G-probe 15 Summary Report
September 2015
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A total of fifteen labs submitted final results during this stage of the G-probe 15 study. Technique breakdown was, twelve labs used LA-ICP-MS, two used SEM, three used EPMA and one lab used Micro-XRF. Three labs reported results from two techniques. The material SyMP-1G used in this study was a glass version of USGS reference material SyMP-1. The material is a syenite collected from an outcrop located adjacent to the Molycorp mine site located at Mountain Pass, California. The starting material

Conversion of SyMP-1 to a glass was accomplished at the USGS by melting 200 g of SyMP-1 in a one liter platinum bowl at 1325° C over a period of six hours. At the end of the melting period the molten material was poured into a platinum boat and rapidly lowered into a water bath for quenching. Twenty grams of random fragments were selected, ground and then split into representative aliquots for bulk analysis testing. Samples were analyzed for their total element content using techniques at the USGS and SGS minerals, Canada. If you have any questions or comments about this study please forward them to me at your earliest convenience.

Below you will find summary results for each element studied in this test. In the element diagrams you will find information for each technique providing a value. Also included is the target value (♦) and calculated precision (X ± Ha) (♦) based on the Horowitz equation. A figure is also presented representing the data compilation for the entire study when more that one technique reported values. The study average is represented by ■ , the standard deviation of the average by ▪ and the maximum and minimum values by □. This study average is calculated primarily for the analysis of the major elements where multiple techniques provided data. For each technique an average value is presented (ex. LA-ICP-MS, ▲) as well as ± one standard deviation (ex. LA-ICP-MS, ▲), and the maximum and minimum values reported (ex. LA-ICP-MS, Δ).

Table 1. Symbols used on figures 1 through 52

Symbol type		Represents
Large solid symbol,	●	Study or method average
Small solid symbol,	•	Study or method one standard deviation
Large open symbol,	○	Study or method Maximum or Minimum

Table 2. Summary results for GP-15, SyMP-1G

Oxide	Xa % m/m	Ha % m/m	s.d.m. % m/m	GP-15 AVG. % m/m	Max % m/m	Min % m/m
SiO2	55.28	1.21	4.32	55.06	58.08	42.02
TiO2	0.79	0.03	0.13	0.86	1.23	0.63
Al2O3	13.02	0.35	1.04	13.18	14.54	10.01
Fe2O3T	7.66	0.23	0.70	7.66	8.88	6.00
Fe(II)OT	6.89	0.21	0.63	6.90	7.99	5.40
MnO	0.11	0.01	0.01	0.11	0.11	0.09
MgO	3.31	0.11	0.28	3.32	3.72	2.54
CaO	3.20	0.11	0.27	3.20	3.64	2.49
Na2O	1.72	0.06	0.15	1.71	1.83	1.32
K2O	10.31	0.29	0.90	10.15	10.92	7.85
P2O5	0.70	0.03	0.07	0.70	0.80	0.53

Element	Xa mg/kg	Ha mg/kg	s.d.m. mg/kg	GP-15 AVG. mg/kg	Max mg/kg	Min mg/kg
Ag	<1	-	0.22	0.86	1.20	0.48
As	<1	-	1.61	3.65	5.90	1.96
Au	<1	-	0.02	0.11	0.13	0.07
B	40.0	3.7	6.1	39.6	47.1	31.9
Ba	5203	230	543	5299	6318	3979
Be	18.3	1.9	8.5	27.5	46.6	19.6
Bi	0.44	0.08	0.05	0.38	0.50	0.30
Cd	<0.2	-	0.10	0.12	0.33	0.01
Ce	481.5	30.4	56.0	500.8	619.1	366.6
Cl	-	-	49.54	114.88	157.40	63.86
Co	19.62	2.01	2.21	19.72	22.53	14.87
Cr	246.0	17.2	31.3	304.3	362.2	232.2
Cs	11.1	0.1	1.0	10.8	11.7	8.0
Cu	74.8	6.3	18.8	77.6	106.0	41.9
Dy	12.73	1.39	1.11	11.41	12.95	9.18
Er	4.24	0.55	0.40	3.86	4.46	3.08
Eu	9.21	1.05	0.69	8.60	9.48	7.26
Ga	21.4	2.2	3.0	21.7	25.2	16.2
Gd	27.7	2.7	3.7	26.3	36.9	20.8
Ge	1.25	0.19	6.29	4.88	18.62	1.28

Element	Xa mg/kg	Ha mg/kg	s.d.m. mg/kg	GP-15 AVG. mg/kg	Max mg/kg	Min mg/kg
Hf	25.75	2.53	2.45	23.27	27.21	17.68
Ho	2.03	0.29	0.16	1.73	1.91	1.33
In	0.07	0.02	0.02	0.09	0.11	0.06
La	219.3	15.6	20.9	217.9	249.0	171.5
Li	32.33	3.07	1.43	30.97	33.00	27.66
Lu	0.58	0.10	0.03	0.42	0.47	0.34
Mn	846.0	49.1	100.3	757.6	844.0	582.0
Mo	33.3	3.1	5.4	31.2	37.2	18.8
Nb	28.2	2.7	2.7	28.9	33.0	22.1
Nd	230.8	16.3	19.5	219.4	249.3	172.4
Ni	185.0	13.5	43.1	220.4	299.5	147.5
Pb	193.0	14.0	25.7	205.1	237.9	132.1
Pr	60.2	5.2	5.2	55.0	63.8	42.3
Pt	-	-	0.15	0.61	0.82	0.42
Rb	660.5	39.8	90.3	664.4	887.9	483.1
Sb	0.24	0.05	0.04	0.19	0.31	0.13
Sc	14.8	1.6	4.2	17.2	29.9	12.1
Se	-	-	0.0	0.5	0.5	0.5
Sm	41.7	3.8	4.1	39.8	45.6	29.5
Sn	5.75	0.71	1.12	5.40	6.98	3.26
Sr	811.2	47.3	421.8	904.4	2323.0	623.6
Ta	1.43	0.22	0.15	1.39	1.64	1.15
Tb	3.18	0.43	0.25	2.61	2.93	2.07
Th	137.2	10.5	9.4	131.4	151.4	111.1
Tl	1.80	0.26	1861	798	4940	1.90
Tm	0.67	0.11	0.07	0.44	0.51	0.17
U	15.3	1.6	1.2	14.3	15.9	11.2
V	153.0	11.5	13.4	162.6	184.4	130.4
W	4.12	0.53	0.28	4.18	4.55	3.48
Y	50.0	4.4	4.4	46.9	51.8	37.9
Yb	3.25	0.44	0.26	2.83	3.19	2.25
Zn	106.7	8.4	38.9	100.9	133.0	2.0
Zr	985.5	55.9	87.1	996.6	1114.8	832.0

Xa = Target value - USGS bulk analysis of glass fragments and W-2 certificate values

Ha = Target precision calculated using modified version of Horowitz equation for data quality 2 ($Ha = 0.01Xa^{0.8495}$)

