Umetco Minerals Memo Table 1

Uranium	*Th-230*	*Th-232*	*Ra-226*
19.4	12.0	16.0	NR
29.7	22.0	37.0	NR
13.5	299.0	16.0	NR
12.5	466.0	37.0	NR
260.6	186.0	241.0	NR
45.8	19.0	35.0	NR
16.7	6.2	9.6	NR
81.7	76.4	139.0	NR

Rapids Bowl/Dunn Tire DEC Samples

	Uranium	*Th-230*	*Th-232*	*Ra-226*
10/2/2006	260.0	NR	400.0	110.0

Holy Trinity DEC Samples

	Uranium	*Th-230 **	*Th-232*	*Ra-226*
10/4/2006	1000.0	117.0	635.0	635.0
	425.0	153.0	220.0	145.0
	145.0	48.0	115.0	60.0

* = Alpha Spec

PAPER E-MAIL

TO: Barb Youngberg

DATE: 4/30/08 **TIME:**

CC: Jerry Riggi **BCC:**

SUBJECT: Slag analysis

☐ SEND ☐ ATTACH ☐ REPLY ☒ FORWARD ☐ SPAM ☐ TRASH

For your review.

TP

SIGNATURE: TP

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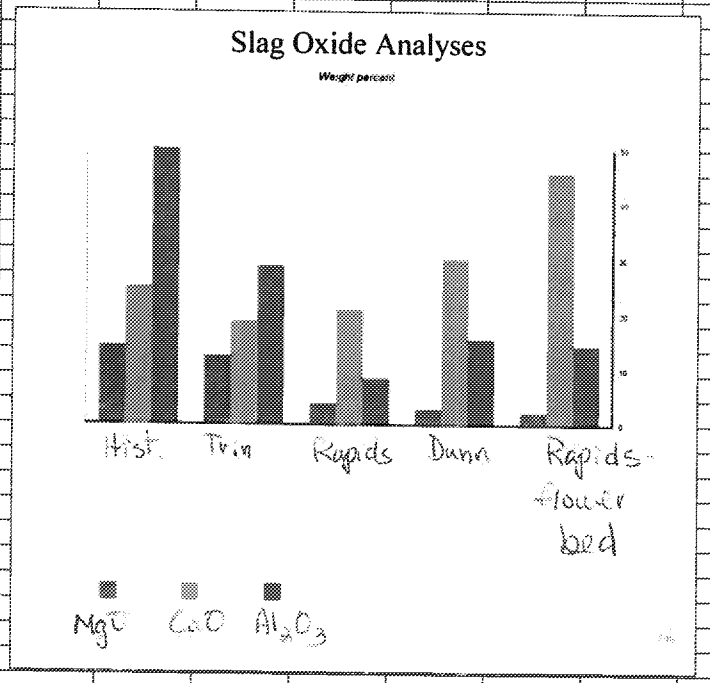
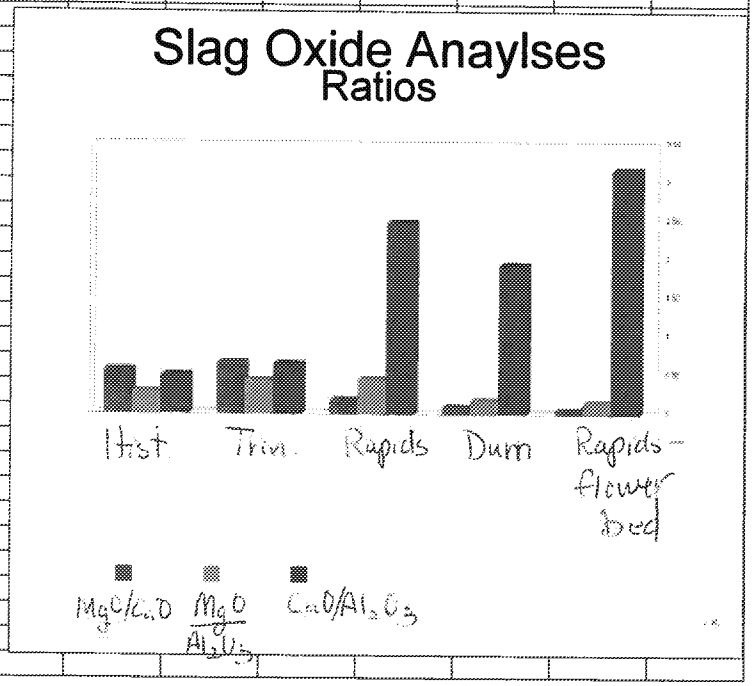
	historic data	Holy Trin	Rapids fenced	Dunn	Rapids flower bed
MgO	14.25	12.4	3.8	2.8	2.2
CaO	25	18.7	20.9	30.1	45.8
Al2O3	50	28.7	8.4	15.5	14.4
Ratios					
MgO-CaO	0.57	**0.66**	0.18	0.09	0.05
MgO-Al O	0.29	0.43	0.45	0.18	0.15
CaO-Al O	0.50	**0.65**	2.49	1.94	3.18





C:\MyFiles\WORK\slag metals.qpw

EMLAB P&K
THE PROVEN LEADER

When quality and accuracy are critical.

RECEIVED
NYSDEC
APR 0 4 2008
Bureau of Hazardous Waste & Radiation Management
Division of Solid & Hazardous Materials

New York State Department of Environmental Conservation
Bureau of Hazardous Waste and Radiation Management
Radiological Sites Section – Ninth Floor
625 Broadway
Albany, NY 12233

Attention:	Thomas Papura	March 27,2008
EMLab P&K #:	397422	
Billing Ref.:	Elemental Analysis of Slag	

Dear Thomas:

Please find enclosed the results of the four (4) slag samples you submitted for oxide analysis and elemental composition.

METHODS:

A portion of material from each submitted bag was removed with tweezers and placed into a mortar and pestle. A portion of this material was then ground into a finer powder, and mounted onto an analysis stub using double sided adhesive tape. These sample mounts were then coated with evaporated graphite in order to increase sample stability and provide a conductive layer. A representative area of each sample area was then examined using EDX spectroscopy in the SEM. These areas were chosen to represent the most homogenous grains and powder in the sample mount area. The resultant EDX spectra were then analyzed, performing peak integrations and nuclear interaction calculations in order to compute the composition of the dust material. In each sample, a number of discrete, larger grains were also assessed in order to determine the extent to which the dust portions were representative of the bulk material. In each case, there were only slight variations between larger grains and the average composition findings, and so the initial average composition readings were used.

FINDINGS:

Please refer to the EDX spectra and composition tables for the four samples. Most of the material examined in these samples appeared to be quite similar. It appeared that calcium was the predominant oxide in all four samples. Many of the other elements noted appeared in small quantities, and were likely only trace elemental contributions, potentially from multiple sources. Small amounts of rare earth elements, metals, and silver were all documented in the sample. Zirconium was found in all the samples, but in low concentrations.

If you have further questions please feel free to contact me through client services at any time.

