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Evolution of magmatic AFM mineral assemblages in granitoid reocks: the hornblende + melt = biotite reaction in the Liberty Hill pluton, South Carolina

Speer

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# Evolution of magmatic AFM mineral assemblages in granitoid rocks: the hornblende + melt = biotite reaction in the Liberty Hill pluton, South Carolina

J. Alexander Speer

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SUPER RECAL

TABLE 1. AVERAGE AMPHIBOLE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 45.38 | 52.75 | 44.87 | 43.59 | 41.90 | 43.30 | 39.17 | 40.13 |
| TIO2 | 1.45 | 0.16 | 1.64 | 1.82 | 1.73 | 1.85 | 1.61 | 1.53 |
| A2O3 | 7.69 | 2.05 | 7.62 | 8.59 | 8.26 | 7.88 | 16.12 | 13.02 |
| FEO | 21.19 | 16.63 | 20.81 | 20.26 | 22.66 | 21.44 | 19.44 | 19.92 |
| MNO | 0.58 | 0.61 | 0.66 | 0.71 | 0.94 | 0.76 | 0.69 | 0.73 |
| MGO | 9.39 | 13.85 | 8.75 | 8.73 | 6.93 | 7.94 | 6.69 | 7.18 |
| CAO | 11.40 | 11.85 | 10.99 | 10.69 | 10.53 | 10.95 | 9.71 | 10.16 |
| BAO | 0.08 | 0.04 | 0.10 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| NA2O | 1.86 | 0.75 | 1.68 | 1.68 | 1.76 | 1.55 | 1.48 | 1.35 |
| K2O | 1.05 | 0.30 | 1.10 | 1.02 | 1.11 | 1.00 | 0.97 | 1.00 |
| F | 0.77 | 0.89 | 0.49 | 0.47 | 0.75 | 0.42 | 0.54 | 0.51 |
| CL | 0.22 | 0.02 | 0.15 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| H2O | 1.58 | 1.63 | 1.70 | 1.73 | 1.53 | 1.72 | 1.68 | 1.67 |
| SUM | 102.64 | 101.53 | 100.56 | 99.29 | 98.10 | 98.81 | 98.10 | 97.20 |
| -O= F+CL | 0.37 | 0.38 | 0.24 | 0.20 | 0.32 | 0.18 | 0.23 | 0.21 |
| SUM | 102.27 | 101.15 | 100.32 | 99.09 | 97.78 | 98.63 | 97.87 | 96.99 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 6.801 | * | 7.676 | * | 6.842 | * | 6.710 | * | 6.657 | * | 6.748 | * | 6.065 | * | 6.304 | * |
| AL | 1.199 | 8.000 | 0.324 | 8.000 | 1.158 | 8.000 | 1.290 | 8.000 | 1.343 | 8.000 | 1.252 | 8.000 | 1.935 | 8.000 | 1.696 | 8.000 |
| AL | 0.159 | * | 0.028 | * | 0.211 | * | 0.268 | * | 0.203 | * | 0.195 | * | 1.007 | * | 0.715 | * |
| TI | 0.163 | * | 0.018 | * | 0.188 | * | 0.211 | * | 0.207 | * | 0.217 | * | 0.187 | * | 0.181 | * |
| FE | 2.656 | * | 2.024 | * | 2.654 | * | 2.608 | * | 3.011 | * | 2.794 | * | 2.517 | * | 2.617 | * |
| MN | 0.074 | * | 0.075 | * | 0.085 | * | 0.093 | * | 0.126 | * | 0.100 | * | 0.090 | * | 0.097 | * |
| MG | 2.098 | 5.150 | 3.004 | 5.148 | 1.989 | 5.126 | 2.003 | 5.183 | 1.641 | 5.188 | 1.844 | 5.151 | 1.544 | 5.346 | 1.681 | 5.291 |
| CA | 1.831 | * | 1.848 | * | 1.795 | * | 1.763 | * | 1.792 | * | 1.828 | * | 1.611 | * | 1.710 | * |
| NA | 0.540 | * | 0.212 | * | 0.497 | * | 0.501 | * | 0.542 | * | 0.468 | * | 0.444 | * | 0.411 | * |
| K | 0.201 | * | 0.056 | * | 0.214 | * | 0.200 | * | 0.225 | * | 0.199 | * | 0.192 | * | 0.200 | * |
| BA | 0.005 | 2.576 | 0.002 | 2.117 | 0.006 | 2.512 | 0.0 | 2.465 | 0.0 | 2.559 | 0.0 | 2.496 | 0.0 | 2.247 | 0.0 | 2.322 |
| CL | 0.056 | * | 0.005 | * | 0.039 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * |
| F | 0.365 | * | 0.410 | * | 0.236 | * | 0.229 | * | 0.377 | * | 0.207 | * | 0.264 | * | 0.253 | * |
| H | 1.580 | 2.000 | 1.582 | 1.997 | 1.729 | 2.004 | 1.777 | 2.005 | 1.621 | 1.998 | 1.788 | 1.995 | 1.735 | 2.000 | 1.750 | 2.004 |
| O | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * |
| | FE | 55.87 | | 40.25 | | 57.16 | | 56.56 | | 64.72 | | 60.24 | | 61.98 | | 60.89 |
| | MG | 44.13 | | 59.75 | | 42.84 | | 43.44 | | 35.28 | | 39.76 | | 38.02 | | 39.11 |
| | F/M | 1.301 | | 0.699 | | 1.377 | | 1.348 | | 1.912 | | 1.569 | | 1.689 | | 1.614 |
| | F/FM | 0.565 | | 0.411 | | 0.579 | | 0.574 | | 0.657 | | 0.611 | | 0.628 | | 0.618 |
| | A* = | 0.109 | | 0.029 | | 0.111 | | 0.128 | | 0.124 | | 0.119 | | 0.253 | | 0.205 |
| | A = | 0.074 | | 0.018 | | 0.073 | | 0.094 | | 0.086 | | 0.084 | | 0.226 | | 0.174 |
| | M = | 0.441 | | 0.597 | | 0.428 | | 0.434 | | 0.353 | | 0.398 | | 0.380 | | 0.391 |

1 S6 53 ENCLAVE, AMPH RIM (AV.4)
2 S6 53 ENCLAVE, AMPH NEXT TO CPX (AV.2)
3 S6 55 ENCLAVE (AV.6)
4 S6 56 CGR AMPH+BIOT GRANITOID (AV.3)
5 S6 65 CGR AMPH+BIOT GRANITOID (AV.2)
6 S6 69 CGR AMPH+BIOT GRANITOID (AV.2)
7 S6 86 CGR AMPH+BIOT GRANITOID, RIM
8 S6 86 CGR AMPH+BIOT GRANITOID, RIM

SUPER RECAL

TABLE 1. AVERAGE AMPHIBOLE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | 16 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SIO2 | 42.64 | | 43.09 | | 42.41 | | 41.94 | | 43.86 | | 43.60 | | 43.62 | | 37.24 | |
| TIO2 | 1.33 | | 1.45 | | 1.09 | | 1.09 | | 1.68 | | 1.68 | | 1.45 | | 0.76 | |
| A203 | 8.94 | | 8.33 | | 9.28 | | 10.92 | | 7.56 | | 7.93 | | 8.14 | | 18.89 | |
| FEO | 23.68 | | 23.99 | | 23.05 | | 24.11 | | 22.30 | | 23.00 | | 22.61 | | 19.34 | |
| MNO | 0.78 | | 0.84 | | 0.75 | | 0.83 | | 0.80 | | 0.90 | | 0.83 | | 0.64 | |
| MGO | 7.63 | | 7.28 | | 7.84 | | 7.52 | | 8.17 | | 7.75 | | 8.07 | | 6.42 | |
| CAO | 10.83 | | 10.75 | | 10.79 | | 10.67 | | 10.58 | | 10.64 | | 10.64 | | 9.64 | |
| BAO | 0.09 | | 0.07 | | 0.05 | | 0.03 | | 0.01 | | 0.04 | | 0.01 | | 0.0 | |
| NA20 | 1.87 | | 1.78 | | 1.84 | | 1.71 | | 1.85 | | 1.67 | | 1.78 | | 1.37 | |
| K20 | 1.29 | | 1.26 | | 1.27 | | 1.28 | | 1.02 | | 1.05 | | 1.09 | | 1.05 | |
| F | 0.63 | | 0.57 | | 0.69 | | 0.54 | | 0.62 | | 0.51 | | 0.60 | | 0.51 | |
| CL | 0.12 | | 0.14 | | 0.07 | | 0.10 | | 0.12 | | 0.11 | | 0.14 | | 0.0 | |
| H20 | 1.62 | | 1.63 | | 1.59 | | 1.68 | | 1.62 | | 1.67 | | 1.63 | | 1.68 | |
| SUM | 101.45 | | 101.18 | | 100.72 | | 102.42 | | 100.19 | | 100.55 | | 100.61 | | 97.54 | |
| -O= F+CL | 0.29 | | 0.27 | | 0.31 | | 0.25 | | 0.29 | | 0.24 | | 0.28 | | 0.21 | |
| SUM | 101.16 | | 100.91 | | 100.41 | | 102.17 | | 99.90 | | 100.31 | | 100.33 | | 97.33 | |
| SI | 6.573 | * | 6.661 | * | 6.563 | * | 6.396 | * | 6.774 | * | 6.731 | * | 6.720 | * | 5.802 | * |
| AL | 1.427 | 8.000 | 1.339 | 8.000 | 1.437 | 8.000 | 1.604 | 8.000 | 1.226 | 8.000 | 1.269 | 8.000 | 1.280 | 8.000 | 2.198 | 8.000 |
| AL | 0.196 | * | 0.179 | * | 0.255 | * | 0.359 | * | 0.150 | * | 0.173 | * | 0.198 | * | 1.270 | * |
| TI | 0.154 | * | 0.169 | * | 0.127 | * | 0.125 | * | 0.195 | * | 0.195 | * | 0.168 | * | 0.089 | * |
| FE | 3.053 | * | 3.102 | * | 2.983 | * | 3.075 | * | 2.880 | * | 2.969 | * | 2.913 | * | 2.520 | * |
| MN | 0.102 | * | 0.110 | * | 0.098 | * | 0.107 | * | 0.105 | * | 0.118 | * | 0.108 | * | 0.084 | * |
| MG | 1.753 | 5.258 | 1.677 | 5.237 | 1.808 | 5.271 | 1.709 | 5.376 | 1.881 | 5.211 | 1.783 | 5.238 | 1.853 | 5.240 | 1.491 | 5.454 |
| CA | 1.789 | * | 1.781 | * | 1.789 | * | 1.744 | * | 1.751 | * | 1.760 | * | 1.756 | * | 1.609 | * |
| NA | 0.559 | * | 0.534 | * | 0.552 | * | 0.506 | * | 0.554 | * | 0.500 | * | 0.532 | * | 0.414 | * |
| K | 0.254 | * | 0.248 | * | 0.251 | * | 0.249 | * | 0.201 | * | 0.207 | * | 0.214 | * | 0.209 | * |
| BA | 0.005 | 2.607 | 0.004 | 2.567 | 0.003 | 2.595 | 0.002 | 2.500 | 0.001 | 2.506 | 0.002 | 2.469 | 0.001 | 2.503 | 0.0 | 2.232 |
| CL | 0.031 | * | 0.037 | * | 0.018 | * | 0.026 | * | 0.031 | * | 0.029 | * | 0.037 | * | 0.0 | * |
| F | 0.307 | * | 0.279 | * | 0.338 | * | 0.260 | * | 0.303 | * | 0.249 | * | 0.292 | * | 0.251 | * |
| H | 1.666 | 2.004 | 1.681 | 1.996 | 1.641 | 1.997 | 1.709 | 1.996 | 1.669 | 2.003 | 1.720 | 1.997 | 1.675 | 2.004 | 1.746 | 1.997 |
| O | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * |
| FE | | 63.52 | | 64.90 | | 62.26 | | 64.27 | | 60.50 | | 62.48 | | 61.12 | | 62.83 |
| MG | | 36.48 | | 35.10 | | 37.74 | | 35.73 | | 39.50 | | 37.52 | | 38.88 | | 37.17 |
| F/M | | 1.799 | | 1.914 | | 1.704 | | 1.862 | | 1.587 | | 1.731 | | 1.630 | | 1.747 |
| F/FM | | 0.643 | | 0.657 | | 0.630 | | 0.651 | | 0.613 | | 0.634 | | 0.620 | | 0.636 |
| A* = | | 0.125 | | 0.117 | | 0.131 | | 0.152 | | 0.110 | | 0.115 | | 0.117 | | 0.289 |
| A = | | 0.082 | | 0.075 | | 0.089 | | 0.113 | | 0.075 | | 0.080 | | 0.081 | | 0.262 |
| M = | | 0.365 | | 0.351 | | 0.377 | | 0.357 | | 0.395 | | 0.375 | | 0.389 | | 0.372 |

9 S6 86 CGR AMPH+BIOT GRANITOID, RIM
10 S6 86 CGR AMPH+BIOT GRANITOID, RIM
11 S6 86 CGR AMPH+BIOT GRANITOID, RIM
12 S6 86 CGR AMPH+BIOT GRANITOID, RIM

13 S6 86 CGR AMPH+BIOT GRANITOID, CORE
14 S6 86 CGR AMPH+BIOT GRANITOID, CORE
15 S6 86 CGR AMPH+BIOT GRANITOID, CORE
16 S6 87 CGR AMPH+BIOT GRANITOID, RIM

SUPER RECAL

TABLE 1. AVERAGE AMPHIBOLE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 42.94 | 41.94 | 39.92 | 42.39 | 41.07 | 42.58 | 41.64 | 41.69 |
| TIO2 | 1.04 | 1.29 | 1.48 | 1.28 | 1.36 | 0.78 | 0.85 | 0.88 |
| A203 | 8.97 | 11.30 | 14.87 | 10.58 | 9.13 | 9.12 | 9.83 | 9.99 |
| FEO | 23.49 | 24.23 | 22.29 | 23.47 | 22.50 | 24.18 | 22.03 | 22.78 |
| MNO | 0.77 | 0.72 | 0.74 | 0.76 | 0.75 | 0.79 | 0.70 | 0.73 |
| MGO | 7.49 | 7.34 | 7.13 | 7.49 | 7.16 | 7.59 | 7.46 | 7.30 |
| CAO | 10.92 | 10.79 | 10.22 | 10.88 | 10.46 | 11.03 | 10.87 | 10.59 |
| BAO | 0.03 | 0.79 | 0.07 | 0.05 | 0.03 | 0.03 | 0.0 | 0.03 |
| NA2O | 1.85 | 1.75 | 1.67 | 1.84 | 1.78 | 1.84 | 1.57 | 1.87 |
| K2O | 1.22 | 1.30 | 1.14 | 1.31 | 1.27 | 1.25 | 1.18 | 1.19 |
| F | 0.53 | 0.46 | 0.45 | 0.52 | 0.52 | 0.53 | 0.64 | 0.54 |
| CL | 0.05 | 0.15 | 0.16 | 0.17 | 0.23 | 0.06 | 0.0 | 0.05 |
| H2O | 1.68 | 1.73 | 1.72 | 1.68 | 1.58 | 1.68 | 1.60 | 1.65 |
| SUM | 100.98 | 103.79 | 101.86 | 102.42 | 97.84 | 101.46 | 98.37 | 99.29 |
| -O= F+CL | 0.23 | 0.23 | 0.23 | 0.26 | 0.27 | 0.24 | 0.27 | 0.24 |
| SUM | 100.75 | 103.56 | 101.63 | 102.16 | 97.57 | 101.22 | 98.10 | 99.05 |
| SI | 6.626 * | 6.345 * | 6.058 * | 6.451 * | 6.550 * | 6.569 * | 6.560 * | 6.529 * |
| AL | 1.374 8.000 | 1.655 8.000 | 1.942 8.000 | 1.549 8.000 | 1.450 8.000 | 1.431 8.000 | 1.440 8.000 | 1.471 8.000 |
| AL | 0.257 * | 0.360 * | 0.717 * | 0.348 * | 0.265 * | 0.227 * | 0.385 * | 0.373 * |
| TI | 0.121 * | 0.147 * | 0.169 * | 0.146 * | 0.163 * | 0.090 * | 0.101 * | 0.104 * |
| FE | 3.031 * | 3.066 * | 2.829 * | 2.987 * | 3.001 * | 3.120 * | 2.902 * | 2.984 * |
| MN | 0.101 * | 0.092 * | 0.095 * | 0.098 * | 0.101 * | 0.103 * | 0.093 * | 0.097 * |
| MG | 1.723 5.232 | 1.655 5.320 | 1.613 5.422 | 1.699 5.278 | 1.702 5.232 | 1.745 5.286 | 1.752 5.233 | 1.704 5.261 |
| CA | 1.805 * | 1.749 * | 1.662 * | 1.774 * | 1.787 * | 1.823 * | 1.835 * | 1.777 * |
| NA | 0.553 * | 0.513 * | 0.491 * | 0.543 * | 0.550 * | 0.550 * | 0.480 * | 0.568 * |
| K | 0.240 * | 0.251 * | 0.221 * | 0.254 * | 0.258 * | 0.246 * | 0.237 * | 0.238 * |
| BA | 0.002 2.601 | 0.047 2.560 | 0.004 2.378 | 0.003 2.574 | 0.002 2.598 | 0.002 2.621 | 0.0 2.551 | 0.002 2.584 |
| CL | 0.013 * | 0.038 * | 0.041 * | 0.044 * | 0.062 * | 0.016 * | 0.0 * | 0.013 * |
| F | 0.259 * | 0.220 * | 0.216 * | 0.250 * | 0.262 * | 0.259 * | 0.319 * | 0.267 * |
| H | 1.729 2.001 | 1.746 2.005 | 1.741 1.998 | 1.705 2.000 | 1.681 2.005 | 1.729 2.003 | 1.681 2.000 | 1.724 2.005 |
| O | 24.000 * | 24.000 * | 24.000 * | 24.000 * | 24.000 * | 24.000 * | 24.000 * | 24.000 * |
| FE | 63.76 | 64.94 | 63.69 | 63.74 | 63.81 | 64.13 | 62.36 | 63.65 |
| MG | 36.24 | 35.06 | 36.31 | 36.26 | 36.19 | 35.88 | 37.64 | 36.35 |
| F/M | 1.818 | 1.908 | 1.813 | 1.816 | 1.823 | 1.847 | 1.710 | 1.808 |
| F/FM | 0.645 | 0.656 | 0.645 | 0.645 | 0.646 | 0.649 | 0.631 | 0.644 |
| A* = | 0.128 | 0.157 | 0.215 | 0.149 | 0.134 | 0.127 | 0.146 | 0.146 |
| A = | 0.087 | 0.118 | 0.184 | 0.108 | 0.091 | 0.086 | 0.107 | 0.108 |
| M = | 0.362 | 0.351 | 0.363 | 0.363 | 0.362 | 0.359 | 0.376 | 0.364 |

17 S6 87 CGR AMPH+BIOT GRANITOID, RIM
18 S6 87 CGR AMPH+BIOT GRANITOID, RIM
19 S6 87 CGR AMPH+BIOT GRANITOID, RIM
20 S6 87 CGR AMPH+BIOT GRANITOID, RIM
21 S6 87 CGR AMPH+BIOT GRANITOID, RIM
22 S6 87 CGR AMPH+BIOT GRANITOID, CORE
23 S6 87 CGR AMPH+BIOT GRANITOID, CORE
24 S6 87 CGR AMPH+BIOT GRANITOID, CORE

SUPER RECAL

TABLE 1. AVERAGE AMPHIBOLE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 42.40 | 42.79 | 42.59 | 42.36 | 41.16 | 43.15 | 41.54 | 43.40 |
| TIO2 | 0.80 | 1.05 | 0.74 | 0.63 | 1.67 | 1.12 | 1.57 | 1.38 |
| A2O3 | 9.25 | 8.32 | 9.32 | 9.66 | 10.40 | 8.59 | 11.07 | 7.03 |
| FEO | 22.55 | 22.89 | 23.84 | 24.71 | 21.90 | 22.04 | 20.57 | 20.41 |
| MNO | 0.74 | 0.74 | 0.76 | 0.74 | 0.77 | 0.82 | 0.73 | 0.55 |
| MGO | 7.35 | 7.48 | 7.29 | 7.75 | 7.11 | 7.80 | 7.69 | 9.29 |
| CAO | 10.77 | 10.65 | 10.94 | 10.87 | 10.80 | 11.41 | 10.69 | 11.01 |
| BAO | 0.01 | 0.02 | 0.10 | 0.06 | 0.0 | 0.0 | 0.0 | 0.0 |
| NA2O | 1.80 | 1.83 | 1.75 | 1.75 | 1.60 | 1.46 | 1.32 | 1.57 |
| K2O | 1.21 | 1.13 | 1.23 | 1.22 | 1.27 | 1.10 | 1.24 | 0.89 |
| F | 0.58 | 0.57 | 0.54 | 0.55 | 0.54 | 0.50 | 0.51 | 0.0 |
| CL | 0.04 | 0.12 | 0.05 | 0.05 | 0.0 | 0.0 | 0.0 | 0.0 |
| H2O | 1.63 | 1.61 | 1.67 | 1.68 | 1.66 | 1.70 | 1.69 | 1.91 |
| SUM | 99.13 | 99.20 | 100.82 | 102.03 | 98.88 | 99.69 | 98.62 | 97.44 |
| -O= F+CL | 0.25 | 0.27 | 0.24 | 0.24 | 0.23 | 0.21 | 0.21 | 0.0 |
| SUM | 98.88 | 98.93 | 100.58 | 101.79 | 98.65 | 99.48 | 98.41 | 97.44 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 6.640 | * | 6.709 | * | 6.598 | * | 6.506 | * | 6.452 | * | 6.693 | * | 6.463 | * | 6.810 | * |
| AL | 1.360 | 8.000 | 1.291 | 8.000 | 1.402 | 8.000 | 1.494 | 8.000 | 1.548 | 8.000 | 1.307 | 8.000 | 1.537 | 8.000 | 1.190 | 8.000 |
| AL | 0.347 | * | 0.246 | * | 0.299 | * | 0.255 | * | 0.373 | * | 0.263 | * | 0.492 | * | 0.110 | * |
| TI | 0.094 | * | 0.124 | * | 0.086 | * | 0.073 | * | 0.197 | * | 0.131 | * | 0.184 | * | 0.163 | * |
| FE | 2.953 | * | 3.001 | * | 3.089 | * | 3.174 | * | 2.871 | * | 2.859 | * | 2.676 | * | 2.678 | * |
| MN | 0.098 | * | 0.098 | * | 0.100 | * | 0.096 | * | 0.102 | * | 0.108 | * | 0.096 | * | 0.073 | * |
| MG | 1.716 | 5.209 | 1.748 | 5.217 | 1.683 | 5.257 | 1.774 | 5.372 | 1.661 | 5.204 | 1.803 | 5.164 | 1.783 | 5.231 | 2.173 | 5.198 |
| CA | 1.807 | * | 1.789 | * | 1.816 | * | 1.789 | * | 1.814 | * | 1.896 | * | 1.782 | * | 1.851 | * |
| NA | 0.547 | * | 0.556 | * | 0.526 | * | 0.521 | * | 0.486 | * | 0.439 | * | 0.398 | * | 0.478 | * |
| K | 0.242 | * | 0.226 | * | 0.243 | * | 0.239 | * | 0.254 | * | 0.218 | * | 0.246 | * | 0.178 | * |
| BA | 0.001 | 2.596 | 0.001 | 2.573 | 0.006 | 2.590 | 0.004 | 2.553 | 0.0 | 2.554 | 0.0 | 2.553 | 0.0 | 2.426 | 0.0 | 2.507 |
| CL | 0.011 | * | 0.032 | * | 0.013 | * | 0.013 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * |
| F | 0.287 | * | 0.283 | * | 0.265 | * | 0.267 | * | 0.268 | * | 0.245 | * | 0.251 | * | 0.0 | * |
| H | 1.703 | 2.001 | 1.684 | 1.998 | 1.726 | 2.003 | 1.721 | 2.002 | 1.736 | 2.004 | 1.759 | 2.004 | 1.754 | 2.005 | 1.999 | 1.999 |
| O | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * |
| FE | | 63.25 | | 63.19 | | 64.72 | | 64.14 | | 63.35 | | 61.32 | | 60.01 | | 55.21 |
| MG | | 36.75 | | 36.81 | | 35.28 | | 35.86 | | 36.65 | | 38.68 | | 39.99 | | 44.79 |
| F/M | | 1.779 | | 1.773 | | 1.894 | | 1.843 | | 1.790 | | 1.645 | | 1.555 | | 1.266 |
| F/FM | | 0.640 | | 0.639 | | 0.654 | | 0.648 | | 0.642 | | 0.622 | | 0.609 | | 0.559 |
| A* = | | 0.136 | | 0.121 | | 0.133 | | 0.132 | | 0.155 | | 0.127 | | 0.167 | | 0.104 |
| A = | | 0.095 | | 0.083 | | 0.092 | | 0.094 | | 0.113 | | 0.090 | | 0.126 | | 0.073 |
| M = | | 0.367 | | 0.368 | | 0.353 | | 0.359 | | 0.367 | | 0.387 | | 0.400 | | 0.448 |

