

Appendix 6: Biogeochemistry – spruce bark

Laboratory methodology

MEG randomization key

MS Excel results from laboratory (digital only, .xlsx)

Assay certificate from laboratory

QC results from laboratory (digital only)

MS Excel spruce bark sample database

Contoured maps of As, Ba, Bi+Te, Co, Cr, Cu, Ni, Ni/Cu, PGE+Au and Sb distribution

Shea Clark Smith

**MINERALS EXPLORATION AND
ENVIRONMENTAL GEOCHEMISTRY**
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BIOGEOCHEMISTRY

This brochure highlights biogeochemical services offered by MEG, which include sample collection, sample preparation, quality assurance procedures, associate analytical services, and biogeochemical interpretation. MEG has developed leading technologies in biogeochemistry, which are available as case histories that can be sent by email on request.

OVERVIEW

MEG is an independent sample preparation laboratory working closely with several analytical laboratories to provide geochemical data for the mining and environmental industries. Established in 1984, it is now highly regarded for its sample preparation, quality control, geochemical interpretation, advanced mercury collection and mercury analysis. It is fully equipped to handle drill core and cuttings, rock chip, soil, sediment, vegetation, humus, and other exploration materials, providing special care to samples that may contain labile constituents at ppb and ppt concentrations.

MEG is best known for its biogeochemical services. This work has provided several published minerals exploration case histories which have become the foundation for several widely attended short courses on the application of biogeochemistry in the natural resources and environmental industries.

BROCHURE 2010

LATE DEVELOPMENTS

As the mining industry has grown globally, so has MEG. We provide the best-known and respected biogeochemical service in the Western Hemisphere, and despite added shipping costs from remote exploration frontiers, MEG receives samples from around the world. We are also the preferred subcontractor for many major N.A. laboratories (eg. ALS Chemex, Actlabs, Acme, SGS-XRAL, American Assay, Alaska Assay, Becquerel, Eco-Tech, iPL, and Skyline).

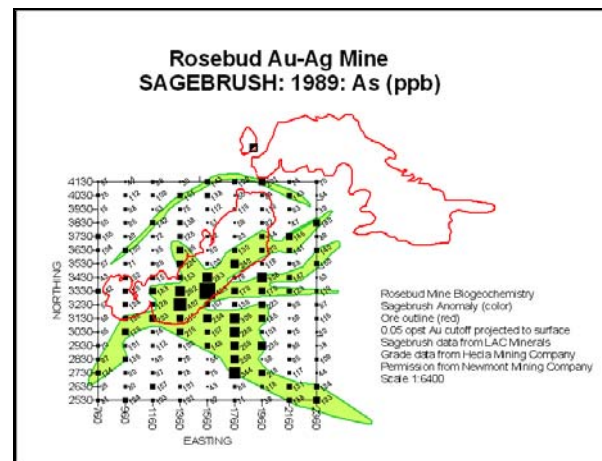
Please note our import permits:

SOIL: P330-09-00260 (Expires 12-16-2012)

VEGETATION: PDEP-07-00480 (10-4-2010)

Permit and Quarantine Stickers must be applied to the outside of all shipping containers.

Please notify MEG prior to shipping for late information on USDA import requirements.



Biogeochemical (A. tridentata), soil, and geophysical response to gold mineralization under 200 m of barren volcanics & alluvium, Rosebud Mine, Pershing Co., NV.

SAMPLE COLLECTION:

MEG is expert in survey design and sample collection. With 30 years experience in varied terrains throughout N.A., we can lead you directly to success. From reconnaissance to detailed grids, we know what to do and how to get it done. We can collect several media in one traverse, giving good return for your field investment. Often,

surveys cover both exposed and covered terrains and samples of just soils or vegetation alone are not enough. MEG can put one crew in the field to complete the entire geochemical survey and expedite the preparation and analysis of all your samples together. GPS, Brunton & chain control, fast and efficient collection, and coordination with the MEG Sample Preparation Laboratories for rapid return of data. We are happy to train and work with other contract or in-house crews. Bee pollen collection is also part of this infield service. Time and materials pricing. No padding.