s.d.m. = Standard deviation of population mean

mean = Mean element concentration for all techniques reporting

Max. = Maximum element/oxide concentration reported

Min. = Minimum element/oxide concentration reported

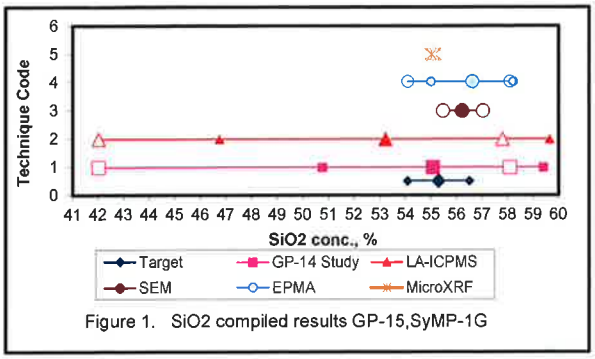

Figure 1. SiO2 compiled results GP-15,SyMP-1G

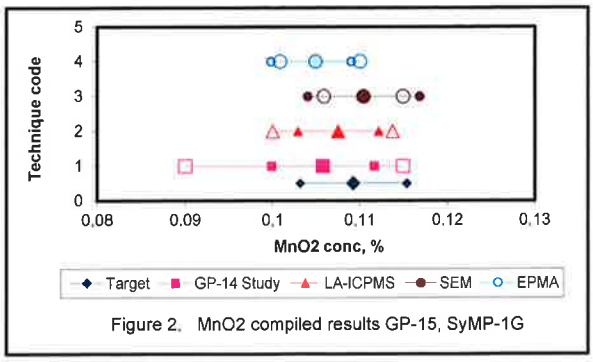

Figure 2. MnO2 compiled results GP-15, SyMP-1G

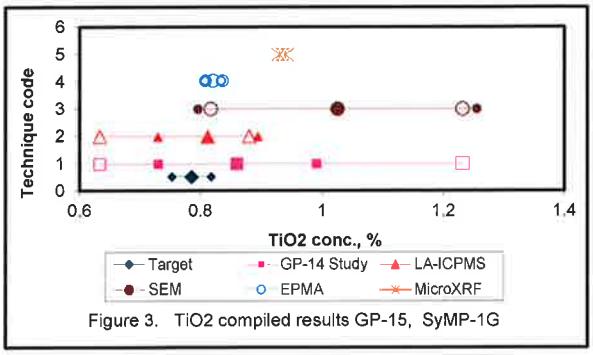

Figure 3. TiO2 compiled results GP-15, SyMP-1G

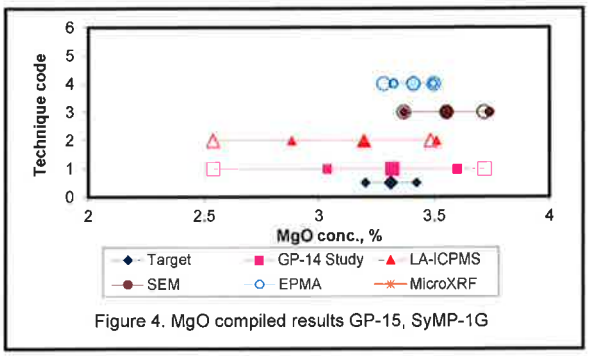

Figure 4. MgO compiled results GP-15, SyMP-1G

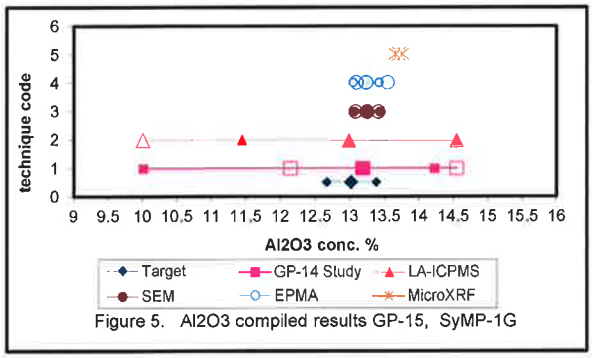

Figure 5. Al2O3 compiled results GP-15, SyMP-1G

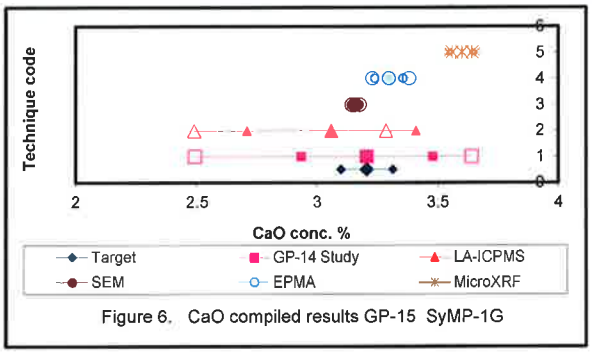

Figure 6. CaO compiled results GP-15 SyMP-1G

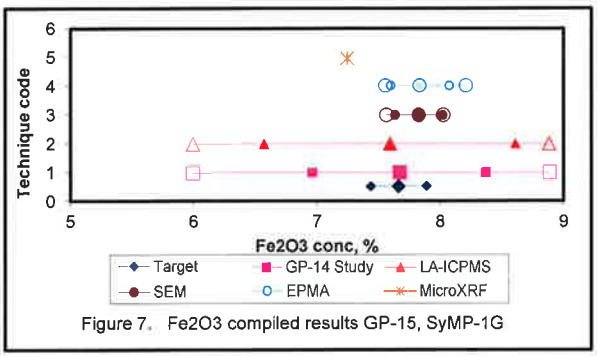

Figure 7. Fe2O3 compiled results GP-15, SyMP-1G

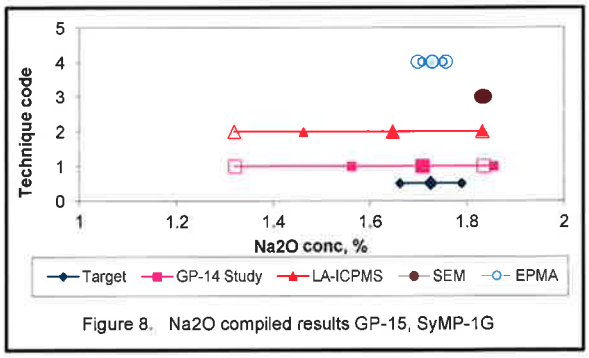

Figure 8. Na2O compiled results GP-15, SyMP-1G

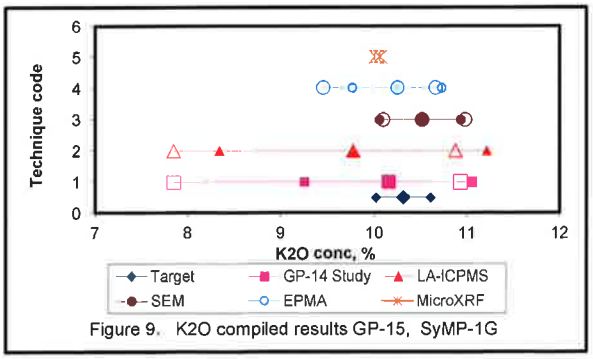

Figure 9. K2O compiled results GP-15, SyMP-1G

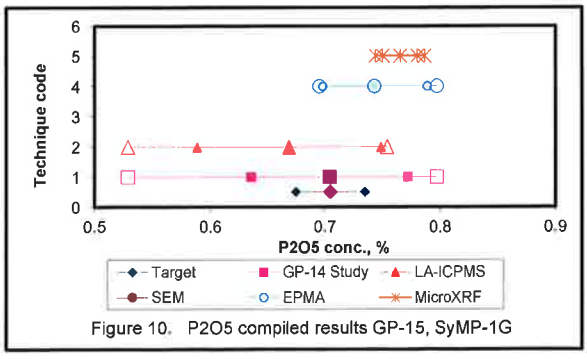

Figure 10. P2O5 compiled results GP-15, SyMP-1G

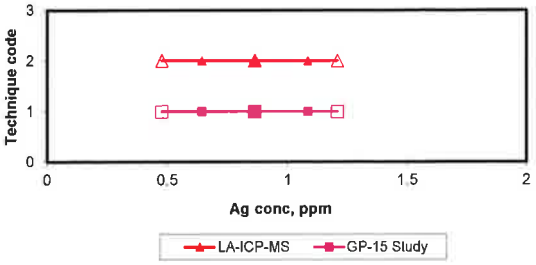

Figure 11. Ag compiled results GP-15, SyMP-1G

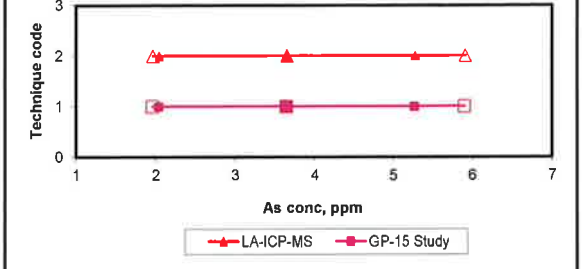

Figure 12. As compiled results GP-15, SyMP-1G

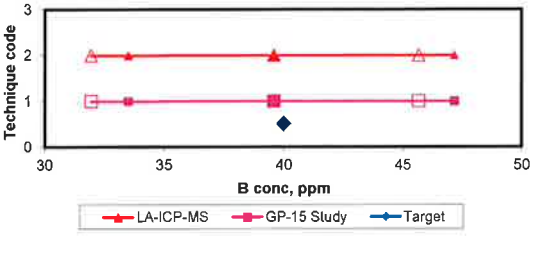

Figure 13. B compiled results GP-15 SyMP-1G

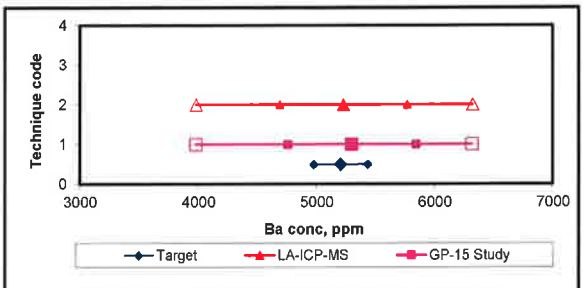

