Results – Hydrothermal breccias

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PETROGRAPHY

Sample Number A92-4R1-1
Rock Type Hydrothermal breccia / volcanic bx / hyaloclastite
Location E. Blanco Depression
Described By RAK
Date 8/25/95
Sample Description:

Closely packed volcanic and glass fragments cemented by silica, barite, and sulfides. Volcanics altered to clay minerals, mostly birefringent, ~

Textures:

Smectite — replacement of volcanic clasts

Mineral Descriptions: Barite - large euhedral / subhedral blocks, to 2.5 mm in length, some resorption. Silica - coatings, nearly isotropic, ~10 μ thick
Sulfides: pyrite >> marcasite in interstitial aggregates and diss. in volcanic clasts; py >> sp sphalerite euhedral, pale green, transparent, generally bordering FeS_2 clusters / grains. Sp also in clusters of small euhedral grains ~ 0.05 mm across

Mineral Abundance:

	Abundant/Dominant	Common	Minor	Trace
Secondary:	smectite	barite silica	pyrite, marcasite sphalerite	

Paragenesis:

All hydrothermal phases except py are interstitial. Some py is disseminated in volcanic frags.

Additional Comments:

Analytical Work Needed:

PETROGRAPHY

Sample Number A72-4R2-(2)
Rock Type
Location
Described By
Date
Sample Description:

Volcanic bx w/ cs plagioclase phenocrysts partly preserved; groundmass altered

Textures:

Mineral Descriptions:

Mineral Abundance:

Abundant/Dominant	Common	Minor	Trace

Paragenesis:

Additional Comments:

Analytical Work Needed:

PETROGRAPHY

Sample Number A92-4R2(1)
Rock Type
Location
Described By
Date
Sample Description:

Textures:

Mineral Descriptions:

Mineral Abundance:

Abundant/Dominant	Common	Minor	Trace
Plagioclase	barite pyrite, marcasite		galena chalcopyrite

Paragenesis:

Additional Comments:

Analytical Work Needed:

Chemistry of hydrothermal samples, East Blanco Depression, Blanco Fracture Zone

	A92-4R2-1 bulk	A92-4R2-2 coat	A92-4R2-2 bulk
weight percent			
SiO_2 [a]	47.1	59.8	42.5
Al_2O_3	11.2	9.37	11.0
Fe_2O_3	9.38	8.29	6.08
MgO	1.78	1.48	1.78
CaO	0.04	0.55	1.16
Na_2O	1.30	1.32	1.14
K_20	0.32	0.85	0.22
P_2O_5	<0.01	<0.01	<0.01
TiO_2	0.223	0.174	0.203
MnO	<0.01	<0.01	<0.01
BaO	7.68	5.81	17.86
LOI	16.6	12.9	12.3
Total	95.6	100.6	94.3
C	0.06	0.54	0.32
C org	0.09	0.55	0.27
S	7.80	6.40	6.92
parts per million			
Ag	23.0	15.0	17.6
As	240	150	84.0
Au (ppb)	240	160	99
B	23	26	22
Be	2	1	1
Bi	<0.5	<0.5	<0.5
Br	10	12	6
Cd	67.8	10.6	6.4
Cl	3380	4.570	1390
Co	22	31	10
Cr	170	70	140
Cs	1.0	2.0	1.0
Cu	399	283	152
Ga	14	13	10
Ge	<10	<10	<10
Hf	<0.2	1.4	<0.02
Hg (ppb)	1580	2440	590
In	<0.5	<0.5	<0.5
Li	3	7	5
Mo	32	70	44
Nb	4	5	4
Ni	79	115	41
Pb	231	294	732
Rb	8	28	6
Sb	11.0	9.9	13.0
Sc	18	10	16
Se	<1	<1	<1
Sn	<2	5	<2
Sr	682	596	1310

Chemistry of hydrothermal samples, East Blanco Depression, Blanco Fracture Zone, continued