25 S6 87 CGR AMPH+BIOT GRANITOID, CORE
26 S6 87 CGR AMPH+BIOT GRANITOID, CORE
27 S6 87 CGR AMPH+BIOT GRANITOID, CORE
28 S6 87 CGR AMPH+BIOT GRANITOID, RIM
29 S6 88 CGR AMPH+BIOT GRANITOID
30 S6 89 CGR AMPH+BIOT GRANITOID (AV.2)
31 S6 90 CGR AMPH+BIOT GRANITOID (AV.3)
32 S6 98 CGR AMPH+BIOT GRANITOID

SUPER RECAL

TABLE 1. AVERAGE AMPHIBOLE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 40.88 | 42.09 | 43.46 | 43.51 | 44.55 | 43.46 | 42.30 | 44.20 |
| TIO2 | 1.32 | 1.28 | 1.63 | 1.67 | 1.45 | 1.77 | 1.37 | 1.57 |
| A2O3 | 11.43 | 9.05 | 7.91 | 7.91 | 8.05 | 7.87 | 9.41 | 7.93 |
| FEO | 21.67 | 24.60 | 24.20 | 23.93 | 20.77 | 20.95 | 21.68 | 21.56 |
| MNO | 0.77 | 0.85 | 0.88 | 0.88 | 0.77 | 0.78 | 0.70 | 0.74 |
| MGO | 7.23 | 8.08 | 8.69 | 8.76 | 8.87 | 8.33 | 7.92 | 8.35 |
| CAO | 11.04 | 10.96 | 10.78 | 10.68 | 10.92 | 10.73 | 11.33 | 11.53 |
| BAO | 0.0 | 0.02 | 0.02 | 0.02 | 0.05 | 0.0 | 0.0 | 0.0 |
| NA2O | 1.45 | 1.71 | 1.83 | 1.76 | 1.69 | 1.72 | 1.61 | 1.49 |
| K2O | 1.22 | 1.33 | 1.15 | 1.11 | 1.18 | 0.98 | 1.14 | 1.01 |
| F | 0.55 | 0.45 | 0.47 | 0.45 | 0.60 | 0.81 | 0.59 | 0.44 |
| CL | 0.0 | 0.12 | 0.15 | 0.13 | 0.15 | 0.0 | 0.0 | 0.0 |
| H2O | 1.66 | 1.71 | 1.71 | 1.72 | 1.64 | 1.55 | 1.65 | 1.75 |
| SUM | 99.22 | 102.25 | 102.88 | 102.53 | 100.69 | 98.95 | 99.70 | 100.57 |
| -O= F+CL | 0.23 | 0.22 | 0.23 | 0.22 | 0.29 | 0.34 | 0.25 | 0.19 |
| SUM | 98.99 | 102.03 | 102.65 | 102.31 | 100.40 | 98.61 | 99.45 | 100.38 |
| SI | 6.374 * | 6.466 * | 6.604 * | 6.619 * | 6.792 * | 6.758 * | 6.563 * | 6.763 * |
| AL | 1.626 8.000 | 1.534 8.000 | 1.396 8.000 | 1.381 8.000 | 1.208 8.000 | 1.242 8.000 | 1.437 8.000 | 1.237 8.000 |
| AL | 0.474 * | 0.105 * | 0.021 * | 0.037 * | 0.239 * | 0.200 * | 0.283 * | 0.192 * |
| TI | 0.155 * | 0.148 * | 0.186 * | 0.191 * | 0.166 * | 0.207 * | 0.160 * | 0.181 * |
| FE | 2.826 * | 3.161 * | 3.075 * | 3.045 * | 2.648 * | 2.725 * | 2.813 * | 2.759 * |
| MN | 0.102 * | 0.111 * | 0.113 * | 0.113 * | 0.099 * | 0.103 * | 0.092 * | 0.096 * |
| MG | 1.680 5.236 | 1.850 5.374 | 1.968 5.364 | 1.986 5.373 | 2.016 5.168 | 1.931 5.165 | 1.832 5.179 | 1.904 5.132 |
| CA | 1.844 * | 1.804 * | 1.755 * | 1.741 * | 1.784 * | 1.788 * | 1.883 * | 1.890 * |
| NA | 0.438 * | 0.509 * | 0.539 * | 0.519 * | 0.500 * | 0.519 * | 0.484 * | 0.442 * |
| K | 0.243 * | 0.261 * | 0.223 * | 0.215 * | 0.229 * | 0.194 * | 0.226 * | 0.197 * |
| BA | 0.0 2.525 | 0.001 2.575 | 0.001 2.518 | 0.001 2.477 | 0.003 2.516 | 0.0 2.501 | 0.0 2.593 | 0.0 2.529 |
| CL | 0.0 * | 0.031 * | 0.039 * | 0.034 * | 0.039 * | 0.0 * | 0.0 * | 0.0 * |
| F | 0.271 * | 0.219 * | 0.226 * | 0.217 * | 0.289 * | 0.398 * | 0.290 * | 0.213 * |
| H | 1.727 1.998 | 1.753 2.002 | 1.733 1.998 | 1.746 1.996 | 1.668 1.996 | 1.608 2.006 | 1.708 1.997 | 1.786 1.999 |
| O | 24.000 * | 24.000 * | 24.000 * | 24.000 * | 24.000 * | 24.000 * | 24.000 * | 24.000 * |
| FE | 62.71 | 63.08 | 60.98 | 60.52 | 56.78 | 58.53 | 60.57 | 59.16 |
| MG | 37.29 | 36.92 | 39.02 | 39.48 | 43.22 | 41.47 | 39.43 | 40.84 |
| F/M | 1.742 | 1.768 | 1.620 | 1.590 | 1.363 | 1.464 | 1.586 | 1.499 |
| F/FM | 0.635 | 0.639 | 0.618 | 0.614 | 0.577 | 0.594 | 0.613 | 0.600 |
| A* = | 0.171 | 0.121 | 0.106 | 0.107 | 0.115 | 0.118 | 0.139 | 0.117 |
| A = | 0.132 | 0.079 | 0.069 | 0.071 | 0.075 | 0.084 | 0.101 | 0.083 |
| M = | 0.373 | 0.369 | 0.390 | 0.395 | 0.432 | 0.415 | 0.394 | 0.408 |

33 S6 132 CGR AMPH+BIOT GRANITOID, RIM
34 S6 132 CGR AMPH+BIOT GRANITOID, RIM
35 S6 132 CGR AMPH+BIOT GRANITOID, CENTER
36 S6 132 CGR AMPH+BIOT GRANITOID, CORE

37 S6 135 CGR AMPH+BIOT GRANITOID (AV.5)
38 S8 12A CGR AMPH+BIOT GRANITOID (AV.2)
39 F6 24 CGR AMPH+BIOT GRANITOID (AV.2)
40 F6 25 CGR AMPH+BIOT GRANITOID (AV.3)

SUPER RECAL

TABLE 1. AVERAGE AMPHIBOLE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
|---|---|---|---|---|---|---|---|---|
| SI02 | 43.69 | 43.73 | 43.37 | 43.11 | 45.00 | 43.33 | 44.55 | 43.45 |
| TI02 | 1.61 | 1.42 | 1.52 | 1.74 | 1.55 | 1.13 | 1.83 | 1.78 |
| A203 | 7.65 | 7.73 | 8.60 | 8.16 | 8.00 | 8.65 | 7.68 | 7.92 |
| FEO | 21.98 | 22.64 | 21.67 | 21.19 | 20.25 | 21.68 | 20.39 | 20.56 |
| MNO | 0.84 | 0.88 | 0.87 | 0.72 | 0.63 | 0.54 | 0.79 | 0.87 |
| MGO | 8.22 | 7.95 | 7.18 | 8.31 | 8.88 | 8.06 | 9.32 | 8.92 |
| CAO | 10.78 | 11.04 | 11.10 | 10.88 | 11.23 | 11.37 | 10.42 | 10.32 |
| BAO | 0.12 | 0.07 | 0.0 | 0.0 | 0.0 | 0.0 | 0.21 | 0.21 |
| NA20 | 2.16 | 1.84 | 1.42 | 1.68 | 1.76 | 1.67 | 1.84 | 1.85 |
| K20 | 1.08 | 1.06 | 1.02 | 1.08 | 1.03 | 1.15 | 1.11 | 1.15 |
| F | 0.71 | 0.92 | 0.47 | 0.52 | 0.0 | 0.0 | 0.49 | 0.74 |
| CL | 0.11 | 0.11 | 0.0 | 0.0 | 0.0 | 0.0 | 0.17 | 0.20 |
| H20 | 1.58 | 1.48 | 1.70 | 1.68 | 1.97 | 1.94 | 1.69 | 1.54 |
| SUM | 100.53 | 100.87 | 98.92 | 99.07 | 100.30 | 99.52 | 100.49 | 99.51 |
| -O= F+CL | 0.32 | 0.41 | 0.20 | 0.22 | 0.0 | 0.0 | 0.24 | 0.36 |
| SUM | 100.21 | 100.46 | 98.72 | 98.85 | 100.30 | 99.52 | 100.25 | 99.15 |
| SI | 6.741 * | 6.745 * | 6.753 * | 6.702 * | 6.829 * | 6.698 * | 6.796 * | 6.730 * |
| AL | 1.259 8.000 | 1.255 8.000 | 1.247 8.000 | 1.298 8.000 | 1.171 8.000 | 1.302 8.000 | 1.204 8.000 | 1.270 8.000 |
| AL | 0.132 * | 0.150 * | 0.331 * | 0.197 * | 0.260 * | 0.274 * | 0.176 * | 0.175 * |
| TI | 0.187 * | 0.165 * | 0.178 * | 0.203 * | 0.177 * | 0.131 * | 0.210 * | 0.207 * |
| FE | 2.836 * | 2.920 * | 2.822 * | 2.755 * | 2.570 * | 2.803 * | 2.601 * | 2.663 * |
| MN | 0.110 * | 0.115 * | 0.115 * | 0.095 * | 0.081 * | 0.071 * | 0.102 * | 0.114 * |
| MG | 1.891 5.156 | 1.828 5.178 | 1.666 5.113 | 1.926 5.175 | 2.009 5.096 | 1.857 5.135 | 2.119 5.208 | 2.059 5.219 |
| CA | 1.782 * | 1.825 * | 1.852 * | 1.812 * | 1.826 * | 1.883 * | 1.703 * | 1.713 * |
| NA | 0.646 * | 0.550 * | 0.429 * | 0.506 * | 0.518 * | 0.500 * | 0.544 * | 0.556 * |
| K | 0.213 * | 0.209 * | 0.203 * | 0.214 * | 0.199 * | 0.227 * | 0.216 * | 0.227 * |
| BA | 0.007 2.648 | 0.004 2.588 | 0.0 2.483 | 0.0 2.533 | 0.0 2.543 | 0.0 2.610 | 0.013 2.476 | 0.013 2.508 |
| CL | 0.029 * | 0.029 * | 0.0 * | 0.0 * | 0.0 * | 0.0 * | 0.044 * | 0.052 * |
| F | 0.346 * | 0.449 * | 0.231 * | 0.256 * | 0.0 * | 0.0 * | 0.236 * | 0.362 * |
| H | 1.626 2.002 | 1.523 2.000 | 1.766 1.997 | 1.742 1.998 | 1.994 1.994 | 2.000 2.000 | 1.720 2.000 | 1.591 2.006 |
| O | 24.000 * | 24.000 * | 24.000 * | 24.000 * | 24.000 * | 24.000 * | 24.000 * | 24.000 * |
| FE | 60.00 | 61.51 | 62.87 | 58.86 | 56.13 | 60.15 | 55.11 | 56.39 |
| MG | 40.00 | 38.49 | 37.13 | 41.14 | 43.87 | 39.85 | 44.89 | 43.61 |
| F/M | 1.558 | 1.661 | 1.762 | 1.480 | 1.320 | 1.547 | 1.276 | 1.349 |
| F/FM | 0.609 | 0.624 | 0.638 | 0.597 | 0.569 | 0.607 | 0.561 | 0.574 |
| A* = | 0.111 | 0.112 | 0.133 | 0.120 | 0.119 | 0.126 | 0.110 | 0.114 |
| A = | 0.074 | 0.076 | 0.098 | 0.083 | 0.083 | 0.088 | 0.072 | 0.075 |
| M = | 0.400 | 0.385 | 0.371 | 0.411 | 0.439 | 0.399 | 0.449 | 0.436 |

41 LH 3 CGR AMPH+BIOT GRANITOID (AV.3)
42 LH 4 CGR AMPH+BIOT GRANITOID (AV.6)
43 LH 6 CGR AMPH+BIOT GRANITOID
44 LH 7 CGR AMPH+BIOT GRANITOID (AV.2)
45 K2 5 CGR AMPH+BIOT GRANITOID
46 K3 283.9 CGR AMPH+BIOT GRANITOID
47 K3 289 ENCLAVE (AV.3)
48 K3 333.9 CGR AMPH+BIOT GRANITOID (AV.3)

SUPER RECAL

TABLE 1. AVERAGE AMPHIBOLE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 49 | 50 | 51 | 52 |
|---|---|---|---|---|
| SIO2 | 43.08 | 43.00 | 43.84 | 43.06 |
| TIO2 | 1.31 | 1.19 | 1.40 | 1.46 |
| A203 | 7.97 | 8.57 | 8.36 | 8.73 |
| FEO | 21.36 | 22.61 | 21.65 | 21.28 |
| MNO | 0.85 | 0.75 | 0.75 | 0.85 |
| MGO | 8.21 | 7.61 | 8.05 | 8.20 |
| CAO | 10.55 | 11.01 | 11.14 | 10.34 |
| BAO | 0.23 | 0.0 | 0.07 | 0.22 |
| NA2O | 1.82 | 2.18 | 1.62 | 1.70 |
| K2O | 1.13 | 1.20 | 1.17 | 1.13 |
| F | 0.55 | 0.0 | 0.34 | 0.41 |
| CL | 0.12 | 0.0 | 0.10 | 0.15 |
| H2O | 1.62 | 1.93 | 1.76 | 1.69 |
| SUM | 98.80 | 100.05 | 100.25 | 99.22 |
| -O= F+CL | 0.26 | 0.0 | 0.17 | 0.21 |
| SUM | 98.54 | 100.05 | 100.08 | 99.01 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SI | 6.745 | * | 6.661 | * | 6.741 | * | 6.692 | * |
| AL | 1.255 | 8.000 | 1.339 | 8.000 | 1.259 | 8.000 | 1.308 | 8.000 |
| AL | 0.215 | * | 0.225 | * | 0.256 | * | 0.290 | * |
| TI | 0.154 | * | 0.139 | * | 0.162 | * | 0.171 | * |
| FE | 2.797 | * | 2.929 | * | 2.784 | * | 2.766 | * |
| MN | 0.113 | * | 0.098 | * | 0.098 | * | 0.112 | * |
| MG | 1.916 | 5.194 | 1.757 | 5.148 | 1.845 | 5.145 | 1.899 | 5.238 |
| CA | 1.770 | * | 1.827 | * | 1.835 | * | 1.722 | * |
| NA | 0.552 | * | 0.655 | * | 0.483 | * | 0.512 | * |
| K | 0.226 | * | 0.237 | * | 0.229 | * | 0.224 | * |
| BA | 0.014 | 2.562 | 0.0 | 2.719 | 0.004 | 2.552 | 0.013 | 2.471 |
| CL | 0.032 | * | 0.0 | * | 0.026 | * | 0.040 | * |
| F | 0.272 | * | 0.0 | * | 0.165 | * | 0.202 | * |
| H | 1.692 | 1.996 | 1.994 | 1.994 | 1.805 | 1.997 | 1.752 | 1.993 |
| O | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * |
| | FE | 59.35 | | 62.50 | | 60.14 | | 59.28 |
| | MG | 40.65 | | 37.50 | | 39.86 | | 40.72 |
| | F/M | 1.519 | | 1.723 | | 1.562 | | 1.515 |
| | F/FM | 0.603 | | 0.633 | | 0.610 | | 0.602 |
| | A* = | 0.117 | | 0.124 | | 0.122 | | 0.128 |
| | A = | 0.078 | | 0.083 | | 0.082 | | 0.090 |
| | M = | 0.407 | | 0.375 | | 0.399 | | 0.407 |

49 K3 1135 CGR AMPH+BIOT GRANITOID (AV.3)
50 K3 1160.2 CGR AMPH+BIOT GRANITOID
51 K3 1271 CGR AMPH+BIOT GRANITOID (AV.4)
52 K3 1303.8 CGR AMPH+BIOT GRANITOID (AV.5)

SUPER RECAL

TABLE 2. AVERAGE BIOTITE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| SI02 | 36.65 | 37.52 | 36.31 | 36.59 | 36.93 | 35.02 | 37.88 | 36.03 |
| TI02 | 3.73 | 3.31 | 3.82 | 3.63 | 3.39 | 3.39 | 3.06 | 3.41 |
| A203 | 13.47 | 13.33 | 13.29 | 13.39 | 13.38 | 16.13 | 16.09 | 14.55 |
| FEO | 23.82 | 23.75 | 22.95 | 24.13 | 23.69 | 23.33 | 24.63 | 23.69 |
| MNO | 0.51 | 0.57 | 0.36 | 0.48 | 0.44 | 0.48 | 0.27 | 0.56 |
| MGO | 9.05 | 8.33 | 10.07 | 8.91 | 8.94 | 8.63 | 7.46 | 8.76 |
| CAO | 0.02 | 0.06 | 0.04 | 0.07 | 0.05 | 0.10 | 0.09 | 0.09 |
| BAO | 0.0 | 0.10 | 0.80 | 0.0 | 0.24 | 0.07 | 0.0 | 0.0 |
| NA2O | 0.07 | 0.14 | 0.16 | 0.08 | 0.09 | 0.09 | 0.06 | 0.09 |
| K2O | 9.17 | 9.92 | 9.53 | 8.97 | 10.03 | 8.64 | 9.39 | 8.71 |
| F | 1.01 | 1.42 | 1.07 | 1.43 | 0.77 | 0.72 | 0.0 | 1.59 |
| CL | 0.0 | 0.05 | 0.09 | 0.0 | 0.09 | 0.05 | 0.0 | 0.0 |
| H2O | 3.40 | 3.22 | 3.37 | 3.20 | 3.50 | 3.53 | 4.00 | 3.13 |
| SUM | 100.90 | 101.72 | 101.86 | 100.88 | 101.54 | 100.18 | 102.93 | 100.61 |
| -O= F+CL | 0.43 | 0.61 | 0.47 | 0.60 | 0.34 | 0.31 | 0.0 | 0.67 |
| SUM | 100.47 | 101.11 | 101.39 | 100.28 | 101.20 | 99.87 | 102.93 | 99.94 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 5.659 | * | 5.774 | * | 5.587 | * | 5.666 | * | 5.691 | * | 5.418 | * | 5.673 | * | 5.580 | * |
| AL | 2.341 | 8.000 | 2.226 | 8.000 | 2.410 | 7.997 | 2.334 | 8.000 | 2.309 | 8.000 | 2.582 | 8.000 | 2.327 | 8.000 | 2.420 | 8.000 |
| AL | 0.109 | * | 0.192 | * | 0.0 | * | 0.109 | * | 0.121 | * | 0.359 | * | 0.513 | * | 0.236 | * |
| TI | 0.433 | * | 0.383 | * | 0.442 | * | 0.423 | * | 0.393 | * | 0.394 | * | 0.345 | * | 0.397 | * |
| FE | 3.076 | * | 3.057 | * | 2.953 | * | 3.125 | * | 3.053 | * | 3.018 | * | 3.085 | * | 3.069 | * |
| MN | 0.067 | * | 0.074 | * | 0.047 | * | 0.063 | * | 0.057 | * | 0.063 | * | 0.034 | * | 0.073 | * |
| MG | 2.083 | 5.767 | 1.911 | 5.617 | 2.310 | 5.752 | 2.056 | 5.776 | 2.054 | 5.678 | 1.990 | 5.824 | 1.665 | 5.642 | 2.022 | 5.798 |
| CA | 0.003 | * | 0.010 | * | 0.007 | * | 0.012 | * | 0.008 | * | 0.017 | * | 0.014 | * | 0.015 | * |
| NA | 0.021 | * | 0.042 | * | 0.048 | * | 0.024 | * | 0.027 | * | 0.027 | * | 0.017 | * | 0.027 | * |
| K | 1.806 | * | 1.947 | * | 1.870 | * | 1.772 | * | 1.972 | * | 1.705 | * | 1.794 | * | 1.721 | * |
| BA | 0.0 | 1.830 | 0.006 | 2.005 | 0.048 | 1.973 | 0.0 | 1.807 | 0.014 | 2.021 | 0.004 | 1.753 | 0.0 | 1.826 | 0.0 | 1.763 |
| CL | 0.0 | * | 0.013 | * | 0.023 | * | 0.0 | * | 0.024 | * | 0.013 | * | 0.0 | * | 0.0 | * |
| F | 0.493 | * | 0.691 | * | 0.521 | * | 0.700 | * | 0.375 | * | 0.352 | * | 0.0 | * | 0.779 | * |
| H | 3.502 | 3.995 | 3.306 | 4.010 | 3.459 | 4.003 | 3.305 | 4.006 | 3.598 | 3.997 | 3.643 | 4.009 | 3.996 | 3.996 | 3.234 | 4.013 |
| O | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * |
| | FE | 59.62 | | 61.53 | | 56.12 | | 60.31 | | 59.79 | | 60.27 | | 64.94 | | 60.28 |
| | MG | 40.38 | | 38.47 | | 43.88 | | 39.69 | | 40.21 | | 39.73 | | 35.06 | | 39.72 |
| | F/M | 1.509 | | 1.639 | | 1.299 | | 1.550 | | 1.515 | | 1.548 | | 1.873 | | 1.554 |
| | F/FM | 0.601 | | 0.621 | | 0.565 | | 0.608 | | 0.602 | | 0.608 | | 0.652 | | 0.608 |
| | A* = | 0.059 | | 0.045 | | 0.049 | | 0.061 | | 0.043 | | 0.110 | | 0.099 | | 0.084 |
| | A = | -0.404 | | -0.526 | | -0.437 | | -0.383 | | -0.518 | | -0.277 | | -0.365 | | -0.327 |
| | M = | 0.404 | | 0.385 | | 0.439 | | 0.397 | | 0.402 | | 0.397 | | 0.351 | | 0.397 |

1 S6 47 CGR BIOTITE GRANITOID (AV.2)
2 S6 51 FGR DYKE (AV.3)
3 S6 53 ENCLAVE (AV.3)
4 S6 54 CGR BIOTITE GRANITOID (AV.2)
5 S6 55 ENCLAVE (AV.6)
6 S6 56 CGR AMPH+BIOT GRANITOID (AV.6)
7 S6 57 FGR BIOTITE GRANITOID
8 S6 58 CGR BIOTITE GRANITOID (AV.3)

