

File in Madec Prospect
strat 68-16 fib

CHEMICAL ANALYSES AND NORMS OF
MEDICINE LAKE STRAT TEST 68-16 VOLCANIC ROCKS

Sample	68-16-1	68-16-2	68-16-3	68-16-4A	68-16-4B	68-16-5	68-16-6	68-16-7	68-16-8
Depth (ft)	505	530	654	751.5	751.5	829	918	1,171	1,205
Elevation (ft)	5,895	5,870	5,746	5,648.5	5,648.5	5,571	5,482	5,229	5,195
SiO ₂	72.41	72.57	58.62	72.77	71.25	69.54	70.06	74.99	75.51
TiO ₂	0.37	0.38	1.51	0.44	0.43	0.59	0.58	0.23	0.24
Al ₂ O ₃	13.95	14.10	16.09	14.06	13.80	14.70	14.76	13.00	13.12
Fe ₂ O ₃	2.25	2.21	8.26	2.25	2.33	3.13	3.10	1.41	1.51
FeO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MnO	0.04	0.05	0.15	0.05	0.05	0.07	0.06	0.03	0.03
MgO	0.44	0.51	2.76	0.34	0.30	0.53	0.51	0.19	0.19
CaO	1.54	1.64	5.75	1.19	1.17	1.90	1.85	0.89	0.89
Na ₂ O	3.31	3.41	3.94	3.78	3.67	3.77	3.87	3.05	3.10
K ₂ O	4.31	4.27	1.69	4.29	4.22	3.68	3.73	4.66	4.68
F ₂ O ₅	0.07	0.07	0.43	0.05	0.05	0.10	0.10	0.02	0.02
H ₂ O+	0.21	0.31	0.0	0.30	0.30	0.14	0.12	0.33	0.21
H ₂ O-	0.10	0.07	0.15	0.03	0.03	0.04	0.08	0.03	0.09
Total	99.00	99.59	99.35	99.55	97.60	98.19	98.82	98.83	99.59
q	32.90	32.31	14.98	31.45	30.94	28.94	28.83	37.28	37.43
c	1.21	1.05	0.0	1.15	1.19	1.30	1.23	1.37	1.38
or	25.47	25.23	9.99	25.35	24.94	21.75	22.04	27.54	27.66
ab	28.01	28.85	33.34	31.99	31.05	31.90	32.75	25.81	26.23
an	7.18	7.68	21.23	5.58	5.48	8.77	8.52	4.28	4.28
wo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
di-wo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
di-en	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
di-fs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
hy-en	1.10	1.27	6.87	0.85	0.75	1.32	1.27	0.47	0.47
hy-fs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
wt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
il	0.09	0.11	0.32	0.11	0.11	0.15	0.13	0.06	0.06
hm	2.25	2.21	8.26	2.25	2.33	3.13	3.10	1.41	1.51
tn	0.0	0.0	3.16	0.0	0.0	0.0	0.0	0.0	0.0
ru	0.32	0.32	0.05	0.38	0.37	0.51	0.51	0.20	0.21
ap	0.17	0.17	1.02	0.12	0.12	0.24	0.24	0.05	0.05
Total	98.69	99.21	99.22	99.22	97.27	98.01	98.62	98.47	99.29
Femic	3.92	4.08	19.69	3.71	3.68	5.35	5.25	2.19	2.30
Salic	94.77	95.13	79.53	95.51	93.59	92.66	93.37	96.28	96.99

