55	0.23	0.00	0.00	40.78	0.00	97.56
24	57.68	0.28	0.00	0.00	40.53	0.00	98.50
25	57.58	0.12	0.00	0.00	40.50	0.06	98.25
26	57.60	0.19	0.00	0.05	40.85	0.05	98.74
27	55.17	0.16	0.00	0.04	40.80	0.00	96.17
28	55.30	0.07	0.00	0.01	40.77	0.01	96.16
29	58.31	0.48	0.00	0.00	41.15	0.00	99.95
30	57.18	0.30	0.00	0.02	41.11	0.00	98.61
31	56.26	0.40	0.00	0.03	40.70	0.02	97.40
32	56.50	0.33	0.00	0.00	40.68	0.02	97.52

15-11-6-20 W3M
6014

No.	SO2	SrO	MgO	MnO	CaO	FeO	Total
1	58.04	0.25	0.00	0.00	41.30	0.00	99.60
2	57.83	0.19	0.00	0.00	40.99	0.03	99.04
3	58.66	0.10	0.00	0.00	40.73	0.00	99.49
4	59.15	0.29	0.00	0.00	40.70	0.00	100.14
5	59.39	0.18	0.00	0.02	40.93	0.00	100.52
6	57.92	0.32	0.00	0.00	40.79	0.00	99.04
7	57.71	0.35	0.00	0.00	41.16	0.04	99.26
52	57.45	0.17	0.01	0.00	40.70	0.04	98.37
53	55.84	0.26	0.04	0.03	40.25	0.00	96.42
54	58.80	0.28	0.03	0.00	40.56	0.00	99.66
55	57.91	0.32	0.03	0.00	41.09	0.02	99.37
56	58.29	0.05	0.00	0.01	41.33	0.02	99.70
57	58.78	0.10	0.01	0.01	40.95	0.00	99.85
58	58.52	0.17	0.00	0.02	41.25	0.00	99.96
59	58.25	0.12	0.00	0.02	40.96	0.03	99.38

	60	57.84	0.20	0.00	0.00	40.74	0.01	98.79
	61	57.49	0.18	0.00	0.00	40.43	0.03	98.13
	62	57.73	0.19	0.00	0.00	40.88	0.02	98.82
	63	57.61	0.10	0.00	0.00	40.80	0.02	98.53
	64	58.33	0.12	0.00	0.03	40.00	0.05	98.53
	65	57.44	0.20	0.03	0.02	40.52	0.04	98.25
15-11-6-20 W3M 6053	120	54.95	0.14	0.00	0.00	41.02	0.00	96.11
	121	53.33	0.03	0.00	0.00	41.10	0.00	94.46
	122	52.90	0.00	0.00	0.04	41.23	0.00	94.17
	123	54.07	0.20	0.00	0.00	40.72	0.00	94.99
	124	55.03	0.02	0.00	0.00	40.34	0.00	95.39
	125	55.15	0.26	0.02	0.00	40.76	0.02	96.21
	126	54.24	0.80	0.00	0.03	40.66	0.00	95.73
	127	54.08	0.76	0.02	0.01	40.29	0.02	95.18
	128	54.60	0.72	0.00	0.00	40.56	0.00	95.88
	129	54.23	0.62	0.00	0.00	40.29	0.05	95.19
	130	53.21	0.64	0.00	0.03	40.45	0.00	94.33
	131	54.07	0.78	0.00	0.00	40.69	0.02	95.56
	132	52.45	0.68	0.00	0.02	40.29	0.00	93.43
	133	55.90	0.72	0.00	0.00	39.99	0.02	96.63
	134	55.09	0.22	0.00	0.00	40.84	0.06	96.21
	135	53.65	0.07	0.00	0.00	40.34	0.02	94.07
	136	54.79	0.47	0.00	0.00	41.03	0.01	96.30
	137	54.26	0.60	0.00	0.00	40.61	0.00	95.47
	138	53.73	0.74	0.02	0.00	40.18	0.00	94.67
	139	54.37	0.57	0.00	0.00	40.82	0.00	95.76
	140	54.13	0.40	0.00	0.04	40.60	0.01	95.18
	141	53.52	0.10	0.00	0.00	40.95	0.00	94.57
	142	53.15	0.27	0.00	0.05	40.78	0.02	94.27
	143	54.06	0.20	0.00	0.05	41.20	0.00	95.50
	144	54.32	0.86	0.00	0.00	40.20	0.00	95.38
	145	54.06	0.40	0.00	0.05	40.32	0.02	94.85
	146	51.37	0.13	0.00	0.03	41.09	0.00	92.62
	147	52.56	0.21	0.00	0.00	41.51	0.01	94.29
15-11-6-20 W3M 6059	1	58.24	0.64	0.00	0.01	41.36	0.00	100.26
	2	58.49	0.71	0.00	0.03	41.55	0.01	100.78
	3	57.86	0.07	0.00	0.00	41.14	0.03	99.10
	4	58.40	0.27	0.00	0.03	41.72	0.00	100.43
	5	57.31	0.24	0.00	0.00	41.87	0.00	99.42