Sincerely,

Jared Kelly
Analyst

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phone(978) 667-1400; fax(978) 667-7871
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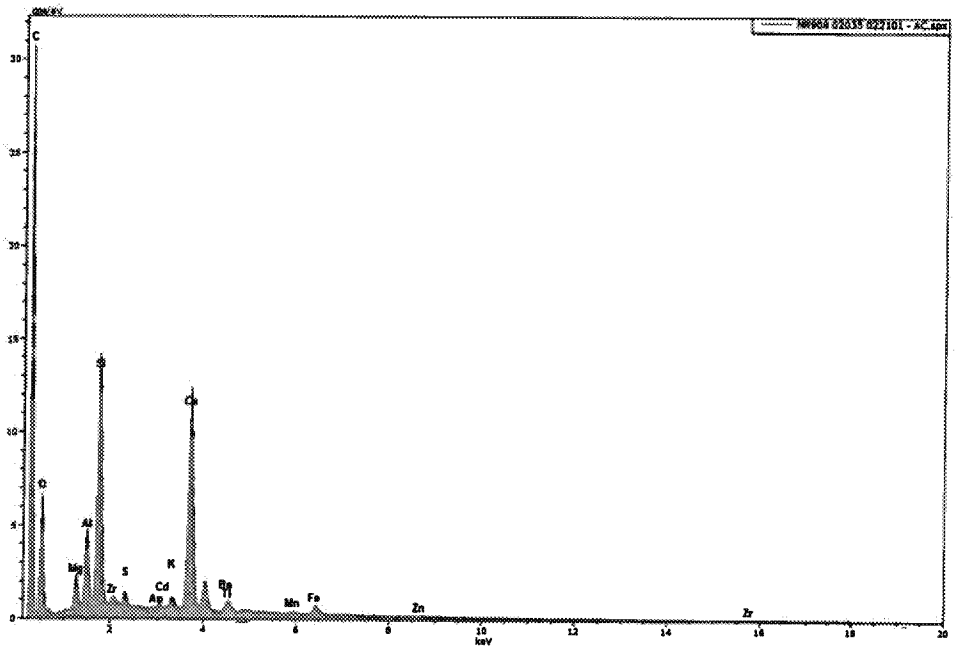
APPENDIX I: Compiled Elemental Composition Data



Results NR908 02035 022101 - AC.spx
Date: 3/11/2008

Element	AN	series	Net	[wt.-%]	[norm. wt.-%]	[norm. at.-%]	Error in %
Carbon	6	K-series	149484	17.23189	14.36292	20.72467	4.321716
Magnesium	12	K-series	19727	1.775677	1.480042	1.055364	0.129657
Aluminium	13	K-series	46766	3.01511	2.513119	1.614249	0.177434
Silicon	14	K-series	164601	8.735558	7.28116	4.493063	0.414668
Sulfur	16	K-series	10159	0.49701	0.414262	0.2239	0.067593
Potassium	19	K-series	8247	0.381998	0.318398	0.141136	0.118631
Calcium	20	K-series	193166	10.42913	8.692765	3.759032	0.348276
Titanium	22	K-series	8330	0.477903	0.398336	0.144185	0.052548
Manganese	25	K-series	3138	0.228418	0.190388	0.060061	0.034131
Iron	26	K-series	9586	0.779262	0.649521	0.201566	0.046912
Zinc	30	K-series	2229	0.261716	0.218143	0.057817	0.033763
Zirconium	40	K-series	1254	1.088777	0.907505	0.172411	0.068878
Silver	47	L-series	2425	0.159163	0.132664	0.021315	0.052958
Cadmium	48	L-series	1206	0.080651	0.067223	0.010364	0.048263
Barium	56	L-series	3748	0.305872	0.254947	0.032174	0.058672
Oxygen	8	K-series	61266	74.52667	62.11861	67.28869	62.79357
			Sum:	119.9748	100	100	

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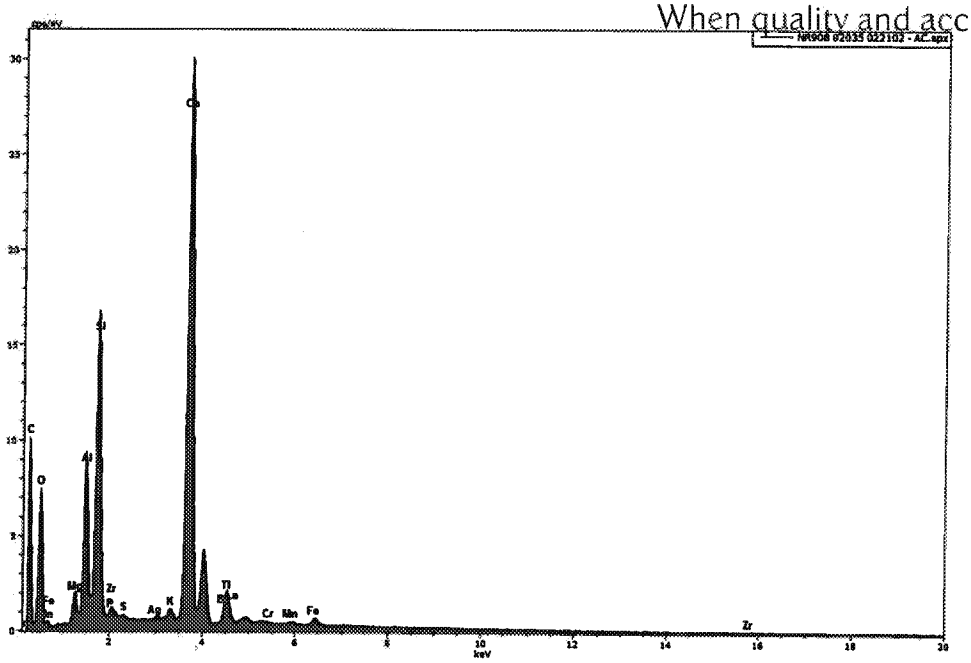

Results NR908 02035 022102 - AC.spx
Date: 3/11/2008

Element	AN	series	Net	[wt.-%]	[norm. wt.-%]	[norm. at.-%]	Error in %
Carbon	6	K-series	38454	0.991276	0.991296	2.029164	3.473246
Magnesium	12	K-series	16706	2.132586	2.132629	2.157311	0.150935
Aluminium	13	K-series	101599	9.162376	9.162559	8.349166	0.485625
Silicon	14	K-series	206109	16.46821	16.46854	14.41671	0.759058
Phosphorus	15	K-series	840	0.073476	0.073477	0.058324	0.064136
Sulfur	16	K-series	4073	0.287039	0.287044	0.220088	0.060936
Potassium	19	K-series	8438	0.468615	0.468625	0.294687	0.048052
Calcium	20	K-series	485982	30.87606	30.87668	18.94164	0.932936
Titanium	22	K-series	25156	1.784444	1.78448	0.916327	0.129049
Chromium	24	K-series	1097	0.078329	0.07833	0.037039	0.036788
Manganese	25	K-series	2947	0.231703	0.231707	0.103696	0.039107
Iron	26	K-series	7469	0.654864	0.654877	0.288305	0.043962
Zirconium	40	K-series	2208	1.968214	1.968254	0.530475	0.0937
Silver	47	L-series	4383	0.3735	0.373507	0.085133	0.057341
Barium	56	L-series	1848	0.187203	0.187207	0.033516	0.116206
Lanthanum	57	L-series	8171	0.816457	0.816474	0.144516	0.07463
Oxygen	8	K-series	72552	33.44364	33.44431	51.39391	62.60391
			Sum:	99.998	100	100	