SUPER RECAL

TABLE 2. AVERAGE BIOTITE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 36.31 | 37.19 | 36.45 | 35.76 | 36.94 | 36.47 | 36.34 | 36.58 |
| TIO2 | 3.30 | 3.72 | 2.19 | 3.67 | 3.70 | 3.59 | 3.14 | 3.25 |
| A2O3 | 13.27 | 14.77 | 16.12 | 13.61 | 14.10 | 14.02 | 13.31 | 13.30 |
| FEO | 24.06 | 25.97 | 24.39 | 23.42 | 22.91 | 22.36 | 24.82 | 23.23 |
| MNO | 0.52 | 0.50 | 0.37 | 0.46 | 0.40 | 0.44 | 0.71 | 0.46 |
| MGO | 8.80 | 4.94 | 7.31 | 8.63 | 8.31 | 9.32 | 8.52 | 9.32 |
| CAO | 0.08 | 0.06 | 0.05 | 0.05 | 0.04 | 0.04 | 0.06 | 0.05 |
| BAO | 0.0 | 0.07 | 0.25 | 0.0 | 0.0 | 0.0 | 0.07 | 0.0 |
| NA2O | 0.10 | 0.07 | 0.09 | 0.05 | 0.08 | 0.06 | 0.13 | 0.05 |
| K2O | 8.85 | 9.24 | 10.02 | 8.97 | 9.13 | 8.98 | 9.31 | 8.91 |
| F | 1.26 | 0.76 | 0.91 | 0.73 | 0.0 | 1.01 | 0.82 | 1.14 |
| CL | 0.0 | 0.02 | 0.05 | 0.0 | 0.0 | 0.0 | 0.08 | 0.0 |
| H2O | 3.24 | 3.49 | 3.45 | 3.47 | 3.87 | 3.39 | 3.43 | 3.31 |
| SUM | 99.79 | 100.80 | 101.65 | 98.82 | 99.48 | 99.68 | 100.74 | 99.60 |
| -O= F+CL | 0.53 | 0.32 | 0.39 | 0.31 | 0.0 | 0.43 | 0.36 | 0.48 |
| SUM | 99.26 | 100.48 | 101.26 | 98.51 | 99.48 | 99.25 | 100.38 | 99.12 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 5.683 | * | 5.777 | * | 5.610 | * | 5.628 | * | 5.716 | * | 5.653 | * | 5.665 | * | 5.704 | * |
| AL | 2.317 | 8.000 | 2.223 | 8.000 | 2.390 | 8.000 | 2.372 | 8.000 | 2.284 | 8.000 | 2.347 | 8.000 | 2.335 | 8.000 | 2.296 | 8.000 |
| AL | 0.130 | * | 0.480 | * | 0.534 | * | 0.152 | * | 0.286 | * | 0.214 | * | 0.110 | * | 0.148 | * |
| TI | 0.388 | * | 0.435 | * | 0.253 | * | 0.434 | * | 0.431 | * | 0.418 | * | 0.368 | * | 0.381 | * |
| FE | 3.149 | * | 3.374 | * | 3.140 | * | 3.082 | * | 2.964 | * | 2.899 | * | 3.236 | * | 3.029 | * |
| MN | 0.069 | * | 0.066 | * | 0.048 | * | 0.061 | * | 0.052 | * | 0.058 | * | 0.094 | * | 0.061 | * |
| MG | 2.053 | 5.789 | 1.144 | 5.498 | 1.677 | 5.653 | 2.024 | 5.754 | 1.916 | 5.650 | 2.153 | 5.742 | 1.980 | 5.787 | 2.166 | 5.786 |
| CA | 0.013 | * | 0.010 | * | 0.008 | * | 0.008 | * | 0.007 | * | 0.007 | * | 0.010 | * | 0.008 | * |
| NA | 0.030 | * | 0.021 | * | 0.027 | * | 0.015 | * | 0.024 | * | 0.018 | * | 0.039 | * | 0.015 | * |
| K | 1.767 | * | 1.831 | * | 1.967 | * | 1.801 | * | 1.802 | * | 1.775 | * | 1.851 | * | 1.772 | * |
| BA | 0.0 | 1.810 | 0.004 | 1.866 | 0.015 | 2.017 | 0.0 | 1.824 | 0.0 | 1.832 | 0.0 | 1.800 | 0.004 | 1.905 | 0.0 | 1.796 |
| CL | 0.0 | * | 0.005 | * | 0.013 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.021 | * | 0.0 | * |
| F | 0.624 | * | 0.373 | * | 0.443 | * | 0.363 | * | 0.0 | * | 0.495 | * | 0.404 | * | 0.562 | * |
| H | 3.383 | 4.006 | 3.616 | 3.995 | 3.542 | 3.998 | 3.643 | 4.006 | 3.994 | 3.994 | 3.505 | 4.001 | 3.567 | 3.992 | 3.443 | 4.006 |
| O | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * |
| FE | 60.54 | | 74.68 | | 65.18 | | 60.36 | | 60.74 | | 57.38 | | 62.04 | | 58.31 | |
| MG | 39.46 | | 25.32 | | 34.82 | | 39.64 | | 39.26 | | 42.62 | | 37.96 | | 41.69 | |
| F/M | 1.568 | | 3.007 | | 1.901 | | 1.553 | | 1.574 | | 1.373 | | 1.682 | | 1.427 | |
| F/FM | 0.611 | | 0.750 | | 0.655 | | 0.608 | | 0.612 | | 0.579 | | 0.627 | | 0.588 | |
| A* = | 0.061 | | 0.088 | | 0.090 | | 0.066 | | 0.073 | | 0.072 | | 0.054 | | 0.061 | |
| A = | -0.378 | | -0.446 | | -0.447 | | -0.392 | | -0.409 | | -0.377 | | -0.425 | | -0.382 | |
| M = | 0.395 | | 0.253 | | 0.348 | | 0.396 | | 0.393 | | 0.426 | | 0.380 | | 0.417 | |

9 S6 65 CGR AMPH+BIOT GRANITOID (AV.2)
10 S6 66 APLITE (AV.6)
11 S6 67 FGR BIOTITE GRANITOID (AV.6)
12 S6 69 CGR AMPH+BIOT GRANITOID (AV.2)
13 S6 71 XENOCRYSTAL GRANITOID
14 S6 74 XENOCRYSTAL GRANITOID (AV.2)
15 S6 77 APLITE (AV.2)
16 S6 86 CGR AMPH+BIOT GRANITOID

SUPER RECAL

TABLE 2. AVERAGE BIOTITE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 34.60 | 34.93 | 35.10 | 34.88 | 37.01 | 35.46 | 35.76 | 36.78 |
| TIO2 | 3.41 | 2.80 | 2.35 | 2.94 | 3.09 | 3.55 | 2.31 | 2.54 |
| A2O3 | 17.18 | 16.31 | 15.82 | 15.87 | 14.43 | 14.96 | 16.69 | 16.11 |
| FEO | 22.94 | 22.58 | 21.24 | 21.43 | 23.74 | 23.78 | 21.78 | 21.47 |
| MNO | 0.39 | 0.57 | 0.50 | 0.50 | 0.0 | 0.45 | 0.28 | 0.57 |
| MGO | 8.57 | 9.17 | 9.77 | 9.48 | 9.52 | 8.34 | 8.51 | 8.76 |
| CAO | 0.04 | 0.15 | 0.13 | 0.11 | 0.06 | 0.16 | 0.11 | 0.04 |
| BAO | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.93 | 0.0 | 0.0 |
| NA2O | 0.08 | 0.04 | 0.07 | 0.08 | 0.07 | 0.09 | 0.03 | 0.02 |
| K2O | 9.54 | 7.90 | 8.37 | 8.51 | 9.50 | 8.88 | 8.64 | 9.45 |
| F | 0.0 | 0.92 | 0.99 | 0.86 | 0.0 | 0.68 | 0.89 | 0.72 |
| CL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.12 | 0.0 | 0.0 |
| H2O | 3.90 | 3.41 | 3.35 | 3.41 | 3.94 | 3.51 | 3.42 | 3.57 |
| SUM | 100.65 | 98.78 | 97.69 | 98.07 | 101.36 | 100.91 | 98.42 | 100.03 |
| -O= F+CL | 0.0 | 0.39 | 0.42 | 0.36 | 0.0 | 0.31 | 0.37 | 0.30 |
| SUM | 100.65 | 98.39 | 97.27 | 97.71 | 101.36 | 100.60 | 98.05 | 99.73 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 5.316 | * | 5.443 | * | 5.515 | * | 5.469 | * | 5.637 | * | 5.505 | * | 5.569 | * | 5.640 | * |
| AL | 2.684 | 8.000 | 2.557 | 8.000 | 2.485 | 8.000 | 2.531 | 8.000 | 2.363 | 8.000 | 2.495 | 8.000 | 2.431 | 8.000 | 2.360 | 8.000 |
| AL | 0.426 | * | 0.438 | * | 0.444 | * | 0.401 | * | 0.228 | * | 0.242 | * | 0.632 | * | 0.552 | * |
| TI | 0.394 | * | 0.328 | * | 0.278 | * | 0.347 | * | 0.354 | * | 0.414 | * | 0.271 | * | 0.293 | * |
| FE | 2.947 | * | 2.943 | * | 2.791 | * | 2.810 | * | 3.024 | * | 3.088 | * | 2.836 | * | 2.754 | * |
| MN | 0.051 | * | 0.075 | * | 0.067 | * | 0.066 | * | 0.0 | * | 0.059 | * | 0.037 | * | 0.074 | * |
| MG | 1.963 | 5.781 | 2.130 | 5.914 | 2.288 | 5.868 | 2.215 | 5.839 | 2.161 | 5.767 | 1.930 | 5.733 | 1.975 | 5.751 | 2.002 | 5.675 |
| CA | 0.007 | * | 0.025 | * | 0.022 | * | 0.018 | * | 0.010 | * | 0.027 | * | 0.018 | * | 0.007 | * |
| NA | 0.024 | * | 0.012 | * | 0.021 | * | 0.024 | * | 0.021 | * | 0.027 | * | 0.009 | * | 0.006 | * |
| K | 1.869 | * | 1.570 | * | 1.677 | * | 1.702 | * | 1.846 | * | 1.758 | * | 1.716 | * | 1.848 | * |
| BA | 0.0 | 1.900 | 0.0 | 1.607 | 0.0 | 1.721 | 0.0 | 1.745 | 0.0 | 1.876 | 0.057 | 1.869 | 0.0 | 1.744 | 0.0 | 1.861 |
| CL | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.032 | * | 0.0 | * | 0.0 | * |
| F | 0.0 | * | 0.453 | * | 0.492 | * | 0.426 | * | 0.0 | * | 0.334 | * | 0.438 | * | 0.349 | * |
| H | 3.997 | 3.997 | 3.545 | 3.998 | 3.511 | 4.003 | 3.566 | 3.993 | 4.003 | 4.003 | 3.635 | 4.001 | 3.553 | 3.991 | 3.652 | 4.001 |
| O | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * |
| | FE | 60.03 | | 58.01 | | 54.95 | | 55.91 | | 58.32 | | 61.54 | | 58.95 | | 57.90 |
| | MG | 39.97 | | 41.99 | | 45.05 | | 44.09 | | 41.68 | | 38.46 | | 41.05 | | 42.10 |
| | F/M | 1.528 | | 1.417 | | 1.249 | | 1.298 | | 1.399 | | 1.630 | | 1.455 | | 1.412 |
| | F/FM | 0.604 | | 0.586 | | 0.555 | | 0.565 | | 0.583 | | 0.620 | | 0.593 | | 0.585 |
| | A* = | 0.112 | | 0.123 | | 0.110 | | 0.109 | | 0.067 | | 0.089 | | 0.123 | | 0.101 |
| | A = | -0.341 | | -0.204 | | -0.261 | | -0.276 | | -0.397 | | -0.339 | | -0.277 | | -0.383 |
| | M = | 0.400 | | 0.420 | | 0.450 | | 0.441 | | 0.417 | | 0.385 | | 0.411 | | 0.421 |

17 S6 87 CGR AMPH+BIOT GRANITOID
18 S6 88 CGR AMPH+BIOT GRANITOID (AV.2)
19 S6 89 CGR AMPH+BIOT GRANITOID (AV.2)
20 S6 90 CGR AMPH+BIOT GRANITOID (AV.2)
21 S6 98 CGR AMPH+BIOT GRANITOID
22 S6 99 FGR BIOTITE GRANITOID (AV.4)
23 S6 100 FGR BIOTITE GRANITOID (AV.2)
24 S6 101 FGR BIOTITE GRANITOID

SUPER RECAL

TABLE 2. AVERAGE BIOTITE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
|---|---|---|---|---|---|---|---|---|
| SI02 | 37.44 | 38.55 | 35.36 | 34.10 | 37.14 | 33.22 | 36.36 | 36.67 |
| TI02 | 3.13 | 2.49 | 3.33 | 2.99 | 3.18 | 2.43 | 3.77 | 2.98 |
| A203 | 13.54 | 15.83 | 17.71 | 18.85 | 13.33 | 16.55 | 12.99 | 12.98 |
| FEO | 21.54 | 24.58 | 22.65 | 20.82 | 22.84 | 25.63 | 23.17 | 24.05 |
| MNO | 0.71 | 0.26 | 0.40 | 0.53 | 0.46 | 0.46 | 0.56 | 0.52 |
| MGO | 10.71 | 7.49 | 7.59 | 9.00 | 9.72 | 7.94 | 9.05 | 9.40 |
| CAO | 0.06 | 0.06 | 0.02 | 0.13 | 0.05 | 0.23 | 0.06 | 0.04 |
| BAO | 0.16 | 0.0 | 0.0 | 0.0 | 0.25 | 0.0 | 0.0 | 0.11 |
| NA20 | 0.17 | 0.06 | 0.05 | 0.09 | 0.10 | 0.03 | 0.10 | 0.17 |
| K20 | 9.67 | 9.70 | 9.41 | 8.20 | 10.00 | 5.07 | 8.90 | 9.63 |
| F | 1.40 | 0.0 | 0.44 | 0.93 | 1.01 | 0.59 | 1.25 | 1.08 |
| CL | 0.08 | 0.0 | 0.0 | 0.0 | 0.08 | 0.0 | 0.0 | 0.08 |
| H20 | 3.27 | 4.01 | 3.70 | 3.45 | 3.41 | 3.44 | 3.24 | 3.33 |
| SUM | 101.88 | 103.03 | 100.66 | 99.09 | 101.57 | 95.59 | 99.45 | 101.04 |
| -0= F+CL | 0.61 | 0.0 | 0.19 | 0.39 | 0.44 | 0.25 | 0.53 | 0.47 |
| SUM | 101.27 | 103.03 | 100.47 | 98.70 | 101.13 | 95.34 | 98.92 | 100.57 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 5.696 | * | 5.766 | * | 5.414 | * | 5.255 | * | 5.704 | * | 5.353 | * | 5.692 | * | 5.692 | * |
| AL | 2.304 | 8.000 | 2.234 | 8.000 | 2.586 | 8.000 | 2.745 | 8.000 | 2.296 | 8.000 | 2.647 | 8.000 | 2.308 | 8.000 | 2.308 | 8.000 |
| AL | 0.123 | * | 0.556 | * | 0.609 | * | 0.678 | * | 0.116 | * | 0.496 | * | 0.088 | * | 0.066 | * |
| TI | 0.358 | * | 0.280 | * | 0.383 | * | 0.347 | * | 0.367 | * | 0.294 | * | 0.444 | * | 0.348 | * |
| FE | 2.740 | * | 3.075 | * | 2.900 | * | 2.683 | * | 2.933 | * | 3.454 | * | 3.033 | * | 3.122 | * |
| MN | 0.091 | * | 0.033 | * | 0.052 | * | 0.069 | * | 0.060 | * | 0.063 | * | 0.074 | * | 0.068 | * |
| MG | 2.429 | 5.742 | 1.670 | 5.613 | 1.732 | 5.677 | 2.067 | 5.844 | 2.225 | 5.701 | 1.907 | 6.214 | 2.111 | 5.750 | 2.175 | 5.779 |
| CA | 0.010 | * | 0.010 | * | 0.003 | * | 0.021 | * | 0.008 | * | 0.040 | * | 0.010 | * | 0.007 | * |
| NA | 0.050 | * | 0.017 | * | 0.015 | * | 0.027 | * | 0.030 | * | 0.009 | * | 0.030 | * | 0.051 | * |
| K | 1.876 | * | 1.850 | * | 1.838 | * | 1.612 | * | 1.959 | * | 1.042 | * | 1.777 | * | 1.907 | * |
| BA | 0.010 | 1.946 | 0.0 | 1.877 | 0.0 | 1.856 | 0.0 | 1.660 | 0.015 | 2.012 | 0.0 | 1.091 | 0.0 | 1.817 | 0.007 | 1.971 |
| CL | 0.021 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.021 | * | 0.0 | * | 0.0 | * | 0.021 | * |
| F | 0.674 | * | 0.0 | * | 0.213 | * | 0.453 | * | 0.491 | * | 0.301 | * | 0.619 | * | 0.530 | * |
| H | 3.319 | 4.013 | 4.001 | 4.001 | 3.779 | 3.992 | 3.547 | 4.000 | 3.493 | 4.005 | 3.698 | 3.999 | 3.383 | 4.002 | 3.448 | 3.999 |
| O | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * |
| | FE | 53.02 | | 64.80 | | 62.61 | | 56.48 | | 56.87 | | 64.43 | | 58.96 | | 58.94 |
| | MG | 46.98 | | 35.20 | | 37.39 | | 43.52 | | 43.13 | | 35.57 | | 41.04 | | 41.06 |
| | F/M | 1.166 | | 1.861 | | 1.704 | | 1.331 | | 1.345 | | 1.844 | | 1.472 | | 1.467 |
| | F/FM | 0.538 | | 0.650 | | 0.630 | | 0.571 | | 0.574 | | 0.648 | | 0.595 | | 0.595 |
| | A* = | 0.051 | | 0.090 | | 0.128 | | 0.160 | | 0.042 | | 0.164 | | 0.057 | | 0.042 |
| | A = | -0.449 | | -0.411 | | -0.334 | | -0.175 | | -0.506 | | 0.002 | | -0.399 | | -0.462 |
| | M = | 0.470 | | 0.352 | | 0.374 | | 0.435 | | 0.431 | | 0.356 | | 0.410 | | 0.411 |

25 S6 110 CGR BIOTITE GRANITOID (AV.8)
26 S6 111 FGR BIOTITE GRANITOID
27 S6 126 CGR MUSC+BIOT GRANITOID (AV.2)
28 S6 132 CGR AMPH+BIOT GRANITOID (AV.2)
29 S6 135 CGR AMPH+BIOT GRANITOID (AV.3)
30 S6 137 FGR BIOTITE GRANITOID
31 S8 12A CGR AMPH+BIOT GRANITOID (AV.2)
32 LH 3 CGR AMPH+BIOT GRANITOID (AV.3)

SUPER RECAL

TABLE 2. AVERAGE BIOTITE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|
| SI02 | 36.38 | 35.48 | 36.72 | 36.37 | 36.17 | 36.71 | 36.57 | 36.38 |
| TI02 | 3.89 | 3.66 | 3.32 | 3.64 | 4.05 | 2.79 | 2.96 | 3.51 |
| A203 | 12.88 | 13.52 | 13.42 | 13.17 | 13.63 | 14.06 | 13.17 | 13.79 |
| FEO | 24.64 | 24.03 | 22.88 | 23.74 | 22.75 | 22.55 | 23.80 | 22.75 |
| MNO | 0.57 | 0.50 | 0.26 | 0.51 | 0.43 | 0.43 | 0.78 | 0.52 |
| MGO | 8.81 | 9.32 | 9.96 | 9.19 | 8.93 | 9.70 | 8.80 | 9.83 |
| CAO | 0.06 | 0.48 | 0.03 | 0.07 | 0.48 | 0.06 | 0.17 | 0.01 |
| BAO | 0.39 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.41 | 0.0 |
| NA2O | 0.16 | 0.06 | 0.08 | 0.08 | 0.05 | 0.06 | 0.16 | 0.19 |
| K2O | 9.12 | 7.66 | 9.20 | 8.73 | 8.77 | 9.12 | 9.18 | 9.70 |
| F | 1.22 | 0.84 | 1.03 | 1.30 | 0.92 | 0.98 | 1.33 | 0.0 |
| CL | 0.06 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.09 | 0.0 |
| H2O | 3.28 | 3.43 | 3.39 | 3.24 | 3.41 | 3.41 | 3.19 | 3.89 |
| SUM | 101.46 | 98.98 | 100.29 | 100.04 | 99.59 | 99.87 | 100.61 | 100.57 |
| -O= F+CL | 0.53 | 0.35 | 0.43 | 0.55 | 0.39 | 0.41 | 0.58 | 0.0 |
| SUM | 100.93 | 98.63 | 99.86 | 99.49 | 99.20 | 99.46 | 100.03 | 100.57 |
| SI | 5.643 * | 5.565 * | 5.675 * | 5.665 * | 5.629 * | 5.683 * | 5.709 * | 5.601 * |
| AL | 2.354 7.998 | 2.435 8.000 | 2.325 8.000 | 2.335 8.000 | 2.371 8.000 | 2.317 8.000 | 2.291 8.000 | 2.399 8.000 |
| AL | 0.0 * | 0.064 * | 0.120 * | 0.083 * | 0.128 * | 0.248 * | 0.132 * | 0.102 * |
| TI | 0.454 * | 0.432 * | 0.386 * | 0.426 * | 0.474 * | 0.325 * | 0.348 * | 0.406 * |
| FE | 3.196 * | 3.152 * | 2.957 * | 3.093 * | 2.961 * | 2.920 * | 3.107 * | 2.929 * |
| MN | 0.075 * | 0.066 * | 0.034 * | 0.067 * | 0.057 * | 0.056 * | 0.103 * | 0.068 * |
| MG | 2.037 5.762 | 2.179 5.893 | 2.295 5.792 | 2.134 5.803 | 2.071 5.691 | 2.238 5.787 | 2.048 5.737 | 2.256 5.761 |
| CA | 0.010 * | 0.081 * | 0.005 * | 0.012 * | 0.080 * | 0.010 * | 0.028 * | 0.002 * |
| NA | 0.048 * | 0.018 * | 0.024 * | 0.024 * | 0.015 * | 0.018 * | 0.048 * | 0.057 * |
| K | 1.804 * | 1.532 * | 1.814 * | 1.735 * | 1.741 * | 1.801 * | 1.828 * | 1.905 * |
| BA | 0.024 1.886 | 0.0 1.631 | 0.0 1.843 | 0.0 1.770 | 0.0 1.836 | 0.0 1.829 | 0.025 1.930 | 0.0 1.963 |
| CL | 0.016 * | 0.0 * | 0.0 * | 0.0 * | 0.0 * | 0.0 * | 0.024 * | 0.0 * |
| F | 0.599 * | 0.417 * | 0.503 * | 0.640 * | 0.453 * | 0.480 * | 0.657 * | 0.0 * |
| H | 3.394 4.008 | 3.589 4.006 | 3.495 3.999 | 3.367 4.007 | 3.540 3.993 | 3.522 4.002 | 3.322 4.003 | 3.995 3.995 |
| O | 24.000 * | 24.000 * | 24.000 * | 24.000 * | 24.000 * | 24.000 * | 24.000 * | 24.000 * |
| FE | 61.08 | 59.13 | 56.31 | 59.17 | 58.84 | 56.60 | 60.28 | 56.49 |
| MG | 38.92 | 40.87 | 43.69 | 40.83 | 41.16 | 43.40 | 39.72 | 43.51 |
| F/M | 1.606 | 1.477 | 1.304 | 1.481 | 1.457 | 1.330 | 1.568 | 1.329 |
| F/FM | 0.616 | 0.596 | 0.566 | 0.597 | 0.593 | 0.571 | 0.611 | 0.571 |
| A* = | 0.050 | 0.083 | 0.057 | 0.061 | 0.070 | 0.069 | 0.055 | 0.054 |
| A = | -0.413 | -0.245 | -0.399 | -0.363 | -0.371 | -0.379 | -0.422 | -0.449 |
| M = | 0.389 | 0.409 | 0.437 | 0.408 | 0.412 | 0.434 | 0.397 | 0.435 |

33 LH 4 CGR AMPH+BIOT GRANITOID (AV.5)
34 LH 6 CGR AMPH+BIOT GRANITOID (AV.2)
35 LH 7 CGR AMPH+BIOT GRANITOID (AV.2)
36 LH 8 CGR AMPH+BIOT GRANITOID (AV.3)
37 F6 24 CGR AMPH+BIOT GRANITOID (AV.2)
38 F6 25 CGR AMPH+BIOT GRANITOID (AV.2)
39 K1 140 CGR AMPH+BIOT GRANITOID (AV.3)
40 K2 5 CGR AMPH+BIOT GRANITOID