Figure 14. Ba compiled results GP-15, SyMP-1G

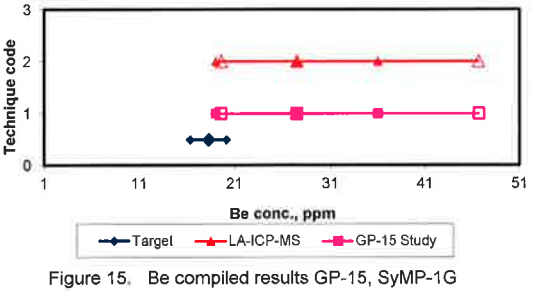

Figure 15. Be compiled results GP-15, SyMP-1G

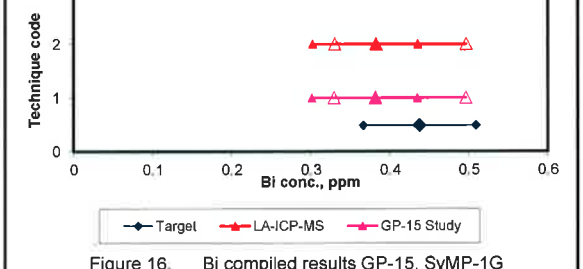

Figure 16. Bi compiled results GP-15, SyMP-1G

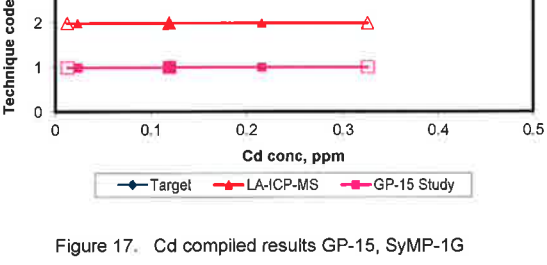

Figure 17. Cd compiled results GP-15, SyMP-1G

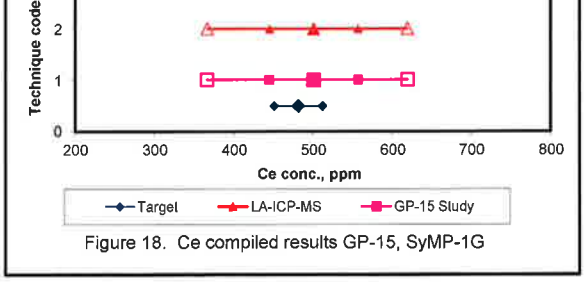

Figure 18. Ce compiled results GP-15, SyMP-1G

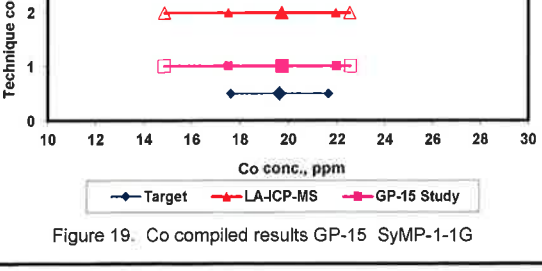

Figure 19. Co compiled results GP-15 SyMP-1-1G

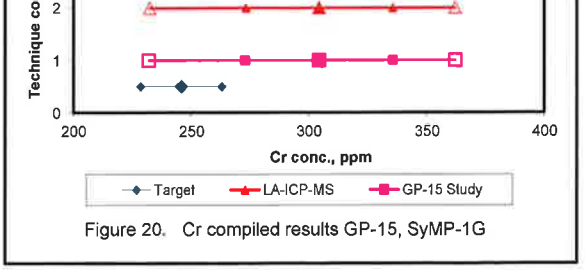

Figure 20. Cr compiled results GP-15, SyMP-1G

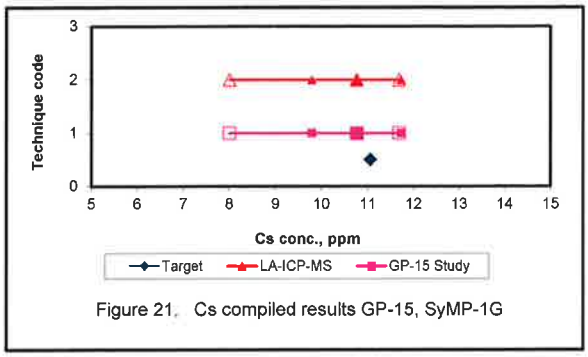

Figure 21. Cs compiled results GP-15, SyMP-1G

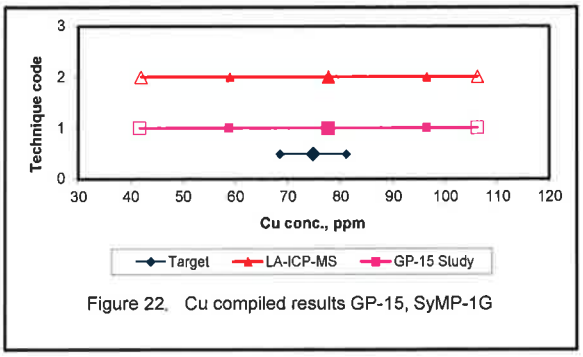

Figure 22. Cu compiled results GP-15, SyMP-1G

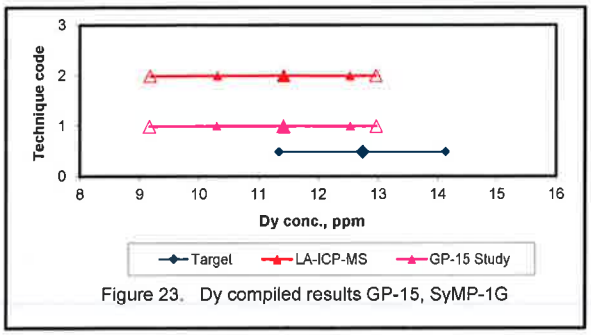

Figure 23. Dy compiled results GP-15, SyMP-1G

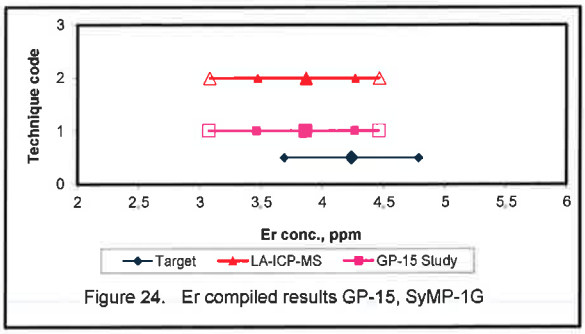

Figure 24. Er compiled results GP-15, SyMP-1G

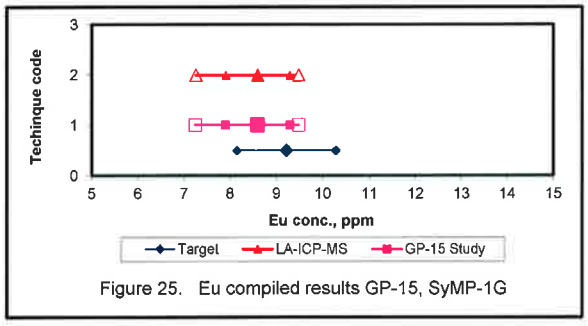

Figure 25. Eu compiled results GP-15, SyMP-1G

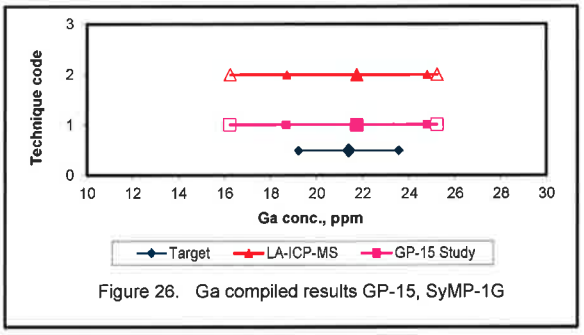

Figure 26. Ga compiled results GP-15, SyMP-1G

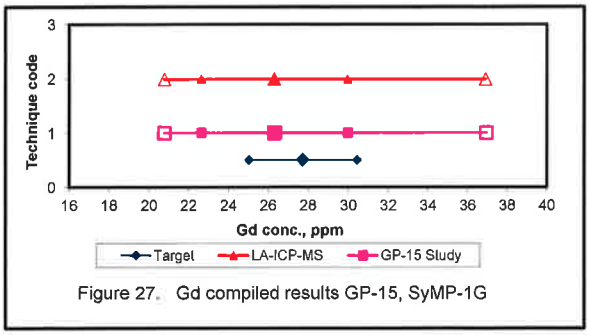

Figure 27. Gd compiled results GP-15, SyMP-1G

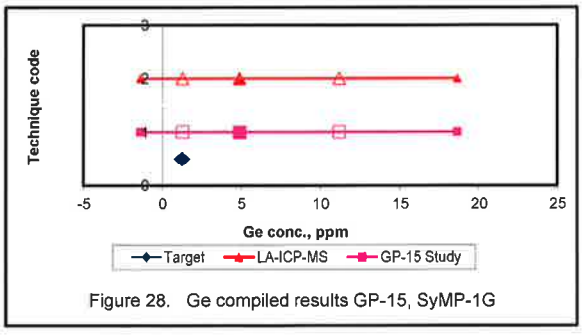

Figure 28. Ge compiled results GP-15, SyMP-1G

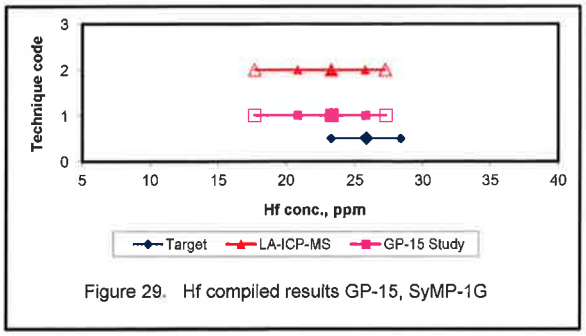

Figure 29. Hf compiled results GP-15, SyMP-1G

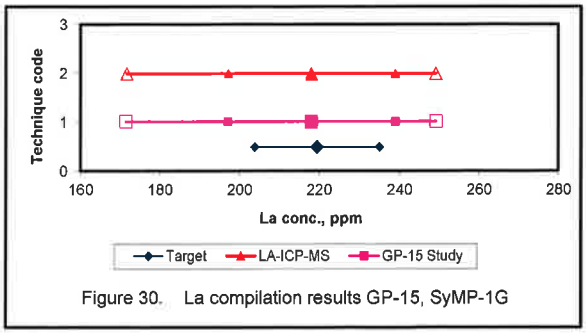