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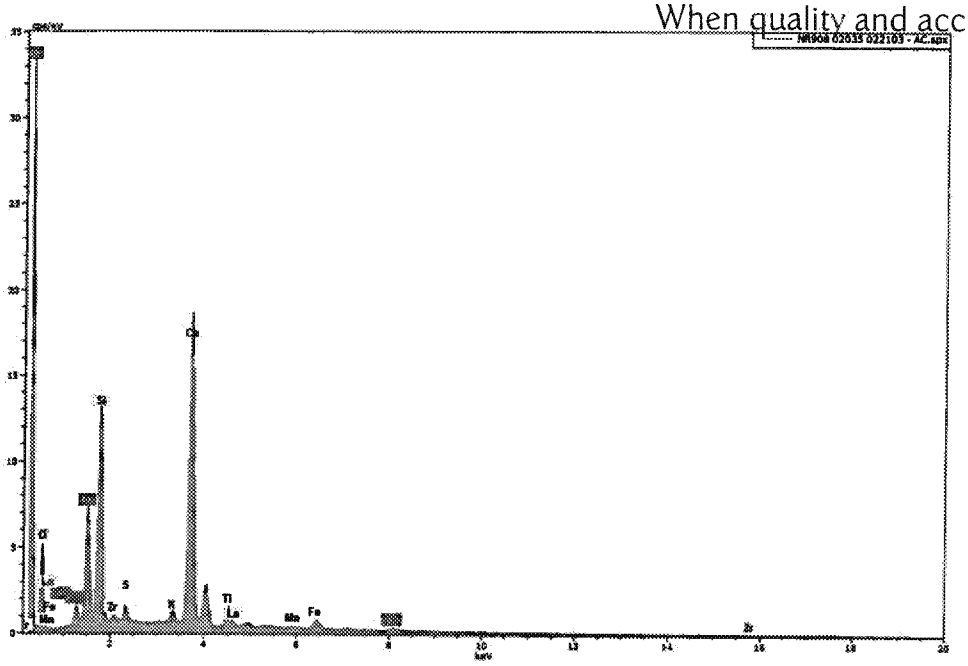

Results NR908 02035 022103 - AC.spx
Date: 3/11/2008

Element	AN	series	Net	[wt.-%]	[norm. wt.-%]	[norm. at.-%]	Error in %
Carbon	6	K-series	230132	22.59848	15.88683	23.78443	4.102958
Magnesium	12	K-series	12836	1.331315	0.93592	0.692433	0.104173
Aluminium	13	K-series	81286	5.760363	4.049561	2.698831	0.314943
Silicon	14	K-series	167023	9.628454	6.768846	4.333782	0.454478
Sulfur	16	K-series	11701	0.575778	0.404775	0.226988	0.071899
Potassium	19	K-series	9645	0.397214	0.279243	0.128428	0.039293
Calcium	20	K-series	296205	14.3333	10.07637	4.520982	0.446103
Titanium	22	K-series	16430	0.932368	0.655459	0.246165	0.063167
Manganese	25	K-series	1192	0.073142	0.051419	0.01683	0.030577
Iron	26	K-series	11403	0.838962	0.589794	0.189904	0.048196
Copper	29	K-series	5949	0.5759	0.404861	0.114565	0.041301
Zirconium	40	K-series	4086	5.852714	4.114484	0.811037	0.20697
Lanthanum	57	L-series	8089	0.656137	0.461267	0.059713	0.045221
Oxygen	8	K-series	50367	78.69248	55.32117	62.17592	66.48873
			Sum:	142.2466	100	100	

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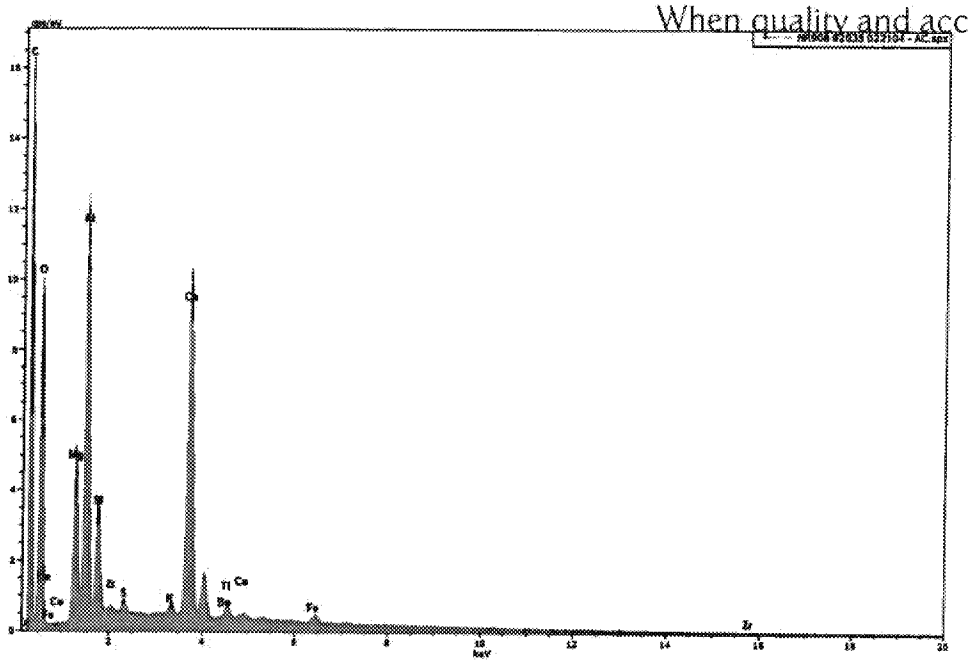

Results NR908 02035 022104 - AC.spx
Date: 3/11/2008

Element	AN	series	Net	[wt.-%]	[norm. wt.-%]	[norm. at.-%]	Error in %
Carbon	6	K-series	107893	8.383366	8.710533	13.78876	1.832385
Magnesium	12	K-series	52377	7.427364	7.717223	6.037054	0.456384
Aluminium	13	K-series	136025	13.374	13.89593	9.792205	0.696534
Silicon	14	K-series	40834	3.30866	3.437783	2.327319	0.174491
Sulfur	16	K-series	6531	0.477163	0.495785	0.293974	0.073303
Potassium	19	K-series	5830	0.348917	0.362534	0.176299	0.038358
Calcium	20	K-series	159629	10.82413	11.24655	5.335475	0.343868
Titanium	22	K-series	6060	0.426164	0.442796	0.175836	0.053248
Iron	26	K-series	5138	0.480127	0.498864	0.169841	0.041076
Zirconium	40	K-series	893	0.810327	0.84195	0.175484	0.061215
Barium	56	L-series	852	0.085395	0.088728	0.012284	0.06136
Cerium	58	L-series	3589	0.357423	0.371372	0.050393	0.157415
Oxygen	8	K-series	97967	49.94097	51.88995	61.66507	22.49946
			Sum:	96.24401	100	100	