	A92-4R2-1 bulk	A92-4R2-2 coat	A92-4R2-2 bulk
Ta	<0.5	<0.5	<0.5
Th	<0.2	2.1	<0.2
Tl	16.6	14.4	4.5
U	21.9	7.8	2.6
V	145	119	104
W	8	4	14
Y	4	7	2
Zn	4730	764	1500
Zr	<1	23	<1
La	0.6	5.9	0.8
Ce	0.8	10.2	0.6
Pr	<0.1	0.6	<0.1
Nd	0.6	5.4	0.3
Sm	0.3	1.1	<0.1
Eu	<0.05	<0.05	<0.05
Tm	<0.01	<0.01	<0.01
Yb	0.4	0.6	<0.01
Lu	<0.05	<0.05	<0.05

[a] Methods: Coulom: C org; ICP: Ag, B, Be, Co, Cu, Ge, Li, Mo, Ni, Pb, Sc, Sr, V, Zn; ICP Mass Spectrometry: Bi, Cd, Ce, Eu, Ga, In, La, Lu, Nd, Pr, Sm, Tl, Tm, Y, Yb; Leco: C, S; Neutron Activation: As, Au, Br, Cr, Cs, Hf, Sb, Se, Ta, Th, U, W; Wet Chemistry: Hg; X-Ray Fluorescence: Cl, Nb, Rb, Sn, Zr; X-Ray Fluorescence-F: Al2O3, Ba, CaO, Fe2O3, K20, LOI, MgO, MnO, Na2O, P2O5, SiO2, TiO2

SAMPLE	AU PPB NA 2	LI PPM ICP 1	BE PPM ICP 1	B PPM ICP 10	C % LECO 0.01	C ORG % COULOM 0.05	NA2O % XRF-F 0.01	MGO % XRF-F 0.01	AL2O3 % XRF-F 0.01
24R2-1 bulk	240	3	2	23	0.06	0.09	1.30	1.78	11.2
A9424R-2A coat	160	7	1	26	0.54	0.55	1.32	1.48	9.37
A9424R-2B bulk	99	5	1	22	0.32	0.27	1.14	1.78	11.0
C XRA CONTROL	--	--	--	--	--	--	--	--	--
C XRA CONTROL	--	--	--	--	--	--	--	--	--
C SY-2	--	93	25	84	--	--	4.75	2.79	12.1
C SY-2	--	--	--	--	--	--	4.75	2.76	12.1
C WET LAB CONTROL	--	--	--	--	--	2.02	--	--	--
D A924R2-1	240	2	2	26	0.07	0.06	1.30	1.77	11.3

SAMPLE	SIO2 % XRF-F 0.01	P2O5 % XRF-F 0.01	S % LECO 0.005	CL PPM XRF 100	K2O % XRF-F 0.01	CAO % XRF-F 0.01	SC PPM ICP 1	TIO2 % XRF-F 0.001	V PPM ICP 2
A924R2-1	47.1	<.01	7.80	3380	0.32	0.04	18	0.223	145
A9424R-2A	59.8	<.01	6.40	4570	0.85	0.55	10	0.174	119
A9424R-2B	42.5	<.01	6.92	1390	0.22	1.16	16	0.203	104
C XRA CONTROL	--	--	--	134	--	--	--	--	--
C XRA CONTROL	--	--	--	148	--	--	--	--	--
C SY-2	60.5	0.44	--	--	4.26	7.99	7	0.128	55
C SY-2	60.2	0.43	--	--	4.25	8.03	--	0.131	--
C WET LAB CONTROL	--	--	--	--	--	--	--	--	--
D A924R2-1	47.3	<.01	7.85	NSS	0.33	0.03	17	0.222	142

