ANALYTICAL LABORATORY and MOBILE SAMPLING PLATFORM

PROGRESS REPORT

JANUARY 1, 1995 to MARCH 31, 1995

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ROCK ANALYSIS

Final, certified values, from the Canadian Certified Reference Materials Project (CCRMP) were received for Standard Reference Material SY-4. Below is a table comparing our results with the certified values.

Element & Mass	CCRMP Values (ppm)	95% Confidence Interval	HRC Values (ppm)	Standard Deviation	Method Detection Limit	% Recovery
Ag 107	0.6	0.16	< DL		1.4	
Ba 135	340	5	344	16	1.5	101
Be 9	2.6	0.1	2.4	0.9	0.61	92
Cd 114	0.1 - 0.3*		< DL		0.36	
Ce 140	122	2	130	5	0.049	107
Co 59	2.8	0.2	3.1	0.2	0.024	111
Cr 52	12	1	12.1	0.8	1.3	101
Cs 133	1.5	0.1	1.30	0.06	0.03	87
Cu 63	7	1	6.3	1.1	0.73	90
Dy 163	18.2	0.6	23	1	0.03	126
Er 166	14.2	0.5	17.5	0.9	0.085	123
Eu 153	2.00	0.04	2.27	0.08	0.049	114
Ga 71	35	1	43	1	0.23	123
Gd 158	14.0	0.5	19	1	0.13	136
Ge 73	1 - 4*		3.9	0.5	0.42	
Ho 165	4.3	0.1	5.2	0.2	0.021	121
La 139	58	1	63	3	0.015	109
Lu 175	2.1	0.1	2.5	0.2	0.055	119
Mo 95	0.2 - 3*		< DL		0.44	
Nb 93	13	1	19	2	0.16	146

Element & Mass	CCRMP Values (ppm)	95% Confidence Interval	HRC Values (ppm)	Standard Deviation	Method Detection Limit	% Recovery
Nd 143	57	1	65	2	0.091	114
Ni 60	9	1	11	5	1.8	122
Pb 208	10	1	11.5	0.9	0.33	115
Pr 141	15.0	0.3	16.8	0.7	0.067	112
Rb 85	55	1.5	30	2	0.18	55
Sm 147	12.7	0.4	14.6	0.4	0.11	115
Sr 86	1191	12	1128	65	0.67	95
Tb 159	2.6	0.1	3.3	0.2	0.073	127
Th 232	1.4	0.2	1.9	0.5	0.45	136
Tm 169	2.3	0.1	2.7	0.2	0.067	117
U 238	0.8	0.1	0.8	0.3	0.32	100
W 182	0.2 - 15*		0.7	1.0	0.55	
Y 89	119	2	130	7	0.030	109
Yb 173	14.8	0.4	18	1	0.12	122
Zr 90	517	16	202	24	0.61	39

* These are information values only. Insufficient data were received to determine a certified value for these elements.

Low recovery for Zircon is due to incomplete digestion of the sample. Another digestion method using basic reagents is being investigated for a more complete digestion.

High recoveries for some of the rare earth elements may be due to oxide formation interference. Correction for such interferences is being investigated at this time.

Digestion of reference rock materials by three different microwave methods has been completed. Analysis by ICP-MS is currently in process. A total of 21 samples are being analyzed.

These include 10 unknowns from Nevada Bureau of Mines and Geology, 8 Standard Reference Materials from the USGS, one soil

sample from NIST, one CCRMP reference material, and one tuff sample from the Yucca Mountain area. It is anticipated that analysis will be completed by the end of June and data compilation and verification will be done in August.

SAMPLE ANALYSIS

The analysis of the samples collected from Ash Meadows, Death Valley and the NTS is in progress and will be completed this quarter.

VAPOR TRACERS

No activity during this quarter.

SOIL GAS SURVEY

No activity during this quarter.

CERTIFICATION

USGS round-robin samples were analyzed for Ca, K, Mg, Na, Hg, pH, alkalinity and conductivity.

Results from the fall 1994 round-robin samples were received and are appended to this report.

Results for EPA WP-033 samples were received and are appended to this report.

SAMPLING

A new spring, Stonewall, located north of Beatty was sampled in January.