15-11-6-20 W3M
6070

No.	SO2	SrO	MgO	MnO	CaO	FeO	Total
1	49.81	0.25	0.04	0.01	41.71	0.00	91.82
2	53.94	0.16	0.01	0.00	40.54	0.00	94.65
3	54.37	0.13	0.00	0.02	40.74	0.00	95.26
4	53.17	0.26	0.00	0.02	40.80	0.00	94.24
5	54.15	0.24	0.02	0.01	40.81	0.00	95.23
6	53.40	0.21	0.00	0.00	41.03	0.00	94.64
7	54.28	0.18	0.00	0.00	40.64	0.00	95.10
8	54.10	0.27	0.00	0.00	40.11	0.07	94.54
9	53.07	0.42	0.00	0.00	40.53	0.00	94.02
10	54.58	0.85	0.03	0.02	40.18	0.02	95.67
11	54.36	0.08	0.00	0.02	40.62	0.01	95.09

15-11-6-20 W3M
6141

No.	SO2	SrO	MgO	MnO	CaO	FeO	Total
1	52.60	0.12	0.00	0.00	41.05	0.00	93.77
2	52.82	0.47	0.00	0.00	40.63	0.00	93.92
3	52.42	0.35	0.00	0.01	41.06	0.01	93.85
4	52.11	0.57	0.00	0.01	40.41	0.00	93.10
5	51.95	0.12	0.00	0.00	40.53	0.00	92.60
6	51.91	0.14	0.00	0.00	40.66	0.00	92.71
7	52.01	0.03	0.01	0.02	40.68	0.00	92.76
8	52.59	0.76	0.00	0.00	40.61	0.00	93.96
9	52.61	0.14	0.00	0.03	40.41	0.05	93.23
10	52.83	0.45	0.00	0.01	40.79	0.04	94.12
11	52.70	0.10	0.00	0.00	40.81	0.03	93.64
12	52.64	0.30	0.00	0.00	40.71	0.03	93.68
13	52.85	0.18	0.00	0.00	40.96	0.00	93.99
14	52.19	0.01	0.00	0.01	40.80	0.00	93.02
15	52.84	0.32	0.00	0.00	40.78	0.00	93.94
16	52.23	0.34	0.00	0.04	41.25	0.00	93.86
17	50.46	0.37	0.00	0.01	41.18	0.00	92.02
18	52.33	0.12	0.00	0.00	40.95	0.00	93.40
19	52.78	0.32	0.00	0.00	40.97	0.00	94.07
86	51.89	0.41	0.00	0.01	40.40	0.00	92.71
87	53.56	0.17	0.00	0.01	39.85	0.00	93.58
88	53.03	0.00	0.00	0.01	41.01	0.00	94.05
89	52.34	0.14	0.00	0.00	40.43	0.00	92.91
90	52.78	0.22	0.00	0.01	40.78	0.01	93.80
91	51.70	0.45	0.00	0.00	40.26	0.00	92.42
92	52.88	0.24	0.00	0.00	40.60	0.00	93.72
93	52.23	0.31	0.00	0.00	40.26	0.00	92.80
94	52.05	0.15	0.00	0.05	40.94	0.00	93.20
95	52.58	0.11	0.00	0.00	40.46	0.00	93.15
96	53.31	0.43	0.00	0.01	40.46	0.00	94.21
124	52.81	0.36	0.00	0.00	40.65	0.00	93.82

125	49.23	0.25	0.03	0.02	42.48	0.00	92.01
126	52.85	0.33	0.00	0.02	40.00	0.06	93.26
127	54.66	0.57	0.00	0.00	40.56	0.05	95.85
128	53.76	0.24	0.00	0.00	40.80	0.00	94.80
129	54.12	0.32	0.00	0.00	40.61	0.04	95.09
130	52.58	0.32	0.00	0.00	40.27	0.00	93.17
131	53.19	0.00	0.01	0.00	41.17	0.03	94.40
132	53.95	0.21	0.00	0.00	40.71	0.00	94.87
133	54.10	0.26	0.03	0.00	40.51	0.02	94.92

15-11-6-20 W3M
6161

No.	SO3	SrO	MgO	MnO	CaO	FeO	Total
75	60.79	0.52	-	-	40.43	0.07	101.81
76	59.11	0.33	-	0.00	40.56	0.06	100.06
77	59.55	0.18	0.03	0.01	40.87	0.00	100.65
78	59.05	0.56	0.01	0.02	39.83	-	99.47
79	60.35	0.51	0.01	-	40.60	0.02	101.48
80	60.32	0.05	0.00	-	41.30	-	101.67
81	60.68	0.13	-	0.03	41.05	0.00	101.89
82	58.93	0.29	-	-	41.02	0.02	100.26
83	59.41	0.40	-	-	40.80	0.03	100.64
84	59.16	0.12	-	-	41.47	-	100.75
85	59.71	0.27	-	-	40.76	-	100.74
86	60.61	0.29	-	0.00	41.53	-	102.43
87	60.20	0.12	-	-	41.21	-	101.53
88	59.15	0.39	-	0.05	40.35	0.01	99.95
113	59.78	0.24	-	-	40.96	0.04	101.02
114	59.09	0.13	-	-	41.25	0.04	100.51
115	59.29	0.12	0.01	-	41.35	-	100.77
116	59.11	0.86	0.03	-	40.74	-	100.74
117	60.11	0.02	0.02	0.03	41.22	0.05	101.44
118	60.76	-	-	-	41.28	-	102.04