

Table No.

Complete Analyses of Lead and Zinc Concentrates  
from Cycles D to F of test No. 93.

000554

| Element %, g/t                            | Lead Cleaner Concentrate | Zinc Cleaner Concentrate |
|-------------------------------------------|--------------------------|--------------------------|
| Iron (Fe)                                 | 4.12                     | 8.80                     |
| Copper (Cu)                               | 0.47                     | 0.40                     |
| Nickel (Ni)                               | <0.002                   | <0.002                   |
| Lead (Pb)                                 | 66.4                     | 0.71 ✓                   |
| Zinc (Zn)                                 | 7.53                     | 56.5                     |
| Bismuth (Bi)                              | <0.0001                  | <0.0001                  |
| Cadmium (Cd)                              | 0.013                    | 0.072                    |
| Cobalt (Co)                               | 0.003                    | <0.002                   |
| Gallium (Ga)                              | 0.0004                   | 0.0009                   |
| Germanium (Ge)                            | <0.001                   | <0.001                   |
| Manganese (Mn)                            | 0.010                    | 0.035                    |
| Mercury (Hg)                              | 0.0067                   | 0.034                    |
| Molybdenum (Mo)                           | 0.002                    | <0.002                   |
| Thorium (Th)                              | <0.001                   | 0.003                    |
| Titanium (TiO <sub>2</sub> )              | <0.05                    | <0.05                    |
| Uranium (U)                               | 0.001                    | <0.001                   |
| Arsenic (As)                              | 0.39                     | 0.097                    |
| Antimony (Sb)                             | 0.17                     | 0.005                    |
| Tin (Sn)                                  | 0.003                    | <0.001                   |
| Selenium (Se)                             | 0.0013                   | <0.0003                  |
| Tellurium (Te)                            | <0.0003                  | <0.0003                  |
| Fluorine (F)                              | 0.03                     | 0.02                     |
| Chlorine (Cl)                             | 0.011                    | 0.003                    |
| Sulphur (S)                               | 17.3                     | 29.6                     |
| Phosphorous (P)                           | 0.008                    | 0.011                    |
| Carbon (C <sub>T</sub> )                  | 0.49                     | 0.19                     |
| Silica (SiO <sub>2</sub> )                | 0.62                     | 1.01                     |
| Alumina (Al <sub>2</sub> O <sub>3</sub> ) | 0.12                     | 0.16                     |
| Calcium (CaO)                             | <0.05                    | 0.17                     |
| Magnesia (MgO)                            | 0.052                    | 0.055                    |
| Sodium (Na <sub>2</sub> O)                | <0.002                   | <0.002                   |
| Potassium (K <sub>2</sub> O)              | 0.019                    | 0.019                    |
| Insol.                                    | 8.53                     | 1.13                     |
| Loss On Ignition (1000°C)                 | 72.8                     | 83.6                     |
| Gold (Au)                                 | <del>45.2</del>          | 0.40                     |
| Silver Ag                                 | 893.                     | 6.58                     |
| Total                                     | 106.3                    | 99.03                    |

Table No.            Effect of Various Depressants on Lead Flotation  
from Composite G-1.

| Test No. | Depressant Added |         | Product | Weight %               | Assay % |      | % Dist. |       |       |
|----------|------------------|---------|---------|------------------------|---------|------|---------|-------|-------|
|          | Name             | Rough # |         |                        | Cher. # | Pb   | Zn      | Pb    | Zn    |
| 95       | NaCN             | 150     | 95      | Pb 4th Cl. Conc.       | 4.07    | 56.0 | 7.71    | 85.2  | 6.3   |
|          |                  |         |         | Pb 1st Cl + Sev. Conc. | 9.20    | 26.1 | 8.80    | 89.9  | 16.2  |
|          |                  |         |         | Pb Comb. Tail.         | 90.80   | 0.30 | 4.60    | 10.1  | 83.8  |
|          |                  |         |         | Head (Calc.)           | 100.00  | 2.67 | 4.99    | 100.0 | 100.0 |
| 98       | PKD Complex      | 150     | 145     | Pb 4th Cl. Conc.       | 3.22    | 65.6 | 5.73    | 78.6  | 3.7   |
|          |                  |         |         | Pb 1st Cl + Sev. Conc. | 9.27    | 26.2 | 8.71    | 90.2  | 16.1  |
|          |                  |         |         | Pb Comb. Tail.         | 90.73   | 0.29 | 4.64    | 9.8   | 83.9  |
|          |                  |         |         | Head (Calc.)           | 100.00  | 2.69 | 5.02    | 100.0 | 100.0 |
|          |                  |         |         |                        |         |      |         |       |       |
| 99       | Thiourea Complex | 150     | 190     | Pb 4th Cl. Conc.       | 4.24    | 55.9 | 7.27    | 87.0  | 6.2   |
|          |                  |         |         | Pb 1st Cl + Sev. Conc. | 9.80    | 25.3 | 8.17    | 91.1  | 16.1  |
|          |                  |         |         | Pb Comb. Tail.         | 90.20   | 0.27 | 4.63    | 8.9   | 83.9  |
|          |                  |         |         | Head (Calc.)           | 100.00  | 2.73 | 4.98    | 100.0 | 100.0 |

Table No. Effect of Primary Grind Fineness on Lead and Zinc  
Rougher Flotation from Composite G-1.

| Test No. | Grind       |                         | Product          | Weight % | Assay % |      | % Dist. |       |
|----------|-------------|-------------------------|------------------|----------|---------|------|---------|-------|
|          | Time (mins) | K <sub>80</sub> $\mu$ m |                  |          | Pb      | Zn   | Pb      | Zn    |
| 79       | 30          | 60                      | Pb Ro. Cone. 1   | 10.61    | 22.5    | 9.78 | 84.4    | 20.5  |
|          |             |                         | Pb Ro. Cones 1-4 | 26.21    | 10.1    | 8.18 | 93.2    | 42.4  |
|          |             |                         | Zn Ro. Cone. 1   | 10.79    | 0.41    | 23.5 | 1.6     | 50.3  |
|          |             |                         | Zn Ro. Cones 1-3 | 17.04    | 0.42    | 15.4 | 2.6     | 52.2  |
|          |             |                         | Zn Rougher Tail  | 56.75    | 0.21    | 0.48 | 4.2     | 5.4   |
|          |             |                         | Head (Calc.)     | 100.00   | 2.83    | 5.05 | 100.0   | 100.0 |
| 80       | 40          | 47                      | Pb Ro. Cone. 1   | 10.95    | 22.3    | 9.29 | 85.9    | 19.9  |
|          |             |                         | Pb Ro. Cones 1-4 | 27.37    | 9.73    | 7.56 | 93.7    | 40.5  |
|          |             |                         | Zn Ro. Cone. 1   | 10.68    | 0.38    | 25.0 | 1.4     | 52.3  |
|          |             |                         | Zn Ro. Cones 1-3 | 18.11    | 0.37    | 15.4 | 2.3     | 54.4  |
|          |             |                         | Zn Rougher Tail  | 54.52    | 0.21    | 0.48 | 4.0     | 5.1   |
|          |             |                         | Head (Calc.)     | 100.00   | 2.84    | 5.11 | 100.0   | 100.0 |
| 81       | 50          | 39                      | Pb Ro. Cone. 1   | 10.82    | 23.2    | 9.03 | 87.5    | 19.2  |
|          |             |                         | Pb Ro. Cones 1-4 | 28.53    | 9.53    | 7.28 | 94.8    | 40.9  |
|          |             |                         | Zn Ro. Cone. 1   | 8.29     | 0.31    | 31.6 | 0.9     | 51.5  |
|          |             |                         | Zn Ro. Cones 1-3 | 14.72    | 0.32    | 18.6 | 1.6     | 53.9  |
|          |             |                         | Zn Rougher Tail  | 56.75    | 0.18    | 0.47 | 3.6     | 5.2   |
|          |             |                         | Head (Calc.)     | 100.00   | 2.87    | 5.08 | 100.0   | 100.0 |
| 82       | 60          | 34                      | Pb Ro. Cone. 1   | 10.35    | 22.8    | 8.58 | 86.4    | 17.6  |
|          |             |                         | Pb Ro. Cones 1-4 | 30.20    | 8.56    | 6.89 | 94.7    | 41.1  |
|          |             |                         | Zn Ro. Cone. 1   | 7.96     | 0.25    | 32.5 | 0.7     | 51.3  |
|          |             |                         | Zn Ro. Cones 1-3 | 15.25    | 0.28    | 17.8 | 1.5     | 53.9  |
|          |             |                         | Zn Rougher Tail  | 54.55    | 0.19    | 0.46 | 3.8     | 5.0   |
|          |             |                         | Head (Calc.)     | 100.00   | 2.73    | 5.05 | 100.0   | 100.0 |

Table No. Effect of Lead Concentrate Regrind on Lead Cleaning from Composite G-1.

| Test No. | Regrind     |                   | Product                | Weight % | Assay % |      | % Dist. |       |
|----------|-------------|-------------------|------------------------|----------|---------|------|---------|-------|
|          | Time (mins) | % Pass 20 $\mu$ m |                        |          | Pb      | Zn   | Pb      | Zn    |
| 78       | 30          | —                 | Pb 4th Cl. Cone.       | 3.74     | 57.1    | 6.55 | 78.7    | 4.9   |
|          |             |                   | Pb Rougher Cone.       | 20.00    | 12.2    | 7.97 | 90.0    | 32.0  |
|          |             |                   | Pb 1st Cl. Scav. Tail. | 11.52    | 0.46    | 7.44 | 2.0     | 17.2  |
|          |             |                   | Pb Rougher Tail.       | 80.00    | 0.34    | 4.23 | 10.0    | 68.0  |
|          |             |                   | Head (Calc.)           | 100.00   | 2.71    | 4.98 | 100.0   | 100.0 |
| 84A      | 40          | 90.5              | Pb 4th Cl. Cone.       | 3.59     | 59.9    | 5.46 | 79.1    | 3.9   |
|          |             |                   | Pb Rougher Cone.       | 22.12    | 11.2    | 7.30 | 91.4    | 32.3  |
|          |             |                   | Pb 1st Cl. Scav. Tail. | 12.57    | 0.46    | 6.99 | 2.1     | 17.6  |
|          |             |                   | Pb Rougher Tail.       | 77.88    | 0.30    | 4.34 | 8.6     | 67.7  |
|          |             |                   | Head (Calc.)           | 100.00   | 2.72    | 5.00 | 100.0   | 100.0 |
| 85       | 50          | 94                | Pb 4th Cl. Cone.       | 3.77     | 55.5    | 5.76 | 78.8    | 4.4   |
|          |             |                   | Pb Rougher Cone.       | 24.62    | 9.99    | 7.01 | 92.7    | 35.2  |
|          |             |                   | Pb 1st Cl. Scav. Tail. | 12.97    | 0.42    | 6.62 | 2.1     | 17.5  |
|          |             |                   | Pb Rougher Tail.       | 75.38    | 0.26    | 4.21 | 7.3     | 64.8  |
|          |             |                   | Head (Calc.)           | 100.00   | 2.66    | 4.90 | 100.0   | 100.0 |
| 86       | 60          | 96                | Pb 4th Cl. Cone.       | 3.46     | 59.7    | 4.85 | 76.2    | 3.4   |
|          |             |                   | Pb Rougher Cone.       | 25.01    | 9.95    | 6.88 | 91.7    | 34.9  |
|          |             |                   | Pb 1st Cl. Scav. Tail. | 14.34    | 0.40    | 6.59 | 2.1     | 19.2  |
|          |             |                   | Pb Rougher Tail.       | 74.99    | 0.30    | 4.28 | 8.3     | 65.1  |
|          |             |                   | Head (Calc.)           | 100.00   | 2.71    | 4.93 | 100.0   | 100.0 |