HRC PERFORMANCE IN USGS ROUND ROBIN - Mercury

	Fall '92	HRC/ MPV	Spr '93	HRC/ MPV	Fall '93	HRC/ MPV	Fall '94	HRC/ MPV
Hg	0	1.2/.41					3	1.10/1.01 ug/l

HRC PERFORMANCE IN USGS ROUND ROBIN - Nutrient (low)

Nonpreserved Nutrients	Spr '94		Fall '94	
	N-42*score	HRC/MPV**	N-44*score	HRC/MPV**
NH3 as N				
NH3+Org N as N				
NO3 + NO2 as N	3	1.87/1.93 mg/l	4	.810/.800 mg/l
total P as P				
PO4 as P				

OLR 3.0

OLR 4.0

OLR-overall lab rating

* performance ratings: 0=poor, 1=questionable, 2=satisfactory, 3=good, 4=excellent

** most probable value

HRC PERFORMANCE IN USGS ROUND ROBIN - Majors

Spr '94 M-130*			Fall '94 M-132*	
scores	HRC/MPV**		scores	HRC/MPV**
		Alkalinity	NR	90.5/94.0 mg/l
		B		
3	21.7/21.2 mg/l	Ca	3	38.9/38.0 mg/l
3	22.4/21.4 mg/l	Chloride	4	55.0/55.7 mg/l
		DSRD		
3	1.18/1.23 mg/l	Fluoride	0	.350/.480 mg/l
4	2.93/3.00 ug/l	K	4	2.04/2.00 ug/l
4	6.02/5.90 mg/l	Mg	4	8.60/8.49 mg/l
3	37.0/35.8 mg/l	Na	4	48.3/47.9 mg/l
		P-total		
2	8.17/8.02	pH	2	8.31/8.09
		SiO2		
3	55.4/58.0 mg/l	SO4	2	56.3/60.0 mg/l
0	436/335 uS	Sp cond	3	500/493 uS
		Sr		
		V		

OLR 2.8

OLR 2.9

HRC PERFORMANCE IN USGS ROUND ROBIN - Trace Metals

	Spr '94 T-129a*		T-129b*		Fall'94 T-131A*		T-131b*	
	scores	GFAA HRC/MP	scores	ICP-MS HRC/MP	scores	GFAA HRC/MPV**	scores	ICP-MS HRC/MPV**
Ag			4	.02/.37 ug			4	1.20/1.26 ug/l
Al			4	51.4/50.0			3	119/132 ug/l
As			4	.19/.55 ug			4	55.5/56.6 ug/l
B								
Ba			4	34.7/34.0			0	5/507 ug/l
Be			3	.03/.12 ug			4	12.0/12.2 ug/l
Ca	2	22.2/21.1			4	31.1/30.6 ug/l		
Cd			4	.32/.34 ug			4	6.15/6.10 ug/l
Co			3	.10/.74 ug			3	25.2/24.6 ug/l
Cr	4	.42/.68 ug		.39/.68 ug			4	19.1/18.6 ug/l
Cu			3	3.2/2.7 ug			4	20.8/20.2 ug/l
Fe								
K	4	3.06/3.00			4	2.46/2.39 mg		
Li			4	18.8/18.0			4	16.9/17.0 ug/l
Mg	2	6.12/5.83			3	8.27/8.00 mg		
Mn			2	28.2/25.2			4	38.0/37.8 ug/l
Mo			4	21.0/20.3			4	113/112 ug/l
Na	2	37.3/35.5			3	22.1/21.4 mg		
Ni			4	1.5/1.7 ug			3	58.7/56.3 ug/l
Pb			3	.06/1.00 u			4	17.4/18.1 ug/l
Sb			4	.23/.55 ug			4	55.8/56.2 ug/l
Se			3	.20/1.60 u			4	11.1/11.2 ug/l
SiO2								
Sr			3	191/181 u			4	293/295 ug/l
V			4	.1/1.0 ug/l			3	36.1/34.2 ug/l
Zn							3	67.7/72.0 ug/l
OLR 2.8		OLR 3.5		T-131 OLR 3.6				

OLR-overall lab rating

* performance ratings: 0=poor, 1=questionable, 2=satisfactory, 3=good, 4=excellent

** most probable value

HRC PERFORMANCE IN USGS ROUND ROBIN - VOCs

Analytes	Fall '94 VOC 5.94		True Expected
	scores	HRC/MPV*	values
trichlorofluoromethane		NR/.95	1.1
vinyl Chloride	4	8.31/7.4	8.3
1,1,1-trichloroethane	4	10.9/10.5	11
1,1-dichloroethane		NR/1.06	1.1
1,1-dichloroethene	4	8.29/8.24	8.7
dichloromethane	3	1.83/1.50	1.2
chloroform	4	11.7/11.8	12
carbon tetrachloride	3	11.1/10	10
benzene	3	11.3/10.9	11
1,2-dichloroethane	3	11.5/11.0	11.2
trichloroethene	4	12.1/11.4	11.5
1,2-dichloropropane	2	1.39/1.20	1.1
bromodichloromethane	4	10.6/10.3	11
toluene		0.27/0	0
dibromochloromethane	3	11.9/10.9	10.6
chlorobenzene	1	1.47/1.12	1.2
xylene		0.57/0	0
bromoform	3	9.63/8.92	9.5
tetrachloroethene	2	1.29/1.06	1.1
1,1,2-trichloroethane	0	1.51/1.19	1.1
1,4-dichlorobenzene	3	11.7/10.8	10.9
1,2-dichlorobenzene		0.51/0	0
mean**	2.9		