SUPER RECAL

TABLE 2. AVERAGE BIOTITE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 37.49 | 36.53 | 36.77 | 36.60 | 36.74 | 35.87 | 36.06 | 36.49 |
| TIO2 | 2.47 | 2.63 | 3.12 | 3.45 | 3.51 | 2.92 | 3.32 | 2.57 |
| A2O3 | 16.29 | 15.27 | 14.39 | 13.26 | 12.91 | 14.05 | 13.41 | 14.30 |
| FEO | 24.04 | 25.09 | 22.98 | 23.13 | 23.31 | 23.27 | 23.56 | 23.86 |
| MNO | 0.22 | 0.36 | 0.39 | 0.50 | 0.59 | 0.59 | 0.60 | 0.44 |
| MGO | 7.32 | 6.82 | 9.83 | 9.63 | 9.72 | 8.90 | 9.04 | 8.46 |
| CAO | 0.09 | 0.06 | 0.08 | 0.16 | 0.16 | 0.05 | 0.16 | 0.05 |
| BAO | 0.0 | 0.23 | 0.0 | 0.38 | 0.31 | 0.13 | 0.32 | 0.0 |
| NA2O | 0.03 | 0.10 | 0.08 | 0.17 | 0.21 | 0.06 | 0.16 | 0.05 |
| K2O | 9.37 | 9.58 | 9.22 | 9.53 | 9.43 | 9.81 | 9.42 | 9.60 |
| F | 0.0 | 0.65 | 0.0 | 0.90 | 1.03 | 0.75 | 0.81 | 0.0 |
| CL | 0.0 | 0.07 | 0.0 | 0.10 | 0.09 | 0.07 | 0.08 | 0.0 |
| H2O | 3.94 | 3.54 | 3.92 | 3.41 | 3.38 | 3.46 | 3.44 | 3.85 |
| SUM | 101.26 | 100.93 | 100.78 | 101.22 | 101.39 | 99.93 | 100.38 | 99.67 |
| -O= F+CL | 0.0 | 0.29 | 0.0 | 0.40 | 0.45 | 0.33 | 0.36 | 0.0 |
| SUM | 101.26 | 100.64 | 100.78 | 100.82 | 100.94 | 99.60 | 100.02 | 99.67 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 5.697 | * | 5.666 | * | 5.621 | * | 5.652 | * | 5.668 | * | 5.612 | * | 5.627 | * | 5.682 | * |
| AL | 2.303 | 8.000 | 2.334 | 8.000 | 2.379 | 8.000 | 2.348 | 8.000 | 2.332 | 8.000 | 2.388 | 8.000 | 2.373 | 8.000 | 2.318 | 8.000 |
| AL | 0.613 | * | 0.457 | * | 0.213 | * | 0.066 | * | 0.015 | * | 0.202 | * | 0.093 | * | 0.306 | * |
| TI | 0.282 | * | 0.307 | * | 0.359 | * | 0.401 | * | 0.407 | * | 0.344 | * | 0.390 | * | 0.301 | * |
| FE | 3.055 | * | 3.255 | * | 2.938 | * | 2.987 | * | 3.008 | * | 3.044 | * | 3.075 | * | 3.107 | * |
| MN | 0.028 | * | 0.047 | * | 0.050 | * | 0.065 | * | 0.077 | * | 0.078 | * | 0.079 | * | 0.058 | * |
| MG | 1.658 | 5.637 | 1.577 | 5.643 | 2.240 | 5.800 | 2.217 | 5.736 | 2.235 | 5.742 | 2.075 | 5.743 | 2.103 | 5.739 | 1.963 | 5.735 |
| CA | 0.015 | * | 0.010 | * | 0.013 | * | 0.026 | * | 0.026 | * | 0.008 | * | 0.027 | * | 0.008 | * |
| NA | 0.009 | * | 0.030 | * | 0.024 | * | 0.051 | * | 0.063 | * | 0.018 | * | 0.048 | * | 0.015 | * |
| K | 1.816 | * | 1.895 | * | 1.798 | * | 1.877 | * | 1.856 | * | 1.958 | * | 1.875 | * | 1.907 | * |
| BA | 0.0 | 1.839 | 0.014 | 1.949 | 0.0 | 1.835 | 0.023 | 1.978 | 0.019 | 1.964 | 0.008 | 1.992 | 0.020 | 1.970 | 0.0 | 1.930 |
| CL | 0.0 | * | 0.018 | * | 0.0 | * | 0.026 | * | 0.024 | * | 0.019 | * | 0.021 | * | 0.0 | * |
| F | 0.0 | * | 0.319 | * | 0.0 | * | 0.440 | * | 0.503 | * | 0.371 | * | 0.400 | * | 0.0 | * |
| H | 3.994 | 3.994 | 3.663 | 4.000 | 3.997 | 3.997 | 3.513 | 3.979 | 3.479 | 4.005 | 3.611 | 4.001 | 3.581 | 4.002 | 3.999 | 3.999 |
| O | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * |
| | FE | 64.82 | | 67.36 | | 56.74 | | 57.40 | | 57.37 | | 59.46 | | 59.39 | | 61.28 |
| | MG | 35.18 | | 32.64 | | 43.26 | | 42.60 | | 42.63 | | 40.54 | | 40.61 | | 38.72 |
| | F/M | 1.860 | | 2.094 | | 1.334 | | 1.377 | | 1.380 | | 1.505 | | 1.500 | | 1.612 |
| | F/FM | 0.650 | | 0.677 | | 0.572 | | 0.579 | | 0.580 | | 0.601 | | 0.600 | | 0.617 |
| | A* = | 0.105 | | 0.085 | | 0.071 | | 0.049 | | 0.045 | | 0.058 | | 0.054 | | 0.066 |
| | A = | -0.367 | | -0.428 | | -0.371 | | -0.448 | | -0.443 | | -0.472 | | -0.439 | | -0.440 |
| | M = | 0.352 | | 0.326 | | 0.433 | | 0.426 | | 0.426 | | 0.405 | | 0.406 | | 0.387 |

41 K3 71.9 FGR BIOTITE GRANITOID
42 K3 130 FGR BIOTITE GRANITOID (AV.4)
43 K3 283.9 CGR AMPH+BIOT GRANITOID
44 K3 289 ENCLAVE (AV.2)
45 K3 333.9 CGR AMPH+BIOT GRANITOID (AV.3)
46 K3 794.1 CGR AMPH+BIOT GRANITOID (AV.3)
47 K3 1135 CGR AMPH+BIOT GRANITOID (AV.3)
48 K3 1160.2 CGR AMPH+BIOT GRANITOID

SUPER RECAL

TABLE 2. AVERAGE BIOTITE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 49 | | 50 | |
|---|---|---|---|---|
| SIO2 | 36.87 | | 36.40 | |
| TIO2 | 2.98 | | 2.89 | |
| A203 | 14.22 | | 13.96 | |
| FEO | 23.31 | | 23.41 | |
| MNO | 0.42 | | 0.59 | |
| MGO | 9.08 | | 9.13 | |
| CAO | 0.08 | | 0.16 | |
| BAO | 0.16 | | 0.34 | |
| NA2O | 0.11 | | 0.16 | |
| K2O | 9.70 | | 9.53 | |
| F | 0.55 | | 0.73 | |
| CL | 0.08 | | 0.09 | |
| H2O | 3.62 | | 3.53 | |
| SUM | 101.18 | | 100.92 | |
| -O= F+CL | 0.25 | | 0.33 | |
| SUM | 100.93 | | 100.59 | |
| SI | 5.665 | * | 5.634 | * |
| AL | 2.335 | 8.000 | 2.366 | 8.000 |
| AL | 0.239 | * | 0.180 | * |
| TI | 0.344 | * | 0.336 | * |
| FE | 2.995 | * | 3.030 | * |
| MN | 0.055 | * | 0.077 | * |
| MG | 2.079 | 5.713 | 2.106 | 5.730 |
| CA | 0.013 | * | 0.027 | * |
| NA | 0.033 | * | 0.048 | * |
| K | 1.901 | * | 1.881 | * |
| BA | 0.010 | 1.956 | 0.021 | 1.977 |
| CL | 0.021 | * | 0.024 | * |
| F | 0.267 | * | 0.357 | * |
| H | 3.710 | 3.998 | 3.645 | 4.026 |
| O | 24.000 | * | 24.000 | * |
| FE | 59.02 | | 58.99 | |
| MG | 40.98 | | 41.01 | |
| F/M | 1.467 | | 1.475 | |
| F/FM | 0.595 | | 0.596 | |
| A* = | 0.062 | | 0.061 | |
| A = | -0.446 | | -0.432 | |
| M = | 0.410 | | 0.410 | |

49 K3 1271 CGR AMPH+BIOT GRANITOID (AV.3)

50 K3 1303.8 CGR AMPH+BIOT GRANITOID (AV.3)

SUPER RECAL

TABLE 3. CLINOPYROXENE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| SIO2 | 51.82 | 52.46 | 51.98 | 51.25 | 51.88 | 52.31 | 51.45 |
| TIO2 | 0.22 | 0.17 | 0.27 | 0.30 | 0.24 | 0.29 | 0.19 |
| A203 | 0.93 | 0.48 | 1.20 | 1.30 | 0.98 | 1.30 | 0.66 |
| FEO | 12.36 | 14.14 | 11.33 | 13.13 | 12.74 | 13.77 | 11.71 |
| MNO | 0.77 | 0.96 | 0.59 | 0.30 | 0.65 | 0.90 | 0.41 |
| MGO | 11.49 | 9.69 | 11.51 | 10.74 | 10.86 | 11.60 | 10.12 |
| CAO | 21.88 | 23.11 | 22.58 | 21.27 | 22.21 | 22.91 | 21.51 |
| BAO | 0.09 | 0.10 | 0.0 | 0.0 | 0.05 | 0.10 | -0.00 |
| NA2O | 0.51 | 0.40 | 0.49 | 0.61 | 0.50 | 0.58 | 0.43 |
| K2O | 0.08 | 0.03 | 0.03 | 0.11 | 0.06 | 0.10 | 0.03 |
| F | 0.07 | 0.02 | 0.0 | 0.0 | 0.02 | 0.05 | -0.01 |
| CL | 0.02 | 0.01 | 0.0 | 0.0 | 0.01 | 0.02 | -0.00 |
| SUM | 100.15 | 101.54 | 99.98 | 99.01 | 100.17 | 103.84 | 96.50 |
| -0= F+CL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| SUM | 100.15 | 101.54 | 99.98 | 99.01 | 100.17 | 103.84 | 96.50 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 1.969 | * | 1.988 | * | 1.970 | * | 1.972 | * | 1.975 | * | 1.935 | * | 2.017 | * |
| AL | 0.031 | 2.000 | 0.012 | 2.000 | 0.030 | 2.000 | 0.028 | 2.000 | 0.025 | 2.000 | 0.056 | 1.991 | 0.0 | 2.017 |
| AL | 0.011 | * | 0.009 | * | 0.024 | * | 0.031 | * | 0.019 | * | 0.0 | * | 0.030 | * |
| TI | 0.006 | * | 0.005 | * | 0.008 | * | 0.009 | * | 0.007 | * | 0.008 | * | 0.006 | * |
| FE | 0.393 | * | 0.448 | * | 0.359 | * | 0.422 | * | 0.406 | * | 0.426 | * | 0.384 | * |
| MN | 0.025 | * | 0.031 | * | 0.019 | * | 0.010 | * | 0.021 | * | 0.028 | * | 0.014 | * |
| MG | 0.651 | 1.086 | 0.547 | 1.040 | 0.650 | 1.060 | 0.616 | 1.088 | 0.616 | 1.068 | 0.640 | 1.102 | 0.591 | 1.025 |
| CA | 0.891 | * | 0.938 | * | 0.917 | * | 0.877 | * | 0.906 | * | 0.908 | * | 0.904 | * |
| BA | 0.001 | * | 0.001 | * | 0.0 | * | 0.0 | * | 0.001 | * | 0.001 | * | -0.000 | * |
| NA | 0.038 | * | 0.029 | * | 0.036 | * | 0.046 | * | 0.037 | * | 0.041 | * | 0.033 | * |
| K | 0.004 | 0.934 | 0.001 | 0.970 | 0.001 | 0.954 | 0.005 | 0.928 | 0.003 | 0.947 | 0.005 | 0.955 | 0.001 | 0.938 |
| O | 6.000 | * | 6.000 | * | 6.000 | * | 6.000 | * | 6.000 | * | 6.000 | * | 6.000 | * |
| WO | 45.47 | | 47.76 | | 47.14 | | 45.55 | | 46.49 | | 45.36 | | 47.75 | |
| EN | 33.22 | | 27.86 | | 33.43 | | 32.00 | | 31.61 | | 31.95 | | 31.24 | |
| FS | 20.05 | | 22.81 | | 18.46 | | 21.95 | | 20.81 | | 21.28 | | 20.29 | |
| RHOD | 1.26 | | 1.57 | | 0.97 | | 0.51 | | 1.08 | | 1.41 | | 0.72 | |
| F/M | 0.642 | | 0.875 | | 0.581 | | 0.702 | | 0.693 | | 0.710 | | 0.673 | |
| F/FM | 0.391 | | 0.467 | | 0.368 | | 0.412 | | 0.409 | | 0.415 | | 0.402 | |

1 S6 53 COARSE-GRAINED AMPH+BIOT GRANITOID
2 S6 55 COARSE-GRAINED AMPH+BIOT GRANITOID
3 S6 98 COARSE-GRAINED AMPH+BIOT GRANITOID
4 K2 5 COARSE-GRAINED AMPH+BIOT GRANITOID
5 AVERAGE
6 AVERAGE PLUS SIGMA
7 AVERAGE MINUS SIGMA

SUPER RECAL

TABLE 4A. 5-ELEMENT FELDSPAR ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 64.68 | 62.29 | 68.87 | 71.05 | 64.72 | 68.23 | 61.53 | 65.83 |
| A2O3 | 19.01 | 23.96 | 19.82 | 20.13 | 18.66 | 18.55 | 22.76 | 17.70 |
| CAO | 0.09 | 4.92 | 0.03 | 1.55 | 0.07 | 0.36 | 4.96 | 0.06 |
| NA2O | 1.12 | 8.88 | 0.38 | 11.10 | 0.43 | 9.46 | 8.15 | 1.04 |
| K2O | 15.10 | 0.24 | 16.59 | 0.09 | 15.79 | 0.19 | 0.32 | 15.23 |
| SUM | 100.00 | 100.29 | 105.69 | 103.92 | 99.67 | 96.79 | 97.72 | 99.86 |
| SI | 2.977 * | 2.753 * | 2.998 * | 2.989 * | 2.993 * | 3.050 * | 2.785 * | 3.031 * |
| AL | 1.031 4.009 | 1.248 4.002 | 1.017 4.015 | 0.998 3.987 | 1.017 4.010 | 0.977 4.028 | 1.214 3.999 | 0.960 3.991 |
| CA | 0.004 * | 0.233 * | 0.001 * | 0.070 * | 0.003 * | 0.017 * | 0.241 * | 0.003 * |
| NA | 0.100 * | 0.761 * | 0.032 * | 0.905 * | 0.039 * | 0.820 * | 0.715 * | 0.093 * |
| K | 0.887 0.991 | 0.014 1.008 | 0.921 0.955 | 0.005 0.980 | 0.931 0.973 | 0.011 0.848 | 0.018 0.974 | 0.894 0.990 |
| O | 8.000 * | 8.000 * | 8.000 * | 8.000 * | 8.000 * | 8.000 * | 8.000 * | 8.000 * |
| AN | 0.45 | 23.13 | 0.15 | 7.13 | 0.36 | 2.03 | 24.69 | 0.30 |
| AB | 10.09 | 75.53 | 3.36 | 92.38 | 3.96 | 96.69 | 73.41 | 9.38 |
| OR | 89.47 | 1.34 | 96.49 | 0.49 | 95.68 | 1.28 | 1.90 | 90.33 |

1 S6 54 COARSE-GRAINED BIOT GRANITOID
2 S6 54 COARSE-GRAINED BIOT GRANITOID
3 S6 57 FINE-GRAINED BIOT GRANITOID
4 S6 57 FINE-GRAINED BIOT GRANITOID
5 S6 65 COARSE-GRAINED AMPH+BIOT GRANITOID
6 S6 65 COARSE-GRAINED AMPH+BIOT GRANITOID
7 S6 65 COARSE-GRAINED AMPH+BIOT GRANITOID
8 S6 71 XENOCRYSTAL GRANITOID

| | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 66.36 | 64.96 | 67.21 | 64.43 | 65.31 | 63.63 | 63.43 | 55.99 |
| A2O3 | 17.14 | 22.34 | 23.74 | 17.96 | 18.87 | 19.36 | 24.55 | 26.39 |
| CAO | 0.04 | 3.66 | 4.22 | 0.03 | 0.01 | 0.03 | 4.79 | 7.17 |
| NA2O | 0.55 | 8.94 | 7.85 | 0.25 | 1.12 | 0.84 | 8.66 | 6.81 |
| K2O | 15.73 | 0.17 | 0.48 | 15.55 | 14.08 | 15.34 | 0.10 | 0.17 |
| SUM | 99.82 | 100.07 | 103.50 | 98.22 | 99.39 | 99.20 | 101.53 | 94.53 |
| SI | 3.057 * | 2.854 * | 2.847 * | 3.018 * | 3.002 * | 2.957 * | 2.760 * | 2.643 * |
| AL | 0.931 3.988 | 1.156 4.010 | 1.185 4.033 | 0.991 4.009 | 1.022 4.024 | 1.060 4.018 | 1.259 4.019 | 1.357 3.999 |
| CA | 0.002 * | 0.172 * | 0.192 * | 0.002 * | 0.000 * | 0.001 * | 0.223 * | 0.363 * |
| NA | 0.049 * | 0.761 * | 0.645 * | 0.023 * | 0.100 * | 0.076 * | 0.731 * | 0.623 * |
| K | 0.924 0.975 | 0.010 0.943 | 0.026 0.862 | 0.929 0.953 | 0.825 0.926 | 0.909 0.987 | 0.006 0.959 | 0.010 0.996 |
| O | 8.000 * | 8.000 * | 8.000 * | 8.000 * | 8.000 * | 8.000 * | 8.000 * | 8.000 * |
| AN | 0.20 | 18.26 | 22.21 | 0.16 | 0.05 | 0.15 | 23.27 | 36.40 |
| AB | 5.04 | 80.73 | 74.78 | 2.38 | 10.78 | 7.67 | 76.15 | 62.57 |
| OR | 94.76 | 1.01 | 3.01 | 97.46 | 89.17 | 92.18 | 0.58 | 1.03 |

9 S6 71 XENOCRYSTAL GRANITOID
10 S6 71 XENOCRYSTAL GRANITOID
11 S6 71 XENOCRYSTAL GRANITOID
12 S6 71 XENOCRYSTAL GRANITOID
13 S6 74 XENOCRYSTAL GRANITOID
14 S6 98 COARSE-GRAINED AMPH+BIOT GRANITOID
15 S6 98 COARSE-GRAINED AMPH+BIOT GRANITOID
16 S6 98 COARSE-GRAINED AMPH+BIOT GRANITOID

SUPER RECAL

TABLE 4A. 5-ELEMENT FELDSPAR ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 58.87 | 64.58 | 63.74 | 63.82 | 63.84 | 64.01 | 64.12 | 64.85 |
| A203 | 26.31 | 19.16 | 18.68 | 18.61 | 18.20 | 18.17 | 18.49 | 22.81 |
| CAO | 8.09 | 0.05 | 0.04 | 0.03 | 0.0 | 0.0 | 0.02 | 1.26 |
| NA20 | 6.57 | 2.06 | 1.27 | 0.50 | 0.33 | 0.59 | 0.66 | 10.55 |
| K20 | 0.17 | 13.91 | 15.22 | 15.74 | 16.55 | 15.96 | 15.79 | 0.05 |
| SUM | 100.01 | 99.76 | 98.95 | 98.70 | 98.92 | 98.73 | 99.08 | 99.52 |
| SI | 2.625 * | 2.970 * | 2.973 * | 2.984 * | 2.991 * | 2.996 * | 2.988 * | 2.856 * |
| AL | 1.382 4.008 | 1.038 4.008 | 1.027 4.000 | 1.025 4.009 | 1.005 3.996 | 1.002 3.999 | 1.015 4.003 | 1.184 4.040 |
| CA | 0.387 * | 0.002 * | 0.002 * | 0.002 * | 0.0 * | 0.0 * | 0.001 * | 0.059 * |
| NA | 0.568 * | 0.184 * | 0.115 * | 0.045 * | 0.030 * | 0.054 * | 0.060 * | 0.901 * |
| K | 0.010 0.964 | 0.816 1.002 | 0.906 1.022 | 0.939 0.985 | 0.989 1.019 | 0.953 1.006 | 0.939 0.999 | 0.003 0.963 |
| O | 8.000 * | 8.000 * | 8.000 * | 8.000 * | 8.000 * | 8.000 * | 8.000 * | 8.000 * |
| AN | 40.09 | 0.25 | 0.20 | 0.15 | 0.0 | 0.0 | 0.10 | 6.17 |
| AB | 58.91 | 18.33 | 11.23 | 4.60 | 2.94 | 5.32 | 5.97 | 93.54 |
| OR | 1.00 | 81.42 | 88.57 | 95.25 | 97.06 | 94.68 | 93.93 | 0.29 |

17 S6 98. PC ASSOCIATED WITH CPX
18 S6 100 FINE-GRAINED GRANITOID
19 S6 100 FINE-GRAINED GRANITOID
20 S6 100 FINE-GRAINED GRANITOID
21 S6 100 FINE-GRAINED GRANITOID
22 S6 100 FINE-GRAINED GRANITOID
23 S6 100 FINE-GRAINED GRANITOID
24 S6 100 FINE-GRAINED GRANITOID

| | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 65.42 | 62.62 | 67.72 | 64.09 | 63.39 | 68.34 | 62.77 | 62.87 |
| A203 | 21.60 | 23.78 | 20.36 | 18.70 | 23.55 | 20.63 | 22.11 | 17.22 |
| CAO | 2.39 | 4.69 | 0.49 | 0.01 | 5.89 | 1.79 | 4.95 | 0.03 |
| NA20 | 10.49 | 8.98 | 11.58 | 0.48 | 7.93 | 9.75 | 7.86 | 0.57 |
| K20 | 0.17 | 0.20 | 0.10 | 15.96 | 0.10 | 0.15 | 0.15 | 15.24 |
| SUM | 100.07 | 100.27 | 100.25 | 99.24 | 100.86 | 100.66 | 97.84 | 95.93 |
| SI | 2.878 * | 2.766 * | 2.956 * | 2.983 * | 2.779 * | 2.961 * | 2.827 * | 3.021 * |
| AL | 1.120 3.997 | 1.238 4.003 | 1.047 4.004 | 1.025 4.008 | 1.217 3.996 | 1.053 4.015 | 1.173 4.000 | 0.975 3.996 |
| CA | 0.113 * | 0.222 * | 0.023 * | 0.000 * | 0.277 * | 0.083 * | 0.239 * | 0.002 * |
| NA | 0.895 * | 0.769 * | 0.980 * | 0.043 * | 0.674 * | 0.819 * | 0.686 * | 0.053 * |
| K | 0.010 1.017 | 0.011 1.002 | 0.006 1.009 | 0.947 0.991 | 0.006 0.956 | 0.008 0.911 | 0.009 0.934 | 0.934 0.989 |
| O | 8.000 * | 8.000 * | 8.000 * | 8.000 * | 8.000 * | 8.000 * | 8.000 * | 8.000 * |
| AN | 11.08 | 22.15 | 2.27 | 0.05 | 28.93 | 9.13 | 25.58 | 0.16 |
| AB | 87.98 | 76.73 | 97.18 | 4.37 | 70.48 | 89.96 | 73.50 | 5.37 |
| OR | 0.94 | 1.12 | 0.55 | 95.58 | 0.58 | 0.91 | 0.92 | 94.47 |

25 S6 100 FINE-GRAINED GRANITOID
26 S6 100 FINE-GRAINED GRANITOID
27 S6 100 FINE-GRAINED GRANITOID
28 S6 100 FINE-GRAINED GRANITOID
29 S6 111 FINE-GRAINED BIOT GRANITOID
30 S6 111 FINE-GRAINED BIOT GRANITOID
31 S6 111 FINE-GRAINED BIOT GRANITOID
32 S6 126 COARSE-GRAINED MUSC+BIOT GRANITOI