Figure 30. La compilation results GP-15, SyMP-1G

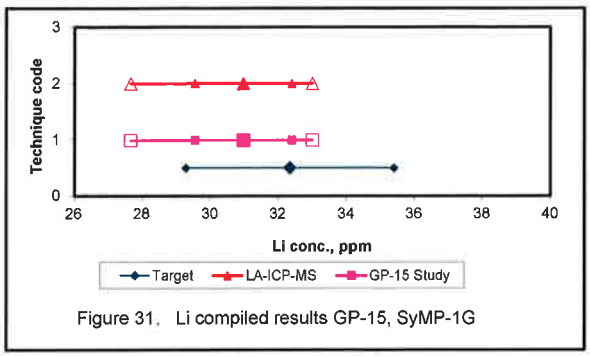

Figure 31. Li compiled results GP-15, SyMP-1G

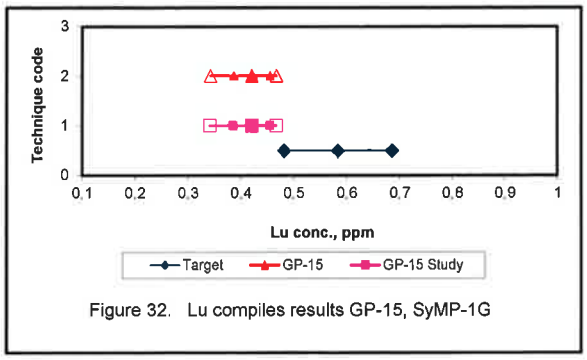

Figure 32. Lu compiles results GP-15, SyMP-1G

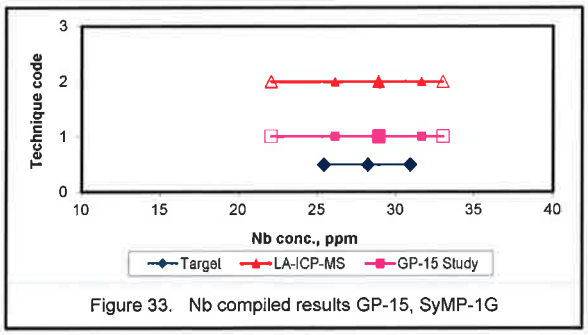

Figure 33. Nb compiled results GP-15, SyMP-1G

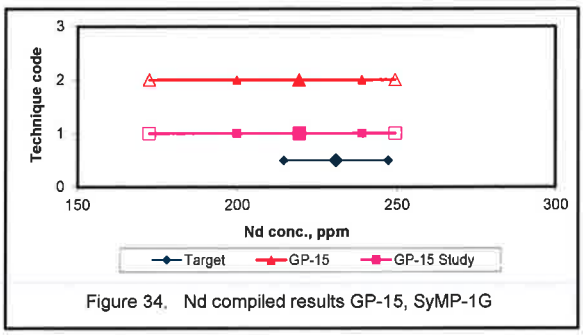

Figure 34. Nd compiled results GP-15, SyMP-1G

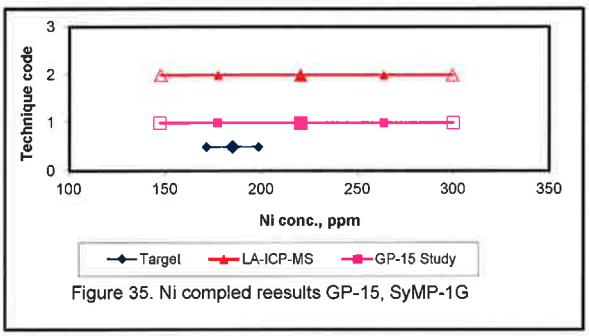

Figure 35. Ni compled reesults GP-15, SyMP-1G

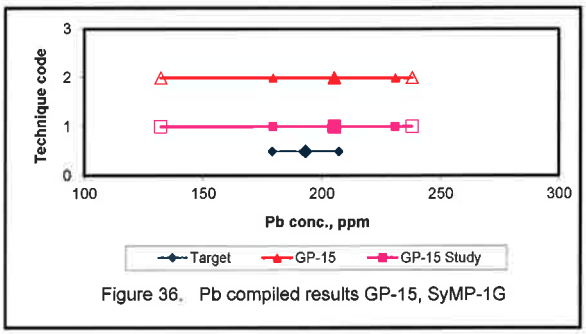

Figure 36. Pb compiled results GP-15, SyMP-1G

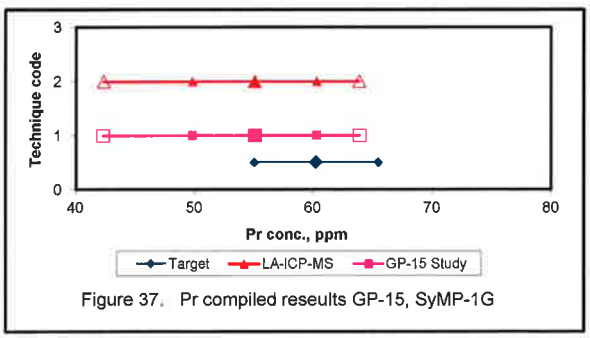

Figure 37. Pr compiled reseults GP-15, SyMP-1G

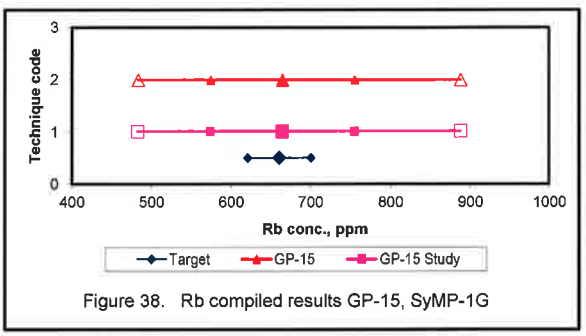

Figure 38. Rb compiled results GP-15, SyMP-1G

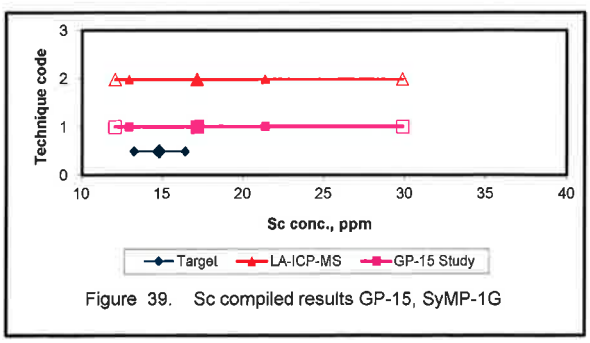

Figure 39. Sc compiled results GP-15, SyMP-1G

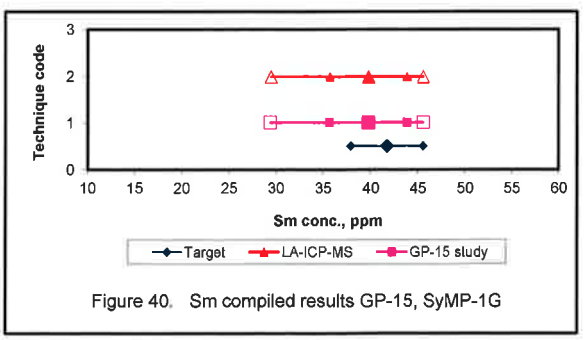

Figure 40. Sm compiled results GP-15, SyMP-1G

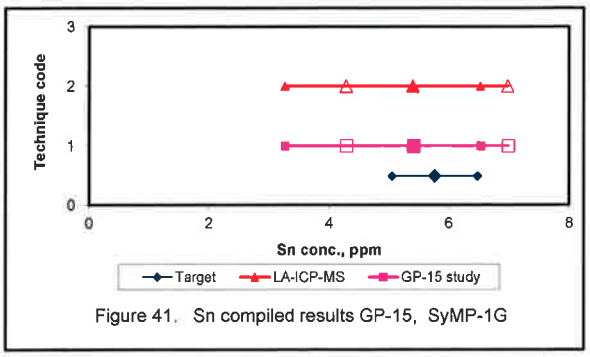

Figure 41. Sn compiled results GP-15, SyMP-1G

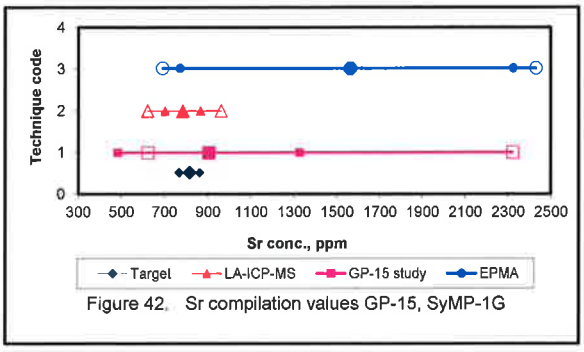

Figure 42. Sr compilation values GP-15, SyMP-1G

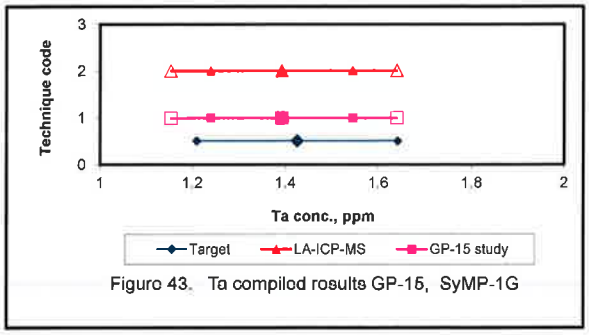

Figure 43. Ta compiled results GP-15, SyMP-1G

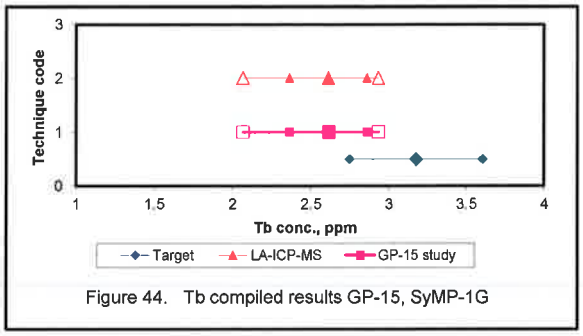

Figure 44. Tb compiled results GP-15, SyMP-1G

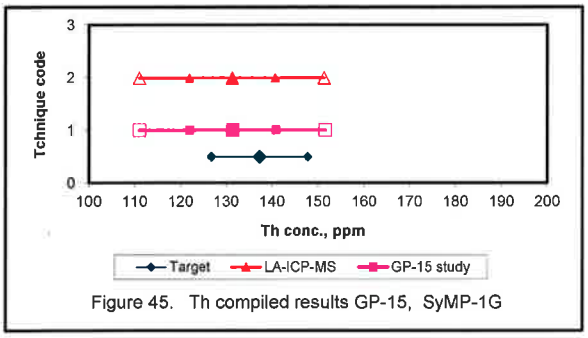

Figure 45. Th compiled results GP-15, SyMP-1G