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New York State Department of Environmental Conservation
Bureau of Hazardous Waste and Radiation Management
Radiological Sites Section, Ninth Floor
625 Broadway, Albany, New York 12233-7255
Phone: (518) 402-8579 • **FAX:** (518) 402-8646
Website: www.dec.ny.gov

Alexander B. Grannis
Commissioner

EMLab Id: 397422
New York State Department of Environment
Prj.: Elemental Analysis of Slag Samples
Due Date:03/24/08 05:00 P

March 7, 2008

Mr. Jared Kelly
EMLab P&K
148 Rangeway Road
North Billerica, MA 01862

Dear Mr. Kelly:

Re: Elemental Analysis of 4 slag samples

Please perform elemental analysis of the enclosed 4 slag samples as per our discussions. The compounds of most interest, as previously discussed, are percentage of MgO, Al_2O_3 and CaO. In addition, if possible, percentage of Th, Zr_2O_3 and Cb_2O_5. These are not crucial, but if it does not incur a significant additional charge, please perform.

Also, if possible, in addition to hard copy results, please send the data in electronic Excel 7.0 or other alternate format, to myself at trpapura@gw.dec.state.ny.us.

If you have any questions, please contact me at the above e-mail address, or via phone at (518) 402-8579.

Sincerely,

Thomas Papura
Environmental Radiation Specialist II
Bureau of Radiation & Hazardous Site Management
Division of Solid & Hazardous Materials
Phone: 518-402-8808

Enclosures

EMLab P & K Billerica

Chain of Custody Form

EMLab P&K

148 Range
N. Billerica, I
(P) 978-66
(F) 978-66

EMLab Id: 397422
New York State Department of Environment
Prj.: Elemental Analysis of Slag Samples
Due Date:03/24/08 05:00 P

Client: NYS DEC DSEHM
Address: 625 Broadway 9th Floor
Albany, NY 12233-7255
Phone: 518 402 8579 Fax: 518-402-9024

Project #:
Project Manager: Tom Papula
Work ID:
Contact: Tom Papula

Job# 397422 Quote#

Requested Turn Around Time
15 Business Day X 5 Business Days ____ 48 Hours ____ Same Day ____
10 Business Day ____ 3-4 Business Days ____ 24 Hours ____ Other ____

Shaded areas for office use

Analysis Requested
Check analysis and required method.
*Rush turnaround times must be Pre Approved
Use comments section to further define.

Comments
(Special Instructions)

Please indicate whether or not the samples that are being submitted for analysis are involved in either pending or potential litigation? Yes ____ No X

Sample Type Codes
DW-Drinking W-Wastewater SO-Soil S-Solid
BH-Biohazard CH- Chemical Hazard A-Air Z-Other

	Sample ID (Use one line per container)	Date Time Collected	Sample Type	# Containers	Plastic(P) or Glass(G)	TEM Water	SEM	EDX	WDX	TEM	PLM	PSA-PLM	PSA-SEM	PSA-TEM	FTIR	Particle ID	HI-VOL	Polished Sections	Dust Analysis PLM	Dust Analysis w/SEM	Coal Ash Test	Soot Identification	Report Required	Other
1	NR908 0203S 022101	02/21/08 11:58	Slag	1	P		X	X																
2	NR908 0203S 022102	02/21/08 12:38	Slag	1	P		X	X																
3	NR908 0203S 022103	02/21/08 11:48	Slag	1	P		X	X																
4	NR908 0203S 022104	02/21/08 14:05	Slag	1	P		X	X																
5																								
6																								
7																								
8																								
9																								
10																								

Elemental analysis of Slag Samples for Percentage of:
CaO
Al_2O_3
MgO
If possible percentage of
Th
Zr_2O_3
Cb_2O_5

Temp @ Receipt: ____

Return samples with results?
Yes X No ____

Sampled by (print): Jerry Riggi
Signature:
Relinquished by: Thomas Papula Date: 3/7/08 Time: 10:00
Received by: Date: 03/10/08 Time: 815
Sample Login: Date: Time:
Sample Filtered: Date: Time:
Sample Prep: Date: Time:
Sample Analysis: Date: Time:

Drinking Water for Asbestos has a 48 hour holding time.
Sealed? Yes ____ No ____
Date Results Faxed: ____

H:Microscopy/Misc/Micrococ21emlab.xls

One Copy of This Sheet Goes To: a) 625 Broadway, 4th Floor, Albany, New York 12233-3502
b) With sample to contract lab c) Retain for your records

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
CONTRACT LAB SAMPLE INFORMATION SHEET
Print Legibly

CAUTION (check if applicable)

☐ Lab personnel are expected to use caution when handling DEC samples, however, please use special caution when handling this sample since it is believed to contain significant concentrations of hazardous and/or toxic material(s).

CHECK THE BOX PRECEDING THE REQUESTED ANALYSIS

PRIORITY POLLUTANTS (Water Part 136)—SPDES

- ☐ 1. 13PP Metals
- ☐ 2. Cyanide
- ☐ 3. BOD
- ☐ 4. CBOD
- ☐ 5. COD
- ☐ 6. pH
- ☐ 7. Settleable Solids
- ☐ 8. Total Solids
- ☐ 9. TSS
- ☐ 10. Sulfate
- ☐ 11. Reactive Phosphorus
- ☐ 12. Total Phosphorus
- ☐ 13. Nitrate/Nitrite
- ☐ 14. Ammonia
- ☐ 15. TKN
- ☐ 16. Total Phenols
- ☐ 17. TOC
- ☐ 18. Oil/Grease
- ☐ 19. Halogenated Volatiles (USEPA 601 GC)
- ☐ 20. Aromatic Volatiles (USEPA 602 GC)
- ☐ 21. Volatiles (USEPA 624 GC/MS)
- ☐ 22. Low-Level Volatiles (USEPA 524.2 GC/MS)
- ☐ 23. Acids Base/Neutrals (USEPA 625 GC/MS)
- ☐ 24. Pesticides/PCBs (USEPA 608-GC)
- ☐ 25. PCBs at 0.065 µg/L (USEPA 608)
- ☐ 26. PCBs congener method (1668A)
- ☐ 27. Other See attached Letter