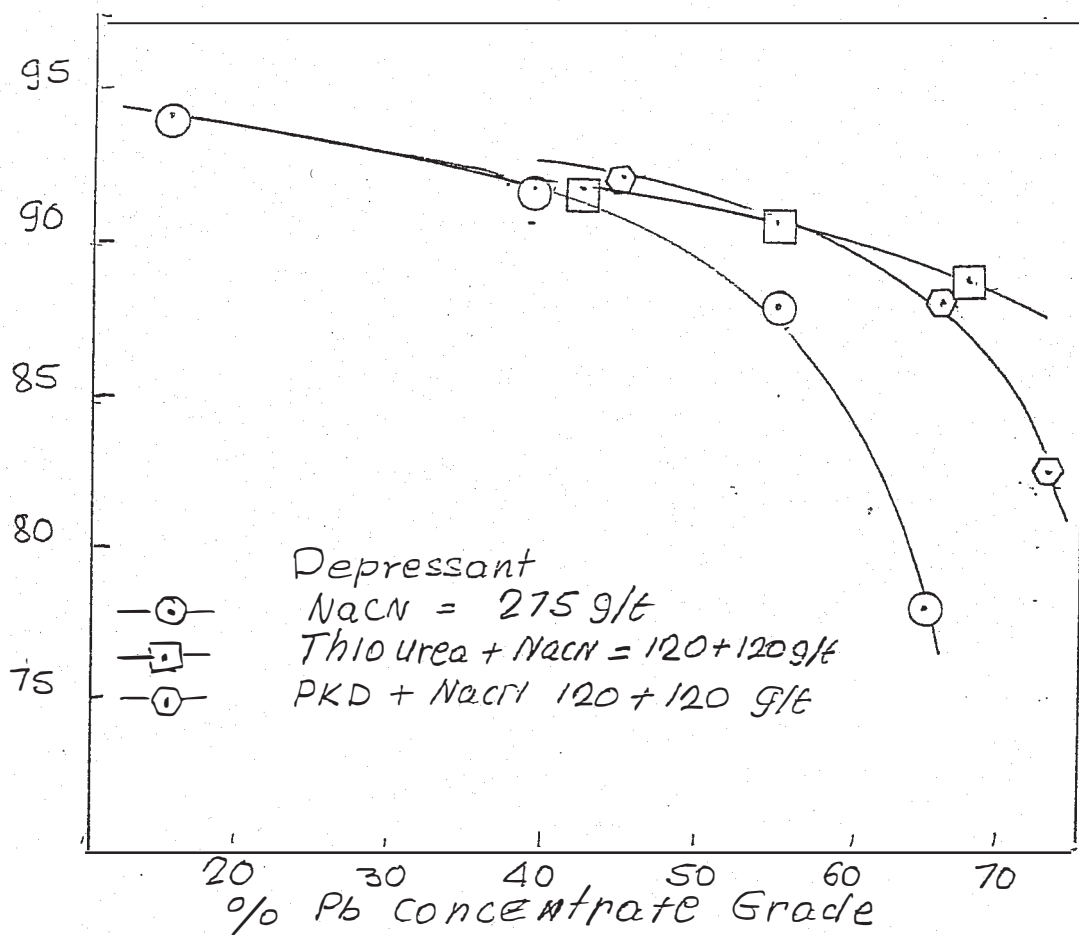
Table No. Effect of Varying the Amounts of  $\text{Na}_2\text{SiO}_3$  and Thiourea Complex in the Pb Cl. and Zn from Composite G-1.

| Test No. | Dep. Added g/t            |                  | Product                | Weight % | Assay % |      | % Dist. |       |
|----------|---------------------------|------------------|------------------------|----------|---------|------|---------|-------|
|          | $\text{Na}_2\text{SiO}_3$ | Thiourea Complex |                        |          | Pb      | Zn   | Pb      | Zn    |
| 84A      | 250                       | 95               | Pb 4th Cl. Conc.       | 3.59     | 59.9    | 5.46 | 79.1    | 3.9   |
|          |                           |                  | Pb Rougher Conc.       | 22.12    | 11.2    | 7.30 | 91.4    | 32.3  |
|          |                           |                  | Pb 1st Cl. Scav. Tail. | 12.57    | 0.46    | 6.99 | 2.1     | 17.6  |
|          |                           |                  | Pb Rougher Tail.       | 77.88    | 0.30    | 4.34 | 8.6     | 67.7  |
|          |                           |                  | Head (Calc.)           | 100.00   | 2.72    | 5.00 | 100.0   | 100.0 |
| 89       | 500                       | 95               | Pb 4th Cl. Conc.       | 2.51     | 50.1    | 4.76 | 47.9    | 2.4   |
|          |                           |                  | Pb Rougher Conc.       | 22.52    | 10.8    | 7.46 | 92.3    | 34.4  |
|          |                           |                  | Pb 1st Cl. Scav. Tail. | 11.83    | 0.64    | 6.97 | 2.9     | 16.9  |
|          |                           |                  | Pb Rougher Tail.       | 77.48    | 0.26    | 4.14 | 7.7     | 65.6  |
|          |                           |                  | Head (Calc.)           | 100.00   | 2.63    | 4.89 | 100.0   | 100.0 |
| 90       | 250                       | 190              | Pb 4th Cl. Conc.       | 3.59     | 61.1    | 6.01 | 79.0    | 4.3   |
|          |                           |                  | Pb Rougher Conc.       | 22.62    | 11.1    | 7.40 | 90.3    | 33.2  |
|          |                           |                  | Pb 1st Cl. Scav. Tail. | 12.45    | 0.46    | 6.98 | 2.1     | 17.2  |
|          |                           |                  | Pb Rougher Tail.       | 77.38    | 0.35    | 4.35 | 9.7     | 66.8  |
|          |                           |                  | Head (Calc.)           | 100.00   | 2.78    | 5.04 | 100.0   | 100.0 |
| 92       | 0                         | 190              | Pb 4th Cl. Conc.       | 3.76     | 59.5    | 6.06 | 81.0    | 4.6   |
|          |                           |                  | Pb Rougher Conc.       | 25.47    | 10.0    | 7.09 | 92.4    | 36.2  |
|          |                           |                  | Pb 1st Cl. Scav. Tail. | 13.16    | 0.64    | 6.61 | 3.0     | 17.5  |
|          |                           |                  | Pb Rougher Tail.       | 74.53    | 0.28    | 4.27 | 7.6     | 63.8  |
|          |                           |                  | Head (Calc.)           | 100.00   | 2.76    | 4.99 | 100.0   | 100.0 |

Table No. Effect of Various Depressants on Lead Flotation  
from Composite G-2.

| Test No. | Depressant Added |            | Product | Weight %                  | Assay %    |      | % Dist. |       |       |
|----------|------------------|------------|---------|---------------------------|------------|------|---------|-------|-------|
|          | Name             | Rough. g/t |         |                           | Clean. g/t | Pb   | Zn      | Pb    | Zn    |
| 75       | NaCN             | 150        | 125     | Pb 4th Cl. Cone.          | 4.16       | 65.4 | 7.68    | 78.1  | 5.1   |
|          |                  |            |         | Pb 1st Cl. + Scav. Cones. | 9.75       | 32.9 | 12.4    | 92.2  | 19.3  |
|          |                  |            |         | Pb Comb. Tails            | 90.25      | 0.30 | 5.59    | 7.8   | 80.7  |
|          |                  |            |         | Head (Calc.)              | 100.00     | 3.49 | 6.26    | 100.0 | 100.0 |
| 91       | Thiourea Complex | 150        | 95      | Pb 4th Cl. Cone.          | 4.89       | 66.9 | 7.35    | 89.2  | 5.8   |
|          |                  |            |         | Pb 1st Cl. + Scav. Cones. | 8.75       | 39.0 | 11.7    | 92.9  | 16.5  |
|          |                  |            |         | Pb Comb. Tails.           | 91.25      | 0.28 | 5.66    | 7.1   | 83.5  |
|          |                  |            |         | Head (Calc.)              | 100.00     | 3.67 | 6.20    | 100.0 | 100.0 |
| 100      | PKD Complex      | 180        | 145     | Pb 4th Cl. Cone.          | 4.15       | 72.8 | 6.10    | 83.6  | 4.1   |
|          |                  |            |         | Pb 1st Cl. + Scav. Cones. | 7.78       | 42.6 | 13.3    | 91.7  | 16.8  |
|          |                  |            |         | Pb Comb. Tails.           | 92.22      | 0.32 | 5.58    | 8.3   | 83.2  |
|          |                  |            |         | Head (Calc.)              | 100.00     | 3.61 | 6.18    | 100.0 | 100.0 |

FIGURE No: EFFECT OF THIUREA AND PKD COMPLEX ON LEAD FLOTATION G2 ORE



Composite G-3Head Assay

|                    |          |
|--------------------|----------|
| Copper (Cu)        | 0.16%    |
| Lead (Pb)          | 4.1%     |
| Zinc (Zn)          | 7.54%    |
| Total Fe (FeT)     | 26.4%    |
| Total Sulphur (ST) | 31.7%    |
| Total Carbon (CT)  | 0.73%    |
| Oxide Lead (PbO)   | 0.29%    |
| Oxide Zinc (ZnO)   | 0.50%    |
| Arsenic (As)       | 0.32%    |
| Gold (Au)          | 1.83 g/t |
| Silver (Ag)        | 75.3 g/t |

Table No.

Effect of Primary Grinding Size on the Flotation of Lead and Zinc from Composite G-3

| Test No. | Primary Grind |         | Product | Weight %             | Assay %            |      | % Dist. |       |       |
|----------|---------------|---------|---------|----------------------|--------------------|------|---------|-------|-------|
|          | Time (mins)   | % 200 M |         |                      | K <sub>80</sub> μm | Pb   | Zn      | Pb    | Zn    |
| 122      | 15            | 74.2    | 82      | Pb Ro. Cone. No. 1   | 26.78              | 13.3 | 19.3    | 87.1  | 69.3  |
|          |               |         |         | Pb Ro. Cones No. 1-3 | 39.95              | 9.54 | 16.2    | 93.2  | 86.8  |
|          |               |         |         | Zn Ro. Cone. No. 1   | 5.76               | 1.35 | 5.73    | 1.9   | 4.4   |
|          |               |         |         | Zn Ro. Cones No. 1-3 | 9.09               | 1.24 | 4.60    | 2.7   | 5.6   |
|          |               |         |         | Zn Rougher Tail      | 50.96              | 0.33 | 1.11    | 4.1   | 7.6   |
|          |               |         |         | Head (Calc.)         | 100.00             | 4.09 | 7.46    | 100.0 | 100.0 |
| 123      | 20            | 79.0    | 71      | Pb Ro. Cone. No. 1   | 21.32              | 16.5 | 19.2    | 86.3  | 55.8  |
|          |               |         |         | Pb Ro. Cones No. 1-3 | 33.75              | 11.2 | 18.2    | 92.6  | 83.8  |
|          |               |         |         | Zn Ro. Cone. No. 1   | 6.30               | 1.27 | 7.96    | 1.9   | 6.8   |
|          |               |         |         | Zn Ro. Cones No. 1-3 | 10.25              | 1.20 | 5.96    | 3.0   | 8.3   |
|          |               |         |         | Zn Rougher Tail      | 56.00              | 0.32 | 1.03    | 4.4   | 7.9   |
|          |               |         |         | Head (Calc.)         | 100.00             | 4.08 | 7.33    | 100.0 | 100.0 |
| 124      | 30            | 92.8    | 50      | Pb Ro. Cone. No. 1   | 20.25              | 17.7 | 17.9    | 87.8  | 50.1  |
|          |               |         |         | Pb Ro. Cones No. 1-3 | 34.55              | 11.1 | 17.3    | 93.9  | 82.5  |
|          |               |         |         | Zn Ro. Cone. No. 1   | 5.09               | 1.09 | 10.9    | 1.4   | 7.7   |
|          |               |         |         | Zn Ro. Cones No. 1-3 | 10.62              | 0.97 | 6.50    | 2.5   | 9.6   |
|          |               |         |         | Zn Rougher Tail      | 54.83              | 0.27 | 1.05    | 3.6   | 7.9   |
|          |               |         |         | Head (Calc.)         | 100.00             | 4.08 | 7.23    | 100.0 | 100.0 |
| 125      | 40            | 97.2    | 41      | Pb Ro. Cone. No. 1   | 15.55              | 22.9 | 13.9    | 87.0  | 29.9  |
|          |               |         |         | Pb Ro. Cones No. 1-3 | 26.70              | 14.3 | 16.1    | 92.9  | 59.6  |
|          |               |         |         | Zn Ro. Cone. No. 1   | 7.93               | 0.76 | 26.4    | 1.5   | 29.0  |
|          |               |         |         | Zn Ro. Cones No. 1-3 | 14.02              | 0.84 | 16.4    | 2.9   | 31.9  |
|          |               |         |         | Zn Rougher Tail      | 59.28              | 0.29 | 1.03    | 4.2   | 8.5   |
|          |               |         |         | Head (Calc.)         | 100.00             | 4.09 | 7.22    | 100.0 | 100.0 |
| 131      | 60            | 99.4    | 30      | Pb Ro. Cone. No. 1   | 12.65              | 27.0 | 11.2    | 82.0  | 19.1  |
|          |               |         |         | Pb Ro. Cones No. 1-3 | 24.12              | 15.5 | 10.0    | 89.8  | 32.6  |
|          |               |         |         | Zn Ro. Cone. No. 1   | 10.90              | 1.04 | 36.9    | 2.7   | 54.3  |
|          |               |         |         | Zn Ro. Cones No. 1-3 | 17.80              | 1.15 | 24.2    | 4.9   | 58.3  |
|          |               |         |         | Zn Rougher Tail      | 58.08              | 0.38 | 1.17    | 5.3   | 9.1   |
|          |               |         |         | Head (Calc.)         | 100.00             | 4.17 | 7.41    | 100.0 | 100.0 |