SUPER RECAL

TABLE 4A. 5-ELEMENT FELDSPAR ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 33 | | 34 | | 35 | | 36 | | 37 | | 38 | | 39 | | 40 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SIO2 | 66.65 | | 64.47 | | 67.90 | | 65.67 | | 64.48 | | 67.55 | | 69.25 | | 61.87 | |
| A203 | 19.77 | | 19.79 | | 19.29 | | 18.68 | | 17.54 | | 18.69 | | 19.66 | | 23.08 | |
| CAO | 0.27 | | 1.35 | | 0.11 | | 0.12 | | 0.08 | | 0.44 | | 0.39 | | 4.88 | |
| NA2O | 11.12 | | 9.51 | | 11.48 | | 0.62 | | 0.59 | | 11.61 | | 10.48 | | 8.39 | |
| K2O | 0.05 | | 0.14 | | 0.42 | | 15.79 | | 15.83 | | 0.13 | | 0.16 | | 0.57 | |
| SUM | 97.86 | | 95.26 | | 99.20 | | 100.88 | | 98.52 | | 98.42 | | 99.94 | | 98.79 | |
| SI | 2.973 | * | 2.952 | * | 2.994 | * | 2.999 | * | 3.021 | * | 3.003 | * | 3.012 | * | 2.776 | * |
| AL | 1.039 | 4.012 | 1.068 | 4.020 | 1.002 | 3.996 | 1.005 | 4.004 | 0.968 | 3.990 | 0.979 | 3.982 | 1.008 | 4.019 | 1.220 | 3.997 |
| CA | 0.013 | * | 0.066 | * | 0.005 | * | 0.006 | * | 0.004 | * | 0.021 | * | 0.018 | * | 0.235 | * |
| NA | 0.962 | * | 0.844 | * | 0.981 | * | 0.055 | * | 0.054 | * | 1.001 | * | 0.884 | * | 0.730 | * |
| K | 0.003 | 0.977 | 0.008 | 0.919 | 0.024 | 1.010 | 0.920 | 0.981 | 0.946 | 1.004 | 0.007 | 1.029 | 0.009 | 0.911 | 0.033 | 0.997 |
| O | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * |
| AN | 1.32 | | 7.21 | | 0.51 | | 0.60 | | 0.40 | | 2.04 | | 2.00 | | 23.53 | |
| AB | 98.39 | | 91.90 | | 97.15 | | 5.60 | | 5.34 | | 97.25 | | 97.03 | | 73.20 | |
| OR | 0.29 | | 0.89 | | 2.34 | | 93.80 | | 94.26 | | 0.72 | | 0.97 | | 3.27 | |

33 S6 126 COARSE-GRAINED MUSC+BIOT GRANITOI
34 S6 126 COARSE-GRAINED MUSC+BIOT GRANITOI
35 S8 12A C-GRDAMPH+BT GRANITOID(EXSOL. KFS)
36 S8-12A COARSDE-GRAINED AMPH+BIOT GRANITO
37 S8 12A COARSE-GRAINED AMPH+BIOT GRANITOI
38 S8 12A COARSE-GRAINED AMPH+BIOT GRANITOI
39 S8 12A COARSE-GRAINED AMPH+BIOT GRANITOI
40 S8 12A COARSE-GRAINED AMPH+BIOT GRANITOI

| | 41 | | 42 | | 43 | | 44 | | 45 | | 46 | | 47 | | 48 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SIO2 | 60.80 | | 66.98 | | 63.96 | | 62.02 | | 62.61 | | 62.77 | | 62.50 | | 65.85 | |
| A203 | 23.82 | | 21.26 | | 17.91 | | 23.97 | | 23.01 | | 23.45 | | 24.46 | | 18.94 | |
| CAO | 5.59 | | 1.00 | | 0.05 | | 5.58 | | 4.13 | | 4.62 | | 5.45 | | 0.06 | |
| NA2O | 8.27 | | 10.98 | | 0.50 | | 8.43 | | 9.40 | | 9.39 | | 8.67 | | 0.69 | |
| K2O | 0.49 | | 0.08 | | 15.76 | | 0.06 | | 0.27 | | 0.26 | | 0.42 | | 15.35 | |
| SUM | 98.97 | | 100.30 | | 98.18 | | 100.06 | | 99.42 | | 100.49 | | 101.50 | | 100.89 | |
| SI | 2.732 | * | 2.923 | * | 3.007 | * | 2.747 | * | 2.789 | * | 2.771 | * | 2.736 | * | 2.998 | * |
| AL | 1.261 | 3.993 | 1.093 | 4.016 | 0.992 | 3.999 | 1.251 | 3.998 | 1.208 | 3.996 | 1.220 | 3.991 | 1.262 | 3.997 | 1.016 | 4.014 |
| CA | 0.269 | * | 0.047 | * | 0.003 | * | 0.265 | * | 0.197 | * | 0.219 | * | 0.256 | * | 0.003 | * |
| NA | 0.720 | * | 0.929 | * | 0.046 | * | 0.724 | * | 0.812 | * | 0.804 | * | 0.736 | * | 0.061 | * |
| K | 0.028 | 1.018 | 0.004 | 0.980 | 0.945 | 0.993 | 0.003 | 0.992 | 0.015 | 1.024 | 0.015 | 1.037 | 0.023 | 1.015 | 0.891 | 0.955 |
| O | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * |
| AN | 26.44 | | 4.77 | | 0.25 | | 26.69 | | 19.24 | | 21.08 | | 25.19 | | 0.31 | |
| AB | 70.80 | | 94.78 | | 4.59 | | 72.97 | | 79.26 | | 77.51 | | 72.50 | | 6.38 | |
| OR | 2.76 | | 0.45 | | 95.16 | | 0.34 | | 1.50 | | 1.41 | | 2.31 | | 93.32 | |

41 S8 12A COARSE-GRAINED AMPH+BIOT GRANITOI
42 F6 24 COARSE-GRAINED AMPH+BIOT GRANITOID
43 F6 24 COARSE-GRAINED AMPH+BIOT GRANITOID
44 F6 24 COARSE-GRAINED AMPH+BIOT GRANITOID
45 F6 24 COARSE-GRAINED AMPH+BIOT GRANITOID
46 F6 24 COARSE-GRAINED AMPH+BIOT GRANITOID
47 F6 24 COARSE-GRAINED AMPH+BIOT GRANITOID
48 F6 24 COARSE-GRAINED AMPH+BIOT GRANITOID

SUPER RECAL

TABLE 4A. 5-ELEMENT FELDSPAR ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 69.42 | 73.52 | 65.87 | 64.60 | 66.79 | 62.46 | 61.84 | 65.50 |
| A203 | 20.02 | 20.98 | 19.12 | 22.83 | 20.80 | 23.44 | 22.88 | 21.44 |
| CAO | 0.20 | 0.12 | 0.03 | 3.17 | 1.07 | 4.74 | 4.72 | 2.43 |
| NA2O | 11.82 | 11.10 | 0.37 | 9.95 | 11.46 | 8.94 | 8.59 | 10.49 |
| K2O | 0.11 | 0.01 | 16.19 | 0.21 | 0.09 | 0.14 | 0.15 | 0.03 |
| SUM | 101.57 | 105.73 | 101.58 | 100.76 | 100.21 | 99.72 | 98.18 | 99.89 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 2.986 | * | 3.016 | * | 2.989 | * | 2.828 | * | 2.925 | * | 2.773 | * | 2.785 | * | 2.884 | * |
| AL | 1.015 | 4.001 | 1.014 | 4.030 | 1.023 | 4.012 | 1.178 | 4.006 | 1.073 | 3.998 | 1.226 | 3.999 | 1.214 | 4.000 | 1.112 | 3.996 |
| CA | 0.009 | * | 0.005 | * | 0.001 | * | 0.149 | * | 0.050 | * | 0.225 | * | 0.228 | * | 0.115 | * |
| NA | 0.986 | * | 0.883 | * | 0.033 | * | 0.845 | * | 0.973 | * | 0.770 | * | 0.750 | * | 0.895 | * |
| K | 0.006 | 1.001 | 0.001 | 0.889 | 0.937 | 0.971 | 0.012 | 1.005 | 0.005 | 1.028 | 0.008 | 1.003 | 0.009 | 0.987 | 0.002 | 1.012 |
| O | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * |
| AN | 0.92 | | 0.59 | | 0.15 | | 14.80 | | 4.88 | | 22.48 | | 23.09 | | 11.33 | |
| AB | 98.48 | | 99.35 | | 3.35 | | 84.04 | | 94.63 | | 76.73 | | 76.04 | | 88.50 | |
| OR | 0.60 | | 0.06 | | 96.50 | | 1.17 | | 0.49 | | 0.79 | | 0.87 | | 0.17 | |

49 F6 24 C-GRD AMPH+BT GRANITOID(EXSOLVED KFS)
50 K3 224 F-GRD BIOT GRANITOID(EXSOLVED KFS
51 K3 224 FINE-GRAINED BIOT GRANITOID
52 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT
53 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT
54 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT
55 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT
56 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT

| | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 62.44 | 64.14 | 63.80 | 63.01 | 60.91 | 62.67 | 62.45 | 61.85 |
| A203 | 23.26 | 23.11 | 23.36 | 23.63 | 25.05 | 23.63 | 23.27 | 23.83 |
| CAO | 4.84 | 4.19 | 4.34 | 4.83 | 4.80 | 4.95 | 4.75 | 5.28 |
| NA2O | 8.81 | 9.30 | 9.13 | 8.80 | 8.60 | 8.90 | 8.96 | 8.70 |
| K2O | 0.19 | 0.19 | 0.29 | 0.31 | 0.26 | 0.27 | 0.12 | 0.17 |
| SUM | 99.54 | 100.93 | 100.92 | 100.58 | 99.62 | 100.42 | 99.55 | 99.83 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 2.777 | * | 2.807 | * | 2.795 | * | 2.774 | * | 2.711 | * | 2.767 | * | 2.777 | * | 2.748 | * |
| AL | 1.219 | 3.997 | 1.192 | 3.999 | 1.206 | 4.001 | 1.226 | 4.000 | 1.314 | 4.024 | 1.229 | 3.996 | 1.219 | 3.997 | 1.248 | 3.996 |
| CA | 0.231 | * | 0.196 | * | 0.204 | * | 0.228 | * | 0.229 | * | 0.234 | * | 0.226 | * | 0.251 | * |
| NA | 0.760 | * | 0.789 | * | 0.776 | * | 0.751 | * | 0.742 | * | 0.762 | * | 0.773 | * | 0.750 | * |
| K | 0.011 | 1.001 | 0.011 | 0.996 | 0.016 | 0.996 | 0.017 | 0.996 | 0.015 | 0.986 | 0.015 | 1.011 | 0.007 | 1.006 | 0.010 | 1.011 |
| O | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * |
| AN | 23.04 | | 19.72 | | 20.47 | | 22.87 | | 23.22 | | 23.16 | | 22.50 | | 24.88 | |
| AB | 75.89 | | 79.21 | | 77.91 | | 75.39 | | 75.28 | | 75.34 | | 76.82 | | 74.17 | |
| OR | 1.08 | | 1.06 | | 1.63 | | 1.75 | | 1.50 | | 1.50 | | 0.68 | | 0.95 | |

57 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT
58 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT
59 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT
60 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT
61 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT
62 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT
63 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT
64 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT

SUPER RECAL

TABLE 4A. 5-ELEMENT FELDSPAR ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 65 | | 66 | | 67 | | 68 | | 69 | | 70 | | 71 | | 72 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SIO2 | 59.77 | | 56.53 | | 58.55 | | 62.95 | | 62.62 | | 64.36 | | 63.95 | | 65.20 | |
| A2O3 | 25.01 | | 27.54 | | 26.15 | | 23.96 | | 23.75 | | 19.11 | | 18.62 | | 18.91 | |
| CAO | 6.92 | | 9.55 | | 7.83 | | 5.01 | | 5.00 | | 0.06 | | 0.0 | | 0.0 | |
| NA2O | 7.68 | | 6.16 | | 7.02 | | 8.84 | | 8.78 | | 0.65 | | 0.49 | | 0.30 | |
| K2O | 0.18 | | 0.15 | | 0.18 | | 0.15 | | 0.22 | | 15.55 | | 15.87 | | 15.77 | |
| SUM | 99.56 | | 99.93 | | 99.73 | | 100.91 | | 100.37 | | 99.73 | | 98.93 | | 100.18 | |
| SI | 2.675 | * | 2.540 | * | 2.622 | * | 2.763 | * | 2.764 | * | 2.974 | * | 2.984 | * | 2.994 | * |
| AL | 1.319 | 3.994 | 1.458 | 3.998 | 1.380 | 4.002 | 1.239 | 4.002 | 1.235 | 3.999 | 1.041 | 4.015 | 1.024 | 4.008 | 1.023 | 4.018 |
| CA | 0.332 | * | 0.460 | * | 0.376 | * | 0.236 | * | 0.236 | * | 0.003 | * | 0.0 | * | 0.0 | * |
| NA | 0.666 | * | 0.537 | * | 0.609 | * | 0.752 | * | 0.751 | * | 0.058 | * | 0.044 | * | 0.027 | * |
| K | 0.010 | 1.009 | 0.009 | 1.005 | 0.010 | 0.995 | 0.008 | 0.996 | 0.012 | 1.000 | 0.916 | 0.978 | 0.945 | 0.989 | 0.924 | 0.950 |
| O | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * |
| AN | 32.90 | | 45.75 | | 37.74 | | 23.65 | | 23.64 | | 0.30 | | 0.0 | | 0.0 | |
| AB | 66.08 | | 53.40 | | 61.23 | | 75.51 | | 75.12 | | 5.96 | | 4.48 | | 2.81 | |
| OR | 1.02 | | 0.86 | | 1.03 | | 0.84 | | 1.24 | | 93.74 | | 95.52 | | 97.19 | |

65 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT
66 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT
67 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT
68 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT
69 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT
70 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT
71 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT
72 K3 283.9 COARSE-GRAINED AMPH+BIOT GRANIT

SUPER RECAL

TABLE 4B. 9-ELEMENT FELDSPAR ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 59.46 | 63.54 | 63.47 | 58.95 | 56.57 | 59.41 | 60.32 | 66.87 |
| A203 | 24.30 | 20.41 | 18.45 | 20.25 | 26.82 | 25.24 | 21.10 | 20.10 |
| FEO | 0.07 | 0.0 | 0.0 | 0.0 | 0.02 | 0.0 | 0.01 | 0.0 |
| TIO2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| MNO | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| CAO | 5.95 | 1.87 | 0.04 | 0.03 | 5.81 | 6.52 | 0.0 | 0.33 |
| MGO | 0.0 | 0.02 | 0.02 | 0.04 | 0.0 | 0.02 | 0.01 | 0.01 |
| NA2O | 7.44 | 9.87 | 0.45 | 0.64 | 7.36 | 7.59 | 0.29 | 11.13 |
| K2O | 0.46 | 0.26 | 16.70 | 15.94 | 0.21 | 0.26 | 16.36 | 0.10 |
| SUM | 97.61 | 95.95 | 99.11 | 95.81 | 96.77 | 99.02 | 98.07 | 98.53 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 2.706 | * | 2.906 | * | 2.975 | * | 2.866 | * | 2.600 | * | 2.671 | * | 2.861 | * | 2.964 | * |
| AL | 1.303 | 4.010 | 1.100 | 4.006 | 1.019 | 3.993 | 1.160 | 4.027 | 1.453 | 4.053 | 1.337 | 4.008 | 1.179 | 4.040 | 1.050 | 4.014 |
| CA | 0.290 | * | 0.092 | * | 0.002 | * | 0.002 | * | 0.286 | * | 0.314 | * | 0.0 | * | 0.016 | * |
| NA | 0.657 | * | 0.875 | * | 0.041 | * | 0.060 | * | 0.656 | * | 0.662 | * | 0.027 | * | 0.956 | * |
| K | 0.027 | 0.973 | 0.015 | 0.982 | 0.998 | 1.041 | 0.989 | 1.050 | 0.012 | 0.954 | 0.015 | 0.990 | 0.990 | 1.016 | 0.006 | 0.978 |
| O | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * |
| AN | | 29.81 | | 9.33 | | 0.19 | | 0.15 | | 29.98 | | 31.71 | | 0.0 | | 1.60 |
| AB | | 67.45 | | 89.12 | | 3.93 | | 5.74 | | 68.73 | | 66.79 | | 2.62 | | 97.82 |
| OR | | 2.74 | | 1.54 | | 95.88 | | 94.11 | | 1.29 | | 1.51 | | 97.38 | | 0.58 |

1 S6 86 COARSE-GRAINED AMPH+BIOT GRANITOID
2 S6 86 COARSE-GRAINED AMPH+BIOT GRANITOID
3 S6 86 COARSE-GRAINED AMPH+BIOT GRANITOID
4 S6 86 COARSE-GRAINED AMPH+BIOT GRANITOID
5 S6 86 COARSE-GRAINED AMPH+BIOT GRANITOID
6 S6 86 COARSE-GRAINED AMPH+BIOT GRANITOID
7 S6 88 C-GRD AMPH+BT GRANITOID(EXSOLVED KFS)
8 S6 88 C-GRD AMPH+BT GRANITOID(EXSOLVED KFS)

| | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 62.16 | 58.95 | 58.06 | 62.22 | 64.73 | 60.22 | 59.38 | 61.46 |
| A203 | 24.88 | 29.16 | 26.17 | 22.43 | 18.84 | 21.33 | 25.93 | 25.31 |
| FEO | 0.04 | 0.06 | 0.10 | 0.03 | 0.48 | 0.0 | 0.11 | 0.07 |
| TIO2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| MNO | 0.04 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.01 | 0.0 |
| CAO | 5.20 | 5.08 | 6.02 | 0.0 | 0.0 | 0.0 | 4.70 | 6.35 |
| MGO | 0.0 | 0.05 | 0.02 | 0.04 | 0.05 | 0.03 | 0.0 | 0.02 |
| NA2O | 8.32 | 7.17 | 7.37 | 0.56 | 0.82 | 0.29 | 7.90 | 7.74 |
| K2O | 0.26 | 0.43 | 0.44 | 16.08 | 16.80 | 16.58 | 0.45 | 0.30 |
| SUM | 100.82 | 100.79 | 98.06 | 101.29 | 101.19 | 98.42 | 98.36 | 101.16 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 2.731 | * | 2.589 | * | 2.635 | * | 2.846 | * | 2.971 | * | 2.850 | * | 2.675 | * | 2.699 | * |
| AL | 1.288 | 4.018 | 1.509 | 4.099 | 1.400 | 4.035 | 1.209 | 4.055 | 1.019 | 3.990 | 1.190 | 4.040 | 1.376 | 4.051 | 1.310 | 4.009 |
| CA | 0.245 | * | 0.239 | * | 0.293 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.227 | * | 0.299 | * |
| NA | 0.709 | * | 0.611 | * | 0.649 | * | 0.050 | * | 0.073 | * | 0.027 | * | 0.690 | * | 0.659 | * |
| K | 0.015 | 0.968 | 0.024 | 0.874 | 0.025 | 0.967 | 0.938 | 0.988 | 0.984 | 1.057 | 1.001 | 1.028 | 0.026 | 0.943 | 0.017 | 0.975 |
| O | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * |
| AN | | 25.29 | | 27.36 | | 30.28 | | 0.0 | | 0.0 | | 0.0 | | 24.06 | | 30.66 |
| AB | | 73.21 | | 69.88 | | 67.08 | | 5.03 | | 6.91 | | 2.59 | | 73.19 | | 67.62 |
| OR | | 1.51 | | 2.76 | | 2.63 | | 94.97 | | 93.09 | | 97.41 | | 2.74 | | 1.72 |

9 S6 89 COARSE-GRAINED AMPH+BIOT GRANITOID
10 S6 89 COARSE-GRAINED AMPH+BIOT GRANITOID
11 S6 89 COARSE-GRAINED AMPH+BIOT GRANITOID
12 S6 89 COARSE-GRAINED AMPH+BIOT GRANITOID
13 S6 89 COARSE-GRAINED AMPH+BIOT GRANITOID
14 S6 88 COARSE-GRAINED AMPH+BIOT GRANITOID
15 S6 88 COARSE-GRAINED AMPH+BIOT GRANITOID
16 S6 88 COARSE-GRAINED AMPH+BIOT GRANITOID

SUPER RECAL

TABLE 4B. 9-ELEMENT FELDSPAR ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 17 | | 18 | | 19 | | 20 | |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 60.53 | | 64.29 | | 62.51 | | 60.55 | |
| A203 | 20.22 | | 19.73 | | 25.09 | | 24.27 | |
| FEO | 0.0 | | 0.0 | | 0.12 | | 0.08 | |
| TIO2 | 0.0 | | 0.0 | | 0.0 | | 0.0 | |
| MNO | 0.0 | | 0.0 | | 0.0 | | 0.0 | |
| CAO | 0.07 | | 0.0 | | 5.53 | | 4.94 | |
| MGO | 0.0 | | 0.0 | | 0.0 | | 0.02 | |
| NA20 | 0.90 | | 0.70 | | 8.24 | | 8.19 | |
| K20 | 15.50 | | 16.78 | | 0.37 | | 0.26 | |
| SUM | 97.22 | | 101.50 | | 101.74 | | 98.21 | |
| SI | 2.888 | * | 2.941 | * | 2.725 | * | 2.730 | * |
| AL | 1.137 | 4.025 | 1.064 | 4.005 | 1.289 | 4.013 | 1.290 | 4.020 |
| CA | 0.004 | * | 0.0 | * | 0.258 | * | 0.239 | * |
| NA | 0.083 | * | 0.062 | * | 0.696 | * | 0.716 | * |
| K | 0.943 | 1.030 | 0.979 | 1.041 | 0.021 | 0.975 | 0.015 | 0.970 |
| O | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * |
| AN | 0.35 | | 0.0 | | 26.48 | | 24.61 | |
| AB | 8.08 | | 5.96 | | 71.41 | | 73.84 | |
| OR | 91.57 | | 94.04 | | 2.11 | | 1.54 | |

17 S6 88 COARSE-GRAINED AMPH+BIOT GRANITOID
18 S6 88 COARSE-GRAINED AMPH+BIOT GRANITOID
19 S6 90 COARSE-GRAINED AMPH+BIOT GRANITOID
20 S6 90 COARSE-GRAINED AMPH+BIOT GRANITOID