All values are in weight percent

CHEMICAL ANALYSES AND NORMS OF
MEDICINE LAKE STRAT TEST 68-16 VOLCANIC ROCKS

Sample	68-16-1	68-16-2	68-16-3	68-16-4A	68-16-4B	68-16-5	68-16-6	68-16-7	68-16-8
Depth (ft)	505	530	654	751.5	751.5	829	918	1,171	1,205
Elevation (ft)	5,895	5,870	5,746	5,648.5	5,648.5	5,571	5,482	5,229	5,195
SiO ₂	72.41	72.57	58.62	72.77	71.25	69.54	70.06	74.99	75.51
TiO ₂	0.37	0.38	1.51	0.44	0.43	0.59	0.58	0.23	0.24
Al ₂ O ₃	13.95	14.10	16.09	14.06	13.80	14.70	14.76	13.00	13.12
Fe ₂ O ₃	2.25	2.21	8.26	2.25	2.33	3.13	3.10	1.41	1.51
FeO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MnO	0.04	0.05	0.15	0.05	0.05	0.07	0.06	0.03	0.03
MgO	0.44	0.51	2.76	0.34	0.30	0.53	0.51	0.19	0.19
CaO	1.54	1.64	5.75	1.19	1.17	1.90	1.85	0.89	0.89
Na ₂ O	3.31	3.41	3.94	3.78	3.67	3.77	3.87	3.05	3.10
K ₂ O	4.31	4.27	1.69	4.29	4.22	3.68	3.73	4.66	4.68
P ₂ O ₅	0.07	0.07	0.43	0.05	0.05	0.10	0.10	0.02	0.02
H ₂ O+	0.21	0.31	0.0	0.30	0.30	0.14	0.12	0.33	0.21
H ₂ O-	0.10	0.07	0.15	0.03	0.03	0.04	0.08	0.03	0.09
Total	99.00	99.59	99.35	99.55	97.60	98.19	98.82	98.83	99.59
q	32.90	32.31	14.98	31.45	30.94	28.94	28.83	37.28	37.43
c	1.21	1.05	0.0	1.15	1.19	1.30	1.23	1.37	1.38
or	25.47	25.23	9.99	25.35	24.94	21.75	22.04	27.54	27.66
ab	28.01	28.85	33.34	31.99	31.05	31.90	32.75	25.81	26.23
an	7.18	7.68	21.23	5.58	5.48	8.77	8.52	4.28	4.28
wo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
di-wo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
di-en	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
di-fs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
hy-en	1.10	1.27	6.87	0.85	0.75	1.32	1.27	0.47	0.47
hy-fs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
il	0.09	0.11	0.32	0.11	0.11	0.15	0.13	0.06	0.06
hm	2.25	2.21	8.26	2.25	2.33	3.13	3.10	1.41	1.51
tn	0.0	0.0	3.16	0.0	0.0	0.0	0.0	0.0	0.0
ru	0.32	0.32	0.05	0.38	0.37	0.51	0.51	0.20	0.21
ap	0.17	0.17	1.02	0.12	0.12	0.24	0.24	0.05	0.05
Total	98.69	99.21	99.22	99.22	97.27	98.01	98.62	98.47	99.29
Fenic	3.92	4.08	19.69	3.71	3.68	5.35	5.25	2.19	2.30
Salic	94.77	95.13	79.53	95.51	93.59	92.66	93.37	96.28	96.99

All values are in weight percent

CHEMICAL ANALYSES AND NORMS OF
MEDICINE LAKE STRAT TEST 68-16 VOLCANIC ROCKS

Sample	68-16-1	68-16-2	68-16-3	68-16-4A	68-16-4B	68-16-5	68-16-6	68-16-7	68-16-8
Depth (ft)	505	530	654	751.5	751.5	829	918	1,171	1,205
Elevation (ft)	5,895	5,870	5,746	5,648.5	5,648.5	5,571	5,482	5,229	5,195
SiO ₂	72.41	72.57	58.62	72.77	71.25	69.54	70.06	74.99	75.51
TiO ₂	0.37	0.38	1.51	0.44	0.43	0.59	0.58	0.23	0.24
Al ₂ O ₃	13.95	14.10	16.09	14.06	13.80	14.70	14.76	13.00	13.12
Fe ₂ O ₃	2.25	2.21	8.26	2.25	2.33	3.13	3.10	1.41	1.51
FeO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MnO	0.04	0.05	0.15	0.05	0.05	0.07	0.06	0.03	0.03
MgO	0.44	0.51	2.76	0.34	0.30	0.53	0.51	0.19	0.19
CaO	1.54	1.64	5.75	1.19	1.17	1.90	1.85	0.89	0.89
Na ₂ O	3.31	3.41	3.94	3.78	3.67	3.77	3.87	3.05	3.10
K ₂ O	4.31	4.27	1.69	4.29	4.22	3.68	3.73	4.66	4.68
P ₂ O ₅	0.07	0.07	0.43	0.05	0.05	0.10	0.10	0.02	0.02
H ₂ O+	0.21	0.31	0.0	0.30	0.30	0.14	0.12	0.33	0.21
H ₂ O-	0.10	0.07	0.15	0.03	0.03	0.04	0.08	0.03	0.09
Total	99.00	99.59	99.35	99.55	97.60	98.19	98.82	98.83	99.59
q	32.90	32.31	14.98	31.45	30.94	28.94	28.83	37.28	37.43
c	1.21	1.05	0.0	1.15	1.19	1.30	1.23	1.37	1.38
or	25.47	25.23	9.99	25.35	24.94	21.75	22.04	27.54	27.66
ab	28.01	28.85	33.34	31.99	31.05	31.90	32.75	25.81	26.23
an	7.18	7.68	21.23	5.58	5.48	8.77	8.52	4.28	4.28
wo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
di-wo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
di-en	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
di-fs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
hy-en	1.10	1.27	6.87	0.85	0.75	1.32	1.27	0.47	0.47
hy-fs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
il	0.09	0.11	0.32	0.11	0.11	0.15	0.13	0.06	0.06
hm	2.25	2.21	8.26	2.25	2.33	3.13	3.10	1.41	1.51
tn	0.0	0.0	3.16	0.0	0.0	0.0	0.0	0.0	0.0
ru	0.32	0.32	0.05	0.38	0.37	0.51	0.51	0.20	0.21
ap	0.17	0.17	1.02	0.12	0.12	0.24	0.24	0.05	0.05
Total	98.69	99.21	99.22	99.22	97.27	98.01	98.62	98.47	99.29
Femic	3.92	4.08	19.69	3.71	3.68	5.35	5.25	2.19	2.30
Salic	94.77	95.13	79.53	95.51	93.59	92.66	93.37	96.28	96.99