LAKEFIELD RESEARCH

Test No.: 122 Project No.: 3733 Date: 25 Oct. 89 Operator: CP

Purpose: The first in a series of grinding tests on Composite G-3. In this test, grind for 15 minutes.

Procedure: Grind and float three lead rougher concentrates, condition and float three zinc rougher concentrates.

Feed: 2000 grams minus 10 mesh Composite G-3.

Grind: 15 minutes at 65% solids in the lab. ball mill.

Conditions:

|                    | REAGENTS ADDED, GRAMS PER TONNE |             |               |      |                   |      |            | TIME, MINUTES |       |       |      |
|--------------------|---------------------------------|-------------|---------------|------|-------------------|------|------------|---------------|-------|-------|------|
|                    | Ca(OH) <sub>2</sub>             | PKD Complex | A317<br>7418A | MIBC | CuSO <sub>4</sub> | A343 | DF<br>1012 | GRIND         | COND. | FROTH | pH   |
| Primary Grind      | 250                             | 180         | 8             |      |                   |      |            | 15            |       |       |      |
| Pb Ro. Cone. No. 1 |                                 |             | 40            | 10   |                   |      |            |               | 1     | 5     | 10.5 |
| Pb Ro. Cone. No. 2 |                                 |             | 20            | 5    |                   |      |            |               | 1     | 3     |      |
| Pb Ro. Cone. No. 3 |                                 |             | 10            | 5    |                   |      |            |               | 1     | 3     |      |
| Condition          | 2000                            |             |               |      | 800               |      |            |               | 5     |       |      |
| Zn Ro. Cone. No. 1 |                                 |             |               |      |                   | 20   | 10         |               | 1     | 2     |      |
| Zn Ro. Cone. No. 2 |                                 |             |               |      |                   | 10   | 2.5        |               | 1     | 2     |      |
| Zn Ro. Cone. No. 3 |                                 |             |               |      |                   | 10   | 2.5        |               | 1     | 2     |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |

|                |  |  |  |  |
|----------------|--|--|--|--|
| Stage          |  |  |  |  |
| Flotation Cell |  |  |  |  |
| Speed: r.p.m.  |  |  |  |  |
| % Solids       |  |  |  |  |
| % - mesh       |  |  |  |  |

## LAKEFIELD RESEARCH

 Test No.: 122

Project No.: \_\_\_\_\_

Date: \_\_\_\_\_

### Metallurgical Results

|    | PRODUCT            | WEIGHT |        | ASSAYS, % |      |  |  | % DISTRIBUTION |       |  |  | METAL UNITS |        |  |  |
|----|--------------------|--------|--------|-----------|------|--|--|----------------|-------|--|--|-------------|--------|--|--|
|    |                    | g      | %      | Pb        | Zn   |  |  | Pb             | Zn    |  |  |             |        |  |  |
| 1  | Pb Ro. Cone. No. 1 | 532.2  | 26.78  | 13.3      | 19.3 |  |  | 87.1           | 69.3  |  |  | 356.17      | 516.85 |  |  |
| 2  | Pb Ro. Cone. No. 2 | 167.4  | 8.42   | 2.12      | 12.2 |  |  | 4.4            | 13.8  |  |  | 17.85       | 102.72 |  |  |
| 3  | Pb Ro. Cone. No. 3 | 94.3   | 4.75   | 1.48      | 5.86 |  |  | 1.7            | 3.7   |  |  | 7.03        | 27.84  |  |  |
| 4  | Zn Ro. Cone. No. 1 | 114.4  | 5.76   | 1.35      | 5.73 |  |  | 1.9            | 4.4   |  |  | 7.78        | 33.00  |  |  |
| 5  | Zn Ro. Cone. No. 2 | 45.6   | 2.29   | 1.10      | 2.82 |  |  | 0.6            | 0.9   |  |  | 2.52        | 6.46   |  |  |
| 6  | Zn Ro. Cone. No. 3 | 20.6   | 1.04   | 0.92      | 2.25 |  |  | 0.2            | 0.3   |  |  | 0.86        | 2.34   |  |  |
| 7  | Zn Rougher Tail.   | 1012.6 | 50.96  | 0.33      | 1.11 |  |  | 4.1            | 7.6   |  |  | 16.82       | 56.57  |  |  |
| 8  |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 9  |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 10 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 11 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 12 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
|    | Head (calc.)       | 1987.1 | 100.00 | 4.09      | 7.46 |  |  | 100.0          | 100.0 |  |  | 409.13      | 745.78 |  |  |

### Calculated Grades and Recoveries

|                  |       |      |      |  |  |      |      |  |  |        |        |  |  |
|------------------|-------|------|------|--|--|------|------|--|--|--------|--------|--|--|
| Pb Ro. Cones 1+2 | 35.20 | 10.6 | 17.6 |  |  | 91.5 | 83.1 |  |  | 374.02 | 619.57 |  |  |
| Pb Ro. Cones 1-3 | 39.95 | 9.54 | 16.2 |  |  | 93.2 | 86.8 |  |  | 381.05 | 647.41 |  |  |
| Zn Ro. Cones 1+2 | 8.05  | 1.28 | 4.90 |  |  | 2.5  | 5.3  |  |  | 10.30  | 39.46  |  |  |
| Zn Ro. Cones 1-3 | 9.09  | 1.24 | 4.60 |  |  | 2.7  | 5.6  |  |  | 11.26  | 41.80  |  |  |
| Zn Flot. Feed.   | 60.05 | 0.47 | 1.64 |  |  | 6.8  | 13.2 |  |  | 28.08  | 98.37  |  |  |
|                  |       |      |      |  |  |      |      |  |  |        |        |  |  |
|                  |       |      |      |  |  |      |      |  |  |        |        |  |  |
|                  |       |      |      |  |  |      |      |  |  |        |        |  |  |

Project No: 3733

M.B.

Product: Combined Product

Test No: 122 S.G.=4.20

| Mesh       | Weight<br>Grams | % Weight |       |         |
|------------|-----------------|----------|-------|---------|
|            |                 | Ind.     | Cum.  | Passing |
| 100m       | 0.74            | 1.5      | 1.5   | 98.5    |
| 150        | 2.99            | 6.0      | 7.5   | 92.5    |
| 200        | 9.17            | 18.3     | 25.8  | 74.2    |
| 270        | 8.46            | 16.9     | 42.7  | 57.3    |
| 29.5 $\mu$ | 8.78            | 17.6     | 60.3  | 39.7    |
| 22.9       | 4.29            | 8.6      | 68.9  | 31.1    |
| 16.0       | 4.16            | 8.3      | 77.2  | 22.8    |
| 11.0       | 3.35            | 6.7      | 83.9  | 16.1    |
| 8.5        | 1.15            | 2.3      | 86.2  | 13.8    |
| -8.5       | 6.91            | 13.8     | 100.0 | -       |
| Total      | 50.00           | 100.0    | -     | -       |

# LAKEFIELD RESEARCH

Test No.: 123 Project No.: 3733 Date: 26 Oct. 89 Operator: CP

Purpose: To repeat test No. 122, but increase grinding time to 20 minutes.

Procedure: As for test No. 122

Feed: 2000 grams minus 10 mesh Composite G-3.

Grind: 20 minutes at 65% solids in the lab. ball mill.

Conditions: \_\_\_\_\_

|                    | REAGENTS ADDED, GRAMS PER TONNE |             |               |      |                   |      |            | TIME, MINUTES |       |       | pH   |
|--------------------|---------------------------------|-------------|---------------|------|-------------------|------|------------|---------------|-------|-------|------|
|                    | Ca(OH) <sub>2</sub>             | PKD Complex | A317<br>3418A | MIBC | CuSO <sub>4</sub> | A343 | DF<br>1012 | GRIND         | COND. | FROTH |      |
| Primary Grind      | 750                             | 180         | 8             |      |                   |      |            | 20            |       |       |      |
| Pb Ro. Cone. No. 1 |                                 |             | 40            | 10   |                   |      |            |               | 1     | 5     | 10.2 |
| Pb Ro. Cone. No. 2 |                                 |             | 20            | 5    |                   |      |            |               | 1     | 3     |      |
| Pb Ro. Cone. No. 3 |                                 |             | 10            | 5    |                   |      |            |               | 1     | 3     |      |
| Condition          | 2000                            |             |               |      |                   |      |            |               | 5     |       |      |
|                    |                                 |             |               |      | 800               |      |            |               | 5     |       | 11.7 |
| Zn Ro. Cone. No. 1 |                                 |             |               |      |                   | 20   | 5          |               | 1     | 2     |      |
| Zn Ro. Cone. No. 2 |                                 |             |               |      |                   | 10   | 2.5        |               | 1     | 2     |      |
| Zn Ro. Cone. No. 3 |                                 |             |               |      |                   | 10   | 2.5        |               | 1     | 2     |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |

|                |  |  |  |  |
|----------------|--|--|--|--|
| Stage          |  |  |  |  |
| Flotation Cell |  |  |  |  |
| Speed: r.p.m.  |  |  |  |  |
| % Solids       |  |  |  |  |
| % — mesh       |  |  |  |  |