SUPER RECAL

TABLE 4C. 12-ELEMENT FELDSPAR ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 65.41 | 66.54 | 62.76 | 58.80 | 63.13 | 63.86 | 60.81 | 63.43 |
| TIO2 | 0.0 | 0.02 | 0.05 | 0.02 | 0.0 | 0.03 | 0.02 | 0.09 |
| A2O3 | 18.15 | 21.33 | 23.16 | 25.61 | 23.69 | 19.21 | 20.90 | 23.53 |
| FEO | 0.10 | 0.06 | 0.11 | 0.13 | 0.15 | 0.10 | 0.11 | 0.13 |
| MNO | 0.01 | 0.0 | 0.02 | 0.0 | 0.0 | 0.0 | 0.0 | 0.01 |
| MGO | 0.02 | 0.0 | 0.0 | 0.02 | 0.0 | 0.03 | 0.04 | 0.0 |
| CAO | 0.02 | 2.04 | 4.73 | 7.21 | 5.17 | 0.11 | 0.15 | 4.34 |
| BAO | 0.46 | 0.09 | 0.01 | 0.01 | 0.0 | 0.0 | 0.0 | 0.0 |
| NA2O | 16.90 | 9.45 | 8.30 | 7.09 | 7.71 | 1.81 | 2.41 | 8.79 |
| K2O | 0.02 | 0.22 | 0.25 | 0.18 | 0.33 | 13.37 | 10.96 | 0.31 |
| F | 0.01 | 0.07 | 0.03 | 0.09 | 0.03 | 0.0 | 0.02 | 0.03 |
| CL | 0.0 | 0.0 | 0.0 | 0.0 | 0.01 | 0.0 | 0.0 | 0.0 |
| SUM | 101.09 | 99.75 | 99.39 | 99.07 | 100.18 | 98.52 | 95.38 | 100.63 |
| -O= F+CL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| SUM | 101.09 | 99.75 | 99.39 | 99.07 | 100.18 | 98.52 | 95.38 | 100.63 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 2.913 | * | 2.917 | * | 2.790 | * | 2.644 | * | 2.782 | * | 2.966 | * | 2.891 | * | 2.786 | * |
| AL | 0.952 | * | 1.102 | * | 1.213 | * | 1.357 | * | 1.230 | * | 1.051 | * | 1.171 | * | 1.218 | * |
| TI | 0.0 | 3.865 | 0.001 | 4.019 | 0.002 | 4.004 | 0.001 | 4.002 | 0.0 | 4.012 | 0.001 | 4.018 | 0.001 | 4.063 | 0.003 | 4.007 |
| FE | 0.004 | * | 0.002 | * | 0.004 | * | 0.005 | * | 0.006 | * | 0.004 | * | 0.004 | * | 0.005 | * |
| MN | 0.000 | * | 0.0 | * | 0.001 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.000 | * |
| MG | 0.001 | * | 0.0 | * | 0.0 | * | 0.001 | * | 0.0 | * | 0.002 | * | 0.003 | * | 0.0 | * |
| CA | 0.001 | * | 0.096 | * | 0.225 | * | 0.347 | * | 0.244 | * | 0.005 | * | 0.008 | * | 0.204 | * |
| BA | 0.008 | * | 0.002 | * | 0.000 | * | 0.000 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * |
| NA | 1.459 | * | 0.803 | * | 0.715 | * | 0.618 | * | 0.659 | * | 0.163 | * | 0.222 | * | 0.749 | * |
| K | 0.001 | 1.475 | 0.012 | 0.915 | 0.014 | 0.960 | 0.010 | 0.982 | 0.019 | 0.927 | 0.792 | 0.966 | 0.663 | 0.900 | 0.017 | 0.975 |
| O | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * |
| AN | | 0.06 | | 10.50 | | 23.59 | | 35.59 | | 26.49 | | 0.57 | | 0.86 | | 21.05 |
| AB | | 99.31 | | 87.99 | | 74.91 | | 63.33 | | 71.49 | | 16.97 | | 24.87 | | 77.16 |
| OR | | 0.08 | | 1.35 | | 1.48 | | 1.06 | | 2.01 | | 82.46 | | 74.27 | | 1.79 |
| CN | | 0.55 | | 0.17 | | 0.02 | | 0.02 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| F/M | | 3.090 | | 0.0 | | 0.0 | | 3.647 | | 0.0 | | 1.870 | | 1.543 | | 0.0 |
| F/FM | | 0.755 | | 0.0 | | 0.0 | | 0.785 | | 0.0 | | 0.652 | | 0.607 | | 0.0 |

1 S6 51 APLITE
2 S6 51 APLITE
3 S6 53 ENCLAVE
4 S6 53 ENCLAVE
5 S6 55 ENCLAVE
6 S6 56 C-GRAINED AMPH+BIOT GRANITOID(LRGE AREA SCAN)
7 S6 58 COARSE-GRAINED BIOT GRANITOID(LRGE AREA SCAN)
8 S6 66 APLITE

SUPER RECAL

TABLE 4C. 12-ELEMENT FELDSPAR ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | 16 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SIO2 | 65.17 | | 65.57 | | 67.15 | | 64.38 | | 65.88 | | 65.74 | | 62.33 | | 64.78 | |
| TIO2 | 0.02 | | 0.01 | | 0.05 | | 0.06 | | 0.04 | | 0.0 | | 0.02 | | 0.01 | |
| A203 | 18.29 | | 23.17 | | 18.80 | | 23.33 | | 18.66 | | 18.49 | | 23.08 | | 22.33 | |
| FEO | 0.09 | | 0.12 | | 0.07 | | 0.05 | | 0.07 | | 0.07 | | 0.09 | | 0.07 | |
| MNO | 0.06 | | 0.0 | | 0.04 | | 0.09 | | 0.06 | | 0.07 | | 0.0 | | 0.01 | |
| MGO | 0.02 | | 0.0 | | 0.0 | | 0.0 | | 0.01 | | 0.01 | | 0.0 | | 0.0 | |
| CAO | 0.02 | | 4.36 | | 0.03 | | 4.66 | | 0.03 | | 0.03 | | 4.45 | | 3.54 | |
| BAO | 0.06 | | 0.11 | | 0.10 | | 0.0 | | 0.33 | | 0.11 | | 0.03 | | 0.0 | |
| NA20 | 0.66 | | 7.91 | | 0.86 | | 8.49 | | 0.69 | | 0.40 | | 9.20 | | 8.43 | |
| K20 | 16.04 | | 0.29 | | 16.51 | | 0.14 | | 16.71 | | 16.67 | | 0.24 | | 0.29 | |
| F | 0.03 | | 0.66 | | 0.03 | | 0.01 | | 0.07 | | 0.04 | | 0.0 | | 0.0 | |
| CL | 0.02 | | 0.01 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | |
| SUM | 100.43 | | 101.54 | | 103.61 | | 101.20 | | 102.48 | | 101.59 | | 99.44 | | 99.46 | |
| -O= F+CL | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | |
| SUM | 100.43 | | 101.54 | | 103.61 | | 101.20 | | 102.48 | | 101.59 | | 99.44 | | 99.46 | |
| SI | 2.999 | * | 2.823 | * | 2.998 | * | 2.806 | * | 2.985 | * | 2.997 | * | 2.779 | * | 2.859 | * |
| AL | 0.992 | * | 1.175 | * | 0.989 | * | 1.198 | * | 0.996 | * | 0.993 | * | 1.213 | * | 1.161 | * |
| TI | 0.001 | 3.991 | 0.000 | 3.998 | 0.002 | 3.988 | 0.002 | 4.006 | 0.001 | 3.983 | 0.0 | 3.991 | 0.001 | 3.992 | 0.000 | 4.020 |
| FE | 0.003 | * | 0.004 | * | 0.003 | * | 0.002 | * | 0.003 | * | 0.003 | * | 0.003 | * | 0.003 | * |
| MN | 0.002 | * | 0.0 | * | 0.002 | * | 0.003 | * | 0.002 | * | 0.003 | * | 0.0 | * | 0.000 | * |
| MG | 0.001 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.001 | * | 0.001 | * | 0.0 | * | 0.0 | * |
| CA | 0.001 | * | 0.201 | * | 0.001 | * | 0.218 | * | 0.001 | * | 0.001 | * | 0.213 | * | 0.167 | * |
| BA | 0.001 | * | 0.002 | * | 0.002 | * | 0.0 | * | 0.006 | * | 0.002 | * | 0.001 | * | 0.0 | * |
| NA | 0.059 | * | 0.660 | * | 0.074 | * | 0.717 | * | 0.061 | * | 0.035 | * | 0.795 | * | 0.721 | * |
| K | 0.941 | 1.010 | 0.016 | 0.883 | 0.940 | 1.022 | 0.008 | 0.948 | 0.966 | 1.039 | 0.969 | 1.014 | 0.014 | 1.025 | 0.016 | 0.908 |
| O | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * |
| AN | | 0.10 | | 22.88 | | 0.14 | | 23.08 | | 0.14 | | 0.15 | | 20.80 | | 18.50 |
| AB | | 5.87 | | 75.10 | | 7.31 | | 76.09 | | 5.86 | | 3.51 | | 77.81 | | 79.70 |
| OR | | 93.92 | | 1.81 | | 92.37 | | 0.83 | | 93.43 | | 96.15 | | 1.34 | | 1.80 |
| CN | | 0.11 | | 0.21 | | 0.17 | | 0.0 | | 0.57 | | 0.19 | | 0.05 | | 0.0 |
| F/M | 4.230 | | 0.0 | | 0.0 | | 3.647 | | 7.337 | | 7.905 | | 1.543 | | 0.0 | |
| F/FM | 0.809 | | 0.0 | | 0.0 | | 0.785 | | 0.880 | | 0.888 | | 0.607 | | 0.0 | |

9 S6 66 APLITE
10 S6 66 APLITE
11 S6 66 APLITE
12 S6 67 FINE-GRAINED BIOT GRANITOID
13 S6 67 FINE-GRAINED BIOT GRANITOID
14 S6 77 APLITE
15 S6 77 APLITE
16 S6 99 FINE-GRAINED BIOT GRANITOID

SUPER RECAL

TABLE 4C. 12-ELEMENT FELDSPAR ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 17 | | 18 | | 19 | | 20 | | 21 | | 22 | | 23 | | 24 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SIO2 | 65.78 | | 65.68 | | 64.78 | | 63.81 | | 58.28 | | 58.64 | | 59.85 | | 64.00 | |
| TIO2 | 0.13 | | 0.0 | | 0.0 | | 0.0 | | 0.05 | | 0.04 | | 0.0 | | 0.01 | |
| A2O3 | 18.68 | | 22.59 | | 23.61 | | 23.68 | | 27.32 | | 26.67 | | 25.82 | | 23.40 | |
| FEO | 0.05 | | 0.14 | | 0.19 | | 0.19 | | 0.12 | | 0.13 | | 0.17 | | 0.16 | |
| MNO | 0.0 | | 0.06 | | 0.0 | | 0.02 | | 0.03 | | 0.0 | | 0.03 | | 0.0 | |
| MGO | 0.0 | | 0.0 | | 0.01 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.01 | |
| CAO | 0.09 | | 3.66 | | 4.80 | | 5.02 | | 9.10 | | 8.20 | | 7.48 | | 4.50 | |
| BAO | 0.25 | | 0.11 | | 0.01 | | 0.12 | | 0.16 | | 0.12 | | 0.07 | | 0.02 | |
| NA2O | 0.95 | | 8.38 | | 8.15 | | 7.85 | | 5.83 | | 6.33 | | 6.28 | | 8.03 | |
| K2O | 15.91 | | 0.56 | | 0.58 | | 0.49 | | 0.23 | | 0.26 | | 0.35 | | 0.40 | |
| F | 0.07 | | 0.02 | | 0.13 | | 0.05 | | 0.0 | | 0.0 | | 0.0 | | 0.07 | |
| CL | 0.02 | | 0.01 | | 0.0 | | 0.01 | | 0.0 | | 0.02 | | 0.01 | | 0.0 | |
| SUM | 101.84 | | 101.18 | | 102.13 | | 101.18 | | 101.12 | | 100.39 | | 100.05 | | 100.53 | |
| -O= F+CL | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | |
| SUM | 101.84 | | 101.18 | | 102.13 | | 101.18 | | 101.12 | | 100.39 | | 100.05 | | 100.53 | |
| SI | 2.986 | * | 2.856 | * | 2.800 | * | 2.788 | * | 2.580 | * | 2.610 | * | 2.662 | * | 2.805 | * |
| AL | 0.999 | * | 1.158 | * | 1.202 | * | 1.219 | * | 1.425 | * | 1.399 | * | 1.353 | * | 1.209 | * |
| TI | 0.004 | 3.990 | 0.0 | 4.014 | 0.0 | 4.002 | 0.0 | 4.007 | 0.002 | 4.008 | 0.001 | 4.010 | 0.0 | 4.015 | 0.000 | 4.014 |
| FE | 0.002 | * | 0.005 | * | 0.007 | * | 0.007 | * | 0.004 | * | 0.005 | * | 0.006 | * | 0.006 | * |
| MN | 0.0 | * | 0.002 | * | 0.0 | * | 0.001 | * | 0.001 | * | 0.0 | * | 0.001 | * | 0.0 | * |
| MG | 0.0 | * | 0.0 | * | 0.001 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.001 | * |
| CA | 0.004 | * | 0.171 | * | 0.222 | * | 0.235 | * | 0.432 | * | 0.391 | * | 0.356 | * | 0.211 | * |
| BA | 0.004 | * | 0.002 | * | 0.000 | * | 0.002 | * | 0.003 | * | 0.002 | * | 0.001 | * | 0.000 | * |
| NA | 0.084 | * | 0.707 | * | 0.683 | * | 0.665 | * | 0.500 | * | 0.546 | * | 0.541 | * | 0.682 | * |
| K | 0.921 | 1.016 | 0.031 | 0.917 | 0.032 | 0.945 | 0.027 | 0.937 | 0.013 | 0.954 | 0.015 | 0.959 | 0.020 | 0.926 | 0.022 | 0.923 |
| O | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * |
| AN | | 0.43 | | 18.74 | | 23.71 | | 25.29 | | 45.54 | | 40.98 | | 38.78 | | 23.06 |
| AB | | 8.25 | | 77.64 | | 72.86 | | 71.55 | | 52.80 | | 57.25 | | 58.92 | | 74.46 |
| OR | | 90.88 | | 3.41 | | 3.41 | | 2.94 | | 1.37 | | 1.55 | | 2.16 | | 2.44 |
| CN | | 0.44 | | 0.21 | | 0.02 | | 0.22 | | 0.29 | | 0.22 | | 0.13 | | 0.04 |
| F/M | | 4.230 | | 0.0 | | 10.660 | | 3.647 | | 7.337 | | 7.905 | | 1.543 | | 8.977 |
| F/FM | | 0.809 | | 0.0 | | 0.914 | | 0.785 | | 0.880 | | 0.888 | | 0.607 | | 0.900 |

17 S6 99 FINE-GRAINED BIOT GRANITOID
18 S6 110 COARSE-GRAINED BIOT GRANITOID
19 S6 110 COARSE-GRAINED BIOT GRANITOID
20 S6 110 COARSE-GRAINED BIOT GRANITOID
21 S6 110 COARSE-GRAINED BIOT GRANITOID
22 S6 110 COARSE-GRAINED BIOT GRANITOID
23 S6 110 COARSE-GRAINED BIOT GRANITOID
24 S6 110 COARSE-GRAINED BIOT GRANITOID

SUPER RECAL

TABLE 4C. 12-ELEMENT FELDSPAR ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 60.98 | 62.97 | 64.53 | 63.84 | 65.22 | 63.28 | 63.34 | 61.94 |
| TIO2 | 0.0 | 0.08 | 0.01 | 0.03 | 0.0 | 0.11 | 0.08 | 0.09 |
| A203 | 24.51 | 23.69 | 18.52 | 23.20 | 18.45 | 17.99 | 21.53 | 22.50 |
| FEO | 0.16 | 0.18 | 0.10 | 0.13 | 0.10 | 0.28 | 0.30 | 0.33 |
| MNO | 0.0 | 0.0 | 0.0 | 0.01 | 0.03 | 0.13 | 0.11 | 0.12 |
| MGO | 0.01 | 0.0 | 0.02 | 0.01 | 0.0 | 0.17 | 0.15 | 0.15 |
| CAO | 6.14 | 4.61 | 0.04 | 4.81 | 0.06 | 0.16 | 3.20 | 4.21 |
| BAO | 0.18 | 0.16 | 0.26 | 0.04 | 0.06 | 0.36 | 0.17 | 0.19 |
| NA2O | 7.44 | 8.70 | 0.28 | 7.61 | 0.50 | 0.68 | 8.94 | 8.17 |
| K2O | 0.40 | 0.45 | 16.51 | 0.46 | 16.83 | 15.54 | 0.38 | 0.46 |
| F | 0.0 | 0.04 | 0.04 | 0.02 | 0.04 | 0.07 | 0.05 | 0.07 |
| CL | 0.05 | 0.0 | 0.0 | 0.01 | 0.0 | 0.03 | 0.03 | 0.03 |
| SUM | 99.82 | 100.84 | 100.27 | 100.14 | 101.25 | 98.70 | 98.20 | 98.16 |
| -0= F+CL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| SUM | 99.82 | 100.84 | 100.27 | 100.14 | 101.25 | 98.70 | 98.20 | 98.16 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 2.716 | * | 2.770 | * | 2.985 | * | 2.810 | * | 2.989 | * | 2.975 | * | 2.848 | * | 2.794 | * |
| AL | 1.286 | * | 1.228 | * | 1.009 | * | 1.203 | * | 0.996 | * | 0.997 | * | 1.141 | * | 1.196 | * |
| TI | 0.0 | 4.003 | 0.003 | 4.000 | 0.000 | 3.995 | 0.001 | 4.014 | 0.0 | 3.986 | 0.004 | 3.976 | 0.003 | 3.991 | 0.003 | 3.993 |
| FE | 0.006 | * | 0.007 | * | 0.004 | * | 0.005 | * | 0.004 | * | 0.011 | * | 0.011 | * | 0.012 | * |
| MN | 0.0 | * | 0.0 | * | 0.0 | * | 0.000 | * | 0.001 | * | 0.005 | * | 0.004 | * | 0.005 | * |
| MG | 0.001 | * | 0.0 | * | 0.001 | * | 0.001 | * | 0.0 | * | 0.012 | * | 0.010 | * | 0.010 | * |
| CA | 0.293 | * | 0.217 | * | 0.002 | * | 0.227 | * | 0.003 | * | 0.008 | * | 0.154 | * | 0.203 | * |
| BA | 0.003 | * | 0.003 | * | 0.005 | * | 0.001 | * | 0.001 | * | 0.007 | * | 0.003 | * | 0.003 | * |
| NA | 0.643 | * | 0.742 | * | 0.025 | * | 0.649 | * | 0.044 | * | 0.062 | * | 0.779 | * | 0.715 | * |
| K | 0.023 | 0.968 | 0.025 | 0.994 | 0.974 | 1.011 | 0.026 | 0.909 | 0.984 | 1.037 | 0.932 | 1.037 | 0.022 | 0.984 | 0.026 | 0.975 |
| O | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * |
| AN | 30.48 | | 22.01 | | 0.20 | | 25.13 | | 0.29 | | 0.80 | | 16.09 | | 21.47 | |
| AB | 66.83 | | 75.16 | | 2.50 | | 71.94 | | 4.30 | | 6.15 | | 81.33 | | 75.39 | |
| OR | 2.36 | | 2.56 | | 96.84 | | 2.86 | | 95.31 | | 92.40 | | 2.27 | | 2.79 | |
| CN | 0.33 | | 0.28 | | 0.47 | | 0.08 | | 0.10 | | 0.66 | | 0.31 | | 0.35 | |
| F/M | 8.977 | | 0.0 | | 2.805 | | 7.862 | | 7.337 | | 1.359 | | 1.539 | | 1.689 | |
| F/FM | 0.900 | | 0.0 | | 0.737 | | 0.887 | | 0.880 | | 0.576 | | 0.606 | | 0.628 | |

25 S6 110 COARSE-GRAINED BIOT GRANITOID
26 S6 110 COARSE-GRAINED BIOT GRANITOID
27 S6 110 COARSE-GRAINED BIOT GRANITOID
28 S6 135 COARSE-GRAINED AMPH+BIOT GRANITOI
29 S6 135 COARSE-GRAINED AMPH+BIOT GRANITOI
30 K1 140 COARSE-GRAINED AMPH+BIOT GRANITOI
31 K1 140 COARSE-GRAINED AMPH+BIOT GRANITOI
32 K1 140 COARSE-GRAINED AMPH+BIOT GRANITOI

SUPER RECAL

TABLE 4C. 12-ELEMENT FELDSPAR ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 62.51 | 63.03 | 68.50 | 64.92 | 64.29 | 62.94 | 62.14 | 60.07 |
| TIO2 | 0.03 | 0.08 | 0.03 | 0.08 | 0.10 | 0.08 | 0.11 | 0.11 |
| A2O3 | 23.63 | 24.15 | 20.33 | 19.15 | 18.01 | 23.07 | 22.88 | 25.17 |
| FEO | 0.05 | 0.09 | 0.09 | 0.03 | 0.26 | 0.27 | 0.34 | 0.33 |
| MNO | 0.03 | 0.0 | 0.04 | 0.02 | 0.12 | 0.12 | 0.12 | 0.13 |
| MGO | 0.0 | 0.0 | 0.0 | 0.01 | 0.16 | 0.16 | 0.15 | 0.16 |
| CAO | 4.99 | 5.28 | 0.34 | 0.27 | 0.13 | 4.45 | 4.56 | 6.64 |
| BAO | 0.02 | 0.15 | 0.03 | 0.56 | 0.25 | 0.18 | 0.20 | 0.24 |
| NA2O | 8.78 | 8.84 | 11.26 | 1.19 | 0.38 | 8.51 | 8.10 | 6.99 |
| K2O | 0.13 | 0.13 | 0.14 | 14.89 | 16.71 | 0.24 | 0.46 | 0.42 |
| F | 0.06 | 0.01 | 0.0 | 0.05 | 0.06 | 0.06 | 0.06 | 0.06 |
| CL | 0.0 | 0.0 | 0.0 | 0.0 | 0.04 | 0.03 | 0.04 | 0.04 |
| SUM | 100.17 | 101.75 | 100.76 | 101.12 | 100.41 | 100.02 | 99.06 | 100.26 |
| -O= F+CL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| SUM | 100.17 | 101.75 | 100.76 | 101.12 | 100.41 | 100.02 | 99.06 | 100.26 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 2.764 | * | 2.750 | * | 2.970 | * | 2.966 | * | 2.981 | * | 2.786 | * | 2.781 | * | 2.673 | * |
| AL | 1.231 | * | 1.242 | * | 1.039 | * | 1.031 | * | 0.984 | * | 1.203 | * | 1.207 | * | 1.320 | * |
| TI | 0.001 | 3.996 | 0.003 | 3.995 | 0.001 | 4.010 | 0.003 | 3.999 | 0.003 | 3.969 | 0.003 | 3.992 | 0.004 | 3.991 | 0.004 | 3.996 |
| FE | 0.002 | * | 0.003 | * | 0.003 | * | 0.001 | * | 0.010 | * | 0.010 | * | 0.013 | * | 0.012 | * |
| MN | 0.001 | * | 0.0 | * | 0.001 | * | 0.001 | * | 0.005 | * | 0.004 | * | 0.005 | * | 0.005 | * |
| MG | 0.0 | * | 0.0 | * | 0.0 | * | 0.001 | * | 0.011 | * | 0.011 | * | 0.010 | * | 0.011 | * |
| CA | 0.236 | * | 0.247 | * | 0.016 | * | 0.013 | * | 0.006 | * | 0.211 | * | 0.219 | * | 0.317 | * |
| BA | 0.000 | * | 0.003 | * | 0.001 | * | 0.010 | * | 0.005 | * | 0.003 | * | 0.004 | * | 0.004 | * |
| NA | 0.753 | * | 0.748 | * | 0.947 | * | 0.105 | * | 0.034 | * | 0.730 | * | 0.703 | * | 0.603 | * |
| K | 0.007 | 1.000 | 0.007 | 1.008 | 0.008 | 0.975 | 0.868 | 0.999 | 0.988 | 1.059 | 0.014 | 0.983 | 0.026 | 0.979 | 0.024 | 0.975 |
| O | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * | 8.000 | * |
| AN | 23.72 | | 24.57 | | 1.63 | | 1.33 | | 0.62 | | 22.03 | | 22.99 | | 33.41 | |
| AB | 75.51 | | 74.45 | | 97.52 | | 10.58 | | 3.31 | | 76.23 | | 73.89 | | 63.64 | |
| OR | 0.74 | | 0.72 | | 0.80 | | 87.09 | | 95.63 | | 1.41 | | 2.76 | | 2.52 | |
| CN | 0.03 | | 0.26 | | 0.05 | | 1.01 | | 0.44 | | 0.33 | | 0.37 | | 0.44 | |
| F/M | 8.977 | | 0.0 | | 2.805 | | 2.820 | | 1.338 | | 1.373 | | 1.726 | | 1.619 | |
| F/FM | 0.900 | | 0.0 | | 0.737 | | 0.738 | | 0.572 | | 0.579 | | 0.633 | | 0.618 | |

33 K3 130 COARSE-GRAINED AMPH+BIOT GRANITOI
34 K3 130 COARSE-GRAINED AMPH+BIOT GRANITOI
35 K3 130 C-GRD AMPH+BT GRANITOID(EXSOLVED KFS)
36 K3 130 COARSE-GRAINED AMPH+BIOT GRANITOI
37 K3 333.9 COARSE-GRAINED AMPH+BIOT GRANIT
38 K3 333.9 COARSE-GRAINED AMPH+BIOT GRANIT
39 K3 333.9 COARSE-GRAINED AMPH+BIOT GRANIT
40 K3 333.9 COARSE-GRAINED AMPH+BIOT GRANIT