CONTRACT LABORATORY PROTOCOLS

- ☐ 28. (ALL) - Water - Includes 29-33
- ☐ 29. Base/Neutral/Acid (B/N/A) Water (GC/MS)
- ☐ 30. Volatile Organic Analysis (VOA) Water (GC/MS)
- ☐ 31. Pesticides/PCBs Water (GC/MS)
- ☐ 32. 23 Metals in Water
- ☐ 33. Cyanide in Water
- ☐ 34. Dioxin - Water (1613B)
- ☒ 42. Other See Attached letter
- ☐ 35. (ALL) - Soil/Sediments - Includes 36-40
- ☐ 36. Base/Neutral/Acid (B/N/A) Soil/Sediments (GC/MS)
- ☐ 37. Volatile Organic Analysis (VOA) Soil/Sediments (GC/MS)
- ☐ 38. Pesticides/PCBs Soil/Sediments (GC)
- ☐ 39. 23 Metals in Soil/Sediments
- ☐ 40. Cyanide in Soil/Sediments
- ☐ 41. Doixin - Soil/Sediments (1613B)

HAZARDOUS WASTES/RCRA ANALYSIS SW-846

- ☐ 43. EP Toxicity
- ☐ 44. Corrosivity
- ☐ 45. Ignitability
- ☐ 46. Reactivity
- ☐ 47. TCLP
- ☐ 48. EP Toxicity (Metals Only)
- ☐ 49. TCLP (Metals Only)
- ☐ 50. Metals—17 Hazardous
- ☐ 51. Percent Solids
- ☐ 52. VOA (USEPA 8260 GC/MS)
- ☐ 53. BNA (USEPA 8270 GC/MS)
- ☐ 54. Pesticides (USEPA 8081)
- ☐ 55. PCBs (USEPA 8082)
- ☐ 56. Dioxin (USEPA 8280)
- ☐ 57. Other _____

MUNICIPAL SLUDGE

☐ 58. RS-01 ☐ 59. RS-02 ☐ 60. Other _____

COLLECTED BY: Jerry Riggi	TELEPHONE NUMBER: 518-402-8579	REGION NO.: 9

CONTRACT LABORATORY: EMLab P&K	COUNTY: Niagara	SAMPLING DATE: February 21, 2008	MILITARY TIME: 11:48

SAMPLE MATRIX:
☐ Air ☐ Soil/Sediment ☐ Groundwater ☐ Surface Water ☐ Wastewater ☒ Other Slag

CASE NO.	SDG NO.	SAMPLE NO.	CHECK FOR MS/MD	TYPE OF SAMPLE
N R 9 0 8	0 2 0 3 S	0 2 2 1 0 3	☐ This Sample	☒ Grab ☐ Composite ☐ Term ____

☐ Check if there will be more samples with this SDG sent in this calendar week.

SAMPLING POINT: Dunn Tire DT02210801
Fenced Area Behind Dunn Tire

Report via Category B, unless checked ☐

Check if field duplicate ☐

Outfall Number

Check if sampling is part of inspection ☐

FLOW: _____ GPD _____ MGD

SPDES NUMBER/REGISTRY NUMBER

One Copy of This Sheet Goes To: a) 625 Broadway, 4th Floor, Albany, New York 12233-3502
b) With sample to contract lab c) Retain for your records

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
CONTRACT LAB SAMPLE INFORMATION SHEET
Print Legibly

CAUTION (check if applicable)

☐ Lab personnel are expected to use caution when handling DEC samples, however, please use special caution when handling this sample since it is believed to contain significant concentrations of hazardous and/or toxic material(s).

CHECK THE BOX PRECEDING THE REQUESTED ANALYSIS

PRIORITY POLLUTANTS (Water Part 136)—SPDES

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- ☐ 27. Other See attached Letter

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- ☐ 32. 23 Metals in Water
- ☐ 33. Cyanide in Water
- ☐ 34. Dioxin - Water (1613B)
- ☒ 42. Other See Attached letter
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- ☐ 36. Base/Neutral/Acid (B/N/A) Soil/Sediments (GC/MS)
- ☐ 37. Volatile Organic Analysis (VOA) Soil/Sediments (GC/MS)
- ☐ 38. Pesticides/PCBs Soil/Sediments (GC)
- ☐ 39. 23 Metals in Soil/Sediments
- ☐ 40. Cyanide in Soil/Sediments
- ☐ 41. Doixin - Soil/Sediments (1613B)

HAZARDOUS WASTES/RCRA ANALYSIS SW-846

- ☐ 43. EP Toxicity
- ☐ 44. Corrosivity
- ☐ 45. Ignitability
- ☐ 46. Reactivity
- ☐ 47. TCLP
- ☐ 48. EP Toxicity (Metals Only)
- ☐ 49. TCLP (Metals Only)
- ☐ 50. Metals—17 Hazardous
- ☐ 51. Percent Solids
- ☐ 52. VOA (USEPA 8260 GC/MS)
- ☐ 53. BNA (USEPA 8270 GC/MS)
- ☐ 54. Pesticides (USEPA 8081)
- ☐ 55. PCBs (USEPA 8082)
- ☐ 56. Dioxin (USEPA 8280)
- ☐ 57. Other _____

MUNICIPAL SLUDGE

☐ 58. RS-01 ☐ 59. RS-02 ☐ 60. Other _____

COLLECTED BY: Jerry Riggi	TELEPHONE NUMBER: 518-402-8579	REGION NO.: 9

CONTRACT LABORATORY: EMLab P&K	COUNTY: Niagara	SAMPLING DATE: February 21, 2008	MILITARY TIME: 14:05

SAMPLE MATRIX:
☐ Air ☐ Soil/Sediment ☐ Groundwater ☐ Surface Water ☐ Wastewater ☒ Other Slag

CASE NO.	SDG NO.	SAMPLE NO.	CHECK FOR MS/MD	TYPE OF SAMPLE
N R 9 0 8	0 2 0 3 S	0 2 2 1 0 4	☐ This Sample	☒ Grab ☐ Composite ☐ Term ____

☐ Check if there will be more samples with this SDG sent in this calendar week.

SAMPLING POINT: Holy Trinity HT02210801
Road Bed Near Roberts
65 uR/Hr

Report via Category B, unless checked ☐

Check if field duplicate ☐

Outfall Number

Check if sampling is part of inspection ☐

FLOW: _____ GPD _____ MGD

SPDES NUMBER/REGISTRY NUMBER

One Copy of This Sheet Goes To: a) 625 Broadway, 4th Floor, Albany, New York 12233-3502
b) With sample to contract lab c) Retain for your records

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
CONTRACT LAB SAMPLE INFORMATION SHEET
Print Legibly

CAUTION (check if applicable)

☐ Lab personnel are expected to use caution when handling DEC samples, however, please use special caution when handling this sample since it is believed to contain significant concentrations of hazardous and/or toxic material(s).