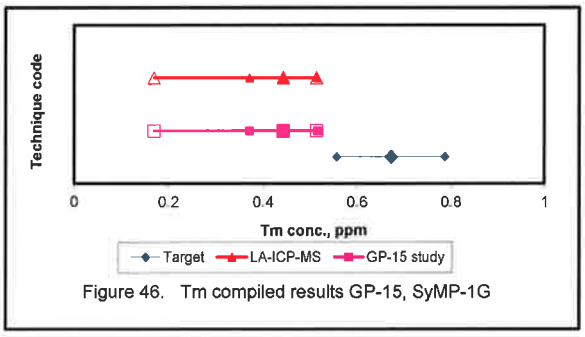

Figure 46. Tm compiled results GP-15, SyMP-1G

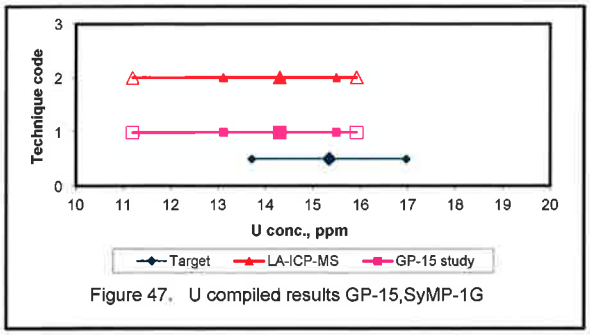

Figure 47. U compiled results GP-15,SyMP-1G

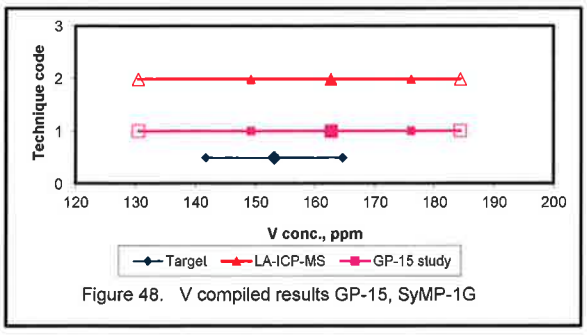

Figure 48. V compiled results GP-15, SyMP-1G

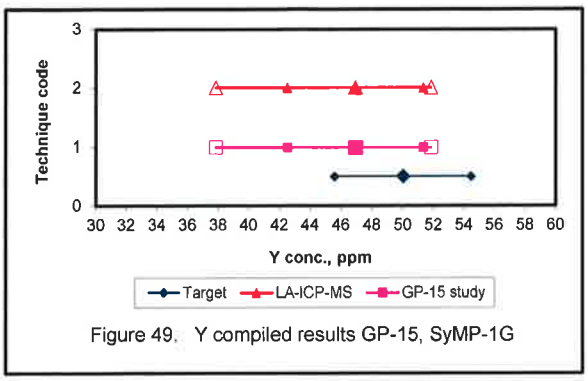

Figure 49. Y compiled results GP-15, SyMP-1G

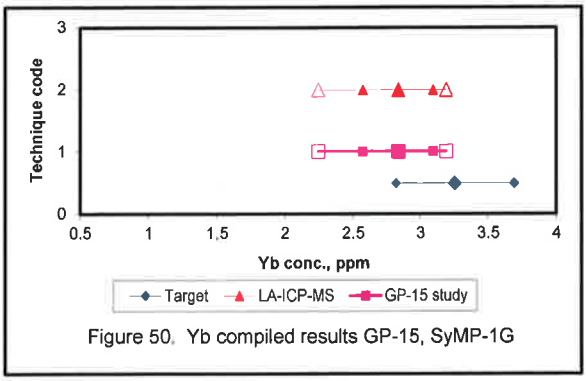

Figure 50. Yb compiled results GP-15, SyMP-1G

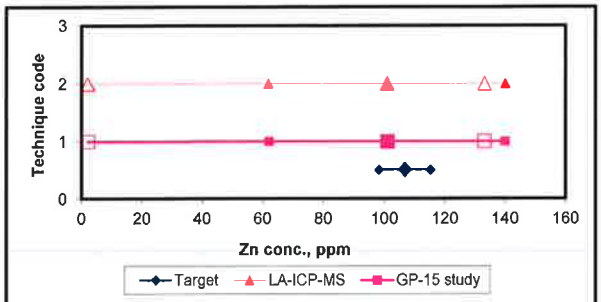

Figure 51. Zn compiled results GP-15, SyMP-1G

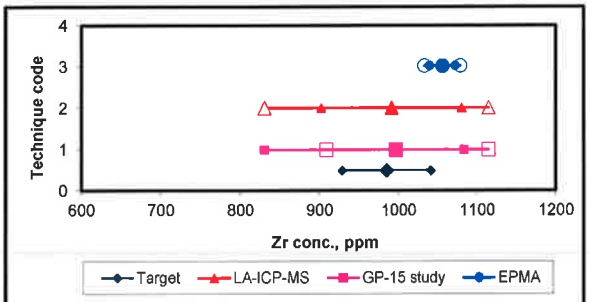

Figure 52. Zr compiled results GP-15, SyMP-1G

Table 3 G-probe 15 contributed data for SyMP-1G

Lab identifier		SyMP-1A	SyMP-1B	SyMP-2A	SyMP-2B	SyMP-3A	SyMP-3B	SyMP-4A	SyMP-4B	SyMP-5A	SyMP-5B
Data Quality		2	2	2	2	2	2	2	2	2	2
Elem/Cmpnd	units	SEM	SEM	SEM	SEM	EPMA	EPMA	EPMA	EPMA	EPMA	EPMA
SiO2	% m/m	56.77	57.02	55.46	55.55	*58.08*	*56.56*	54.08	56.38	57.94	57.76
TiO2	% m/m	0.82	0.84	1.23	1.22	*0.83*	*0.84*	0.82	0.81	0.81	0.82
Al2O3	% m/m	13.09	13.10	13.41	13.40	*13.15*	*13.10*	13.13	13.25	13.54	13.50
Fe2O3T	% m/m	7.86	7.56							7.86	7.86
Fe(II)O	% m/m			7.06	7.21	7.02	*6.96*	7.38	6.79		
MnO	% m/m			0.11	0.11	*0.11*	*0.11*	0.10	0.10	0.10	0.11
MgO	% m/m	3.37	3.42	3.72	3.71	*3.50*	*3.46*	3.45	3.28	3.36	3.38
CaO	% m/m	3.16	3.18	3.14	3.15	*3.31*	*3.26*	3.38	3.23	3.31	3.31
Na2O	% m/m	1.83	1.83	1.83	1.83	*1.74*	*1.73*	1.75	1.70	1.72	1.75