Just honest pay for honest work.

SAMPLE PREPARATION:

MEG is Nevada's only independent full service sample preparation laboratory. This means you get the best prep, and because we work with all of the analytical labs in the industry, you get your choice of the best analysis without sacrificing one for the other. We are focused at MEG on preparing your samples cleanly, accurately, and consistently. Additionally, we are positioned to assure you unsurpassed quality since we incorporate QA/QC protocols you don't find at other laboratories. These include randomization and true-blind standards, replicates and blanks sent on for analysis. In this NI43-101 era, expert and thoughtful sample preparation is an important consideration to JV partners, stakeholders, and shareholders in your company.

And our vegetation prep equipment stands alone in the western US: Microwave dryers, Wiley Mill, Baird Pellet Press, 6 Temperature Controlled Ashing Kilns with smoke capture system. Since 1984, the vegetation lab (located 300 ft from the rock lab) has processed over 250,000 samples.

QUALITY CONTROL:

MEG Labs routinely adds standards (blind & known) to each job sent on to the analytical lab of your choice. We often randomize submittals (on your instructions, only) to monitor for systematic error during prep and analysis. A full spectrum of

biogeochemical standard reference materials are available for immediate use including Au-Ag, Cu-Mo-Pb-Zn, Pt-Pd, Ni-Co-V. Submittals leaving MEG are visually uniform, providing no information to the analytical lab as to what is sample and what is QA/QC. This is your guarantee that the ***DATA IS AS GOOD AS IT GETS.***

CONSULTING SERVICES

MEG is expert in the field of biogeochemistry. MEG can provide detailed examples and discussions on methods for minerals exploration and environmental studies. Specific services include field and office training, data review, and interpretation leading to target selection and assessment.

MEG is expert in the area of quality assurance. Standards, replicates, blanks and randomization schemes are your measures of quality. If you are understaffed, or need help creating a quality assurance program, MEG can monitor your QA/QC stream as an impartial advocate to assure your data's accuracy and precision. This involvement is by invitation only; otherwise MEG is totally out of the data loop.

Office	US \$105 /hour
Field	US \$1050 /day

QUALITY CONTROL PROGRAM

Known controls and several blind standards, replicates & blanks are included with every job that leaves MEG. These QA/QC samples are strategically positioned so that every batch of 30 within the submittal is monitored for precision & accuracy. This adds only about 4% to 9% to the total cost.

Blind standards, replicates & blanks	US \$5.90
Known controlseach....	US \$5.90
Randomizationeach....	US \$1.20

MEG LABS operates as an independent prep service to assure your geochemical samples are properly treated prior to analysis. MEG and the analytical labs will each invoice for their respective services. Data reporting is strictly proprietary, between you and the analytical laboratory. MEG is involved only to assure quality through randomization, controls, and blind standards, replicates and blanks. If you require QA/QC compilations, please refer to the services described above.

PROCEDURES

All samples are vigorously washed to thoroughly eliminate dust and other surface contaminants. Prior to washing or immediately thereafter, plant tissues can be separated to maximize chemical response and reduce variability. They are thoroughly dried in a microwave oven, and macerated to pass a 0.5mm sieve if they are to be pelletized, or a 2mm sieve if they are to be ashed. Ashed samples are submitted for either INAA, ICP/MS, ICP/OES, and/or GF/AAS analysis. Pelletized samples are analyzed by instrumental neutron activation analysis (INAA). Wet digestion of plant tissue and analysis by ICP/MS keeps prep costs low with superb metal detection.

DRY PULP / ICPMS PACKAGE:

Wash/dry/macerate/blend & SPLIT	US \$9.55
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15g PELLET PACKAGE:

Wash/dry/macerate/blend/weigh & PELLETIZE	US \$10.95
Shrink wrap each pellet	add US \$1.90
Substitute 30 g pellet.....	add US \$1.90

30g ASH PACKAGE:

Wash/dry/macerate/blend/weigh & ASH	US \$15.95
Each additional 30 g	add US \$ 5.55
Encapsulate ash for INAA	add US \$ 2.50

HUMUS PREP (Ao soils)

The preparation is designed to maximize the organic content of the sample while eliminating coarse and fine inorganics. The sample is then treated as vegetation described above. Itemized HUMUS and WEIGH charges are applied to the total prep cost.