All values are in weight percent

CHEMICAL ANALYSES AND NORMS OF
MEDICINE LAKE STRAT TEST 68-16 VOLCANIC ROCKS

	<u>68-16-1</u>	<u>68-16-2</u>	<u>68-16-3</u>	<u>68-16-4A</u>	<u>68-16-4B</u>	<u>68-16-5</u>	<u>68-16-6</u>	<u>68-16-7</u>	<u>68-16-8</u>
Sample									
Depth (Ft)	505	530	654	751.5	751.5	829	918	1,171	1,205
Elevation (Ft)	5,895	5,870	5,746	5,648.5	5,648.5	5,571	5,482	5,229	5,195
SiO ₂	72.41	72.57	58.62	72.77	71.25	69.54	70.06	74.99	75.51
TiO ₂	0.37	0.38	1.51	0.44	0.43	0.59	0.58	0.23	0.24
Al ₂ O ₃	13.95	14.10	16.09	14.06	13.80	14.70	14.76	13.00	13.12
Fe ₂ O ₃	2.25	2.21	8.26	2.25	2.33	3.13	3.10	1.41	1.51
FeO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MnO	0.04	0.05	0.15	0.05	0.05	0.07	0.06	0.03	0.03
MgO	0.44	0.51	2.76	0.34	0.30	0.53	0.51	0.19	0.19
CaO	1.54	1.64	5.75	1.19	1.17	1.90	1.85	0.89	0.89
Na ₂ O	3.31	3.41	3.94	3.78	3.67	3.77	3.87	3.05	3.10
K ₂ O	4.31	4.27	1.69	4.29	4.22	3.68	3.73	4.66	4.68
P ₂ O ₅	0.07	0.07	0.43	0.05	0.05	0.10	0.10	0.02	0.02
H ₂ O ⁺	0.21	0.31	0.0	0.30	0.30	0.14	0.12	0.33	0.21
H ₂ O ⁻	<u>0.10</u>	<u>0.07</u>	<u>0.15</u>	<u>0.03</u>	<u>0.03</u>	<u>0.04</u>	<u>0.08</u>	<u>0.03</u>	<u>0.09</u>
Total	99.00	99.59	99.35	99.55	97.60	98.19	98.82	98.83	99.59

q	32.90	32.31	14.98	31.45	30.94	28.94	28.83	37.28	37.43
c	1.21	1.05	0.0	1.15	1.19	1.30	1.23	1.37	1.38
or	25.47	25.23	9.99	25.35	24.94	21.75	22.04	27.54	27.66
ab	28.01	28.85	33.34	31.99	31.05	31.90	32.75	25.81	26.23
an	7.18	7.68	21.23	5.58	5.48	8.77	8.52	4.28	4.28
wo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
di-wo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
di-en	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
di-fs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
hy-en	1.10	1.27	6.87	0.85	0.75	1.32	1.27	0.47	0.47
hy-fs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
il	0.09	0.11	0.32	0.11	0.11	0.15	0.13	0.06	0.06
hm	2.25	2.21	8.26	2.25	2.33	3.13	3.10	1.41	1.51
tn	0.0	0.0	3.16	0.0	0.0	0.0	0.0	0.0	0.0
ru	0.32	0.32	0.05	0.38	0.37	0.51	0.51	0.20	0.21
ap	<u>0.17</u>	<u>0.17</u>	<u>1.02</u>	<u>0.12</u>	<u>0.12</u>	<u>0.24</u>	<u>0.24</u>	<u>0.05</u>	<u>0.05</u>
Total	98.69	99.21	99.22	99.22	97.27	98.01	98.62	98.47	99.29
Femic	3.92	4.08	19.69	3.71	3.68	5.35	5.25	2.19	2.30
Salic	94.77	95.13	79.53	95.51	93.59	92.66	93.37	96.28	96.99