K2O	% m/m	10.92	10.89	10.13	10.09	*9.46*	*10.59*	10.27	10.24	10.65	10.74
P2O5	% m/m	0.75	0.70	0.68	0.69	*0.80*	*0.79*	0.69	0.72	0.72	0.73
Ag	mg/kg										
As	mg/kg										
Au	mg/kg										
B	mg/kg										
Ba	mg/kg					*5968*	*6089*	5551	5391		
Be	mg/kg										
Bi	mg/kg										
Br	mg/kg										
Cd	mg/kg										
Ce	mg/kg										
Cl	mg/kg							64	81		
Co	mg/kg										
Cr	mg/kg										
Cs	mg/kg										
Cu	mg/kg										
Dy	mg/kg										
Er	mg/kg										
Eu	mg/kg										
F	mg/kg										
Ga	mg/kg										
Gd	mg/kg										
Ge	mg/kg										
Hf	mg/kg										
Hg	mg/kg										
Ho	mg/kg										
I	mg/kg										
In	mg/kg										
Ir	mg/kg										
La	mg/kg										
Li	mg/kg										
Lu	mg/kg										
Mn	mg/kg										
Mo	mg/kg										
Nb	mg/kg										
Nd	mg/kg										
Ni	mg/kg										
Os	mg/kg										
Pb	mg/kg										
Pd	mg/kg										
Pr	mg/kg										
Pt	mg/kg										
Rb	mg/kg										
Re	mg/kg										
Rh	mg/kg										
Ru	mg/kg										
S	mg/kg					*153*	*201*				
Sb	mg/kg										
Sc	mg/kg										
Se	mg/kg										
Sm	mg/kg										
Sn	mg/kg										
Sr	mg/kg					*2305*	*2323*	845	772		
Ta	mg/kg										
Tb	mg/kg										
Te	mg/kg										
Th	mg/kg										
Tl	mg/kg										
Tm	mg/kg										
U	mg/kg										
V	mg/kg										
W	mg/kg										
Y	mg/kg										
Yb	mg/kg										
Zn	mg/kg										
Zr	mg/kg							1072	1040		

Table 3 cont.