ITEM PREP COSTS

Remove leaves & Prune.....	US \$1.55
Pelletize (8 to 15 g)	US \$3.90
Pelletize (30 grams)	US \$5.80
Ash (40g/ 450 C)	US \$5.55
Ash weight	US \$1.20
Humus (see above).....	US \$3.15
Duplicate Pulp	US \$1.00
Randomize	US \$1.20
Surcharges	US \$65/hr
Rush jobs	add 50%
Shipping (UPS, etc.)	COST +\$25 Handling
Veg Disposal (USDA Regulated)...	US \$0.55

MEG package prices apply to 225 g (1/2 pound) vegetation and humus samples in 7 x 12 inch cloth, olefin, or finon bags.

FIELD SERVICES

Crew	US \$ 295/day
Supervisor	US \$ 470/day
Vehicle	US \$ 0.70/mile
Expenses	Cost + 10%

HYDRO-BIOGEOCHEMICAL SURVEYS

Water quality issues can be addressed using biogeochemistry linked to ground water chemistry. See our "Consulting & Environmental Services Brochure". Call for details.

OTHER SERVICES

SAMPLE PREPARATION: *Rock Soil Sediment*
SURVEY & COLLECTION
GEOCHEMICAL INTERPRETATION
QUALITY ASSURANCE PROGRAMS
GEOCHEMICAL REFERENCE STANDARDS
MERCURY & RADON SOIL GAS ANALYSIS

Biogeochemistry

Plants may be viewed as geochemical sampling devices, with root systems that can selectively adsorb elements from a large 3D section of soil, groundwater and even bedrock. Typically, the relationship between the chemistry of a plant and that of the soil the plant grows in isn't one-to-one due to biological effects. The differences in element distribution and uptake in plants provide complementary information to soil surveys and may concentrate elements of interest where they are not present in soils.

ALS Geochemistry can help you find resources on designing vegetation surveys and special preparation for various vegetation tissue types. Please contact client services for more information.

Results are reported on vegetation samples following a nitric/hydrochloric acid digestion on 1g of sample. Due to permit requirements, vegetation samples are not available for return to the client.

39 Elements in Vegetation by Nitric/Hydrochloric, ICP-AES and ICP-MS

ANALYTES & DETECTION LIMITS (ppm)								CODE	PRICE PER SAMPLE (\$)
Ag	0.002	Cu	0.01	Nb	0.05	Ta	0.01	ME-VEG41	25.95 Sold only as a complete package.
Al	0.01%	Fe	0.001%	Ni	0.1	Te	0.02		
As	0.1	Ga	0.05	P	0.001%	Th	0.01		
Au	0.0002	Ge	0.05	Pb	0.01	Ti	0.001%		
B	10	Hf	0.02	Pd	0.002	Tl	0.02		
Ba	0.1	Hg	0.001	Pt	0.001	U	0.01		
Be	0.05	In	0.01	Rb	0.1	V	1		
Bi	0.01	K	0.01%	Re	0.001	W	0.05		
Ca	0.01%	La	0.01	S	0.01%	Y	0.005		
Cd	0.01	Li	0.1	Sb	0.02	Zn	0.1		
Ce	0.02	Mg	0.001%	Sc	0.1	Zr	0.1		
Co	0.01	Mn	1	Se	0.1				
Cr	0.5	Mo	0.01	Sn	0.2				
Cs	0.05	Na	0.001%	Sr	0.2				

REEs may be added on request.