LAKEFIELD RESEARCH

Test No.: 123

Project No.: \_\_\_\_\_

Date: \_\_\_\_\_

Metallurgical Results

|    | PRODUCT            | WEIGHT |        | ASSAYS, % |      |  |  | % DISTRIBUTION |       |  |  | METAL UNITS |        |  |  |
|----|--------------------|--------|--------|-----------|------|--|--|----------------|-------|--|--|-------------|--------|--|--|
|    |                    | g      | %      | Pb        | Zn   |  |  | Pb             | Zn    |  |  |             |        |  |  |
| 1  | Pb Ro. Cone. No. 1 | 424.6  | 21.32  | 16.5      | 19.2 |  |  | 86.3           | 55.8  |  |  | 351.78      | 409.34 |  |  |
| 2  | Pb Ro. Cone. No. 2 | 152.8  | 7.67   | 2.32      | 21.0 |  |  | 4.4            | 22.0  |  |  | 17.79       | 161.07 |  |  |
| 3  | Pb Ro. Cone. No. 3 | 94.8   | 4.76   | 1.63      | 9.23 |  |  | 1.9            | 6.0   |  |  | 7.76        | 43.93  |  |  |
| 4  | Zn Ro. Cone. No. 1 | 125.4  | 6.30   | 1.27      | 7.96 |  |  | 1.9            | 6.8   |  |  | 8.00        | 50.15  |  |  |
| 5  | Zn Ro. Cone. No. 2 | 50.6   | 2.54   | 1.11      | 3.02 |  |  | 0.7            | 1.1   |  |  | 2.82        | 7.67   |  |  |
| 6  | Zn Ro. Cone. No. 3 | 28.1   | 1.41   | 1.04      | 2.30 |  |  | 0.4            | 0.4   |  |  | 1.47        | 3.24   |  |  |
| 7  | Zn Rougher Tail.   | 115.2  | 58.00  | 0.32      | 1.03 |  |  | 4.4            | 7.9   |  |  | 17.92       | 57.68  |  |  |
| 8  |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 9  |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 10 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 11 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 12 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
|    | Head (calc.)       | 1991.5 | 100.00 | 4.08      | 7.33 |  |  | 100.0          | 100.0 |  |  | 407.54      | 733.08 |  |  |

Calculated Grades and Recoveries

|                  |       |      |      |  |  |      |      |  |  |        |        |
|------------------|-------|------|------|--|--|------|------|--|--|--------|--------|
| Pb Ro. Cones 1+2 | 28.99 | 12.8 | 19.7 |  |  | 90.7 | 77.8 |  |  | 369.57 | 570.41 |
| Pb Ro. Cones 1-3 | 33.75 | 11.2 | 18.2 |  |  | 92.6 | 83.8 |  |  | 377.33 | 614.34 |
| Zn Ro. Cones 1+2 | 8.89  | 1.22 | 6.54 |  |  | 2.6  | 7.9  |  |  | 10.82  | 57.82  |
| Zn Ro. Cones 1-3 | 10.25 | 1.20 | 5.96 |  |  | 3.0  | 8.3  |  |  | 12.29  | 61.06  |
| Zn Flot. Feed.   | 66.25 | 0.46 | 1.79 |  |  | 7.4  | 16.2 |  |  | 30.21  | 118.74 |
|                  |       |      |      |  |  |      |      |  |  |        |        |
|                  |       |      |      |  |  |      |      |  |  |        |        |

Project No: 3733

Product: Combined Product

Test No: <sup>123</sup>~~123~~ S.G.-4.23

| Mesh       | Weight Grams | % Weight |       |         |
|------------|--------------|----------|-------|---------|
|            |              | Ind.     | Cum.  | Passing |
| 100m       | 0.35         | 0.7      | 0.7   | 99.3    |
| 150        | 1.55         | 3.1      | 3.8   | 96.2    |
| 200        | 8.62         | 17.2     | 21.0  | 79.0    |
| 270        | 5.52         | 11.0     | 32.1  | 67.9    |
| 29.1 $\mu$ | 10.41        | 20.8     | 52.9  | 47.1    |
| 22.6       | 5.15         | 10.3     | 63.2  | 36.8    |
| 15.8       | 5.10         | 10.2     | 73.4  | 26.6    |
| 10.8       | 4.07         | 8.1      | 81.5  | 18.5    |
| 8.4        | 1.21         | 2.4      | 84.0  | 16.0    |
| -8.4       | 8.02         | 16.0     | 100.0 | -       |
| Total      | 50.00        | 100.0    | -     | -       |

LAKEFIELD RESEARCH

Test No.: 124 Project No.: 3733 Date: 26 Oct. 89 Operator: CP  
 Purpose: To repeat tests No. 122 and 123, but increase grinding time to 30 minutes.

Procedure: As for test No. 122.

Feed: 2000 grams minus 10 mesh Composite G-3.

Grind: 30 minutes at 65% solids in the lab. ball mill.

Conditions:

|                    | REAGENTS ADDED, GRAMS PER TONNE |                |               |      |                   |      |            | TIME, MINUTES |       |       |      |
|--------------------|---------------------------------|----------------|---------------|------|-------------------|------|------------|---------------|-------|-------|------|
|                    | Ca(OH) <sub>2</sub>             | PKD<br>Complex | A317<br>3418A | MIBC | CeSO <sub>4</sub> | A343 | DF<br>1012 | GRIND         | COND. | FROTH | pH   |
| Primary Grind      | 750                             | 180            | 8             |      |                   |      |            | 30            |       |       |      |
| Pb Ro. Cone. No. 1 |                                 |                | 40            | 10   |                   |      |            |               | 1     | 5     | 10.0 |
| Pb Ro. Cone. No. 2 |                                 |                | 20            | 5    |                   |      |            |               | 1     | 3     |      |
| Pb Ro. Cone. No. 3 |                                 |                | 10            | 5    |                   |      |            |               | 1     | 3     |      |
| Condition          | 2000                            |                |               |      |                   |      |            |               | 5     |       |      |
|                    |                                 |                |               |      | 800               |      |            |               | 5     |       | 11.5 |
| Zn Ro. Cone. No. 1 |                                 |                |               |      |                   | 20   | 5          |               | 1     | 2     |      |
| Zn Ro. Cone. No. 2 |                                 |                |               |      |                   | 10   | 2.5        |               | 1     | 2     |      |
| Zn Ro. Cone. No. 3 |                                 |                |               |      |                   | 10   | 2.5        |               | 1     | 2     |      |
|                    |                                 |                |               |      |                   |      |            |               |       |       |      |
|                    |                                 |                |               |      |                   |      |            |               |       |       |      |
|                    |                                 |                |               |      |                   |      |            |               |       |       |      |
|                    |                                 |                |               |      |                   |      |            |               |       |       |      |
|                    |                                 |                |               |      |                   |      |            |               |       |       |      |
|                    |                                 |                |               |      |                   |      |            |               |       |       |      |

|                |  |  |  |  |
|----------------|--|--|--|--|
| Stage          |  |  |  |  |
| Flotation Cell |  |  |  |  |
| Speed: r.p.m.  |  |  |  |  |
| % Solids       |  |  |  |  |
| % - mesh       |  |  |  |  |

## LAKEFIELD RESEARCH

Test No.: 124

Project No.: \_\_\_\_\_

Date: \_\_\_\_\_

### Metallurgical Results

|    | PRODUCT            | WEIGHT |        | ASSAYS, % |      |  |  | % DISTRIBUTION |       |  |  | METAL UNITS |        |  |  |
|----|--------------------|--------|--------|-----------|------|--|--|----------------|-------|--|--|-------------|--------|--|--|
|    |                    | g      | %      | Pb        | Zn   |  |  | Pb             | Zn    |  |  |             |        |  |  |
| 1  | Pb Ro. Cone. No. 1 | 404.1  | 20.25  | 17.7      | 17.9 |  |  | 87.8           | 50.1  |  |  | 358.43      | 362.19 |  |  |
| 2  | Pb Ro. Cone. No. 2 | 166.6  | 8.35   | 2.05      | 21.2 |  |  | 4.2            | 24.5  |  |  | 17.12       | 177.02 |  |  |
| 3  | Pb Ro. Cone. No. 3 | 118.8  | 5.95   | 1.27      | 9.63 |  |  | 1.9            | 7.9   |  |  | 7.56        | 57.30  |  |  |
| 4  | Zn Ro. Cone. No. 1 | 101.5  | 5.09   | 1.09      | 10.9 |  |  | 1.4            | 7.7   |  |  | 5.55        | 55.48  |  |  |
| 5  | Zn Ro. Cone. No. 2 | 62.8   | 3.14   | 0.93      | 2.89 |  |  | 0.7            | 1.3   |  |  | 2.92        | 9.07   |  |  |
| 6  | Zn Ro. Cone. No. 3 | 47.7   | 2.39   | 0.77      | 1.87 |  |  | 0.4            | 0.6   |  |  | 1.84        | 4.47   |  |  |
| 7  | Zn Rougher Tail.   | 1094.5 | 54.83  | 0.27      | 1.05 |  |  | 3.6            | 7.9   |  |  | 14.80       | 57.57  |  |  |
| 8  |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 9  |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 10 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 11 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 12 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
|    | Head (calc.)       | 1996.0 | 100.00 | 4.08      | 7.23 |  |  | 100.0          | 100.0 |  |  | 408.22      | 723.39 |  |  |

### Calculated Grades and Recoveries

|                  |       |      |      |      |      |        |        |
|------------------|-------|------|------|------|------|--------|--------|
| Pb Ro. Cones 1+2 | 28.60 | 13.1 | 18.9 | 92.0 | 74.6 | 375.55 | 539.50 |
| Pb Ro. Cones 1-3 | 34.55 | 11.1 | 17.3 | 93.9 | 82.5 | 383.11 | 596.80 |
| Zn Ro. Cones 1+2 | 8.23  | 1.03 | 7.84 | 2.1  | 9.0  | 8.47   | 64.55  |
| Zn Ro. Cones 1-3 | 10.62 | 0.97 | 6.50 | 2.5  | 9.6  | 10.31  | 69.02  |
| Zn Flot. Feed.   | 65.45 | 0.38 | 1.93 | 6.1  | 17.5 | 25.11  | 126.59 |
|                  |       |      |      |      |      |        |        |
|                  |       |      |      |      |      |        |        |
|                  |       |      |      |      |      |        |        |

Project No: 3733

M.B.

Product: Combined Product

Test No: 124 S.G.=4.22

| Mesh       | Weight<br>Grams | % Weight |       |         |
|------------|-----------------|----------|-------|---------|
|            |                 | Ind.     | Cum.  | Passing |
| 100m       | 0.00            | 0.0      | 0.0   | 100.0   |
| 150        | 0.67            | 1.3      | 1.3   | 98.7    |
| 200        | 2.92            | 5.8      | 7.2   | 92.8    |
| 270        | 5.98            | 12.0     | 19.1  | 80.9    |
| 29.1 $\mu$ | 11.28           | 22.6     | 41.7  | 58.3    |
| 22.6       | 6.10            | 12.2     | 53.9  | 46.1    |
| 15.8       | 5.84            | 11.7     | 65.6  | 34.4    |
| 10.8       | 4.64            | 9.3      | 74.9  | 25.1    |
| 8.4        | 1.07            | 2.1      | 77.0  | 23.0    |
| -8.4       | 11.50           | 23.0     | 100.0 | -       |
| Total      | 50.00           | 100.0    | -     | -       |

LAKEFIELD RESEARCH

Test No.: 125 Project No.: 3733 Date: 26 Oct. 89 Operator: CP

Purpose: To repeat tests No. 122 to 124, but increase grinding time to 40 minutes.

Procedure: As for test No. 122

Feed: 2000 grams minus 10 mesh Composite G-3.

Grind: 40 minutes at 65% solids in the lab. ball mill.