Lab identifier		SyMP-6A	SyMP-6B	SyMP-6A	SyMP-6B	SyMP-7A	SyMP-7B	SyMP-2A	SyMP-2B	SyMP-8A	SyMP-8B
Data Quality		2	2	2	2	2	2	2	2	2	2
Elem/Cmpnd	units	Micro-XRF	Micro-XRF	LAICPMS	LAICPMS	LAICPMS	LAICPMS	LAICPMS	LAICPMS	LAICPMS	LAICPMS
SiO2	% m/m	54.98	55.11							53.69	56.26
TiO2	% m/m	0.93	0.94							0.84	0.88
Al2O3	% m/m	13.66	13.75							12.58	13.49
Fe2O3T	% m/m	7.24	7.24							8.88	8.81
Fe(II)O	% m/m									7.99	7.92
MnO	% m/m	0.102	0.090							0.11	0.10
MgO	% m/m			3.22	3.27					3.35	3.48
CaO	% m/m	3.64	3.56							3.19	3.19
Na2O	% m/m			1.63	1.66					1.69	1.76
K2O	% m/m	10.05	10.01								
P2O5	% m/m	0.78	0.75							0.69	0.72
Ag	mg/kg			0.72	1.11			0.8	0.7	0.95	1.14
As	mg/kg			5.90	5.78			2.8	2.8	4.74	5.42
Au	mg/kg			0.07	0.10			0.1	0.1		
B	mg/kg				31.93			34.6	34.6	34.70	37.80
Ba	mg/kg			5427.7	5487.6	4703	4740	6318.1	6261.3	5126.00	5123.00
Be	mg/kg			25.35	25.92			23.4	23.4	19.57	20.39
Bi	mg/kg			0.310	0.40	0.40	0.50	0.3	0.4	0.41	0.33
Br	mg/kg										
Cd	mg/kg			0.10	0.13			0.0	0.0	0.07	0.08
Ce	mg/kg			484.16	492.34	491	554	619.1	615.5	462.10	471.00
Cl	mg/kg									157.30	157.40
Co	mg/kg			19.27	16.25	20.6	20.6	22.4	22.3	20.21	19.06
Cr	mg/kg			311.98	299.36			317.1	321.3	285.60	293.00
Cs	mg/kg			10.31	10.35	11.0	11.6	11.5	11.4	9.89	10.62
Cu	mg/kg			75.62	67.76	87.2	84.7	93.9	93.6	53.50	56.80
Dy	mg/kg			11.70	12.06	12.2	11.3	11.9	11.5	9.34	9.95
Er	mg/kg			3.87	4.02	4.46	3.93	4.1	4.1	3.17	3.39
Eu	mg/kg			8.61	8.93	8.14	7.49	8.2	8.2	7.76	8.01
F	mg/kg										
Ga	mg/kg							25.2	25.1		
Gd	mg/kg			26.87	27.90	36.9	33.6	27.2	26.6	21.66	23.65
Ge	mg/kg			17.84	18.62			3.5	3.5		
Hf	mg/kg			23.86	24.38	24.8	24.3	24.3	23.4	19.27	20.50
Hg	mg/kg										
Ho	mg/kg			1.70	1.75	1.77	1.68	1.8	1.7		
I	mg/kg										
In	mg/kg			0.07	0.07	0.081	0.101				
Ir	mg/kg			0.15	0.08			0.0	0.0		
La	mg/kg			225.73	230.65	203	203	210.7	210.0	192.40	196.20
Li	mg/kg			33.00	32.34			32.7	32.3	30.80	31.34
Lu	mg/kg			0.42	0.43	0.44	0.43	0.4	0.4	0.34	0.35
Mn	mg/kg			791.09	697.14					834.10	844.00
Mo	mg/kg			33.14	30.50	34.2	31.6	35.4	35.9	25.80	27.90
Nb	mg/kg			26.18	26.86	29.9	29.5	27.6	27.7	26.70	28.20
Nd	mg/kg			229.76	232.83	219	208	216.9	215.7	190.20	199.80
Ni	mg/kg			211.30	191.19	216	224	245.9	256.1	225.50	172.00
Os	mg/kg										
Pb	mg/kg			187.89	207.68	212	230	208.7	206.2	204.80	189.00
Pd	mg/kg									0.19	0.21
Pr	mg/kg			53.47	54.95	54.4	53.4	54.4	54.2	49.47	52.90
Pt	mg/kg			0.67	0.82			0.4	0.4		
Rb	mg/kg			611.23	609.08	668	704	887.9	878.8	619.00	645.00
Re	mg/kg			0.003	0.002						
Rh	mg/kg										
Ru	mg/kg										
S	mg/kg										
Sb	mg/kg			0.17	0.19	0.19	0.20	0.2	0.2		
Sc	mg/kg			25.33	29.87			17.3	17.2		
Se	mg/kg			0.47	0.48			<DL	<DL		
Sm	mg/kg			42.32	43.06	40.0	37.8	39.5	39.5	34.18	36.12
Sn	mg/kg			4.46	4.69	4.29	5.14	5.3	5.3		
Sr	mg/kg			795.3	812.0	727	713	960.8	962.6	732.00	743.60
Ta	mg/kg			1.22	1.27	1.59	1.46	1.3	1.3	1.20	1.29
Tb	mg/kg			2.57	2.63	2.81	2.55	2.6	2.6	2.21	2.35
Te	mg/kg										
Th	mg/kg			137.33	139.99	129	125	125.2	123.7	111.10	116.10
Tl	mg/kg			2.33	1.90	2.25	2.22	2.0	2.1		
Tm	mg/kg			0.45	0.17	0.48	0.45	0.5	0.5	0.38	0.39
U	mg/kg			13.210	13.370	14.3	15.2	14.8	14.5	13.46	14.28
V	mg/kg			163.27	165.12			184.4	181.9	156.70	164.50
W	mg/kg			4.05	4.02	4.17	4.09	4.4	4.4	3.48	3.78
Y	mg/kg			46.03	47.07	49.6	47.6	48.6	48.3	37.86	39.90
Yb	mg/kg			2.90	2.98	2.91	2.72	2.9	2.8	2.42	2.51
Zn	mg/kg			112.51	115.13			114.0	114.5	127.20	130.40
Zr	mg/kg			1063.03	1066.65	1011	1010	1114.8	1043.7	832.00	882.00