SAMPLE	CR PPM NA 2	MNO % XRF-F 0.01	FE2O3 % XRF-F 0.01	CO PPM ICP 1	NI PPM ICP 1	CU PPM ICP 0.5	ZN PPM ICP 0.5	GA PPM ICPMS 1	GE PPM ICP 10
A924R2-1	170	<.01	9.38	22	79	399	4730	14	<10
A9424R-2A	70	<.01	8.29	31	115	283	764	13	<10
A9424R-2B	140	<.01	6.08	10	41	152	1500	10	<10
C XRA CONTROL	--	--	--	--	--	--	--	--	--
C XRA CONTROL	--	--	--	--	--	--	--	--	--
C SY-2	--	0.32	6.27	7	7	4.9	260	34	<10
C SY-2	--	0.32	6.28	--	--	--	--	--	--
C WET LAB CONTROL	--	--	--	--	--	--	--	--	--
D A924R2-1	170	<.01	9.49	21	80	401	4750	14	<10

SAMPLE	AS PPM NA 0.1	SE PPM NA 1	BR PPM NA 1	RB PPM XRF 2	SR PPM ICP 1	Y PPM ICPMS 1	ZR PPM XRF 1	NB PPM XRF 2	MO PPM ICP 1
A924R2-1	240	<1	10	8	682	4	<1	4	32
A9424R-2A	150	<1	12	28	596	7	23	5	70
A9424R-2B	84.0	<1	6	6	1310	2	<1	4	44
C XRA CONTROL	--	--	--	223	--	--	286	22	--
C XRA CONTROL	--	--	--	219	--	--	286	23	--
C SY-2	--	--	--	--	291	139	--	--	<1
C SY-2	--	--	--	--	--	--	--	--	--
C WET LAB CONTROL	--	--	--	--	--	--	--	--	--
D A924R2-1	240	<1	9	NSS	676	4	NSS	NSS	33

SAMPLE	AG PPM ICP 0.1	CD PPM ICPMS 0.2	IN PPM ICPMS 0.5	SN PPM XRF 2	SB PPM NA 0.1	CS PPM NA 0.5	BA PPM XRF-F 10	LA PPM ICPMS 0.1	CE PPM ICPMS 0.1
A924R2-1	23.0	67.8	<.5	<2	11.0	1.0	68800	0.6	0.8
A9424R-2A	15.0	10.6	<.5	5	9.9	2.0	52100	5.9	10.2
A9424R-2B	17.6	6.4	<.5	<2	13.0	1.0	160000	0.8	0.6
C XRA CONTROL	--	--	--	6	--	--	--	--	--
C XRA CONTROL	--	--	--	6	--	--	--	--	--
C SY-2	0.3	0.2	<.5	--	--	--	454	78.2	181
C SY-2	--	--	--	--	--	--	426	--	--
C WET LAB CONTROL	--	--	--	--	--	--	--	--	--
D A924R2-1	22.3	69.1	<.5	NSS	11.0	1.0	68600	0.6	0.7

SAMPLE	PR PPM ICPMS 0.1	ND PPM ICPMS 0.1	SM PPM ICPMS 0.1	EU PPM ICPMS 0.05	GD PPM ICPMS 0.1	TB PPM ICPMS 0.1	DY PPM ICPMS 0.1	HO PPM ICPMS 0.05	ER PPM ICPMS 0.1
A924R2-1	<.1	0.6	0.3	<.05	0.4	<.1	0.5	<.05	0.3
A9424R-2A	0.9	5.4	1.1	<.05	1.2	<.1	0.9	<.05	0.5
A9424R-2B	<.1	0.3	<.1	<.05	0.1	<.1	<.1	<.05	<.1

SAMPLE	PR PPM ICPMS 0.1	ND PPM ICPMS 0.1	SM PPM ICPMS 0.1	EU PPM ICPMS 0.05	GD PPM ICPMS 0.1	TB PPM ICPMS 0.1	DY PPM ICPMS 0.1	HO PPM ICPMS 0.05	ER PPM ICPMS 0.1
XRA CONTROL	--	--	--	--	--	--	--	--	--
C XRA CONTROL	--	--	--	--	--	--	--	--	--
C SY-2	21.5	84.9	19.6	2.41	20.0	2.9	22.4	4.54	15.8
C SY-2	--	--	--	--	--	--	--	--	--
C WET LAB CONTROL	--	--	--	--	--	--	--	--	--
D A924R2-1	<.1	0.5	0.2	<.05	0.4	<.1	0.5	<.05	0.3