CHECK THE BOX PRECEDING THE REQUESTED ANALYSIS

PRIORITY POLLUTANTS (Water Part 136)—SPDES

- ☐ 1. 13PP Metals
- ☐ 2. Cyanide
- ☐ 3. BOD
- ☐ 4. CBOD
- ☐ 5. COD
- ☐ 6. pH
- ☐ 7. Settleable Solids
- ☐ 8. Total Solids
- ☐ 9. TSS
- ☐ 10. Sulfate
- ☐ 11. Reactive Phosphorus
- ☐ 12. Total Phosphorus
- ☐ 13. Nitrate/Nitrite
- ☐ 14. Ammonia
- ☐ 15. TKN
- ☐ 16. Total Phenols
- ☐ 17. TOC
- ☐ 18. Oil/Grease
- ☐ 19. Halogenated Volatiles (USEPA 601 GC)
- ☐ 20. Aromatic Volatiles (USEPA 602 GC)
- ☐ 21. Volatiles (USEPA 624 GC/MS)
- ☐ 22. Low-Level Volatiles (USEPA 524.2 GC/MS)
- ☐ 23. Acids Base/Neutrals (USEPA 625 GC/MS)
- ☐ 24. Pesticides/PCBs (USEPA 608-GC)
- ☐ 25. PCBs at 0.065 µg/L (USEPA 608)
- ☐ 26. PCBs congener method (1668A)
- ☐ 27. Other See attached Letter

CONTRACT LABORATORY PROTOCOLS

- ☐ 28. (ALL) - Water - Includes 29-33
- ☐ 29. Base/Neutral/Acid (B/N/A) Water (GC/MS)
- ☐ 30. Volatile Organic Analysis (VOA) Water (GC/MS)
- ☐ 31. Pesticides/PCBs Water (GC/MS)
- ☐ 32. 23 Metals in Water
- ☐ 33. Cyanide in Water
- ☐ 34. Dioxin - Water (1613B)
- ☒ 42. Other See Attached letter
- ☐ 35. (ALL) - Soil/Sediments - Includes 36-40
- ☐ 36. Base/Neutral/Acid (B/N/A) Soil/Sediments (GC/MS)
- ☐ 37. Volatile Organic Analysis (VOA) Soil/Sediments (GC/MS)
- ☐ 38. Pesticides/PCBs Soil/Sediments (GC)
- ☐ 39. 23 Metals in Soil/Sediments
- ☐ 40. Cyanide in Soil/Sediments
- ☐ 41. Doixin - Soil/Sediments (1613B)

HAZARDOUS WASTES/RCRA ANALYSIS SW-846

- ☐ 43. EP Toxicity
- ☐ 44. Corrosivity
- ☐ 45. Ignitability
- ☐ 46. Reactivity
- ☐ 47. TCLP
- ☐ 48. EP Toxicity (Metals Only)
- ☐ 49. TCLP (Metals Only)
- ☐ 50. Metals—17 Hazardous
- ☐ 51. Percent Solids
- ☐ 52. VOA (USEPA 8260 GC/MS)
- ☐ 53. BNA (USEPA 8270 GC/MS)
- ☐ 54. Pesticides (USEPA 8081)
- ☐ 55. PCBs (USEPA 8082)
- ☐ 56. Dioxin (USEPA 8280)
- ☐ 57. Other _____

MUNICIPAL SLUDGE

☐ 58. RS-01 ☐ 59. RS-02 ☐ 60. Other _____

COLLECTED BY: Jerry Riggi	TELEPHONE NUMBER: 518-402-8579	REGION NO.: 9

CONTRACT LABORATORY: EMLab P&K	COUNTY: Niagara	SAMPLING DATE: February 21, 2008	MILITARY TIME: 12:36

SAMPLE MATRIX:
☐ Air ☐ Soil/Sediment ☐ Groundwater ☐ Surface Water ☐ Wastewater ☒ Other Slag

CASE NO.	SDG NO.	SAMPLE NO.	CHECK FOR MS/MD	TYPE OF SAMPLE
N R 9 0 8	0 2 0 3 S	0 2 2 1 0 2	☐ This Sample	☒ Grab ☐ Composite ☐ Term ____

☐ Check if there will be more samples with this SDG sent in this calendar week.

SAMPLING POINT: Rapids Bowl RB02210802
Front Flower Bed
120 uR/hr

Report via Category B, unless checked ☐

Check if field duplicate ☐

Outfall Number

Check if sampling is part of inspection ☐

FLOW: _____ GPD _____ MGD

SPDES NUMBER/REGISTRY NUMBER

One Copy of This Sheet Goes To: a) 625 Broadway, 4th Floor, Albany, New York 12233-3502
b) With sample to contract lab c) Retain for your records

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
CONTRACT LAB SAMPLE INFORMATION SHEET
Print Legibly

CAUTION (check if applicable)

☐ Lab personnel are expected to use caution when handling DEC samples, however, please use special caution when handling this sample since it is believed to contain significant concentrations of hazardous and/or toxic material(s).

CHECK THE BOX PRECEDING THE REQUESTED ANALYSIS

PRIORITY POLLUTANTS (Water Part 136)—SPDES

- ☐ 1. 13PP Metals
- ☐ 2. Cyanide
- ☐ 3. BOD
- ☐ 4. CBOD
- ☐ 5. COD
- ☐ 6. pH
- ☐ 7. Settleable Solids
- ☐ 8. Total Solids
- ☐ 9. TSS
- ☐ 10. Sulfate
- ☐ 11. Reactive Phosphorus
- ☐ 12. Total Phosphorus
- ☐ 13. Nitrate/Nitrite
- ☐ 14. Ammonia
- ☐ 15. TKN
- ☐ 16. Total Phenols
- ☐ 17. TOC
- ☐ 18. Oil/Grease
- ☐ 19. Halogenated Volatiles (USEPA 601 GC)
- ☐ 20. Aromatic Volatiles (USEPA 602 GC)
- ☐ 21. Volatiles (USEPA 624 GC/MS)
- ☐ 22. Low-Level Volatiles (USEPA 524.2 GC/MS)
- ☐ 23. Acids Base/Neutrals (USEPA 625 GC/MS)
- ☐ 24. Pesticides/PCBs (USEPA 608-GC)
- ☐ 25. PCBs at 0.065 µg/L (USEPA 608)
- ☐ 26. PCBs congener method (1668A)
- ☐ 27. Other See attached Letter

CONTRACT LABORATORY PROTOCOLS

- ☐ 28. (ALL) - Water - Includes 29-33
- ☐ 29. Base/Neutral/Acid (B/N/A) Water (GC/MS)
- ☐ 30. Volatile Organic Analysis (VOA) Water (GC/MS)
- ☐ 31. Pesticides/PCBs Water (GC/MS)
- ☐ 32. 23 Metals in Water
- ☐ 33. Cyanide in Water
- ☐ 34. Dioxin - Water (1613B)
- ☒ 42. Other See Attached letter
- ☐ 35. (ALL) - Soil/Sediments - Includes 36-40
- ☐ 36. Base/Neutral/Acid (B/N/A) Soil/Sediments (GC/MS)
- ☐ 37. Volatile Organic Analysis (VOA) Soil/Sediments (GC/MS)
- ☐ 38. Pesticides/PCBs Soil/Sediments (GC)
- ☐ 39. 23 Metals in Soil/Sediments
- ☐ 40. Cyanide in Soil/Sediments
- ☐ 41. Doixin - Soil/Sediments (1613B)