Conditions:

|                    | REAGENTS ADDED, GRAMS PER TONNE |             |               |      |                   |      |            | TIME, MINUTES |       |       | pH   |
|--------------------|---------------------------------|-------------|---------------|------|-------------------|------|------------|---------------|-------|-------|------|
|                    | Ca(OH) <sub>2</sub>             | PKD Complex | A317<br>3418A | MIBC | CuSO <sub>4</sub> | A343 | DF<br>1012 | GRIND         | COND. | FROTH |      |
| Primary Grind      | 750                             | 180         | 8             |      |                   |      |            | 40            |       |       |      |
| Pb Ro. Cone. No. 1 |                                 |             | 40            | 10   |                   |      |            |               | 1     | 5     | 9.9  |
| Pb Ro. Cone. No. 2 |                                 |             | 20            | 5    |                   |      |            |               | 1     | 3     |      |
| Pb Ro. Cone. No. 3 |                                 |             | 10            | 5    |                   |      |            |               | 1     | 3     |      |
| Condition          | 2000                            |             |               |      |                   |      |            |               | 5     |       |      |
|                    |                                 |             |               |      | 800               |      |            |               | 5     |       | 11.5 |
| Zn Ro. Cone. No. 1 |                                 |             |               |      |                   | 20   | 5          |               | 1     | 2     |      |
| Zn Ro. Cone. No. 2 |                                 |             |               |      |                   | 10   | 2.5        |               | 1     | 2     |      |
| Zn Ro. Cone. No. 3 |                                 |             |               |      |                   | 10   | 2.5        |               | 1     | 2     |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |
|                    |                                 |             |               |      |                   |      |            |               |       |       |      |

|                |  |  |  |  |
|----------------|--|--|--|--|
| Stage          |  |  |  |  |
| Flotation Cell |  |  |  |  |
| Speed: r.p.m.  |  |  |  |  |
| % Solids       |  |  |  |  |
| % - mesh       |  |  |  |  |

LAKEFIELD RESEARCH

Test No.: 125

Project No.: \_\_\_\_\_

Date: \_\_\_\_\_

Metallurgical Results

|    | PRODUCT            | WEIGHT |        | ASSAYS, % |      |  |  | % DISTRIBUTION |       |  |  | METAL UNITS |        |  |  |
|----|--------------------|--------|--------|-----------|------|--|--|----------------|-------|--|--|-------------|--------|--|--|
|    |                    | g      | %      | Pb        | Zn   |  |  | Pb             | Zn    |  |  |             |        |  |  |
| 1  | Pb Ro. Cone. No. 1 | 310.5  | 15.55  | 22.9      | 13.9 |  |  | 87.0           | 29.9  |  |  | 356.10      | 216.15 |  |  |
| 2  | Pb Ro. Cone. No. 2 | 136.6  | 6.84   | 2.52      | 21.8 |  |  | 4.2            | 20.7  |  |  | 17.24       | 149.11 |  |  |
| 3  | Pb Ro. Cone. No. 3 | 86.1   | 4.31   | 1.66      | 15.1 |  |  | 1.7            | 9.0   |  |  | 7.15        | 65.08  |  |  |
| 4  | Zn Ro. Cone. No. 1 | 158.4  | 7.93   | 0.76      | 26.4 |  |  | 1.5            | 29.0  |  |  | 6.03        | 209.35 |  |  |
| 5  | Zn Ro. Cone. No. 2 | 61.8   | 3.09   | 1.00      | 4.52 |  |  | 0.8            | 1.9   |  |  | 3.09        | 13.97  |  |  |
| 6  | Zn Ro. Cone. No. 3 | 60.0   | 3.00   | 0.87      | 2.41 |  |  | 0.6            | 1.0   |  |  | 2.61        | 7.23   |  |  |
| 7  | Zn Rougher Tail.   | 1184.1 | 59.28  | 0.29      | 1.03 |  |  | 4.2            | 8.5   |  |  | 17.19       | 61.06  |  |  |
| 8  | V                  |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 9  |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 10 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 11 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 12 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
|    | Head (calc.)       | 1997.5 | 100.00 | 4.89      | 7.22 |  |  | 100.0          | 100.0 |  |  | 409.41      | 721.95 |  |  |

Calculated Grades and Recoveries

|                  |       |  |      |      |  |  |      |      |  |  |        |        |  |  |
|------------------|-------|--|------|------|--|--|------|------|--|--|--------|--------|--|--|
| Pb Ro. Cones 1+2 | 22.39 |  | 16.7 | 16.3 |  |  | 91.2 | 50.6 |  |  | 373.34 | 365.26 |  |  |
| Pb Ro. Cones 1-3 | 26.70 |  | 14.3 | 16.1 |  |  | 92.9 | 59.6 |  |  | 380.49 | 430.34 |  |  |
| Zn Ro. Cones 1+2 | 11.02 |  | 0.83 | 20.3 |  |  | 2.3  | 30.9 |  |  | 9.12   | 223.32 |  |  |
| Zn Ro. Cones 1-3 | 14.02 |  | 0.84 | 16.4 |  |  | 2.9  | 31.9 |  |  | 11.73  | 230.55 |  |  |
| Zn Flot. Feed.   | 73.30 |  | 0.39 | 3.98 |  |  | 7.1  | 40.4 |  |  | 28.92  | 291.61 |  |  |
|                  |       |  |      |      |  |  |      |      |  |  |        |        |  |  |
|                  |       |  |      |      |  |  |      |      |  |  |        |        |  |  |

Product: Combined Product

Test No: <sup>125</sup>~~125~~ S.G.=4.23

| Mesh       | Weight<br>Grams | % Weight |       |         |
|------------|-----------------|----------|-------|---------|
|            |                 | Ind.     | Cum.  | Passing |
| 100m       | 0.00            | 0.0      | 0.0   | 100.0   |
| 150        | 0.24            | 0.5      | 0.5   | 99.5    |
| 200        | 1.14            | 2.3      | 2.8   | 97.2    |
| 270        | 4.19            | 8.4      | 11.1  | 88.9    |
| 29.1 $\mu$ | 10.61           | 21.2     | 32.4  | 67.6    |
| 22.6       | 6.61            | 13.2     | 45.6  | 54.4    |
| 15.8       | 7.26            | 14.5     | 60.1  | 39.9    |
| 10.8       | 5.81            | 11.6     | 71.7  | 28.3    |
| 8.4        | 1.55            | 3.1      | 74.8  | 25.2    |
| -8.4       | 12.59           | 25.2     | 100.0 | -       |
| Total      | 50.00           | 100.0    | -     | -       |

LAKEFIELD RESEARCH

Test No.: 131 Project No.: 3733 Date: 14 Nov. 89 Operator: CP  
 Purpose: To continue the primary grinding series with a 60 minute grind.

Procedure: As for test No. 122.

Feed: 2000 grams minus 10 mesh Composite C-3.  
 Grind: 60 minutes at 65% solids in the lab. ball mill.  
 Conditions: \_\_\_\_\_

|                    | REAGENTS ADDED, GRAMS PER TONNE |             |           |      |                   |      |         | TIME, MINUTES |       |       |      |
|--------------------|---------------------------------|-------------|-----------|------|-------------------|------|---------|---------------|-------|-------|------|
|                    | Ca(OH) <sub>2</sub>             | PKD Complex | A312 3H8A | MIBC | CuSO <sub>4</sub> | A343 | DF 1012 | GRIND         | COND. | FROTH | pH   |
| Primary Grind      | 750                             | 180         | 8         |      |                   |      |         | 60            |       |       | 9.9  |
| Pb Ro. Cone. No. 1 | 200                             |             | 40        | 10   |                   |      |         |               | 1     | 5     | 9.9  |
| Pb Ro. Cone. No. 2 |                                 |             | 20        | 5    |                   |      |         |               | 1     | 3     |      |
| Pb Ro. Cone. No. 3 |                                 |             | 10        | 5    |                   |      |         |               | 1     | 3     |      |
| Condition          | 2000                            |             |           |      |                   |      |         |               | 5     |       |      |
|                    |                                 |             |           |      | 800               |      |         |               | 5     |       | 11.6 |
| Zn Ro. Cone. No. 1 |                                 |             |           |      |                   | 20   | 5       |               | 1     | 2     |      |
| Zn Ro. Cone. No. 2 |                                 |             |           |      |                   | 10   | 2.5     |               | 1     | 2     |      |
| Zn Ro. Cone. No. 3 |                                 |             |           |      |                   | 10   | 2.5     |               | 1     | 2     |      |
|                    |                                 |             |           |      |                   |      |         |               |       |       |      |
|                    |                                 |             |           |      |                   |      |         |               |       |       |      |
|                    |                                 |             |           |      |                   |      |         |               |       |       |      |
|                    |                                 |             |           |      |                   |      |         |               |       |       |      |
|                    |                                 |             |           |      |                   |      |         |               |       |       |      |
|                    |                                 |             |           |      |                   |      |         |               |       |       |      |

|                |  |  |  |  |
|----------------|--|--|--|--|
| Stage          |  |  |  |  |
| Flotation Cell |  |  |  |  |
| Speed: r.p.m.  |  |  |  |  |
| % Solids       |  |  |  |  |
| % - mesh       |  |  |  |  |

LAKEFIELD RESEARCH

Test No.: 131

Project No.: \_\_\_\_\_

Date: \_\_\_\_\_

Metallurgical Results

|    | PRODUCT            | WEIGHT |        | ASSAYS, % |      |  |  | % DISTRIBUTION |       |  |  | METAL UNITS |        |        |  |
|----|--------------------|--------|--------|-----------|------|--|--|----------------|-------|--|--|-------------|--------|--------|--|
|    |                    | g      | %      | Pb        | Zn   |  |  | Pb             | Zn    |  |  |             |        |        |  |
| 1  | Pb Ro. Cone. No. 1 | 252.3  | 12.65  | 27.0      | 11.2 |  |  | 82.0           | 19.1  |  |  |             | 341.55 | 141.68 |  |
| 2  | Pb Ro. Cone. No. 2 | 120.7  | 6.05   | 3.86      | 11.1 |  |  | 5.6            | 9.1   |  |  |             | 23.35  | 67.16  |  |
| 3  | Pb Ro. Cone. No. 3 | 108.1  | 5.42   | 1.68      | 6.07 |  |  | 2.2            | 4.4   |  |  |             | 9.11   | 32.90  |  |
| 4  | Zn Ro. Cone. No. 1 | 217.5  | 10.90  | 1.04      | 36.9 |  |  | 2.7            | 54.3  |  |  |             | 11.34  | 402.21 |  |
| 5  | Zn Ro. Cone. No. 2 | 72.9   | 3.65   | 1.43      | 5.44 |  |  | 1.3            | 2.7   |  |  |             | 5.22   | 19.86  |  |
| 6  | Zn Ro. Cone. No. 3 | 64.9   | 3.25   | 1.22      | 2.87 |  |  | 0.9            | 1.3   |  |  |             | 3.96   | 9.33   |  |
| 7  | Zn Rougher Tail.   | 1158.4 | 58.08  | 0.38      | 1.17 |  |  | 5.3            | 9.1   |  |  |             | 22.07  | 67.95  |  |
| 8  |                    |        |        |           |      |  |  |                |       |  |  |             |        |        |  |
| 9  |                    |        |        |           |      |  |  |                |       |  |  |             |        |        |  |
| 10 |                    |        |        |           |      |  |  |                |       |  |  |             |        |        |  |
| 11 |                    |        |        |           |      |  |  |                |       |  |  |             |        |        |  |
| 12 |                    |        |        |           |      |  |  |                |       |  |  |             |        |        |  |
|    | Head (calc.)       | 1994.8 | 100.00 | 4.17      | 7.41 |  |  | 100.0          | 100.0 |  |  |             | 416.60 | 741.09 |  |