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MEDICINE LAKE STRAT TEST 68-16 VOLCANIC ROCKS

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TiO ₂	0.37	0.38	1.51	0.44	0.43	0.59	0.58	0.23	0.24
Al ₂ O ₃	13.95	14.10	16.09	14.06	13.80	14.70	14.76	13.00	13.12
Fe ₂ O ₃	2.25	2.21	8.26	2.25	2.33	3.13	3.10	1.41	1.51
FeO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MnO	0.04	0.05	0.15	0.05	0.05	0.07	0.06	0.03	0.03
MgO	0.44	0.51	2.76	0.34	0.30	0.53	0.51	0.19	0.19
CaO	1.54	1.64	5.75	1.19	1.17	1.90	1.85	0.89	0.89
Na ₂ O	3.31	3.41	3.94	3.78	3.67	3.77	3.87	3.05	3.10
K ₂ O	4.31	4.27	1.69	4.29	4.22	3.68	3.73	4.66	4.68
P ₂ O ₅	0.07	0.07	0.43	0.05	0.05	0.10	0.10	0.02	0.02
H ₂ O ⁺	0.21	0.31	0.0	0.30	0.30	0.14	0.12	0.33	0.21
H ₂ O ⁻	<u>0.10</u>	<u>0.07</u>	<u>0.15</u>	<u>0.03</u>	<u>0.03</u>	<u>0.04</u>	<u>0.08</u>	<u>0.03</u>	<u>0.09</u>
Total	99.00	99.59	99.35	99.55	97.60	98.19	98.82	98.83	99.59

q	32.90	32.31	14.98	31.45	30.94	28.94	28.83	37.28	37.43
c	1.21	1.05	0.0	1.15	1.19	1.30	1.23	1.37	1.38
or	25.47	25.23	9.99	25.35	24.94	21.75	22.04	27.54	27.66
ab	28.01	28.85	33.34	31.99	31.05	31.90	32.75	25.81	26.23
an	7.18	7.68	21.23	5.58	5.48	8.77	8.52	4.28	4.28
wo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
dl-wo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
dl-en	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
dl-fs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
hy-en	1.10	1.27	6.87	0.85	0.75	1.32	1.27	0.47	0.47
hy-fs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
fl	0.09	0.11	0.32	0.11	0.11	0.15	0.13	0.06	0.06
hm	2.25	2.21	8.26	2.25	2.33	3.13	3.10	1.41	1.51
tn	0.0	0.0	3.16	0.0	0.0	0.0	0.0	0.0	0.0
ru	0.32	0.32	0.05	0.38	0.37	0.51	0.51	0.20	0.21
ap	<u>0.17</u>	<u>0.17</u>	<u>1.02</u>	<u>0.12</u>	<u>0.12</u>	<u>0.24</u>	<u>0.24</u>	<u>0.05</u>	<u>0.05</u>
Total	98.69	99.21	99.22	99.22	97.27	98.01	98.62	98.47	99.29
Femic	3.92	4.08	19.69	3.71	3.68	5.35	5.25	2.19	2.30
Salic	94.77	95.13	79.53	95.51	93.59	92.66	93.37	96.28	96.99