HAZARDOUS WASTES/RCRA ANALYSIS SW-846

- ☐ 43. EP Toxicity
- ☐ 44. Corrosivity
- ☐ 45. Ignitability
- ☐ 46. Reactivity
- ☐ 47. TCLP
- ☐ 48. EP Toxicity (Metals Only)
- ☐ 49. TCLP (Metals Only)
- ☐ 50. Metals—17 Hazardous
- ☐ 51. Percent Solids
- ☐ 52. VOA (USEPA 8260 GC/MS)
- ☐ 53. BNA (USEPA 8270 GC/MS)
- ☐ 54. Pesticides (USEPA 8081)
- ☐ 55. PCBs (USEPA 8082)
- ☐ 56. Dioxin (USEPA 8280)
- ☐ 57. Other _____

MUNICIPAL SLUDGE

☐ 58. RS-01 ☐ 59. RS-02 ☐ 60. Other _____

COLLECTED BY: Jerry Riggi	TELEPHONE NUMBER: 518-402-8579	REGION NO.: 9

CONTRACT LABORATORY: EMLab P&K	COUNTY: Niagara	SAMPLING DATE: February 21, 2008	MILITARY TIME: 11:58

SAMPLE MATRIX:

☐ Air ☐ Soil/Sediment ☐ Groundwater ☐ Surface Water ☐ Wastewater ☒ Other Slag

CASE NO.	SDG NO.	SAMPLE NO.	CHECK FOR MS/MD	TYPE OF SAMPLE
N R 9 0 8	0 2 0 3 S	0 2 2 1 0 1	☐ This Sample	☒ Grab ☐ Composite ☐ Term ____

☐ Check if there will be more samples with this SDG sent in this calendar week.

SAMPLING POINT: Rapids Bowl RB02210801
Behind Fenced area 65uR/hr

Report via Category B, unless checked ☐

Check if field duplicate ☐

Outfall Number

Check if sampling is part of inspection ☐

FLOW: _____ GPD _____ MGD

SPDES NUMBER/REGISTRY NUMBER

New York State Department of Environmental Conservation
Bureau of Hazardous Waste and Radiation Management
Radiological Sites Section, Ninth Floor
625 Broadway, Albany, New York 12233-7255
Phone: (518) 402-8579 • **FAX:** (518) 402-8646
Website: www.dec.ny.gov

Alexander B. Grannis
Commissioner

EMLab Id: 397422
New York State Department of Environment
Prj.: Elemental Analysis of Slag Samples
Due Date:03/24/08 05:00 P

March 7, 2008

Mr. Jared Kelly
EMLab P&K
148 Rangeway Road
North Billerica, MA 01862

Dear Mr. Kelly:

Re: Elemental Analysis of 4 slag samples

Please perform elemental analysis of the enclosed 4 slag samples as per our discussions. The compounds of most interest, as previously discussed, are percentage of MgO, Al_2O_3 and CaO. In addition, if possible, percentage of Th, Zr_2O_3 and Cb_2O_5. These are not crucial, but if it does not incur a significant additional charge, please perform.

Also, if possible, in addition to hard copy results, please send the data in electronic Excel 7.0 or other alternate format, to myself at trpapura@gw.dec.state.ny.us.

If you have any questions, please contact me at the above e-mail address, or via phone at (518) 402-8579.

JDE # 107596

Sincerely,

Thomas Papura
Environmental Radiation Specialist II
Bureau of Radiation & Hazardous Site Management
Division of Solid & Hazardous Materials
Phone: 518-402-8808

DRAFT

Answers to Health Department Check List Questions

1. Natural U_3O_8 and ThO_2 (source material).

2. Form

The ores will be processed in an electric arc furnace where the material will be heated until it becomes molten. At this time reducing agent will be added to reduce the columbium oxide to a metallic. A slag-metal separation is made and the molten slag is poured into 20 cubic foot cast iron pots and allowed to solidify. The solid slag is then dumped and is ready for disposal.

The slag is a mixture of chemical compounds in a solid state similar to rock formations ranging in size from 2,000 lbs. by down pieces. The Thorium or Uranium oxides will be dispersed through the pieces of slag.

Analysis of 250 NT Uranium Bearing Slag presently stored at plant site.

U_3O_8	.25%
Cb_2O_5	2.00
Ta_2O_5	.70
TiO_2	2.30
ZrO_2	1.00
Al_2O_3	50.00
CaO	25.00
MgO	14.25
Other rare earth oxides	3.50

Analysis of material to be generated 50,000 lbs. for test purposes and 100,000 lbs. to be generated per month, if successful.

ThO_2	1.25%
Cb_2O_5	1.00
Zr_2O_3	1.00
MgO	15.00
Al_2O_3	55.00
CaO	27.50

3. No salts will be added. Lime and alumina will be added to the ore and columbium removed.

4. None

5. Quantity to be disposed of --

   1. Immediately - 250 NT slag containing .25% U_3O_8 or 1250 lbs. U_3O_8.

New York State Department of Environmental Conservation
Division of Solid and Hazardous Materials
Bureau of Pesticides Management, 11th Floor
625 Broadway, Albany, New York 12233-7254
Phone: (518) 402-8788 • **FAX:** (518) 402-9024
Website: www.dec.ny.gov

Alexander B. Grannis
Commissioner

Memorandum

To: Tom Papura, Radiological Sites Section

From: John A. Miller, Chemistry and Laboratory Services Section

Re: Weight percent calculations for corresponding oxides given only the weight percent of corresponding metal: Mg, Ca and Al.

Date: April 11, 2008

Attached are the calculations requested. The weight percent for the corresponding oxides of Mg, Ca and Al in the slag samples assume that all of the Mg, Ca and Al came from the oxides in the sample.

All questions and comments can be addressed to the following:

John A. Miller

Environmental Chemist II
Chemistry and Laboratory Services Section
Bureau of Pesticides management
Division of Solid and Hazardous Materials
NYS Department of Environmental Conservation
(518) 402-8788
jamiller@gw.dec.state.ny.us

Bruker AXS Microanalysis GmbH, Germany 3/31/2008

Quantax

Results NR908 02035 022104 - AC.spx
Date: 3/11/2008

Element	AN	series	Net	[wt.-%]	[norm. wt.-%]	[norm. at.-%]	Error in %
Magnesium	12	K-series	50337	7.494586733	16.88189792	21.64900958	0.46042966
Aluminium	13	K-series	134268	15.18587671	34.20687885	39.51473775	0.78754857
Silicon	14	K-series	40117	4.344439447	9.7860477	10.86019333	0.22134391
Sulfur	16	K-series	4708	0.41396768	0.93248105	0.906374367	0.07281045
Potassium	19	K-series	4300	0.328632449	0.740259556	0.590117557	0.03886785
Calcium	20	K-series	156456	13.38155815	30.14256913	23.44156556	0.41925204
Titanium	22	K-series	6803	0.716630616	1.614243099	1.050817228	0.06992363
Iron	26	K-series	3814	0.471057982	1.061079557	0.592189206	0.04194185
Zirconium	40	K-series	844	1.351044289	3.043288788	1.039791931	0.08648835
Barium	56	L-series	815	0.122343137	0.275583488	0.062546089	0.08227435
Cerium	58	L-series	3944	0.584081802	1.315670859	0.292657403	0.23039853
			Sum:	44.39421899	100	100	