Table 3 **cont.**

Lab identifier		SyMP-9A	SyMP-9B	SyMP-10A	SyMP-10B	SyMP-11A	SyMP-11B	SyMP-12A	SyMP-12B	SyMP-13A	SyMP-13B
Data Quality		2	2	2	2	2	2	2	2	2	2
Elem/Cmpnd	units	LAICPMS	LAICPMS	LAICPMS	LAICPMS	LAICPMS	LAICPMS	LAICPMS	LAICPMS	LAICPMS	LAICPMS
SiO2	% m/m			57.29	57.17						
TiO2	% m/m	0.832	0.829	0.850	0.854			0.840	0.836		
Al2O3	% m/m	14.5	14.5	13.56	13.55						
Fe2O3T	% m/m	8.18	7.95	7.00	7.08						
Fe(II)O	% m/m										
MnO	% m/m	0.113	0.114	0.106	0.106						
MgO	% m/m			3.37	3.40	3.24	3.22				
CaO	% m/m			3.27	3.29						
Na2O	% m/m			1.83	1.83						
K2O	% m/m			10.88	10.87						
P2O5	% m/m			0.753	0.754			0.720	0.714		
Ag	mg/kg							0.799	0.855		
As	mg/kg							2.20	1.96		
Au	mg/kg			0.11	0.11						
B	mg/kg			46.33	46.64						
Ba	mg/kg	5489	5461	5547	5575	5279	5270	5055	5080	5,588.54	5,550.25
Be	mg/kg			46.33	46.64	29.6	29.0	23.1	23.0		
Bi	mg/kg			0.38	0.43			0.437	0.406	0.36	0.42
Br	mg/kg										
Cd	mg/kg							<0.2	<0.2		
Ce	mg/kg	495	501	515	520	481	482	495	491	541.97	525.09
Cl	mg/kg										
Co	mg/kg	19.3	18.7	20.07	20.67	19.8	17.6	21.6	21.0		
Cr	mg/kg	327	330	286	291	271	288	318	307		
Cs	mg/kg	11.7	11.7	11.16	11.12	11.1	11.0	11.5	11.4		
Cu	mg/kg	102	106	77.03	78.22	63.1	55.0	90	77		
Dy	mg/kg	11.2	11.2	12.81	12.95	12.3	12.3	11.2	11.2	11.72	11.78
Er	mg/kg	3.61	3.58	4.33	4.35	4.05	4.12	3.84	3.84	3.87	3.93
Eu	mg/kg	9.25	9.02	9.15	9.23	9.25	9.11	8.4	8.3	9.03	9.44
F	mg/kg										
Ga	mg/kg	24.6	24.6					21.5	21.5	20.99	20.23
Gd	mg/kg	24.6	24.8	28.07	28.38	27.5	27.5	24.7	24.6	25.68	26.31
Ge	mg/kg	2.67	2.70					1.62	1.28	1.28	1.31
Hf	mg/kg	24.3	24.0	25.73	25.86	25.5	25.2	22.3	23.2	22.58	23.14
Hg	mg/kg										
Ho	mg/kg	1.80	1.81	1.86	1.89	1.84	1.84	1.66	1.67	1.75	1.84
I	mg/kg										
In	mg/kg							0.079	0.063	0.11	0.11
Ir	mg/kg										
La	mg/kg	236	237	228	230	228	228	215	214	245.55	248.99
Li	mg/kg			31.37	31.41	29.7	27.7	29.8	29.9		
Lu	mg/kg	0.409	0.400	0.453	0.462	0.44	0.44	0.406	0.408	0.42	0.42
Mn	mg/kg					804	806	812	822		
Mo	mg/kg	35.9	36.0	32.14	32.99			34.4	32.4	28.78	21.89
Nb	mg/kg	29.8	29.3	31.81	32.05	29.0	28.6	31.2	30.7	29.46	27.30
Nd	mg/kg	225	227	239	242	234	235	217	216	220.30	221.71
Ni	mg/kg	300	281	193	205	211	149	256	211		
Os	mg/kg										
Pb	mg/kg	214	216	205	213	207	184	215	208		
Pd	mg/kg										
Pr	mg/kg	59.5	59.8	60.39	60.96	58.3	58.3	52.6	52.4	53.03	52.68
Pt	mg/kg			0.67	0.62						
Rb	mg/kg	683	672	663	662	634	616	678	682		
Re	mg/kg										
Rh	mg/kg										
Ru	mg/kg										
S	mg/kg										
Sb	mg/kg	0.179	0.181					0.194	0.168		
Sc	mg/kg	15.3	15.3	16.29	16.40	16.7	16.6	15.3	15.4		
Se	mg/kg										
Sm	mg/kg	42.8	43.1	43.36	43.84	42.6	42.8	39.8	39.6	39.08	39.59
Sn	mg/kg	6.60	6.11	6.32	6.51	6.98	4.72				
Sr	mg/kg	810	808	827	831	805	803	778	778		
Ta	mg/kg			1.58	1.60	1.39	1.39	1.37	1.38		
Tb	mg/kg	2.73	2.73	2.89	2.92	2.91	2.91	2.52	2.51	2.64	2.68
Te	mg/kg										
Th	mg/kg	141	137	139	140	133	132	131	131		
Tl	mg/kg			2.03	2.09			2.26	2.27		
Tm	mg/kg	0.46	0.45	0.504	0.512	0.48	0.48	0.452	0.451	0.48	0.49
U	mg/kg	15.7	15.5	14.50	14.67	14.2	14.1	14.5	14.4		
V	mg/kg	168	168	167	167	161	159	169	168		
W	mg/kg			4.24	4.28	4.03	4.10	4.32	4.38		
Y	mg/kg	46.0	45.6	51.18	51.84	50.9	50.6	45.8	45.6	49.89	50.90
Yb	mg/kg	2.88	2.85	3.16	3.18	3.06	3.03	2.70	2.77	2.97	2.97
Zn	mg/kg	120	116	102.54	103.95	2.02	2.05	133	131		
Zr	mg/kg	946	918	1074	1084	1064	1042	961	994	1,000.04	1,007.25

Table 3 cont.

Lab identifier		SyMP-14A	SyMP-14B	SyMP-15A	SyMP-15A	SyMP-5A	SyMP-5B	SyMP-	SyMP-
Data Quality		2	2	2	2	2	2	2	2
Elem/Cmpnd	units	LAICPMS	LAICPMS	LAICPMS	LAICPMS	LAICPMS	LAICPMS		
SiO2	% m/m	57.8	57.4	43.97	42.02				
TiO2	% m/m	0.86	0.84	0.63	0.643				
Al2O3	% m/m	13.6	13.6	10.51	10.01				
Fe2O3T	% m/m	7.64	8.21	6.00	6.11				
Fe(II)O	% m/m								
MnO	% m/m	0.11	0.11						
MgO	% m/m	3.34	3.36	2.55	2.54				
CaO	% m/m	3.27	3.28	2.49	2.50				
Na2O	% m/m	1.72	1.71	1.32	1.32				
K2O	% m/m	10.6	10.5	8.02	7.85				
P2O5	% m/m	0.63	0.62	0.56	0.53				
Ag	mg/kg	1.20	0.67	0.48	0.99				
As	mg/kg	2.74	2.17						
Au	mg/kg								
B	mg/kg	47.1	42.4						
Ba	mg/kg	5191	5156	4055.92	3978.55	4789.3	5113.1		
Be	mg/kg	24.3	24.9						
Bi	mg/kg	0.35	0.30						
Br	mg/kg								
Cd	mg/kg	0.06	0.16	0.33	0.22				
Ce	mg/kg	499	505	371.91	366.58	509.4	529.7		
Cl	mg/kg								
Co	mg/kg	22.0	22.5	15.67	14.87				
Cr	mg/kg	362	360	277.22	232.24				
Cs	mg/kg	10.3	10.2	8.48	8.01	11.2	11.2		
Cu	mg/kg	96	90	53.68	41.87				
Dy	mg/kg	11.9	12.0	9.31	9.18	10.0	12.9		
Er	mg/kg	4.05	4.09	3.14	3.08	3.4	4.4		
Eu	mg/kg	9.17	9.27	7.26	7.35	8.2	9.5		
F	mg/kg								
Ga	mg/kg	22.1	22.2	16.22	16.39				
Gd	mg/kg	27.2	27.2	21.08	20.78	21.1	27.1		
Ge	mg/kg	2.12	2.11						
Hf	mg/kg	24.4	24.0	17.84	17.68	20.8	27.2		
Hg	mg/kg	0.55	0.37						
Ho	mg/kg	1.77	1.80	1.36	1.33	1.5	1.9		
I	mg/kg								
In	mg/kg								
Ir	mg/kg								
La	mg/kg	230	231	174.60	171.50	198.3	242.1		
Li	mg/kg	30.5	30.8						
Lu	mg/kg	0.46	0.46			0.4	0.5		
Mn	mg/kg			584.00	581.99				
Mo	mg/kg	36.5	37.2	22.24	18.76				
Nb	mg/kg	31.8	31.0	22.07	22.54	31.0	33.0		
Nd	mg/kg	235	236	176.64	172.45	206.4	249.3		
Ni	mg/kg	267	273	172.33	147.45				
Os	mg/kg								
Pb	mg/kg	238	236	145.89	132.10	229.4	222.3		
Pd	mg/kg								
Pr	mg/kg	60.2	60.5	43.20	42.30	55.5	63.8		
Pt	mg/kg								
Rb	mg/kg	669	667	499.97	483.06	693.7	690.1		
Re	mg/kg								
Rh	mg/kg								
Ru	mg/kg								
S	mg/kg								
Sb	mg/kg	0.31	0.18	0.130	0.147				
Sc	mg/kg	16.7	16.7	12.27	12.10	15.4	18.9		
Se	mg/kg								
Sm	mg/kg	41.6	41.6	30.13	29.45	37.0	45.6		
Sn	mg/kg	6.45	6.36	3.26	3.83				
Sr	mg/kg	794	791	624.19	623.56	723.9	824.8		
Ta	mg/kg	1.55	1.55	1.19	1.15	1.4	1.6		
Tb	mg/kg	2.73	2.76	2.15	2.07	2.3	2.9		
Te	mg/kg								
Th	mg/kg	131	133	-	-	121.4	151.4		
Tl	mg/kg					4620.0	4939.9		
Tm	mg/kg	0.48	0.49	0.370	0.377	0.4	0.5		
U	mg/kg	14.8	14.4	11.60	11.20	15.7	15.9		
V	mg/kg	162	161	131.78	130.44				
W	mg/kg	4.55	4.53						
Y	mg/kg	50.5	50.8	40.31	39.74	39.6	51.8		
Yb	mg/kg	2.96	3.00	2.34	2.25	2.5	3.2		
Zn	mg/kg	117	115	75.36	83.43				
Zr	mg/kg	1032	1026	831.98	840.12	852.4	1102.7		