All values are in weight percent

CHEMICAL ANALYSES AND NORMS OF
MEDICINE LAKE STRAT TEST 68-16 VOLCANIC ROCKS

Sample	<u>68-16-1</u>	<u>68-16-2</u>	<u>68-16-3</u>	<u>68-16-4A</u>	<u>68-16-4B</u>	<u>68-16-5</u>	<u>68-16-6</u>	<u>68-16-7</u>	<u>68-16-8</u>
Depth (ft)	505	530	654	751.5	751.5	829	918	1,171	1,205
Elevation (ft)	5,895	5,870	5,746	5,648.5	5,648.5	5,571	5,482	5,229	5,195
SiO ₂	72.41	72.57	58.62	72.77	71.25	69.54	70.06	74.99	75.51
TiO ₂	0.37	0.38	1.51	0.44	0.43	0.59	0.58	0.23	0.24
Al ₂ O ₃	13.95	14.10	16.09	14.06	13.80	14.70	14.76	13.00	13.12
Fe ₂ O ₃	2.25	2.21	8.26	2.25	2.33	3.13	3.10	1.41	1.51
FeO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MnO	0.04	0.05	0.15	0.05	0.05	0.07	0.06	0.03	0.03
MgO	0.44	0.51	2.76	0.34	0.30	0.53	0.51	0.19	0.19
CaO	1.54	1.64	5.75	1.19	1.17	1.90	1.85	0.89	0.89
Na ₂ O	3.31	3.41	3.94	3.78	3.67	3.77	3.87	3.05	3.10
K ₂ O	4.31	4.27	1.69	4.29	4.22	3.68	3.73	4.66	4.68
P ₂ O ₅	0.07	0.07	0.43	0.05	0.05	0.10	0.10	0.02	0.02
H ₂ O+	0.21	0.31	0.0	0.30	0.30	0.14	0.12	0.33	0.21
H ₂ O-	<u>0.10</u>	<u>0.07</u>	<u>0.15</u>	<u>0.03</u>	<u>0.03</u>	<u>0.04</u>	<u>0.08</u>	<u>0.03</u>	<u>0.09</u>
Total	99.00	99.59	99.35	99.55	97.60	98.19	98.82	98.83	99.59

CHEMICAL ANALYSES AND NORMS OF
MEDICINE LAKE STRAT TEST 68-16 VOLCANIC ROCKS

Sample	<u>68-16-1</u>	<u>68-16-2</u>	<u>68-16-3</u>	<u>68-16-4A</u>	<u>68-16-4B</u>	<u>68-16-5</u>	<u>68-16-6</u>	<u>68-16-7</u>	<u>68-16-8</u>
Depth (ft)	505	530	654	751.5	751.5	829	918	1,171	1,205
Elevation (ft)	5,895	5,870	5,746	5,648.5	5,648.5	5,571	5,482	5,229	5,195
SiO ₂	72.41	72.57	58.62	72.77	71.25	69.54	70.06	74.99	75.51
TiO ₂	0.37	0.38	1.51	0.44	0.43	0.59	0.58	0.23	0.24
Al ₂ O ₃	13.95	14.10	16.09	14.06	13.80	14.70	14.76	13.00	13.12
Fe ₂ O ₃	2.25	2.21	8.26	2.25	2.33	3.13	3.10	1.41	1.51
FeO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MnO	0.04	0.05	0.15	0.05	0.05	0.07	0.06	0.03	0.03
MgO	0.44	0.51	2.76	0.34	0.30	0.53	0.51	0.19	0.19
CaO	1.54	1.64	5.75	1.19	1.17	1.90	1.85	0.89	0.89
Na ₂ O	3.31	3.41	3.94	3.78	3.67	3.77	3.87	3.05	3.10
K ₂ O	4.31	4.27	1.69	4.29	4.22	3.68	3.73	4.66	4.68
P ₂ O ₅	0.07	0.07	0.43	0.05	0.05	0.10	0.10	0.02	0.02
H ₂ O+	0.21	0.31	0.0	0.30	0.30	0.14	0.12	0.33	0.21
H ₂ O-	<u>0.10</u>	<u>0.07</u>	<u>0.15</u>	<u>0.03</u>	<u>0.03</u>	<u>0.04</u>	<u>0.08</u>	<u>0.03</u>	<u>0.09</u>
Total	99.00	99.59	99.35	99.55	97.60	98.19	98.82	98.83	99.59

q	32.90	32.31	14.98	31.45	30.94	28.94	28.83	37.28	37.43
c	1.21	1.05	0.0	1.15	1.19	1.30	1.23	1.37	1.38
or	25.47	25.23	9.99	25.35	24.94	21.75	22.04	27.54	27.66
ab	28.01	28.85	33.34	31.99	31.05	31.90	32.75	25.81	26.23
an	7.18	7.68	21.23	5.58	5.48	8.77	8.52	4.28	4.28
wo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
df-wo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
df-en	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
df-fs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
hy-en	1.10	1.27	6.87	0.85	0.75	1.32	1.27	0.47	0.47
hy-fs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
il	0.09	0.11	0.32	0.11	0.11	0.15	0.13	0.06	0.06
hm	2.25	2.21	8.26	2.25	2.33	3.13	3.10	1.41	1.51
tn	0.0	0.0	3.16	0.0	0.0	0.0	0.0	0.0	0.0
ru	0.32	0.32	0.05	0.38	0.37	0.51	0.51	0.20	0.21
ap	0.17	0.17	1.02	0.12	0.12	0.24	0.24	0.05	0.05
Total	98.69	99.21	99.22	99.22	97.27	98.01	98.62	98.47	99.29
Femic	3.92	4.08	19.69	3.71	3.68	5.35	5.25	2.19	2.30
Salic	94.77	95.13	79.53	95.51	93.59	92.66	93.37	96.28	96.99