* "most probable value" = median of all reported values

** mean is based on values reported; not penalized for missed compounds or extra compounds

HRC PERFORMANCE IN USGS ROUND ROBIN

	OLRs				
	Fall '92	Spr '93	Fall '93	Spr '94	Fall '94
Trace Metals	T-121/T-123	T-125	T-127	T-129	T-131
ICP-MS	2.9	3.7	3.3	3.5	3.6
AA	2.8	2.3	3	2.8	AA+ICP-MS
ICP-MS	3.7				
AA	3.2				
Majors	M-124	M-126	M-128	M-130	M-132
	0.9	1.6	2.7	2.8	2.9
Nutrients-nonpreserved		N-38	N-40	N-42	N-44
		1.5	4	3	4
Nutrients-preserved	N-37	N-39	N-41		
	1	3.5	3.5		
Precipitation	P-19	P-20	P-21	P-22	P-23
	4	3	3.8	2.8	2.3
Mercury					Hg-19
	0				3
Volatile Organics					VOC 5.94
					2.9
OWRs (inorganic)					3.1
					3.2

OLRs-overall laboratory ratings for that sample

OWRs-overall weighted laboratory ratings for entire sample set

Performance Evaluation Report
USEPA Water Pollution Study WPO33

Page: 1
Date: 10FEB95

Participant ID: NV00049

Type: OTHER

Requesting Office: NV

Sample Number	Reported Value	True Value*	Acceptance Limits	Warning Limits	Performance Evaluation
MINERALS IN MG/LITER (EXCEPT AS NOTED)					
019-PH-UNITS					
03	5.30	5.26	5.21- 5.36	5.23- 5.35	Accept.
04	4.09	4.11	4.02- 4.16	4.04- 4.14	Accept.
020-SPEC. COND. (UMHOS/CM AT 25 C)					
01	315	309	284- 337	291- 330	Accept.
02	948	937	873- 1020	892- 1010	Accept.
021-TDS AT 180 C					
01	159	184	124- 200	133- 190	Accept.
02	473	561	441- 701	473- 668	Accept.
023-CALCIUM					
01	11.9	12.0	10.7- 13.6	11- 13.2	Accept.
02	88.8	89.0	77.7- 98.1	80.3- 95.5	Accept.
024-MAGNESIUM					
01	12.6	13.0	11.4- 14.9	11.8- 14.4	Accept.
02	4.19	4.19	3.57- 4.74	3.72- 4.59	Accept.
025-SODIUM					
01	15.5	15.7	13.7- 18.2	14.3- 17.6	Accept.
02	95.5	94.2	85.7- 101	87.6- 99	Accept.
026-POTASSIUM					
01	13.4	14.0	12.1- 16	12.6- 15.5	Accept.
02	5.3	5.20	4.24- 6.23	4.49- 5.98	Accept.
027-TOTAL ALKALINITY (AS CaCO3)					
01	27.3	28.5	24.2- 33.1	25.3- 32	Accept.
02	85.6	86.4	76.9- 95	79.2- 92.7	Accept.
028-CHLORIDE					
01	58.4	59.2	53.5- 64.1	54.8- 62.7	Accept.
02	165	170	155- 182	159- 178	Accept.
029-FLUORIDE					
01	0.19	0.240	0.168- 0.31	0.186-0.292	Ck. for Err.
02	3.30	4.00	3.5- 4.46	3.62- 4.34	Not Accept.
030-SULFATE					
01	20.3	22.0	17.6- 25.4	18.6- 24.4	Accept.
02	104	110	88.6- 127	93.4- 122	Accept.
NUTRIENTS IN MILLIGRAMS/LITER					
032-NITRATE-NITROGEN					
01	0.84	0.860	0.654- 1.05	0.703- 1.01	Accept.
02	0.26	0.270	0.177-0.362	0.199- 0.34	Accept.
033-ORTHOPHOSPHATE					
01	4.86	5.00	4.28- 5.67	4.46- 5.5	Accept.
02	0.10	0.120	0.0883-0.152	0.0963-0.145	Accept.

***** END OF DATA FOR NV00049 *****

NOTE: FOR LIMITS AND TRUE VALUES, ASSUME THREE SIGNIFICANT DIGITS.

***** END OF REPORT FOR NV00049 *****

* Based on gravimetric calculations, or a reference value when necessary.