Parameter	MWt	Wt %
Magnesium	24.305	7.494586733
Calcium	40.078	13.38155815
Aluminium	26.982	15.18587671

Parameter	MWt	Stoich Ratio w/Oxide	Wt %
MgO	40.304	1	12.426
CaO	56.072	1	19.122
Al_2O_3	101.961	2	28.693

2 moles of Al for every one mole of Al_2O_3

Tom: Here's the equation that I used. It works because we assume a 100 gram slag sample:

$$X\ Wt\ \%\ Al_2O_3 = (15.186\ grams\ Al)\frac{(1\ mole\ Al)}{(26.982\ grams\ Al)}\frac{(1\ mole\ Al_2O_3)}{(2\ moles\ Al)}\frac{(101.961\ grams)}{(1\ mole\ Al_2O_3)} = 28.693\ \%$$

Holy Trinity Sample
Road bed near Roberts

Bruker AXS Microanalysis GmbH, Germany 3/31/2008

Quantax

Results NR908 02035 022101 - AC.spx
Date: 3/11/2008

Element	AN	series	Net	[wt.-%]	[norm. wt.-%]	[norm. at.-%]	Error in %
Magnesium	12	K-series	18164	2.290345742	5.193110132	7.351879538	0.160244176
Aluminium	13	K-series	45837	4.430029326	10.04461019	12.80951918	0.249014004
Silicon	14	K-series	165937	14.44437212	32.75104445	40.12448482	0.669310615
Sulfur	16	K-series	12574	1.15969514	2.629482733	2.821577673	0.117066377
Potassium	19	K-series	7089	0.491164782	1.113662781	0.980081758	0.15264418
Calcium	20	K-series	188851	14.94718993	33.8911292	29.09688336	0.488871074
Titanium	22	K-series	8526	0.844777149	1.915440402	1.37651509	0.073066178
Manganese	25	K-series	2505	0.305857549	0.693498761	0.434349494	0.038449494
Iron	26	K-series	8904	1.187920969	2.693481734	1.659513009	0.058640817
Zinc	30	K-series	1558	0.319541135	0.724524807	0.381248723	0.036702841
Zirconium	40	K-series	1429	2.89975076	6.5748698	2.479959113	0.137692874
Silver	47	L-series	2176	0.22835609	0.517772624	0.165163065	0.059418505
Cadmium	48	L-series	288	0.030059073	0.068155683	0.020862368	0.013476241
Barium	56	L-series	3714	0.524486741	1.189216702	0.297962806	0.083617867
			Sum:	44.10354651	100	100	

Parameter	MWt	Wt %
Magnesium	24.305	2.290345742
Calcium	40.078	14.947189930
Aluminium	26.982	4.430029326

Parameter	MWt	Stoich Ratio w/Oxide	Wt %
MgO	40.304	1	3.798
CaO	56.072	1	20.812
Al_2O_3	101.961	2	8.370

Rapids Bowl behind fenced area

Bruker AXS Microanalysis GmbH, Germany 3/31/2008

Quantax

Results NR908 02035 022103 - AC.spx
Date: 3/11/2008

Element	AN	series	Net	[wt.-%]	[norm. wt.-%]	[norm. at.-%]	Error in %
Magnesium	12	K-series	12160	1.73180619	3.080107316	4.328402433	0.128161017
Aluminium	13	K-series	81003	8.187029594	14.56105764	18.43247258	0.437096379
Silicon	14	K-series	169863	16.11642014	28.66389084	34.8586361	0.743838246
Sulfur	16	K-series	14418	1.23649176	2.199164859	2.342450427	0.1186732
Potassium	19	K-series	11230	0.725966374	1.291168927	1.127931176	0.050344854
Calcium	20	K-series	296461	21.93558194	39.01357254	33.24811972	0.669451225
Titanium	22	K-series	16548	1.4495027	2.578015887	1.839030184	0.084206819
Manganese	25	K-series	1695	0.171361918	0.304776076	0.1894809	0.035142575
Iron	26	K-series	10972	1.232734459	2.192482304	1.340891562	0.059205493
Copper	29	K-series	4728	0.724827924	1.289144134	0.69290017	0.046164179
Zirconium	40	K-series	1184	1.806231755	3.212477052	1.20278591	0.099019285
Lanthanum	57	L-series	7302	0.907559886	1.614142426	0.396898831	0.053313322
			Sum:	56.22551464	100	100	

Parameter	MWt	Wt %
Magnesium	24.305	1.732
Calcium	40.078	21.936
Aluminium	26.982	8.187

Parameter	MWt	Stoich Ratio w/Oxide	Wt %
MgO	40.304	1	2.872
CaO	56.072	1	30.885
Al_2O_3	101.961	2	15.453

Dunn Tire behind fenced area

Bruker AXS Microanalysis GmbH, Germany 3/31/2008

Quantax

Results NR908 02035 022102 - AC.spx
Date: 3/11/2008

Element	AN	series	Net	[wt.-%]	[norm. wt.-%]	[norm. at.-%]	Error in %
Magnesium	12	K-series	12438	1.3568028	2.087530352	3.068418653	0.10576576
Aluminium	13	K-series	95409	7.630379979	11.73984149	15.54436337	0.408726658
Silicon	14	K-series	200718	15.19074979	23.37196773	29.72970218	0.702174406
Phosphorus	15	K-series	645	0.058474709	0.089967186	0.103769004	0.058373508
Sulfur	16	K-series	2002	0.149875133	0.23059275	0.256908398	0.050662969
Potassium	19	K-series	5868	0.336021374	0.516990985	0.472392002	0.044697697
Calcium	20	K-series	480853	32.74835922	50.3855047	44.91351168	0.988031465
Titanium	22	K-series	25130	2.323021985	3.574122122	2.666813755	0.162748261
Chromium	24	K-series	1068	0.096018188	0.147730298	0.101502579	0.039852566
Manganese	25	K-series	2684	0.264859945	0.407504446	0.264994553	0.041822527
Iron	26	K-series	6789	0.715077143	1.100193218	0.703795613	0.04595306
Zirconium	40	K-series	2129	2.581000151	3.971038499	1.555150509	0.115829155
Silver	47	L-series	573	0.050185582	0.077213818	0.025572892	0.030147443
Barium	56	L-series	2685	0.355374119	0.546766457	0.142237426	0.137684188
Lanthanum	57	L-series	8813	1.139396172	1.753035955	0.450867387	0.092713912
			Sum:	64.99559629	100	100	

Parameter	MWt	Wt %
Magnesium	24.305	1.357
Calcium	40.078	32.748
Aluminium	26.982	7.630

Parameter	MWt	Stoich Ratio w/Oxide	Wt %
MgO	40.304	1	[illegible]
CaO	56.072	1	45.811
Al_2O_3	101.961	2	[illegible]

Rapids Bowl

Front flower bed