SUPER RECAL

TABLE 4C. 12-ELEMENT FELDSPAR ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 68.43 | 62.08 | 67.33 | 60.59 | 65.30 | 62.03 | 64.31 | 63.74 |
| TIO2 | 0.08 | 0.09 | 0.09 | 0.01 | 0.14 | 0.06 | 0.04 | 0.10 |
| A203 | 19.60 | 17.70 | 19.10 | 25.81 | 22.98 | 23.66 | 18.74 | 18.37 |
| FEO | 0.21 | 0.30 | 0.23 | 0.13 | 0.10 | 0.18 | 0.11 | 0.27 |
| MNO | 0.11 | 0.13 | 0.13 | 0.0 | 0.03 | 0.05 | 0.0 | 0.13 |
| MGO | 0.15 | 0.16 | 0.14 | 0.0 | 0.0 | 0.01 | 0.01 | 0.17 |
| CAO | 0.33 | 0.18 | 0.25 | 7.59 | 4.01 | 5.17 | 0.03 | 0.19 |
| BAO | 0.17 | 0.27 | 0.19 | 0.21 | 0.0 | 0.08 | 1.02 | 0.56 |
| NA20 | 10.34 | 0.64 | 11.19 | 6.85 | 8.64 | 7.52 | 0.41 | 0.74 |
| K20 | 0.38 | 15.49 | 0.15 | 0.28 | 0.13 | 0.52 | 16.41 | 15.53 |
| F | 0.07 | 0.04 | 0.06 | 0.0 | 0.02 | 0.04 | 0.78 | 0.07 |
| CL | 0.03 | 0.03 | 0.03 | 0.0 | 0.01 | 0.01 | 0.0 | 0.03 |
| SUM | 99.80 | 97.04 | 98.80 | 101.47 | 101.33 | 99.28 | 101.08 | 99.80 |
| -O= F+CL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| SUM | 99.80 | 97.04 | 98.80 | 101.47 | 101.33 | 99.28 | 101.08 | 99.80 |

| | | * | | * | | * | | * | | * | | * | | * | | * |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 2.992 | | 2.972 | | 2.984 | | 2.664 | | 2.834 | | 2.765 | | 2.949 | | 2.967 | |
| AL | 1.010 | | 0.999 | | 0.998 | | 1.337 | | 1.175 | | 1.243 | | 1.013 | | 1.007 | |
| TI | 0.003 | 4.005 | 0.003 | 3.974 | 0.003 | 3.985 | 0.000 | 4.001 | 0.005 | 4.013 | 0.002 | 4.010 | 0.001 | 3.963 | 0.003 | 3.978 |
| FE | 0.008 | | 0.012 | | 0.009 | | 0.005 | | 0.004 | | 0.007 | | 0.004 | | 0.011 | |
| MN | 0.004 | | 0.005 | | 0.005 | | 0.0 | | 0.001 | | 0.002 | | 0.0 | | 0.005 | |
| MG | 0.010 | | 0.011 | | 0.009 | | 0.0 | | 0.0 | | 0.001 | | 0.001 | | 0.012 | |
| CA | 0.015 | | 0.009 | | 0.012 | | 0.358 | | 0.186 | | 0.247 | | 0.001 | | 0.009 | |
| BA | 0.003 | | 0.005 | | 0.003 | | 0.004 | | 0.0 | | 0.001 | | 0.018 | | 0.010 | |
| NA | 0.877 | | 0.059 | | 0.962 | | 0.584 | | 0.727 | | 0.650 | | 0.036 | | 0.067 | |
| K | 0.021 | 0.938 | 0.946 | 1.048 | 0.008 | 1.008 | 0.016 | 0.965 | 0.007 | 0.925 | 0.030 | 0.937 | 0.960 | 1.021 | 0.922 | 1.036 |
| O | 8.000 | | 8.000 | | 8.000 | | 8.000 | | 8.000 | | 8.000 | | 8.000 | | 8.000 | |
| AN | | 1.69 | | 0.91 | | 1.20 | | 37.21 | | 20.25 | | 26.61 | | 0.15 | | 0.94 |
| AB | | 95.68 | | 5.83 | | 97.60 | | 60.78 | | 78.97 | | 70.05 | | 3.59 | | 6.62 |
| OR | | 2.31 | | 92.77 | | 0.86 | | 1.63 | | 0.78 | | 3.19 | | 94.46 | | 91.43 |
| CN | | 0.32 | | 0.50 | | 0.33 | | 0.38 | | 0.0 | | 0.15 | | 1.80 | | 1.01 |
| F/M | | 1.202 | | 1.514 | | 1.449 | | 2.820 | | 1.338 | | 12.941 | | 6.172 | | 1.326 |
| F/FM | | 0.546 | | 0.602 | | 0.592 | | 0.738 | | 0.572 | | 0.928 | | 0.861 | | 0.570 |

41 K3 333.9 COARSE-GRAINED AMPH+BIOT GRANIT
42 K3 1135 COARSE-GRAINED AMPH+BIOT GRANITO
43 K3 1135 COARSE-GRAINED AMPH+BIOT GRANITO
44 K3 1271 COARSE-GRAINED AMPH+BIOT GRANITO
45 K3 1271 COARSE-GRAINED AMPH+BIOT GRANITO
46 K3 1271 COARSE-GRAINED AMPH+BIOT GRANITO
47 K3 1271 COARSE-GRAINED AMPH+BIOT GRANITO
48 K3 1303.8 COARSE-GRAINED AMPH+BT GRANITO

SUPER RECAL

TABLE 4C. 12-ELEMENT FELDSPAR ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 49 | | 50 | | 51 | | 52 | | 53 | | 54 | | 55 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SIO2 | 59.16 | | 63.05 | | 61.93 | | 62.43 | | 59.37 | | 68.22 | | 65.17 | |
| TIO2 | 0.11 | | 0.07 | | 0.12 | | 0.01 | | 0.06 | | 0.0 | | 0.0 | |
| A2O3 | 27.86 | | 21.80 | | 24.85 | | 23.11 | | 24.75 | | 20.42 | | 18.70 | |
| FEO | 0.21 | | 0.16 | | 0.20 | | 0.14 | | 0.23 | | 0.06 | | 0.10 | |
| MNO | 0.12 | | 0.01 | | 0.04 | | 0.0 | | 0.03 | | 0.01 | | 0.0 | |
| MGO | 0.17 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.02 | |
| CAO | 0.52 | | 3.49 | | 6.65 | | 4.56 | | 6.39 | | 0.11 | | 0.07 | |
| BAO | 0.16 | | 0.02 | | 0.08 | | 0.0 | | 0.0 | | 0.02 | | 0.20 | |
| NA2O | 9.41 | | 8.35 | | 7.35 | | 8.41 | | 7.54 | | 11.29 | | 1.34 | |
| K2O | 0.16 | | 0.72 | | 0.37 | | 0.45 | | 0.52 | | 0.13 | | 15.10 | |
| F | 0.07 | | 0.0 | | 0.01 | | 0.0 | | 0.04 | | 0.05 | | 0.02 | |
| CL | 0.03 | | 0.0 | | 0.0 | | 0.0 | | 0.01 | | 0.0 | | 0.01 | |
| SUM | 97.88 | | 97.67 | | 101.59 | | 99.11 | | 98.89 | | 100.26 | | 100.70 | |
| -O= F+CL | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | |
| SUM | 97.88 | | 97.67 | | 101.59 | | 99.11 | | 98.89 | | 100.26 | | 100.70 | |
| SI | 2.655 | % | 2.847 | % | 2.712 | % | 2.787 | % | 2.678 | % | 2.969 | % | 2.985 | % |
| AL | 1.473 | % | 1.160 | % | 1.282 | % | 1.216 | % | 1.315 | % | 1.047 | % | 1.009 | % |
| TI | 0.004 | 4.132 | 0.002 | 4.009 | 0.004 | 3.998 | 0.000 | 4.004 | 0.002 | 3.995 | 0.0 | 4.016 | 0.0 | 3.995 |
| FE | 0.008 | % | 0.006 | % | 0.007 | % | 0.005 | % | 0.009 | % | 0.002 | % | 0.004 | % |
| MN | 0.005 | % | 0.000 | % | 0.001 | % | 0.0 | % | 0.001 | % | 0.000 | % | 0.0 | % |
| MG | 0.011 | % | 0.0 | % | 0.0 | % | 0.0 | % | 0.0 | % | 0.0 | % | 0.001 | % |
| CA | 0.025 | % | 0.169 | % | 0.312 | % | 0.218 | % | 0.309 | % | 0.005 | % | 0.003 | % |
| BA | 0.003 | % | 0.000 | % | 0.001 | % | 0.0 | % | 0.0 | % | 0.000 | % | 0.004 | % |
| NA | 0.819 | % | 0.731 | % | 0.624 | % | 0.728 | % | 0.659 | % | 0.953 | % | 0.119 | % |
| K | 0.009 | 0.880 | 0.041 | 0.948 | 0.021 | 0.967 | 0.026 | 0.977 | 0.030 | 1.008 | 0.007 | 0.968 | 0.882 | 1.013 |
| O | 8.000 | % | 8.000 | % | 8.000 | % | 8.000 | % | 8.000 | % | 8.000 | % | 8.000 | % |
| AN | 2.92 | | 17.93 | | 32.57 | | 22.45 | | 30.94 | | 0.53 | | 0.34 | |
| AB | 95.68 | | 77.63 | | 65.13 | | 74.92 | | 66.06 | | 98.69 | | 11.80 | |
| OR | 1.07 | | 4.40 | | 2.16 | | 2.64 | | 3.00 | | 0.75 | | 87.50 | |
| CN | 0.33 | | 0.04 | | 0.14 | | 0.0 | | 0.0 | | 0.04 | | 0.36 | |
| F/M | 1.094 | | 1.514 | | 1.449 | | 2.820 | | 1.338 | | 12.941 | | 2.805 | |
| F/FM | 0.522 | | 0.602 | | 0.592 | | 0.738 | | 0.572 | | 0.928 | | 0.737 | |

49 K3 1303.8 COARSE-GRAINED AMPH+BT GRANITO
50 GR1 04 LH4 COARSE-GRAINED AMPH+BIOT GRAN
51 GR1 04 LH4 COARSE-GRAINED AMPH+BIOT GRAN
52 GR1 09 LH3 COARSE-GRAINED AMPH+BIOT GRAN
53 GR1 09 LH3 COARSE-GRAINED AMPH+BIOT GRAN
54 GR1 09 LH3 C-GR AMPH+BT GRANITOID(EXSOLVED RFS)
55 GR1 09 LH3 C-GR AMPH+BT GRANITOID(LRGE AREA SCAN)

SUPER RECAL

TABLE 5. MUSCOVITE ANALYSES FOR THE LIBERTY HILL PLUTON, S. C.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 46.49 | 47.72 | 45.62 | 46.41 | 47.42 | 47.71 | 44.67 | 45.65 |
| TIO2 | 0.55 | 0.18 | 0.29 | 0.57 | 0.57 | 0.50 | 1.05 | 0.20 |
| A2O3 | 27.38 | 28.89 | 28.30 | 27.71 | 31.43 | 31.00 | 30.27 | 33.27 |
| FEO | 5.60 | 4.81 | 6.39 | 5.62 | 5.34 | 5.79 | 5.98 | 4.66 |
| MNO | 0.08 | 0.06 | 0.07 | 0.06 | 0.04 | 0.05 | 0.04 | 0.02 |
| MGO | 1.75 | 1.81 | 1.49 | 1.70 | 1.84 | 1.79 | 1.43 | 0.57 |
| CAO | 0.02 | 0.01 | 0.02 | 0.02 | 0.02 | 0.06 | 0.01 | 0.03 |
| BAO | 0.03 | 0.0 | 0.05 | 0.18 | 0.0 | 0.0 | 0.0 | 0.0 |
| NA2O | 0.33 | 0.14 | 0.23 | 0.22 | 0.18 | 0.13 | 0.28 | 0.27 |
| K2O | 11.16 | 10.36 | 11.03 | 11.14 | 9.83 | 9.98 | 10.17 | 10.54 |
| F | 0.40 | 0.0 | 0.69 | 0.25 | 0.0 | 0.0 | 0.14 | 0.0 |
| CL | 0.01 | 0.0 | 0.03 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| H2O | 4.09 | 4.37 | 3.93 | 4.17 | 4.49 | 4.50 | 4.25 | 4.42 |
| SUM | 97.89 | 98.35 | 98.14 | 98.05 | 101.16 | 101.51 | 98.29 | 99.63 |
| -O= F+CL | 0.17 | 0.0 | 0.30 | 0.11 | 0.0 | 0.0 | 0.06 | 0.0 |
| SUM | 97.72 | 98.35 | 97.85 | 97.94 | 101.16 | 101.51 | 98.23 | 99.63 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 6.486 | * | 6.548 | * | 6.362 | * | 6.472 | * | 6.323 | * | 6.358 | * | 6.196 | * | 6.191 | * |
| AL | 1.514 | 8.000 | 1.452 | 8.000 | 1.638 | 8.000 | 1.528 | 8.000 | 1.677 | 8.000 | 1.642 | 8.000 | 1.804 | 8.000 | 1.809 | 8.000 |
| AL | 2.987 | * | 3.220 | * | 3.012 | * | 3.025 | * | 3.262 | * | 3.225 | * | 3.144 | * | 3.508 | * |
| TI | 0.058 | * | 0.019 | * | 0.030 | * | 0.060 | * | 0.057 | * | 0.050 | * | 0.110 | * | 0.020 | * |
| FE | 0.653 | * | 0.552 | * | 0.745 | * | 0.655 | * | 0.596 | * | 0.645 | * | 0.694 | * | 0.529 | * |
| MN | 0.009 | * | 0.007 | * | 0.008 | * | 0.007 | * | 0.005 | * | 0.006 | * | 0.005 | * | 0.002 | * |
| MG | 0.364 | 4.071 | 0.370 | 4.168 | 0.310 | 4.106 | 0.353 | 4.101 | 0.366 | 4.285 | 0.356 | 4.282 | 0.296 | 4.248 | 0.115 | 4.175 |
| CA | 0.003 | * | 0.001 | * | 0.003 | * | 0.003 | * | 0.003 | * | 0.009 | * | 0.001 | * | 0.004 | * |
| NA | 0.089 | * | 0.037 | * | 0.062 | * | 0.059 | * | 0.047 | * | 0.034 | * | 0.075 | * | 0.071 | * |
| K | 1.986 | * | 1.813 | * | 1.962 | * | 1.981 | * | 1.672 | * | 1.696 | * | 1.799 | * | 1.823 | * |
| BA | 0.002 | 2.080 | 0.0 | 1.852 | 0.003 | 2.030 | 0.010 | 2.054 | 0.0 | 1.721 | 0.0 | 1.738 | 0.0 | 1.876 | 0.0 | 1.899 |
| CL | 0.002 | * | 0.0 | * | 0.007 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * |
| F | 0.176 | * | 0.0 | * | 0.304 | * | 0.110 | * | 0.0 | * | 0.0 | * | 0.061 | * | 0.0 | * |
| H | 3.821 | 4.000 | 4.000 | 4.000 | 3.689 | 4.000 | 3.890 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 3.939 | 4.000 | 4.000 | 4.000 |
| O | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * | 24.000 | * |
| | MUSC | 95.56 | | 97.91 | | 96.78 | | 96.94 | | 97.13 | | 97.58 | | 95.91 | | 96.03 |
| | PARG | 4.30 | | 2.01 | | 3.07 | | 2.91 | | 2.70 | | 1.93 | | 4.01 | | 3.74 |
| | MARG | 0.14 | | 0.08 | | 0.15 | | 0.15 | | 0.17 | | 0.49 | | 0.08 | | 0.23 |
| | F/M | 1.821 | | 1.510 | | 2.433 | | 1.875 | | 1.641 | | 1.831 | | 2.362 | | 4.607 |
| | F/FM | 0.646 | | 0.602 | | 0.709 | | 0.652 | | 0.621 | | 0.647 | | 0.703 | | 0.822 |

1 S6 67 FINE-GRAINED BIOTITE GRANITOID
2 S6 71 XENOCRYSTAL GRANITOID
3 S6 77 APLITE
4 S6 99 FINE-GRAINED BIOTITE GRANITOID
5 S6 100 XENOCRYSTAL GRANITOID
6 S6 111 FINE-GRAINED BIOTITE GRANITOID
7 S6 126 COARSE-GRAINED MUSC+BIOT GRANITOI
8 F6 24 COARSE-GRAINED AMPH+BIOT GRANITOID

SUPER RECAL

TABLE 5. MUSCOVITE ANALYSES FOR THE LIBERTY HILL PLUTON, S. C.

| | 9 | | 10 | |
|---|---|---|---|---|
| SIO2 | 48.32 | | 46.21 | |
| TIO2 | 0.15 | | 0.24 | |
| A2O3 | 31.78 | | 34.62 | |
| FEO | 5.94 | | 1.57 | |
| MNO | 0.05 | | 0.03 | |
| MGO | 1.70 | | 0.24 | |
| CAO | 0.04 | | 0.07 | |
| BAO | 0.0 | | 0.0 | |
| NA2O | 0.18 | | 1.21 | |
| K2O | 10.20 | | 8.96 | |
| F | 0.0 | | 0.0 | |
| CL | 0.0 | | 0.0 | |
| H2O | 4.56 | | 4.43 | |
| SUM | 102.92 | | 97.58 | |
| -O= F+CL | 0.0 | | 0.0 | |
| SUM | 102.92 | | 97.58 | |
| SI | 6.353 | * | 6.250 | * |
| AL | 1.647 | 8.000 | 1.750 | 8.000 |
| AL | 3.277 | * | 3.768 | * |
| TI | 0.015 | * | 0.024 | * |
| FE | 0.653 | * | 0.178 | * |
| MN | 0.006 | * | 0.003 | * |
| MG | 0.333 | 4.283 | 0.048 | 4.022 |
| CA | 0.006 | * | 0.010 | * |
| NA | 0.046 | * | 0.317 | * |
| K | 1.711 | * | 1.546 | * |
| BA | 0.0 | 1.762 | 0.0 | 1.873 |
| CL | 0.0 | * | 0.0 | * |
| F | 0.0 | * | 0.0 | * |
| H | 4.000 | 4.000 | 4.000 | 4.000 |
| O | 24.000 | * | 24.000 | * |
| MUSC | 97.08 | | 82.52 | |
| PARG | 2.60 | | 16.94 | |
| MARG | 0.32 | | 0.54 | |
| F/M | 1.977 | | 3.741 | |
| F/FM | 0.664 | | 0.789 | |

9 K3 71.9 FINE-GRAINED BIOTITE GRANITOID

10 K3 289 COARSE-GRAINED AMPH+BIOT GRANITOI

SUPER RECAL

TABLE 6. ILMENITE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 0.27 | 0.47 | 0.0 | 0.08 | 0.08 | 0.08 | 0.08 | 0.06 |
| TIO2 | 50.80 | 47.84 | 49.76 | 50.16 | 47.68 | 47.36 | 47.10 | 48.99 |
| A2O3 | 0.57 | 5.90 | 0.0 | 0.03 | 0.11 | 0.09 | 0.08 | 0.04 |
| FEO | 38.15 | 38.52 | 44.36 | 47.42 | 47.83 | 44.57 | 45.64 | 43.41 |
| MNO | 8.54 | 8.13 | 5.58 | 4.20 | 3.28 | 6.00 | 5.20 | 7.23 |
| MGO | 0.05 | 0.09 | 0.03 | 0.01 | 0.28 | 0.28 | 0.31 | 0.05 |
| CAO | 0.12 | 0.10 | 0.04 | 0.10 | 0.18 | 0.19 | 0.23 | 0.12 |
| BAO | 0.0 | 0.0 | 0.0 | 0.25 | 0.47 | 0.44 | 0.47 | 0.26 |
| NA2O | 0.0 | 0.0 | 0.01 | 0.05 | 0.14 | 0.15 | 0.12 | 0.02 |
| K2O | 0.05 | 0.07 | 0.03 | 0.08 | 0.11 | 0.10 | 0.10 | 0.06 |
| F | 0.0 | 0.0 | 0.0 | 0.04 | 0.17 | 0.16 | 0.16 | 0.09 |
| CL | 0.0 | 0.0 | 0.0 | 0.02 | 0.05 | 0.05 | 0.05 | 0.02 |
| SUM | 98.23 | 100.58 | 99.77 | 101.92 | 99.36 | 98.49 | 98.56 | 99.84 |
| -O= F+CL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| SUM | 98.23 | 100.58 | 99.77 | 101.92 | 99.36 | 98.49 | 98.56 | 99.84 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TI | 0.982 | * | 0.887 | * | 0.962 | * | 0.952 | * | 0.930 | * | 0.932 | * | 0.928 | * | 0.948 | * |
| AL | 0.017 | 0.999 | 0.171 | 1.058 | 0.0 | 0.962 | 0.001 | 0.953 | 0.003 | 0.934 | 0.003 | 0.935 | 0.002 | 0.930 | 0.001 | 0.950 |
| MG | 0.002 | * | 0.003 | * | 0.001 | * | 0.000 | * | 0.011 | * | 0.011 | * | 0.012 | * | 0.002 | * |
| FE | 0.820 | * | 0.794 | * | 0.953 | * | 1.001 | * | 1.038 | * | 0.975 | * | 1.000 | * | 0.935 | * |
| MN | 0.186 | * | 0.170 | * | 0.121 | * | 0.090 | * | 0.072 | * | 0.133 | * | 0.115 | * | 0.158 | * |
| CA | 0.003 | 1.011 | 0.003 | 0.970 | 0.001 | 1.077 | 0.003 | 1.093 | 0.005 | 1.126 | 0.005 | 1.124 | 0.006 | 1.133 | 0.003 | 1.097 |
| O | 3.000 | * | 3.000 | * | 3.000 | * | 3.000 | * | 3.000 | * | 3.000 | * | 3.000 | * | 3.000 | * |
| F/M | 525.160 | | 291.473 | | 935.341 | | 2899.288 | | 102.500 | | 101.488 | | 92.137 | | 569.297 | |
| F/FM | 0.998 | | 0.997 | | 0.999 | | 1.000 | | 0.990 | | 0.990 | | 0.989 | | 0.998 | |

1 S6 56 COARSE-GRAINED AMPH+BIOT GRANITOID
2 S6 58 COARSE-GRAINED BIOT GRANITOID
3 S6 86 COARSE-GRAINED AMPH+BIOT GRANITOID
4 K3 130 COARSE-GRAINED AMPH+BIOT GRANITOI
5 K3 333.9 COARSE-GRAINED AMPH+BIOT GRANIT
6 K3 1135 COARSE-GRAINED AMPH+BIOT GRANITO
7 K3 1303.8 COARSE-GRAINED AMPH+BIOT GRANI
8 GR1 04 LH4 COARSE-GRAINED AMPH+BIOT GRAN

SUPER RECAL

TABLE 6. ILMENITE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 9 |
|---|---|
| SIO2 | 0.06 |
| TIO2 | 44.88 |
| A203 | 0.02 |
| FEO | 46.26 |
| MNO | 4.45 |
| MGO | 0.04 |
| CAO | 0.10 |
| BAO | 0.45 |
| NA2O | 0.08 |
| K2O | 0.06 |
| F | 0.12 |
| CL | 0.02 |
| SUM | 95.75 |
| -O= F+CL | 0.0 |
| SUM | 95.75 |

| | | |
|---|---|---|
| TI | 0.917 | * |
| AL | 0.001 | 0.918 |
| MG | 0.002 | * |
| FE | 1.052 | * |
| MN | 0.102 | * |
| CA | 0.003 | 1.159 |
| O | 3.000 | * |
| F/M | 712.103 | |
| F/FM | 0.999 | |