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SAMPLE PREPARATION SERVICES
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Job No: CX13008V
Company: ALS CHEMEX
Geologist: D. JAMES / S. RICE
Project/ PO #: SW YUKON / MIDNIGHT
Received: 17-SEP-2013
Completed: 23-SEP-2013
Shipped to: ALS CHEMEX (Vancouver)

NOTES FROM MEG CHEMIST:

All weights in grams. Blind QA/QC samples are indicated to client only.
Sample preparation (using the ENTIRE sample):

___ Oven Dry (50C) ___ Randomize within limits of ALS Bar Code Labels
___ Pulverize to 150 mesh = _____sec
___ (-150 mesh) into 3x5 envelope with ALS bar code
___ Store archive pulp envelope with ALS bar code
___ Store bulk reject in original bar coded ziploc

NOTE: SAMPLE L-14100 MISSING FROM SHIPMENT

SPECIES: BLACK SPUCE BARK (S) & LABRADOR TEA (L)
ALS CLIENT: MIDMIN
WORK ORDER: WH13150726
ANALYSIS: ME-VEG41

MEG SEQ	ALS SEQ	SAMPLE ID
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s1	s2	s3	s4
1	42	QAQC 1	
2	20	S-12150	
3	61	S-16550	
4	51	S-16050	
5	47	S-14650	
6	59	S-16450	
7	72	S0W30S	
8	41	S-14350	
9	24	S-12350	
10	7	S-10350	
11	62	S-16600	
12	11	S-10550	
13	91	S-10300	
14	54	S-16200	
15	40	S-14300	
16	22	S-12250	
17	50	S-16000	
18	78	L-14050	
19	49	S-14800	
20	84	L-14400	
21	94	S-14800A	
22	68	S0E15S	
23	69	S0E	
24	18	S-12050	
25	35	S-14050	A
26	44	QAQC 2	
27	58	S-16400	
28	36	S-14100	
29	57	S-16350	
30	92	S-14400S	

STANDARD: V34 (11 ppm Cu, 1.3 Ni, 0.1 ppb Pt)

STANDARD: V32 (7 ppm Cu, 0.7 Ni)

31 66 S0E30S
 32 13 S- 10650
 33 73 S0W15S
 34 60 S- 16500
 35 70 S0E15N
 36 64 S- 16800
 37 95 S- 16300S
 38 52 S- 16100
 39 31 S- 12750
 40 81 L- 14200
 41 96 L- 10100
 42 83 L- 14350
 43 12 S- 10600
 44 30 S- 12650
 45 65 QAQC 3
 46 98 L- 14450
 47 76 S0W30N
 48 55 S- 16250
 49 53 S- 16150
 50 97 L- 14300
 51 93 S- 14500S
 52 82 L- 14250
 53 1 S- 10000
 54 10 S- 10500
 55 2 S- 10050
 56 34 S- 14050
 57 86 L- 14550
 58 77 L- 14000
 59 74 S0W
 60 67 S0E30S A
 61 5 S- 10200
 62 23 S- 12300
 63 43 S- 14450
 64 16 S- 10800
 65 46 S- 14600
 66 15 S- 10700 A
 67 39 S- 14250
 68 45 S- 14550
 69 63 S- 16650
 70 6 S- 10250
 71 4 S- 10150
 72 3 S- 10100
 73 71 S0E30N
 74 19 S- 12100
 75 8 S- 10400
 76 88 L- L0E
 77 25 S- 12400
 78 85 L- 14500
 79 29 S- 12600
 80 17 S- 12000
 81 27 S- 12500
 82 32 S- 12800
 83 56 QAQC 4
 84 33 S- 14000
 85 90 L- L0W15S
 86 26 S- 12450
 87 21 S- 12200
 88 28 S- 12550
 89 89 L- L0E15N

STANDARD: V34 (11 ppm Cu, 1.3 Ni, 0.1 ppb Pt)

STANDARD: V32 (7 ppm Cu, 0.7 Ni)

90 80 L- 14150
91 48 S- 14700
92 38 S- 14200
93 75 SOW15N
94 14 S- 10700
95 87 L- L0E15S
96 9 S- 10450
97 37 S- 14150
98 79 QAQC 5

STANDARD: V34 (11 ppm Cu, 1.3 Ni, 0.1 ppb Pt)