Calculated Grades and Recoveries

|                  |       |  |      |      |  |  |      |      |  |  |  |        |        |  |
|------------------|-------|--|------|------|--|--|------|------|--|--|--|--------|--------|--|
| Pb Ro. Cones 1+2 | 18.70 |  | 19.5 | 11.2 |  |  | 87.6 | 28.2 |  |  |  | 364.90 | 208.84 |  |
| Pb Ro. Cones 1-3 | 24.12 |  | 15.5 | 10.0 |  |  | 89.8 | 32.6 |  |  |  | 374.01 | 241.74 |  |
| Zn Ro. Cones 1+2 | 14.55 |  | 1.14 | 29.0 |  |  | 4.0  | 57.0 |  |  |  | 16.56  | 422.07 |  |
| Zn Ro. Cones 1-3 | 17.80 |  | 1.15 | 24.7 |  |  | 4.9  | 58.3 |  |  |  | 20.52  | 431.40 |  |
| Zn Flot. Feed    | 75.88 |  | 0.56 | 6.58 |  |  | 10.2 | 67.4 |  |  |  | 42.59  | 499.35 |  |
|                  |       |  |      |      |  |  |      |      |  |  |  |        |        |  |
|                  |       |  |      |      |  |  |      |      |  |  |  |        |        |  |
|                  |       |  |      |      |  |  |      |      |  |  |  |        |        |  |

| Mesh       | Weight<br>Grams | % Weight |       |         |
|------------|-----------------|----------|-------|---------|
|            |                 | Ind.     | Cum.  | Passing |
| 150        | 0.00            | 0.0      | 0.0   | 100.0   |
| 200        | 0.31            | 0.6      | 0.6   | 99.4    |
| 270        | 1.45            | 2.9      | 3.5   | 96.5    |
| 30.5 $\mu$ | 7.78            | 15.6     | 19.1  | 80.9    |
| 23.6       | 6.58            | 13.2     | 32.2  | 67.8    |
| 16.5       | 8.42            | 16.8     | 49.1  | 50.9    |
| 11.3       | 7.58            | 15.2     | 64.2  | 35.8    |
| 8.8        | 2.09            | 4.2      | 68.4  | 31.6    |
| -8.8       | 15.79           | 31.6     | 100.0 | -       |
| Total      | 50.00           | 100.0    | -     | -       |

Table No.

# Effect of Various Modifiers and Depressants on Lead and Zinc Flotation from Composite G-3.

| Test No. | Modifier                        |      | Depressant     |     | Product              | Weight % | Assay % |      | % Dist. |       |
|----------|---------------------------------|------|----------------|-----|----------------------|----------|---------|------|---------|-------|
|          | Type                            | g/t  | Type           | g/t |                      |          | Pb      | Zn   | Pb      | Zn    |
| 125      | Ca(OH) <sub>2</sub>             | 750  | PKD<br>Complex | 180 | Pb Ro. Cone. No. 1   | 15.55    | 22.9    | 13.9 | 87.0    | 29.5  |
|          |                                 |      |                |     | Pb Ro. Cones No. 1-3 | 26.70    | 14.3    | 16.1 | 92.9    | 59.5  |
|          |                                 |      |                |     | Zn Ro. Cone. No. 1   | 7.93     | 0.76    | 26.4 | 1.5     | 29.1  |
|          |                                 |      |                |     | Zn Ro. Cones No. 1-3 | 14.02    | 0.84    | 16.4 | 2.9     | 31.5  |
|          |                                 |      |                |     | Zn Rougher Tail.     | 59.28    | 0.29    | 1.03 | 4.2     | 8.5   |
|          |                                 |      |                |     | Head (Calc.)         | 100.00   | 4.09    | 7.22 | 100.0   | 100.0 |
| 129      | Na <sub>2</sub> CO <sub>3</sub> | 1500 | PKD<br>Complex | 180 | Pb Ro. Cone. No. 1   | 21.53    | 17.3    | 13.3 | 88.3    | 39.5  |
|          |                                 |      |                |     | Pb Ro. Cones No. 1-3 | 28.90    | 13.5    | 12.7 | 92.6    | 49.5  |
|          |                                 |      |                |     | Zn Ro. Cone. No. 1   | 8.23     | 0.78    | 32.6 | 1.5     | 36.5  |
|          |                                 |      |                |     | Zn Ro. Cones No. 1-3 | 15.86    | 0.87    | 19.3 | 3.2     | 41.8  |
|          |                                 |      |                |     | Zn Rougher Tail.     | 55.24    | 0.32    | 1.10 | 4.2     | 8.5   |
|          |                                 |      |                |     | Head (Calc.)         | 100.00   | 4.22    | 7.32 | 100.0   | 100.0 |
| 130      | Ca(OH) <sub>2</sub>             | 750  | NaCN           | 180 | Pb Ro. Cone. No. 1   | 24.11    | 15.5    | 19.2 | 88.1    | 64.8  |
|          |                                 |      |                |     | Pb Ro. Cones No. 1-3 | 37.05    | 10.8    | 16.6 | 94.3    | 84.5  |
|          |                                 |      |                |     | Zn Ro. Cone. No. 1   | 5.43     | 1.01    | 8.69 | 1.3     | 6.5   |
|          |                                 |      |                |     | Zn Ro. Cones No. 1-3 | 9.15     | 0.95    | 6.10 | 2.1     | 7.5   |
|          |                                 |      |                |     | Zn Rougher Tail.     | 53.80    | 0.29    | 1.00 | 3.6     | 7.5   |
|          |                                 |      |                |     | Head (Calc.)         | 100.00   | 4.24    | 7.24 | 100.0   | 100.0 |

# LAKEFIELD RESEARCH

Test No.: 129 Project No.: 3733 Date: 13 Nov. 89 Operator: CP

Purpose: To repeat test No. 125, but replace lime with twice the amount of soda-ash to the grind, and increase Cu<sub>2</sub>S<sub>4</sub> addition.

Procedure: As for test No. 122.

Feed: 2000 grams minus 10 mesh Composite G-3.

Grind: 40 minutes at 65% solids in the lab. ball mill.

Conditions:

|                   | REAGENTS ADDED, GRAMS PER TONNE |               |               |      |                  |      | TIME, MINUTES |       |       |       |      |
|-------------------|---------------------------------|---------------|---------------|------|------------------|------|---------------|-------|-------|-------|------|
|                   | <chem>Na2CO3</chem>             | PKD<br>Conden | A317<br>3A18A | MIBC | <chem>C2S</chem> | A343 | DF<br>1012    | GRIND | COND. | FROTH | pH   |
| Primary Grind     | 1500                            | 180           | 8             |      |                  |      |               | 40    |       |       |      |
| Pb Ro. Cone No. 1 |                                 |               | 40            | 10   |                  |      |               |       | 1     | 5     | 9.5  |
| Pb Ro. Cone No. 2 |                                 |               | 10            | 5    |                  |      |               |       | 1     | 3     |      |
| Pb Ro. Cone No. 3 |                                 |               | 5             | 5    |                  |      |               |       | 1     | 3     |      |
|                   | <u>Ca(OH)<sub>2</sub></u>       |               |               |      |                  |      |               |       |       |       |      |
| Condition         | 2000                            |               |               |      |                  |      |               |       | 5     |       |      |
|                   |                                 |               |               |      | 1000             |      |               |       | 5     |       |      |
| Zn Ro. Cone No. 1 |                                 |               |               |      |                  | 20   | 10            |       | 1     | 2     | 11.8 |
| Zn Ro. Cone No. 2 |                                 |               |               |      |                  | 10   | 2.5           |       | 1     | 2     |      |
| Zn Ro. Cone No. 3 |                                 |               |               |      |                  | 10   | 2.5           |       | 1     | 2     |      |
|                   |                                 |               |               |      |                  |      |               |       |       |       |      |
|                   |                                 |               |               |      |                  |      |               |       |       |       |      |
|                   |                                 |               |               |      |                  |      |               |       |       |       |      |
|                   |                                 |               |               |      |                  |      |               |       |       |       |      |
|                   |                                 |               |               |      |                  |      |               |       |       |       |      |
|                   |                                 |               |               |      |                  |      |               |       |       |       |      |
|                   |                                 |               |               |      |                  |      |               |       |       |       |      |
|                   |                                 |               |               |      |                  |      |               |       |       |       |      |
|                   |                                 |               |               |      |                  |      |               |       |       |       |      |
|                   |                                 |               |               |      |                  |      |               |       |       |       |      |
|                   |                                 |               |               |      |                  |      |               |       |       |       |      |

|                |  |  |  |  |
|----------------|--|--|--|--|
| Stage          |  |  |  |  |
| Flotation Cell |  |  |  |  |
| Speed: r.p.m.  |  |  |  |  |
| % Solids       |  |  |  |  |
| % - mesh       |  |  |  |  |

## LAKEFIELD RESEARCH

 Test No.: 129

Project No.: \_\_\_\_\_

Date: \_\_\_\_\_

### Metallurgical Results

|    | PRODUCT            | WEIGHT |        | ASSAYS, % |      |  |  | % DISTRIBUTION |       |  |  | METAL UNITS |        |  |  |
|----|--------------------|--------|--------|-----------|------|--|--|----------------|-------|--|--|-------------|--------|--|--|
|    |                    | g      | %      | Pb        | Zn   |  |  | Pb             | Zn    |  |  |             |        |  |  |
| 1  | Pb Ro. Cone. No. 1 | 431.9  | 21.53  | 17.3      | 13.3 |  |  | 88.3           | 39.1  |  |  | 372.47      | 286.35 |  |  |
| 2  | Pb Ro. Cone. No. 2 | 95.9   | 4.78   | 2.73      | 11.1 |  |  | 3.1            | 7.2   |  |  | 13.05       | 53.06  |  |  |
| 3  | Pb Ro. Cone. No. 3 | 51.9   | 2.59   | 1.90      | 10.2 |  |  | 1.2            | 3.6   |  |  | 4.92        | 26.42  |  |  |
| 4  | Zn Ro. Cone. No. 1 | 165.0  | 8.23   | 0.78      | 32.6 |  |  | 1.5            | 36.7  |  |  | 6.42        | 268.30 |  |  |
| 5  | Zn Ro. Cone. No. 2 | 94.2   | 4.70   | 1.00      | 6.06 |  |  | 1.1            | 3.9   |  |  | 4.70        | 28.48  |  |  |
| 6  | Zn Ro. Cone. No. 3 | 58.8   | 2.93   | 0.92      | 2.91 |  |  | 0.6            | 1.2   |  |  | 2.70        | 8.53   |  |  |
| 7  | Zn Rougher Tail.   | 1108.0 | 55.24  | 0.32      | 1.10 |  |  | 4.2            | 8.3   |  |  | 17.68       | 60.76  |  |  |
| 8  |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 9  |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 10 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 11 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 12 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
|    | Head (calc.)       | 2005.7 | 100.00 | 4.22      | 7.32 |  |  | 100.0          | 100.0 |  |  | 421.94      | 231.90 |  |  |

### Calculated Grades and Recoveries

|                  |       |      |      |  |  |      |      |  |  |        |        |
|------------------|-------|------|------|--|--|------|------|--|--|--------|--------|
| Pb Ro. Cones 1+2 | 26.31 | 14.7 | 12.9 |  |  | 91.4 | 46.3 |  |  | 385.52 | 339.41 |
| Pb Ro. Cones 1-3 | 28.90 | 13.5 | 12.7 |  |  | 92.6 | 49.9 |  |  | 390.44 | 365.83 |
| Zn Ro. Cones 1+2 | 12.93 | 0.86 | 23.0 |  |  | 2.6  | 40.6 |  |  | 11.12  | 296.78 |
| Zn Ro. Cones 1-3 | 15.86 | 0.87 | 19.3 |  |  | 3.2  | 41.8 |  |  | 13.82  | 305.31 |
| Zn Flot. Feed    | 71.10 | 0.44 | 5.15 |  |  | 7.4  | 50.1 |  |  | 31.50  | 366.07 |
|                  |       |      |      |  |  |      |      |  |  |        |        |
|                  |       |      |      |  |  |      |      |  |  |        |        |
|                  |       |      |      |  |  |      |      |  |  |        |        |

# LAKEFIELD RESEARCH

Test No.: 130 Project No.: 3733 Date: 13 Nov. 89 Operator: CP

Purpose: To repeat test No. 125, but replace the PKD complex with cyanide and increase collector addition to the zinc float rougher.