SAMPLE	TM PPM ICPMS 0.1	YB PPM ICPMS 0.1	LU PPM ICPMS 0.05	HF PPM NA 0.2	TA PPM NA 0.5	W PPM NA 1	HG PPB WET 5	TL PPM ICPMS 0.1	PB PPM ICP 2
A924R2-1	<.1	0.4	<.05	<.2	<.5	8	1580	16.6	231
A9424R-2A	<.1	0.6	<.05	1.4	<.5	4	2440	14.4	294
A9424R-2B	<.1	<.1	<.05	<.2	<.5	14	590	4.5	732
C XRA CONTROL	--	--	--	--	--	--	--	--	--
C XRA CONTROL	--	--	--	--	--	--	--	--	--
C SY-2	2.1	18.6	2.62	--	--	--	--	1.0	90
C SY-2	--	--	--	--	--	--	--	--	--
C WET LAB CONTROL	--	--	--	--	--	--	87	--	--
D A924R2-1	<.1	0.4	<.05	<.2	<.5	9	1650	16.9	239

SAMPLE	BI PPM ICPMS 0.5	TH PPM NA 0.2	U PPM NA 0.1	LOI % XRF-F 0.01	SUM % XRF-F 0.1
A924R2-1	<.5	<.2	21.9	16.6	95.6
A9424R-2A	<.5	2.1	7.8	12.9	100.6
A9424R-2B	<.5	<.2	2.6	12.3	94.3
C XRA CONTROL	--	--	--	--	--
C XRA CONTROL	--	--	--	--	--
C SY-2	<.5	--	--	1.20	100.8
C SY-2	--	--	--	1.20	100.5
C WET LAB CONTROL	--	--	--	--	--
24R2-1	<.5	<.2	22.6	15.9	95.3

XRAL Laboratories
A Division of SGS Canada Inc.

1885 Leslie Street
Don Mills, Ont.
Canada M3B 3J4
Telephone (416) 445-5755
Fax (416) 445-4152

PLEASE DELIVER THE FOLLOWING TO:

NAME: JANE A. REID

FIRM: U.S. GEOLOGICAL SURVEY

FAX NO. 14153543191

FROM:

DEPT.: DATACENTER

TOTAL NUMBER OF PAGES INCLUDING COVER LETTER: 3

PARTIAL REPORT: [ ] YES [X] NO

DATE: 28-Jun-95 PROJECT #: REQ# 9460-4390

WORKORDER #: 3972

IF YOU DO NOT RECEIVE ALL PAGES, PLEASE CALL (416) 445-5755

COMMENTS (IF ANY):

XRAL Laboratories
A Division of SGS Canada Inc.

1885 Leslie Street
Don Mills, Ont.
Canada M3B 3J4
Telephone (416) 445-5755
Fax (416) 445-4152

ACKNOWLEDGEMENT OF ANALYTICAL REQUEST

TO: U.S. GEOLOGICAL SURVEY
ATTN: JANE A. REID
345 MIDDLEFIELD ROAD - MS 999
MENLO PARK, CALIFORNIA 94025

CUSTOMER No. 139

WORKORDER *3972-*

We have received a shipment on *1-Jun-95*.

Project No.:
Weighbill No.:*400-0981-1594*
From:

Shipped via:*FEDEX*
Summary:*U.S. GEOLOGICAL SURV(3R,CP)*

Distribution of:*No instructions for pulps; thus to be dumped after 180 days of reporting.*
unused material:*No instructions for rejects; thus to be dumped after 30 days of reporting.*

3 samples from *A924R2-1* to *A9424R-2B*

Analytical Request:

Ele	Unit	Req	Ele	Unit	Req	Ele	Unit	Req	Ele	Unit	Req	Ele	Unit	Req	Ele	Unit	Req
AU	PPB	3	LI	PPM	3	BE	PPM	3	B	PPM	3	C	%	3	C ORG	%	3
NA2O	%	3	MGO	%	3	AL2O3	%	3	SIO2	%	3	P2O5	%	3	S	%	3
CL	PPM	3	K2O	%	3	CAO	%	3	SC	PPM	3	TIO2	%	3	V	PPM	3
CR	PPM	3	CR2O3	%	3	MNO	%	3	FE2O3	%	3	CO	PPM	3	NI	PPM	3
CU	PPM	3	ZN	PPM	3	GA	PPM	3	GE	PPM	3	AS	PPM	3	SE	PPM	3
BR	PPM	3	RB	PPM	3	RB	PPM	3	SR	PPM	3	SR	PPM	3	Y	PPM	3
Y	PPM	3	ZR	PPM	3	ZR	PPM	3	NB	PPM	3	NB	PPM	3	MO	PPM	3
AG	PPM	3	CD	PPM	3	IN	PPM	3	SN	PPM	3	SB	PPM	3	CS	PPM	3
BA	PPM	3	LA	PPM	3	CE	PPM	3	PR	PPM	3	ND	PPM	3	SM	PPM	3
EU	PPM	3	GD	PPM	3	TB	PPM	3	DY	PPM	3	HO	PPM	3	ER	PPM	3
TM	PPM	3	YB	PPM	3	LU	PPM	3	HF	PPM	3	TA	PPM	3	W	PPM	3
HG	PPB	3	TL	PPM	3	PB	PPM	3	BI	PPM	3	TH	PPM	3	U	PPM	3
LOI	%	3															

When referring to these samples please quote Work Order No. 3972.

We thank you for your order.

07-Jun-95

X-Ray Laboratories

(Rev. April 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR

REQUISITION

COPY FOR YOUR INFORMATION
ORIGINAL

Requisition No. 5-9460-439

To Purchasing	Bureau/Office USGS/OEMG/PMG
	Date 5/25/95
Appropriation/Allotment No. 001- 5-9460-33521 OC:26.9Z $509.85	Charge shipping costs to
Vendor XRAL Laboratories 1885 Leslie Street Toronto, Ontario M3B 3J4 1-800-387-0255	Deliver to Jane Reid x3073 345 Middlefield Road, MS999 Menlo Park, CA 94025

ITEM OR FORM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	MER package	3		140.00	$420.00
2	Organic C Assay	3		13.65	$40.95
3	Total C Assay	3		9.65	$28.95
4	Agate mill grinding	3		6.65	$19.95
	TOTAL.....				$509.85

To Be Completed by Fiscal Authority Only

UND CERTIFICATION: Funds in the amounts shown are available nd chargeable to the cost authorities shown above.

ignature	Date	Approved by (Signature)	Date 5/30/95
itle		Title ADMINISTRATIVE OFFICER	
equi ed by (Signature) Jane A Reid	Date 5/25/95	Bureau Officer (Signature)	Date
tle Geologist		Title	

United States Department of the Interior
Geological Survey

Branch of Pacific Marine Geology
345 Middlefield Road, MS 999
Menlo Park, California 94025

May 30, 1995

Igor Levin
XRAL Laboratories
1885 Leslie Street
Toronto, Ontario M3B 3J4

Dear Igor:

Enclosed are three barite-rich hydrothermal samples from the Blanco Fracture Zone, offshore California. I request the MER package, assays for total carbon and organic carbon, and grinding in an agate mill. I have sent extra sample for re-runs (if necessary), although sample A924R2-2A is limited due to a small available sample.

The purchase requistion number is 9460-4390 (copy attached), and someone from the USGS purchasing office should call your office soon with the purchase order number.

These samples have no economic value.

If you have questions, please call me at 415-354-3073. I understand it should take about 3-4 weeks to get results. I would appreciate a faxed copy of the results as soon as is practicable, at 415-354-3191.

Thank you.

Sincerely,

Jane A. Reid
Geologist

The samples are:

A924R2-1	bulk	12.5 g
A924R2-2A	"mud" (smectite?) coat	~8 g
A924R2-2B	bulk	14.8 g