All values are in weight percent

CHEMICAL ANALYSES AND NORMS OF
MEDICINE LAKE STRAT TEST 68-16 VOLCANIC ROCKS

Sample	<u>68-16-1</u>	<u>68-16-2</u>	<u>68-16-3</u>	<u>68-16-4A</u>	<u>68-16-4B</u>	<u>68-16-5</u>	<u>68-16-6</u>	<u>68-16-7</u>	<u>68-16-8</u>
Depth (ft)	505	530	654	751.5	751.5	829	918	1,171	1,205
Elevation (ft)	5,895	5,870	5,746	5,648.5	5,648.5	5,571	5,482	5,229	5,195
SiO ₂	72.41	72.57	58.62	72.77	71.25	69.54	70.06	74.99	75.51
TiO ₂	0.37	0.38	1.51	0.44	0.43	0.59	0.58	0.23	0.24
Al ₂ O ₃	13.95	14.10	16.09	14.06	13.80	14.70	14.76	13.00	13.12
Fe ₂ O ₃	2.25	2.21	8.26	2.25	2.33	3.13	3.10	1.41	1.51
FeO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MnO	0.04	0.05	0.15	0.05	0.05	0.07	0.06	0.03	0.03
MgO	0.44	0.51	2.76	0.34	0.30	0.53	0.51	0.19	0.19
CaO	1.54	1.64	5.75	1.19	1.17	1.90	1.85	0.89	0.89
Na ₂ O	3.31	3.41	3.94	3.78	3.67	3.77	3.87	3.05	3.10
K ₂ O	4.31	4.27	1.69	4.29	4.22	3.68	3.73	4.66	4.68
P ₂ O ₅	0.07	0.07	0.43	0.05	0.05	0.10	0.10	0.02	0.02
H ₂ O+	0.21	0.31	0.0	0.30	0.30	0.14	0.12	0.33	0.21
H ₂ O-	<u>0.10</u>	<u>0.07</u>	<u>0.15</u>	<u>0.03</u>	<u>0.03</u>	<u>0.04</u>	<u>0.08</u>	<u>0.03</u>	<u>0.09</u>
Total	99.00	99.59	99.35	99.55	97.60	98.19	98.82	98.83	99.59

q	32.90	32.31	14.98	31.45	30.94	28.94	28.83	37.28	37.43
c	1.21	1.05	0.0	1.15	1.19	1.30	1.23	1.37	1.38
or	25.47	25.23	9.99	25.35	24.94	21.75	22.04	27.54	27.66
ab	28.01	28.85	33.34	31.99	31.05	31.90	32.75	25.81	26.23
an	7.18	7.68	21.23	5.58	5.48	8.77	8.52	4.28	4.28
wo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
df-wo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
df-en	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
df-fs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
hy-en	1.10	1.27	6.87	0.85	0.75	1.32	1.27	0.47	0.47
hy-fs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
il	0.09	0.11	0.32	0.11	0.11	0.15	0.13	0.06	0.06
hm	2.25	2.21	8.26	2.25	2.33	3.13	3.10	1.41	1.51
tn	0.0	0.0	3.16	0.0	0.0	0.0	0.0	0.0	0.0
ru	0.32	0.32	0.05	0.38	0.37	0.51	0.51	0.20	0.21
ap	<u>0.17</u>	<u>0.17</u>	<u>1.02</u>	<u>0.12</u>	<u>0.12</u>	<u>0.24</u>	<u>0.24</u>	<u>0.05</u>	<u>0.05</u>
Total	98.69	99.21	99.22	99.22	97.27	98.01	98.62	98.47	99.29
Femic	3.92	4.08	19.69	3.71	3.68	5.35	5.25	2.19	2.30
Salic	94.77	95.13	79.53	95.51	93.59	92.66	93.37	96.28	96.99