Procedure: As for test No. 122

Feed: 2000 grams minus 10 mesh Composite 6-3.

Grind: 40 minutes at 65% solids in the lab. ball mill.

Conditions:

|                    | REAGENTS ADDED, GRAMS PER TONNE |                 |                  |                 |                             |                 | TIME, MINUTES |       |       |      |
|--------------------|---------------------------------|-----------------|------------------|-----------------|-----------------------------|-----------------|---------------|-------|-------|------|
|                    | <del>Coob</del>                 | <del>NacW</del> | <del>7418A</del> | <del>MIBC</del> | <del>CaSO<sub>4</sub></del> | <del>A343</del> | GRIND         | COND. | FROTH | pH   |
| Primary Grind      | 750                             | 180             | 8                |                 |                             |                 | 40            |       |       |      |
| Pb Ro. Conc. No. 1 |                                 |                 | 40               | 10              |                             |                 |               | 1     | 5     | 9.6  |
| Pb Ro. Conc. No. 2 |                                 |                 | 10               | 5               |                             |                 |               | 1     | 3     |      |
| Pb Ro. Conc. No. 3 |                                 |                 | 10               | 5               |                             |                 |               | 1     | 3     |      |
| Condition          | 2000                            |                 |                  |                 |                             |                 |               | 5     |       |      |
|                    |                                 |                 |                  | 800             |                             |                 |               | 5     |       |      |
| Zn Ro. Conc. No. 1 |                                 |                 |                  |                 |                             | 30              | 10            | 1     | 3     | 11.9 |
| Zn Ro. Conc. No. 2 |                                 |                 |                  |                 |                             | 10              | 2.5           | 1     | 2     |      |
| Zn Ro. Conc. No. 3 |                                 |                 |                  |                 |                             | 10              | 2.5           | 1     | 2     |      |
|                    |                                 |                 |                  |                 |                             |                 |               |       |       |      |
|                    |                                 |                 |                  |                 |                             |                 |               |       |       |      |
|                    |                                 |                 |                  |                 |                             |                 |               |       |       |      |
|                    |                                 |                 |                  |                 |                             |                 |               |       |       |      |
|                    |                                 |                 |                  |                 |                             |                 |               |       |       |      |
|                    |                                 |                 |                  |                 |                             |                 |               |       |       |      |
|                    |                                 |                 |                  |                 |                             |                 |               |       |       |      |
|                    |                                 |                 |                  |                 |                             |                 |               |       |       |      |

|                |  |  |  |  |
|----------------|--|--|--|--|
| Stage          |  |  |  |  |
| Flotation Cell |  |  |  |  |
| Speed: r.p.m.  |  |  |  |  |
| % Solids       |  |  |  |  |
| % - mesh       |  |  |  |  |

LAKEFIELD RESEARCH

Test No.: 130

Project No.: \_\_\_\_\_

Date: \_\_\_\_\_

**Metallurgical Results**

|    | PRODUCT            | WEIGHT |        | ASSAYS, % |      |  |  | % DISTRIBUTION |       |  |  | METAL UNITS |        |  |  |
|----|--------------------|--------|--------|-----------|------|--|--|----------------|-------|--|--|-------------|--------|--|--|
|    |                    | g      | %      | Pb        | Zn   |  |  | Pb             | Zn    |  |  |             |        |  |  |
| 1  | Pb Ro. Cone. No. 1 | 480.9  | 24.11  | 15.5      | 19.2 |  |  | 88.1           | 64.0  |  |  | 373.71      | 462.91 |  |  |
| 2  | Pb Ro. Cone. No. 2 | 131.3  | 6.58   | 2.60      | 14.5 |  |  | 4.0            | 13.2  |  |  | 17.11       | 95.41  |  |  |
| 3  | Pb Ro. Cone. No. 3 | 126.9  | 6.36   | 1.47      | 8.79 |  |  | 2.2            | 7.7   |  |  | 9.35        | 55.90  |  |  |
| 4  | Zn Ro. Cone. No. 1 | 108.2  | 5.43   | 1.01      | 8.69 |  |  | 1.3            | 6.5   |  |  | 5.48        | 47.19  |  |  |
| 5  | Zn Ro. Cone. No. 2 | 44.1   | 2.21   | 0.90      | 2.59 |  |  | 0.5            | 0.8   |  |  | 1.99        | 5.72   |  |  |
| 6  | Zn Ro. Cone. No. 3 | 30.0   | 1.51   | 0.78      | 1.94 |  |  | 0.3            | 0.4   |  |  | 1.18        | 2.93   |  |  |
| 7  | Zn Rougher Tail.   | 1073.0 | 53.80  | 0.29      | 1.00 |  |  | 3.6            | 7.4   |  |  | 15.60       | 53.80  |  |  |
| 8  |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 9  |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 10 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 11 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 12 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
|    | Head (calc.)       | 1994.4 | 100.00 | 4.24      | 7.24 |  |  | 100.0          | 100.0 |  |  | 424.42      | 723.86 |  |  |

**Calculated Grades and Recoveries**

|                  |       |      |      |  |  |      |      |  |  |        |        |  |  |
|------------------|-------|------|------|--|--|------|------|--|--|--------|--------|--|--|
| Pb Ro. Cones 1+2 | 30.69 | 12.7 | 18.2 |  |  | 92.1 | 77.2 |  |  | 390.82 | 558.32 |  |  |
| Pb Ro. Cones 1-3 | 37.05 | 10.8 | 16.6 |  |  | 91.3 | 84.9 |  |  | 400.17 | 614.22 |  |  |
| Zn Ro. Cones 1+2 | 7.64  | 0.98 | 6.93 |  |  | 1.8  | 7.3  |  |  | 7.47   | 52.91  |  |  |
| Zn Ro. Cones 1-3 | 9.15  | 0.95 | 6.10 |  |  | 2.1  | 7.7  |  |  | 8.65   | 55.84  |  |  |
| Zn Flot. Feed    | 62.95 | 0.39 | 1.74 |  |  | 5.7  | 15.1 |  |  | 24.25  | 109.64 |  |  |
|                  |       |      |      |  |  |      |      |  |  |        |        |  |  |
|                  |       |      |      |  |  |      |      |  |  |        |        |  |  |

Table No.

Effect of Various Amounts of PKD Complex Added to the Ground on Lead and Zinc Flotation from Composite 5

| Test No. | PKD Complex Added g/t | Product              | Weight % | Assay % |      | % Dist. |       |
|----------|-----------------------|----------------------|----------|---------|------|---------|-------|
|          |                       |                      |          | Pb      | Zn   | Pb      | Zn    |
| 125      | 180                   | Pb Ro. Cone. No. 1   | 15.55    | 22.9    | 13.9 | 87.0    | 29.9  |
|          |                       | Pb Ro. Cones No. 1-3 | 26.70    | 14.3    | 16.1 | 92.9    | 59.6  |
|          |                       | Zn Ro. Cone. No. 1   | 7.93     | 0.76    | 26.4 | 1.5     | 29.0  |
|          |                       | Zn Ro. Cones No. 1-3 | 14.02    | 0.84    | 16.4 | 2.9     | 31.9  |
|          |                       | Zn Rougher Tail.     | 59.28    | 0.29    | 1.03 | 4.2     | 8.5   |
|          |                       | Head (Calc.)         | 100.00   | 4.09    | 7.22 | 100.0   | 100.0 |
| 126      | 225                   | Pb Ro. Cone. No. 1   | 18.38    | 19.7    | 15.8 | 87.3    | 39.2  |
|          |                       | Pb Ro. Cones No. 1-3 | 32.13    | 12.1    | 16.6 | 93.3    | 72.0  |
|          |                       | Zn Ro. Cone. No. 1   | 6.76     | 0.85    | 19.6 | 1.4     | 17.9  |
|          |                       | Zn Ro. Cones No. 1-3 | 13.39    | 0.81    | 11.2 | 2.7     | 20.2  |
|          |                       | Zn Rougher Tail.     | 54.48    | 0.31    | 1.06 | 4.0     | 7.8   |
|          |                       | Head (Calc.)         | 100.00   | 4.15    | 7.41 | 100.0   | 100.0 |
| 127      | 300                   | Pb Ro. Cone. No. 1   | 19.10    | 18.9    | 15.7 | 88.2    | 40.5  |
|          |                       | Pb Ro. Cones No. 1-3 | 33.70    | 11.4    | 16.8 | 93.8    | 76.6  |
|          |                       | Zn Ro. Cone. No. 1   | 7.17     | 0.76    | 13.9 | 1.3     | 13.5  |
|          |                       | Zn Ro. Cones No. 1-3 | 13.89    | 0.74    | 8.41 | 2.5     | 15.8  |
|          |                       | Zn Rougher Tail.     | 52.41    | 0.29    | 1.08 | 3.7     | 7.6   |
|          |                       | Head (Calc.)         | 100.00   | 4.10    | 7.41 | 100.0   | 100.0 |
| 128      | 400                   | Pb Ro. Cone. No. 1   | 17.87    | 20.2    | 18.6 | 87.0    | 44.7  |
|          |                       | Pb Ro. Cones No. 1-3 | 31.83    | 12.2    | 18.9 | 93.3    | 80.8  |
|          |                       | Zn Ro. Cone. No. 1   | 5.08     | 0.97    | 13.2 | 1.2     | 9.0   |
|          |                       | Zn Ro. Cones No. 1-3 | 10.84    | 0.92    | 7.72 | 2.4     | 11.2  |
|          |                       | Zn Rougher Tail.     | 57.33    | 0.31    | 1.03 | 4.3     | 8.0   |
|          |                       | Head (Calc.)         | 100.00   | 4.15    | 7.43 | 100.0   | 100.0 |

LAKEFIELD RESEARCH

Test No.: 126 Project No.: 3733 Date: 27 Oct. 89 Operator: SP

Purpose: To repeat test No. 125, but increase the PKL concentration to 225 g/t.

Procedure: As for test No. 122.

Feed: 2000 grams minus 10 mesh Composite 5-3.

Grind: 40 minutes at 60% solids in the lab ball mill.