9 GR1 09 LH3 COARSE-GRAINED AMPH+BIOT GRAN

SUPER RECAL

TABLE 7. CHLORITE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 26.77 | 27.00 | 26.31 | 23.88 | 25.68 | 26.75 | 26.46 | 26.21 |
| TIO2 | 0.31 | 0.13 | 0.06 | 0.13 | 0.09 | 0.11 | 0.04 | 0.03 |
| A203 | 19.41 | 19.85 | 22.31 | 19.18 | 21.43 | 20.14 | 18.11 | 18.71 |
| FEO | 31.18 | 33.39 | 26.76 | 30.79 | 29.90 | 29.29 | 29.83 | 28.85 |
| MNO | 0.52 | 0.39 | 0.94 | 0.70 | 0.63 | 0.50 | 0.55 | 0.79 |
| MGO | 11.63 | 10.56 | 10.16 | 9.72 | 11.24 | 11.33 | 12.25 | 11.88 |
| CAO | 0.12 | 0.07 | 0.10 | 0.05 | 0.03 | 0.07 | 0.04 | 0.03 |
| BAO | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| NA2O | 0.0 | 0.02 | 0.05 | 0.0 | 0.0 | 0.02 | 0.0 | 0.01 |
| K2O | 0.24 | 0.02 | 0.04 | 0.04 | 0.03 | 0.05 | 0.0 | 0.03 |
| F | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| CL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| H2O | 11.34 | 11.42 | 11.18 | 10.51 | 11.27 | 11.23 | 11.02 | 10.96 |
| SUM | 101.52 | 102.85 | 97.91 | 95.00 | 100.30 | 99.49 | 98.30 | 97.50 |
| -O= F+CL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| SUM | 101.52 | 102.85 | 97.91 | 95.00 | 100.30 | 99.49 | 98.30 | 97.50 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 2.829 | * | 2.834 | * | 2.819 | * | 2.723 | * | 2.729 | * | 2.854 | * | 2.878 | * | 2.864 | * |
| AL | 1.171 | 4.000 | 1.166 | 4.000 | 1.181 | 4.000 | 1.277 | 4.000 | 1.271 | 4.000 | 1.146 | 4.000 | 1.122 | 4.000 | 1.136 | 4.000 |
| AL | 1.247 | * | 1.289 | * | 1.636 | * | 1.300 | * | 1.413 | * | 1.386 | * | 1.199 | * | 1.274 | * |
| TI | 0.025 | * | 0.010 | * | 0.005 | * | 0.011 | * | 0.007 | * | 0.009 | * | 0.003 | * | 0.002 | * |
| FE | 2.756 | * | 2.931 | * | 2.398 | * | 2.936 | * | 2.657 | * | 2.614 | * | 2.713 | * | 2.637 | * |
| MN | 0.047 | * | 0.035 | * | 0.085 | * | 0.068 | * | 0.057 | * | 0.045 | * | 0.051 | * | 0.073 | * |
| MG | 1.832 | * | 1.652 | * | 1.623 | * | 1.652 | * | 1.781 | * | 1.802 | * | 1.986 | * | 1.935 | * |
| CA | 0.014 | * | 0.008 | * | 0.011 | * | 0.006 | * | 0.003 | * | 0.008 | * | 0.005 | * | 0.004 | * |
| NA | 0.0 | * | 0.004 | * | 0.010 | * | 0.0 | * | 0.0 | * | 0.004 | * | 0.0 | * | 0.002 | * |
| K | 0.032 | * | 0.003 | * | 0.005 | * | 0.006 | * | 0.004 | * | 0.007 | * | 0.0 | * | 0.004 | * |
| BA | 0.0 | 5.952 | 0.0 | 5.931 | 0.0 | 5.774 | 0.0 | 5.979 | 0.0 | 5.922 | 0.0 | 5.875 | 0.0 | 5.957 | 0.0 | 5.931 |
| CL | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * |
| F | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * |
| H | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 |
| O | 18.000 | * | 18.000 | * | 18.000 | * | 18.000 | * | 18.000 | * | 18.000 | * | 18.000 | * | 18.000 | * |
| F/M | | 1.530 | | 1.795 | | 1.530 | | 1.818 | | 1.524 | | 1.476 | | 1.392 | | 1.400 |
| F/FM | | 0.605 | | 0.642 | | 0.605 | | 0.645 | | 0.604 | | 0.596 | | 0.582 | | 0.583 |

1 S6 47 COARSE-GRAINED BIOTITE GRANITOID
2 S6 57 FINE-GRAINED BIOTITE GRANITOID
3 S6 58 COARSE-GRAINED BIOTITE GRANITOID
4 S6 65 COARSE-GRAINED AMPH+BIOT GRANITOID
5 S6 71 XENOCRYSTAL GRANITOID
6 S6 74 XENOCRYSTAL GRANITOID
7 S6 86 COARSE-GRAINED AMPH+BIOT GRANITOID
8 S6 87 COARSE-GRAINED AMPH+BIOT GRANITOID

SUPER RECAL

TABLE 7. CHLORITE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|
| SIO2 | 22.99 | 24.37 | 25.97 | 27.08 | 25.65 | 25.27 | 27.57 | 25.90 |
| TIO2 | 0.10 | 0.02 | 0.06 | 0.07 | 0.17 | 0.17 | 0.13 | 0.10 |
| A2O3 | 24.10 | 22.52 | 19.25 | 20.18 | 20.31 | 22.74 | 19.66 | 18.02 |
| FEO | 28.10 | 31.23 | 31.56 | 24.14 | 32.92 | 29.23 | 30.46 | 31.98 |
| MNO | 0.69 | 1.00 | 0.68 | 0.30 | 0.44 | 0.56 | 0.60 | 0.83 |
| MGO | 10.21 | 10.10 | 10.78 | 15.67 | 9.99 | 11.91 | 12.21 | 11.41 |
| CAO | 0.04 | 0.0 | 0.04 | 0.17 | 0.06 | 0.03 | 0.12 | 0.08 |
| BAO | 0.0 | 0.0 | 0.18 | 0.0 | 0.0 | 0.0 | 0.0 | 0.03 |
| NA2O | 0.02 | 0.01 | 0.06 | 0.01 | 0.0 | 0.01 | 0.03 | 0.04 |
| K2O | 0.01 | 0.01 | 0.03 | 0.06 | 0.01 | 0.02 | 0.07 | 0.08 |
| F | 0.0 | 0.0 | 0.14 | 0.0 | 0.0 | 0.0 | 0.0 | 0.14 |
| CL | 0.0 | 0.0 | 0.02 | 0.0 | 0.0 | 0.0 | 0.0 | 0.01 |
| H2O | 10.97 | 11.18 | 10.99 | 11.47 | 11.15 | 11.45 | 11.51 | 10.93 |
| SUM | 97.23 | 100.44 | 99.76 | 99.15 | 100.70 | 101.39 | 102.36 | 99.55 |
| -O= F+CL | 0.0 | 0.0 | 0.06 | 0.0 | 0.0 | 0.0 | 0.0 | 0.06 |
| SUM | 97.23 | 100.44 | 99.70 | 99.15 | 100.70 | 101.39 | 102.36 | 99.48 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 2.512 | * | 2.612 | * | 2.807 | * | 2.830 | * | 2.755 | * | 2.645 | * | 2.870 | * | 2.818 | * |
| AL | 1.488 | 4.000 | 1.388 | 4.000 | 1.193 | 4.000 | 1.170 | 4.000 | 1.245 | 4.000 | 1.355 | 4.000 | 1.130 | 4.000 | 1.182 | 4.000 |
| AL | 1.616 | * | 1.456 | * | 1.258 | * | 1.315 | * | 1.326 | * | 1.451 | * | 1.282 | * | 1.128 | * |
| TI | 0.008 | * | 0.002 | * | 0.005 | * | 0.006 | * | 0.014 | * | 0.013 | * | 0.010 | * | 0.008 | * |
| FE | 2.568 | * | 2.799 | * | 2.853 | * | 2.110 | * | 2.957 | * | 2.559 | * | 2.652 | * | 2.910 | * |
| MN | 0.064 | * | 0.091 | * | 0.062 | * | 0.027 | * | 0.040 | * | 0.050 | * | 0.053 | * | 0.076 | * |
| MG | 1.663 | * | 1.613 | * | 1.737 | * | 2.441 | * | 1.599 | * | 1.858 | * | 1.895 | * | 1.850 | * |
| CA | 0.005 | * | 0.0 | * | 0.005 | * | 0.019 | * | 0.007 | * | 0.003 | * | 0.013 | * | 0.009 | * |
| NA | 0.004 | * | 0.002 | * | 0.013 | * | 0.002 | * | 0.0 | * | 0.002 | * | 0.006 | * | 0.008 | * |
| K | 0.001 | * | 0.001 | * | 0.004 | * | 0.008 | * | 0.001 | * | 0.003 | * | 0.009 | * | 0.011 | * |
| BA | 0.0 | 5.929 | 0.0 | 5.965 | 0.008 | 5.944 | 0.0 | 5.926 | 0.0 | 5.945 | 0.0 | 5.939 | 0.0 | 5.920 | 0.001 | 6.003 |
| CL | 0.0 | * | 0.0 | * | 0.004 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.002 | * |
| F | 0.0 | * | 0.0 | * | 0.048 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.048 | * |
| H | 8.000 | 8.000 | 8.000 | 8.000 | 7.948 | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | 7.950 | 8.000 |
| O | 18.000 | * | 18.000 | * | 18.000 | * | 18.000 | * | 18.000 | * | 18.000 | * | 18.000 | * | 18.000 | * |
| F/M | | 1.583 | | 1.791 | | 1.678 | | 0.875 | | 1.874 | | 1.404 | | 1.428 | | 1.614 |
| F/FM | | 0.613 | | 0.642 | | 0.627 | | 0.467 | | 0.652 | | 0.584 | | 0.588 | | 0.617 |

9 S6 88 COARSE-GRAINED AMPH+BIOT GRANITOID
10 S6 89 COARSE-GRAINED AMPH+BIOT GRANITOID
11 S6 99 FINE-GRAINED BIOTITE GRANITOID
12 S6 100 FINE-GRAINED BIOTITE GRANITOID
13 S6 111 FINE-GRAINED BIOTITE GRANITOID
14 S6 126 COARSE-GRAINED MUSC+BIOT GRANITOI
15 F6 24 COARSE-GRAINED AMPH+BIOT GRANITOID
16 LH4 COARSE-GRAINED AMPH+BIOT GRANITOID

SUPER RECAL

TABLE 7. CHLORITE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|
| SI02 | 25.43 | 33.89 | 25.26 | 25.21 | 26.13 | 30.22 | 25.34 | 24.79 |
| TI02 | 0.09 | 1.07 | 0.17 | 0.0 | 0.14 | 1.07 | 0.34 | 0.18 |
| A203 | 21.33 | 16.82 | 19.28 | 18.63 | 18.66 | 15.54 | 22.79 | 19.93 |
| FEO | 29.65 | 26.56 | 30.28 | 31.21 | 30.90 | 28.39 | 25.51 | 32.18 |
| MNO | 1.15 | 0.48 | 1.02 | 0.90 | 0.90 | 0.61 | 0.61 | 0.56 |
| MGO | 10.91 | 11.52 | 11.73 | 10.60 | 12.31 | 12.04 | 11.55 | 10.28 |
| CAO | 0.06 | 0.20 | 0.14 | 0.05 | 0.16 | 0.32 | 0.25 | 0.12 |
| BAO | 0.0 | 0.0 | 0.19 | 0.0 | 0.20 | 0.24 | 0.0 | 0.0 |
| NA2O | 0.03 | 0.05 | 0.09 | 0.0 | 0.10 | 0.09 | 0.03 | 0.0 |
| K2O | 0.01 | 0.0 | 0.08 | 0.02 | 0.09 | 1.80 | 0.34 | 0.04 |
| F | 0.0 | 0.0 | 0.17 | 0.0 | 0.18 | 0.41 | 0.20 | 0.16 |
| CL | 0.0 | 0.0 | 0.04 | 0.0 | 0.05 | 0.05 | 0.0 | 0.0 |
| H2O | 11.20 | 11.91 | 10.94 | 10.79 | 11.10 | 11.21 | 11.12 | 10.88 |
| SUM | 99.86 | 102.50 | 99.39 | 97.41 | 100.92 | 101.99 | 98.08 | 99.12 |
| -O= F+CL | 0.0 | 0.0 | 0.08 | 0.0 | 0.09 | 0.18 | 0.08 | 0.07 |
| SUM | 99.86 | 102.50 | 99.31 | 97.41 | 100.83 | 101.81 | 98.00 | 99.05 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 2.721 | * | 3.409 | * | 2.737 | * | 2.799 | * | 2.789 | * | 3.155 | * | 2.700 | * | 2.707 | * |
| AL | 1.279 | 4.000 | 0.591 | 4.000 | 1.263 | 4.000 | 1.201 | 4.000 | 1.211 | 4.000 | 0.845 | 4.000 | 1.300 | 4.000 | 1.293 | 4.000 |
| AL | 1.410 | * | 1.403 | * | 1.199 | * | 1.237 | * | 1.137 | * | 1.067 | * | 1.562 | * | 1.272 | * |
| TI | 0.007 | * | 0.081 | * | 0.014 | * | 0.0 | * | 0.011 | * | 0.084 | * | 0.027 | * | 0.015 | * |
| FE | 2.653 | * | 2.234 | * | 2.744 | * | 2.898 | * | 2.759 | * | 2.479 | * | 2.273 | * | 2.939 | * |
| MN | 0.104 | * | 0.041 | * | 0.094 | * | 0.085 | * | 0.081 | * | 0.054 | * | 0.055 | * | 0.052 | * |
| MG | 1.740 | * | 1.727 | * | 1.894 | * | 1.754 | * | 1.959 | * | 1.874 | * | 1.834 | * | 1.673 | * |
| CA | 0.007 | * | 0.022 | * | 0.016 | * | 0.006 | * | 0.018 | * | 0.036 | * | 0.029 | * | 0.014 | * |
| NA | 0.006 | * | 0.010 | * | 0.019 | * | 0.0 | * | 0.021 | * | 0.018 | * | 0.006 | * | 0.0 | * |
| K | 0.001 | * | 0.0 | * | 0.011 | * | 0.003 | * | 0.012 | * | 0.240 | * | 0.046 | * | 0.006 | * |
| BA | 0.0 | 5.929 | 0.0 | 5.517 | 0.008 | 5.999 | 0.0 | 5.982 | 0.008 | 6.006 | 0.010 | 5.861 | 0.0 | 5.833 | 0.0 | 5.970 |
| CL | 0.0 | * | 0.0 | * | 0.007 | * | 0.0 | * | 0.009 | * | 0.009 | * | 0.0 | * | 0.0 | * |
| F | 0.0 | * | 0.0 | * | 0.058 | * | 0.0 | * | 0.061 | * | 0.135 | * | 0.067 | * | 0.055 | * |
| H | 8.000 | 8.000 | 8.000 | 8.000 | 7.934 | 8.000 | 8.000 | 8.000 | 7.930 | 8.000 | 7.856 | 8.000 | 7.933 | 8.000 | 7.945 | 8.000 |
| O | 18.000 | * | 18.000 | * | 18.000 | * | 18.000 | * | 18.000 | * | 18.000 | * | 18.000 | * | 18.000 | * |
| | F/M | 1.585 | | 1.317 | | 1.498 | | 1.700 | | 1.450 | | 1.352 | | 1.269 | | 1.787 |
| | F/FM | 0.613 | | 0.568 | | 0.600 | | 0.630 | | 0.592 | | 0.575 | | 0.559 | | 0.641 |

17 K3 224 FINE-GRAINED BIOTITE GRANITOID
18 K3 224 FINE-GRAINED BIOTITE GRANITOID
19 K3 1135 COARSE-GRAINED AMPH+BIOT GRANITO
20 K3 1160.2 COARSE-GRAINED AMPH+BIOT GRANI
21 K3 1303.8 COARSE-GRAINED AMPH+BIOT GRANI
22 K3 1303.8 COARSE-GRAINED AMPH+BIOT GRANI
23 S6 87 COARSE-GRAINED AMPH+BIOT GRANITOID
24 S6 100 FINE-GRAINED BIOTITE GRANITOID

SUPER RECAL

TABLE 7. CHLORITE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 25 | 26 | 27 | 28 | 29 | 30 |
|---|---|---|---|---|---|---|
| SIO2 | 26.67 | 26.15 | 25.65 | 25.17 | 25.21 | 25.89 |
| TIO2 | 0.16 | 0.18 | 0.08 | 0.19 | 0.10 | 0.12 |
| A2O3 | 18.37 | 19.71 | 18.62 | 19.09 | 19.58 | 18.85 |
| FEO | 28.91 | 29.15 | 31.27 | 31.08 | 31.44 | 30.28 |
| MNO | 0.58 | 1.04 | 0.63 | 0.90 | 0.88 | 1.02 |
| MGO | 13.71 | 12.03 | 11.10 | 11.24 | 10.95 | 12.29 |
| CAO | 0.04 | 0.08 | 0.03 | 0.05 | 0.08 | 0.06 |
| BAO | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| NA2O | 0.01 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| K2O | 0.02 | 0.12 | 0.02 | 0.02 | 0.03 | 0.02 |
| F | 0.12 | 0.19 | 0.08 | 0.13 | 0.08 | 0.20 |
| CL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| H2O | 11.18 | 11.10 | 10.88 | 10.89 | 10.97 | 11.02 |
| SUM | 99.77 | 99.75 | 98.36 | 98.76 | 99.32 | 99.75 |
| -O= F+CL | 0.05 | 0.08 | 0.03 | 0.05 | 0.03 | 0.08 |
| SUM | 99.71 | 99.67 | 98.33 | 98.71 | 99.29 | 99.67 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 2.841 | * | 2.793 | * | 2.811 | * | 2.750 | * | 2.741 | * | 2.784 | * |
| AL | 1.159 | 4.000 | 1.207 | 4.000 | 1.189 | 4.000 | 1.250 | 4.000 | 1.259 | 4.000 | 1.216 | 4.000 |
| AL | 1.147 | * | 1.274 | * | 1.216 | * | 1.207 | * | 1.249 | * | 1.173 | * |
| TI | 0.013 | * | 0.014 | * | 0.007 | * | 0.016 | * | 0.008 | * | 0.010 | * |
| FE | 2.576 | * | 2.604 | * | 2.866 | * | 2.839 | * | 2.858 | * | 2.723 | * |
| MN | 0.052 | * | 0.094 | * | 0.058 | * | 0.083 | * | 0.081 | * | 0.093 | * |
| MG | 2.177 | * | 1.915 | * | 1.813 | * | 1.830 | * | 1.774 | * | 1.970 | * |
| CA | 0.005 | * | 0.009 | * | 0.004 | * | 0.006 | * | 0.009 | * | 0.007 | * |
| NA | 0.002 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * |
| K | 0.003 | * | 0.016 | * | 0.003 | * | 0.003 | * | 0.004 | * | 0.003 | * |
| BA | 0.0 | 5.974 | 0.0 | 5.927 | 0.0 | 5.966 | 0.0 | 5.984 | 0.0 | 5.984 | 0.0 | 5.978 |
| CL | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * | 0.0 | * |
| F | 0.040 | * | 0.064 | * | 0.028 | * | 0.045 | * | 0.028 | * | 0.068 | * |
| H | 7.960 | 8.000 | 7.936 | 8.000 | 7.972 | 8.000 | 7.955 | 8.000 | 7.972 | 8.000 | 7.932 | 8.000 |
| O | 18.000 | * | 18.000 | * | 18.000 | * | 18.000 | * | 18.000 | * | 18.000 | * |
| | F/M | 1.207 | | 1.409 | | 1.613 | | 1.597 | | 1.657 | | 1.430 |
| | F/FM | 0.547 | | 0.585 | | 0.617 | | 0.615 | | 0.624 | | 0.588 |

25 S6 101 FINE-GRAINED BIOTITE GRANITOID
26 S6 132 COARSE-GRAINED AMPH+BIOT GRANITOI
27 S6 137 FINE-GRAINED BIOTITE GRANITOID
28 F6 24 COARSE-GRAINED AMPH+BIOT GRANITOID
29 F6 25 COARSE-GRAINED AMPH+BIOT GRANITOID
30 LH 7 COARSE-GRAINED AMPH+BIOT GRANITOID

SUPER RECAL

TABLE 8. EPIDOTE ANALYSES FOR THE LIBERTY HILL PLUTON, S.C.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| SIO2 | 36.65 | 37.51 | 36.94 | 37.33 | 37.03 | 36.46 | 37.47 |
| TIO2 | 0.84 | 0.19 | 0.56 | 0.12 | 0.30 | 0.0 | 0.16 |
| A203 | 21.46 | 25.16 | 23.35 | 22.04 | 22.82 | 21.81 | 22.42 |
| F203 | 17.53 | 13.25 | 16.58 | 13.89 | 13.04 | 17.90 | 12.98 |
| MNO | 0.20 | 0.18 | 0.18 | 0.25 | 0.37 | 0.10 | 0.49 |
| MGO | 0.11 | 0.02 | 0.24 | 0.19 | 0.20 | 0.0 | 0.21 |
| CAO | 21.96 | 23.48 | 21.16 | 21.98 | 21.86 | 22.50 | 21.55 |
| BAO | 0.11 | 0.0 | 0.0 | 0.21 | 0.20 | 0.0 | 0.21 |
| NA2O | 0.01 | 0.0 | 0.02 | 0.09 | 0.09 | 0.0 | 0.09 |
| K2O | 0.02 | 0.01 | 0.02 | 0.08 | 0.08 | 0.0 | 0.09 |
| F | 0.0 | 0.0 | 0.0 | 0.11 | 0.11 | 0.0 | 0.08 |
| CL | 0.0 | 0.0 | 0.0 | 0.03 | 0.04 | 0.0 | 0.03 |
| H2O | 1.87 | 1.92 | 1.89 | 1.78 | 1.78 | 1.87 | 1.79 |
| SUM | 100.76 | 101.72 | 100.94 | 98.10 | 97.92 | 100.64 | 97.57 |
| -O= F+CL | 0.0 | 0.0 | 0.0 | 0.05 | 0.06 | 0.0 | 0.04 |
| SUM | 100.76 | 101.72 | 100.94 | 98.05 | 97.87 | 100.64 | 97.53 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SI | 2.933 | * | 2.929 | * | 2.924 | * | 3.031 | * | 3.005 | * | 2.924 | * | 3.048 | * |
| AL | 0.067 | 3.000 | 0.071 | 3.000 | 0.076 | 3.000 | 0.0 | 3.031 | 0.0 | 3.005 | 0.076 | 3.000 | 0.0 | 3.048 |
| AL | 1.956 | * | 2.244 | * | 2.101 | * | 2.109 | * | 2.182 | * | 1.985 | * | 2.149 | * |
| TI | 0.051 | * | 0.011 | * | 0.033 | * | 0.007 | * | 0.018 | * | 0.0 | * | 0.010 | * |
| MG | 0.013 | * | 0.002 | * | 0.028 | * | 0.023 | * | 0.024 | * | 0.0 | * | 0.025 | * |
| FE3+ | 1.055 | * | 0.778 | * | 0.987 | * | 0.849 | * | 0.796 | * | 1.080 | * | 0.795 | * |
| MN | 0.014 | 3.089 | 0.012 | 3.047 | 0.012 | 3.162 | 0.017 | 3.005 | 0.025 | 3.046 | 0.007 | 3.072 | 0.034 | 3.013 |
| CA | 1.883 | * | 1.964 | * | 1.794 | * | 1.912 | * | 1.901 | * | 1.933 | * | 1.878 | * |
| K | 0.002 | * | 0.001 | * | 0.002 | * | 0.008 | * | 0.008 | * | 0.0 | * | 0.009 | * |
| NA | 0.002 | * | 0.0 | * | 0.003 | * | 0.014 | * | 0.014 | * | 0.0 | * | 0.014 | * |
| BA | 0.003 | 1.890 | 0.0 | 1.965 | 0.0 | 1.799 | 0.007 | 1.941 | 0.006 | 1.929 | 0.0 | 1.933 | 0.007 | 1.908 |
| CL | 0.0 | * | 0.0 | * | 0.0 | * | 0.004 | * | 0.006 | * | 0.0 | * | 0.004 | * |
| F | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.028 | 0.0 | 0.028 | 0.0 | 0.0 | 0.0 | 0.021 | 0.0 |
| H | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 0.968 | 1.000 | 0.966 | 1.000 | 1.000 | 1.000 | 0.975 | 1.000 |
| O | 13.000 | * | 13.000 | * | 13.000 | * | 13.000 | * | 13.000 | * | 13.000 | * | 13.000 | * |
| PS | | 34.13 | | 25.07 | | 31.08 | | 28.53 | | 26.51 | | 34.31 | | 26.69 |
| CZ | | 65.43 | | 74.55 | | 68.54 | | 70.89 | | 72.64 | | 65.47 | | 72.18 |
| PD | | 0.44 | | 0.38 | | 0.38 | | 0.58 | | 0.85 | | 0.22 | | 1.13 |

1 S6 74 XENOCRYSTAL GRANITOID (AV.2)
2 S6 100 XENOCRYSTAL GRANITOID (AV. 2)
3 S6 111 FINE-GRAINED BIOTITE GRANITOID (A
4 K3 289 MAFIC ENCLAVE
5 K3 333.9 COARSE-GRAINED AMPH+BIOT GRANIT
6 K3 1160.2 COARSE-GRAINED AMPH+BIOT GRANI
7 K3 1303.8 COARSE-GRAINED GRANITOID