All values are in weight percent

CHEMICAL ANALYSES AND NORMS OF
MEDICINE LAKE STRAT TEST 68-16 VOLCANIC ROCKS

Sample	68-16-1	68-16-2	68-16-3	68-16-4A	68-16-4B	68-16-5	68-16-6	68-16-7	68-16-8
Depth (ft)	505	530	654	751.5	751.5	829	918	1,171	1,205
Elevation (ft)	5,895	5,870	5,746	5,648.5	5,648.5	5,571	5,482	5,229	5,195
SiO ₂	72.41	72.57	58.62	72.77	71.25	69.54	70.06	74.99	75.51
TiO ₂	0.37	0.38	1.51	0.44	0.43	0.59	0.58	0.23	0.24
Al ₂ O ₃	13.95	14.10	16.09	14.06	13.80	14.70	14.76	13.00	13.12
Fe ₂ O ₃	2.25	2.21	8.26	2.25	2.33	3.13	3.10	1.41	1.51
FeO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MnO	0.04	0.05	0.15	0.05	0.05	0.07	0.06	0.03	0.03
MgO	0.44	0.51	2.76	0.34	0.30	0.53	0.51	0.19	0.19
CaO	1.54	1.64	5.75	1.19	1.17	1.90	1.85	0.89	0.89
Na ₂ O	3.31	3.41	3.94	3.78	3.67	3.77	3.87	3.05	3.10
K ₂ O	4.31	4.27	1.69	4.29	4.22	3.68	3.73	4.66	4.68
P ₂ O ₅	0.07	0.07	0.43	0.05	0.05	0.10	0.10	0.02	0.02
H ₂ O+	0.21	0.31	0.0	0.30	0.30	0.14	0.12	0.33	0.21
H ₂ O-	0.10	0.07	0.15	0.03	0.03	0.04	0.08	0.03	0.09
Total	99.00	99.59	99.35	99.55	97.60	98.19	98.82	98.83	99.59
q	32.90	32.31	14.98	31.45	30.94	28.94	28.83	37.28	37.43
c	1.21	1.05	0.0	1.15	1.19	1.30	1.23	1.37	1.38
or	25.47	25.23	9.99	25.35	24.94	21.75	22.04	27.54	27.66
ab	28.01	28.85	33.34	31.99	31.05	31.90	32.75	25.81	26.23
an	7.18	7.68	21.23	5.58	5.48	8.77	8.52	4.28	4.28
wo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
di-wo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
di-en	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
di-fs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
hy-en	1.10	1.27	6.87	0.85	0.75	1.32	1.27	0.47	0.47
hy-fs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
il	0.09	0.11	0.32	0.11	0.11	0.15	0.13	0.06	0.06
hm	2.25	2.21	8.26	2.25	2.33	3.13	3.10	1.41	1.51
tn	0.0	0.0	3.16	0.0	0.0	0.0	0.0	0.0	0.0
ru	0.32	0.32	0.05	0.38	0.37	0.51	0.51	0.20	0.21
ap	0.17	0.17	1.02	0.12	0.12	0.24	0.24	0.05	0.05
Total	98.69	99.21	99.22	99.22	97.27	98.01	98.62	98.47	99.29
Fenic	3.92	4.08	19.69	3.71	3.68	5.35	5.25	2.19	2.30
Salic	94.77	95.13	79.53	95.51	93.59	92.66	93.37	96.28	96.99

All values are in weight percent

TRACE ELEMENT ANALYSES
MEDICINE LAKE STRAT TEST 68-16

Sample	<u>68-16-1</u>	<u>68-16-2</u>	<u>68-16-3</u>	<u>68-16-4A</u>	<u>68-16-4B</u>	<u>68-16-5</u>	<u>68-16-6</u>	<u>68-16-7</u>	<u>68-16-8</u>
Depth (ft)	505	530	654	751.5	751.5	829	918	1,171	1,205
Elevation (ft)	5,895	5,870	5,746	5,648.5	5,648.5	5,571	5,482	5,229	5,195
S*	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cl	<50.00	330.90	<50.00	280.76	281.53	<50.00	<50.00	374.20	<50.00
V	42.85	42.14	203.47	24.25	21.85	33.86	38.11	23.60	26.30
Ni	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00
Cu	<20.00	<20.00	47.15	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00
Zn	33.56	42.91	88.29	49.42	45.41	54.12	47.10	31.70	28.75
Rb	132.28	131.88	33.36	113.02	110.45	88.56	91.92	138.62	144.01
Sr	139.75	142.56	347.76	97.57	91.91	174.43	169.86	78.77	82.77
Zr	237.75	229.68	198.20	343.05	359.50	283.65	290.57	204.52	205.22
Ba	911.33	911.00	511.49	975.83	998.40	938.21	915.81	838.15	832.61
Pb	<40.0	<40.0	<40.0	<40.0	<40.0	<40.0	<40.0	<40.0	<40.0

All trace elements except S are in ppm

*Weight percent

TRACE ELEMENT ANALYSES
 MEDICINE LAKE STRAT TEST 68-16

	<u>68-16-1</u>	<u>68-16-2</u>	<u>68-16-3</u>	<u>68-16-4A</u>	<u>68-16-4B</u>	<u>68-16-5</u>	<u>68-16-6</u>	<u>68-16-7</u>	<u>68-16-8</u>
Sample									
Depth (Ft)	505	530	654	751.5	751.5	829	918	1,171	1,205
Elevation (Ft)	5,895	5,870	5,746	5,648.5	5,648.5	5,571	5,482	5,229	5,195
S*	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cl	<50.00	330.90	<50.00	280.76	281.53	<50.00	<50.00	374.20	<50.00
V	42.85	42.14	203.47	24.25	21.85	33.86	38.11	23.60	26.30
Nl	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00
Cu	<20.00	<20.00	47.15	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00
Zn	33.56	42.91	88.29	49.42	45.41	54.12	47.10	31.70	28.75
Rb	132.28	131.88	33.36	113.02	110.45	88.56	91.92	138.62	144.01
Sr	139.75	142.56	347.76	97.57	91.91	174.43	169.86	78.77	82.77
Zr	237.75	229.68	198.20	343.05	359.50	283.65	290.57	204.52	205.22
Ba	911.33	911.00	511.49	975.83	998.40	938.21	915.81	838.15	832.61
Pb	<40.0	<40.0	<40.0	<40.0	<40.0	<40.0	<40.0	<40.0	<40.0

All trace elements except S are in ppm

*Weight percent

TRACE ELEMENT ANALYSES
MEDICINE LAKE STRAT TEST 68-16

	<u>68-16-1</u>	<u>68-16-2</u>	<u>68-16-3</u>	<u>68-16-4A</u>	<u>68-16-4B</u>	<u>68-16-5</u>	<u>68-16-6</u>	<u>68-16-7</u>	<u>68-16-8</u>
Sample									
Depth (Ft)	505	530	654	751.5	751.5	829	918	1,171	1,205
Elevation (Ft)	5,895	5,870	5,746	5,648.5	5,648.5	5,571	5,482	5,229	5,195
S*	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cl	<50.00	330.90	<50.00	280.76	281.53	<50.00	<50.00	374.20	<50.00
V	42.85	42.14	203.47	24.25	21.85	33.86	38.11	23.60	26.30
N1	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00
Cu	<20.00	<20.00	47.15	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00
Zn	33.56	42.91	88.29	49.42	45.41	54.12	47.10	31.70	28.75
Rb	132.28	131.88	33.36	113.02	110.45	88.56	91.92	138.62	144.01
Sr	139.75	142.56	347.76	97.57	91.91	174.43	169.86	78.77	82.77
Zr	237.75	229.68	198.20	343.05	359.50	283.65	290.57	204.52	205.22
Ba	911.33	911.00	511.49	975.83	998.40	938.21	915.81	838.15	832.61
Pb	<40.0	<40.0	<40.0	<40.0	<40.0	<40.0	<40.0	<40.0	<40.0

All trace elements except S are in ppm

*Weight percent

TRACE ELEMENT ANALYSES
 MEDICINE LAKE STRAT TEST 68-16

Sample	<u>68-16-1</u>	<u>68-16-2</u>	<u>68-16-3</u>	<u>68-16-4A</u>	<u>68-16-4B</u>	<u>68-16-5</u>	<u>68-16-6</u>	<u>68-16-7</u>	<u>68-16-8</u>
Depth (Ft)	505	530	654	751.5	751.5	829	918	1,171	1,205
Elevation (Ft)	5,895	5,870	5,746	5,648.5	5,648.5	5,571	5,482	5,229	5,195
S*	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cl	<50.00	330.90	<50.00	280.76	281.53	<50.00	<50.00	374.20	<50.00
V	42.85	42.14	203.47	24.25	21.85	33.86	38.11	23.60	26.30
Ni	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00
Cu	<20.00	<20.00	47.15	<20.00	<20.00	<20.00	<20.00	<20.00	<20.00
Zn	33.56	42.91	88.29	49.42	45.41	54.12	47.10	31.70	28.75
Rb	132.28	131.88	33.36	113.02	110.45	88.56	91.92	138.62	144.01
Sr	139.75	142.56	347.76	97.57	91.91	174.43	169.86	78.77	82.77
Zr	237.75	229.68	198.20	343.05	359.50	283.65	290.57	204.52	205.22
Ba	911.33	911.00	511.49	975.83	998.40	938.21	915.81	838.15	832.61
Pb	<40.0	<40.0	<40.0	<40.0	<40.0	<40.0	<40.0	<40.0	<40.0

All trace elements except S are in ppm

*Weight percent