Conditions:

|                    | REAGENTS ADDED, GRAMS PER TONNE |             |               |      |                   |      |         | TIME, MINUTES |       |       | pH   |
|--------------------|---------------------------------|-------------|---------------|------|-------------------|------|---------|---------------|-------|-------|------|
|                    | Ca(OH) <sub>2</sub>             | PKD Complex | A312<br>3418A | MIBC | CuSO <sub>4</sub> | A343 | DF 1012 | GRIND         | COND. | FROTH |      |
| Primary Grind      | 750                             | 225         | 8             |      |                   |      |         | 40            |       |       |      |
| Pb No. Conc. No. 1 |                                 |             | 40            | 10   |                   |      |         |               | 1     | 5     | 10.0 |
| Pb No. Conc. No. 2 |                                 |             | 20            | 5    |                   |      |         |               | 1     | 3     |      |
| Pb No. Conc. No. 3 |                                 |             | 10            | 5    |                   |      |         |               | 1     | 3     |      |
| Condition          | 2000                            |             |               |      |                   |      |         |               | 5     |       |      |
|                    |                                 |             |               |      | 400               |      |         |               | 5     |       | 11.5 |
| Zn No. Conc. No. 1 |                                 |             |               |      |                   | 20   | 5       |               | 1     | 2     |      |
| Zn No. Conc. No. 2 |                                 |             |               |      |                   | 10   | 2.5     |               | 1     | 2     |      |
| Zn No. Conc. No. 3 |                                 |             |               |      |                   | 10   | 2.5     |               | 1     | 2     |      |
|                    |                                 |             |               |      |                   |      |         |               |       |       |      |
|                    |                                 |             |               |      |                   |      |         |               |       |       |      |
|                    |                                 |             |               |      |                   |      |         |               |       |       |      |
|                    |                                 |             |               |      |                   |      |         |               |       |       |      |
|                    |                                 |             |               |      |                   |      |         |               |       |       |      |
|                    |                                 |             |               |      |                   |      |         |               |       |       |      |
|                    |                                 |             |               |      |                   |      |         |               |       |       |      |

|                |  |  |  |  |
|----------------|--|--|--|--|
| Stage          |  |  |  |  |
| Flotation Cell |  |  |  |  |
| Speed: r.p.m.  |  |  |  |  |
| % Solids       |  |  |  |  |
| % - mesh       |  |  |  |  |

## LAKEFIELD RESEARCH

 Test No.: 126

Project No.: \_\_\_\_\_

Date: \_\_\_\_\_

### Metallurgical Results

|    | PRODUCT            | WEIGHT |        | ASSAYS, % |      |  |  | % DISTRIBUTION |       |  |  | METAL UNITS |        |
|----|--------------------|--------|--------|-----------|------|--|--|----------------|-------|--|--|-------------|--------|
|    |                    | g      | %      | Pb        | Zn   |  |  | Pb             | Zn    |  |  |             |        |
| 1  | Pb Ro. Cone. No. 1 | 365.9  | 18.38  | 19.7      | 15.8 |  |  | 97.3           | 39.2  |  |  | 362.09      | 290.40 |
| 2  | Pb Ro. Cone. No. 2 | 158.9  | 7.99   | 2.16      | 21.2 |  |  | 4.1            | 22.8  |  |  | 17.26       | 169.39 |
| 3  | Pb Ro. Cone. No. 3 | 114.6  | 5.76   | 1.36      | 12.9 |  |  | 1.9            | 10.0  |  |  | 7.83        | 74.30  |
| 4  | Zn Ro. Cone. No. 1 | 134.5  | 6.76   | 0.85      | 19.6 |  |  | 1.4            | 17.9  |  |  | 5.75        | 132.50 |
| 5  | Zn Ro. Cone. No. 2 | 66.7   | 3.35   | 0.83      | 3.18 |  |  | 0.7            | 1.4   |  |  | 2.78        | 10.65  |
| 6  | Zn Ro. Cone. No. 3 | 65.3   | 3.28   | 0.70      | 1.94 |  |  | 0.6            | 0.9   |  |  | 2.30        | 6.36   |
| 7  | Zn Rougher Tail.   | 1084.0 | 54.48  | 0.31      | 1.06 |  |  | 4.0            | 7.8   |  |  | 16.89       | 57.75  |
| 8  | V                  |        |        |           |      |  |  |                |       |  |  |             |        |
| 9  |                    |        |        |           |      |  |  |                |       |  |  |             |        |
| 10 |                    |        |        |           |      |  |  |                |       |  |  |             |        |
| 11 |                    |        |        |           |      |  |  |                |       |  |  |             |        |
| 12 |                    |        |        |           |      |  |  |                |       |  |  |             |        |
|    | Head (calc.)       | 1989.9 | 100.00 | 4.15      | 7.41 |  |  | 100.0          | 100.0 |  |  | 414.90      | 741.35 |

### Calculated Grades and Recoveries

|                  |       |      |      |  |  |      |      |  |  |        |        |
|------------------|-------|------|------|--|--|------|------|--|--|--------|--------|
| Pb Ro. Cones 1+2 | 26.37 | 14.9 | 17.4 |  |  | 91.4 | 62.0 |  |  | 379.35 | 459.79 |
| Pb Ps. Cones 1-3 | 32.13 | 12.1 | 16.6 |  |  | 93.3 | 72.0 |  |  | 387.18 | 534.09 |
| Zn Ro. Cones 1+2 | 10.11 | 0.84 | 14.2 |  |  | 2.1  | 19.3 |  |  | 8.53   | 143.15 |
| Zn Ro. Cones 1-3 | 13.39 | 0.81 | 11.2 |  |  | 2.7  | 20.2 |  |  | 10.83  | 149.51 |
| Zn Flot. Feed    | 67.87 | 0.41 | 3.05 |  |  | 6.7  | 28.0 |  |  | 27.72  | 207.26 |
|                  |       |      |      |  |  |      |      |  |  |        |        |
|                  |       |      |      |  |  |      |      |  |  |        |        |

LAKEFIELD RESEARCH

Test No.: 127 Project No.: 3733 Date: 27 Oct. 67 Operator: CI-

Purpose: To repeat test No. 126, but increase the PKD comp. addition to the grind to 300 g/t.

Procedure: As for test No. 122

Feed: 2000 grams minus 10 mesh Composite G-3.

Grind: 40 minutes at 65% solids in the mill.

Conditions: \_\_\_\_\_

|                    | REAGENTS ADDED, GRAMS PER TONNE |           |               |      |                   |      |            | TIME, MINUTES |       |       |      |
|--------------------|---------------------------------|-----------|---------------|------|-------------------|------|------------|---------------|-------|-------|------|
|                    | G(OH) <sub>2</sub>              | PKD Comp. | A317<br>3418A | MIBC | CuSO <sub>4</sub> | A343 | DF<br>1012 | GRIND         | COND. | FROTH | pH   |
| Primary Grind      | 750                             | 300       | 8             |      |                   |      |            | 40            |       |       |      |
| Pb Co. Conc. No. 1 |                                 |           | 40            | 10   |                   |      |            |               | 1     | 5     | 10.0 |
| Pb Co. Conc. No. 2 |                                 |           | 20            | 5    |                   |      |            |               | 1     | 3     |      |
| Pb Co. Conc. No. 3 |                                 |           | 10            | 5    |                   |      |            |               | 1     | 3     |      |
| Condition          | 2000                            |           |               |      |                   |      |            |               | 5     |       |      |
|                    |                                 |           |               |      | 800               |      |            |               | 5     |       | 11.6 |
| Zn Co. Conc. No. 1 |                                 |           |               |      |                   | 20   | 5          |               | 1     | 2     |      |
| Zn Co. Conc. No. 2 |                                 |           |               |      |                   | 10   | 2.5        |               | 1     | 2     |      |
| Zn Co. Conc. No. 3 |                                 |           |               |      |                   | 10   | 2.5        |               | 1     | 2     |      |
|                    |                                 |           |               |      |                   |      |            |               |       |       |      |
|                    |                                 |           |               |      |                   |      |            |               |       |       |      |
|                    |                                 |           |               |      |                   |      |            |               |       |       |      |
|                    |                                 |           |               |      |                   |      |            |               |       |       |      |
|                    |                                 |           |               |      |                   |      |            |               |       |       |      |
|                    |                                 |           |               |      |                   |      |            |               |       |       |      |
|                    |                                 |           |               |      |                   |      |            |               |       |       |      |
|                    |                                 |           |               |      |                   |      |            |               |       |       |      |

|                |  |  |  |  |  |
|----------------|--|--|--|--|--|
| Stage          |  |  |  |  |  |
| Flotation Cell |  |  |  |  |  |
| Speed: r.p.m.  |  |  |  |  |  |
| % Solids       |  |  |  |  |  |
| % - mesh       |  |  |  |  |  |

## LAKEFIELD RESEARCH

 Test No.: 127

Project No.: \_\_\_\_\_

Date: \_\_\_\_\_

### Metallurgical Results

|    | PRODUCT            | WEIGHT |        | ASSAYS, % |      |  |  | % DISTRIBUTION |       |  |  | METAL UNITS |  |        |        |
|----|--------------------|--------|--------|-----------|------|--|--|----------------|-------|--|--|-------------|--|--------|--------|
|    |                    | g      | %      | Pb        | Zn   |  |  | Pb             | Zn    |  |  |             |  |        |        |
| 1  | Pb Ro. Cone. No. 1 | 379.5  | 19.10  | 18.9      | 15.7 |  |  | 88.2           | 40.5  |  |  |             |  | 360.99 | 299.87 |
| 2  | Pb Ro. Cone. No. 2 | 163.0  | 8.20   | 1.90      | 23.0 |  |  | 3.8            | 25.5  |  |  |             |  | 15.58  | 188.60 |
| 3  | Pb Ro. Cone. No. 3 | 127.2  | 6.40   | 1.17      | 12.3 |  |  | 1.8            | 10.6  |  |  |             |  | 7.49   | 78.72  |
| 4  | Zn Ro. Cone. No. 1 | 142.5  | 7.17   | 0.76      | 13.9 |  |  | 1.3            | 13.5  |  |  |             |  | 5.45   | 99.66  |
| 5  | Zn Ro. Cone. No. 2 | 74.3   | 3.74   | 0.73      | 3.00 |  |  | 0.7            | 1.5   |  |  |             |  | 2.73   | 11.22  |
| 6  | Zn Ro. Cone. No. 3 | 59.2   | 2.98   | 0.69      | 2.01 |  |  | 0.5            | 0.8   |  |  |             |  | 2.06   | 5.99   |
| 7  | Zn Rougher Tail.   | 1041.4 | 52.41  | 0.29      | 1.08 |  |  | 3.7            | 7.6   |  |  |             |  | 15.20  | 56.60  |
| 8  | V                  |        |        |           |      |  |  |                |       |  |  |             |  |        |        |
| 9  |                    |        |        |           |      |  |  |                |       |  |  |             |  |        |        |
| 10 |                    |        |        |           |      |  |  |                |       |  |  |             |  |        |        |
| 11 |                    |        |        |           |      |  |  |                |       |  |  |             |  |        |        |
| 12 |                    |        |        |           |      |  |  |                |       |  |  |             |  |        |        |
|    | Head (calc.)       | 1987.1 | 100.00 | 4.10      | 7.41 |  |  | 100.0          | 100.0 |  |  |             |  | 109.50 | 740.66 |

### Calculated Grades and Recoveries

|                  |       |  |      |      |  |  |      |      |  |  |  |  |        |        |
|------------------|-------|--|------|------|--|--|------|------|--|--|--|--|--------|--------|
| Pb Ro. Cones 1+2 | 27.30 |  | 13.8 | 17.9 |  |  | 92.0 | 66.0 |  |  |  |  | 376.57 | 488.47 |
| Pb Ro. Cones 1-3 | 33.70 |  | 11.4 | 16.8 |  |  | 93.8 | 76.6 |  |  |  |  | 384.06 | 567.19 |
| Zn Ro. Cones 1+2 | 10.91 |  | 0.75 | 10.2 |  |  | 2.0  | 15.0 |  |  |  |  | 8.18   | 110.88 |
| Zn Ro. Cones 1-3 | 13.89 |  | 0.74 | 8.41 |  |  | 2.5  | 15.8 |  |  |  |  | 10.24  | 116.87 |
| Zn Flot. Feed    | 66.30 |  | 0.38 | 2.62 |  |  | 6.2  | 23.4 |  |  |  |  | 25.44  | 173.47 |
|                  |       |  |      |      |  |  |      |      |  |  |  |  |        |        |
|                  |       |  |      |      |  |  |      |      |  |  |  |  |        |        |
|                  |       |  |      |      |  |  |      |      |  |  |  |  |        |        |

LAKEFIELD RESEARCH

Test No.: 128 Project No.: 3733 Date: 27 Oct 87 Operator:

Purpose: To repeat tests 126 and 127 but increase PK's comp. in addition to the grind to 40 g/t.

Procedure: As for test No. 127.

Feed: 2000 grams minus 10 mesh Composite G-3.

Grind: 40 minutes at 65% solids in the jar.

Conditions:

|                    | REAGENTS ADDED, GRAMS PER TONNE |               |               |      |                   |      |            | TIME, MINUTES |       |       | pH   |
|--------------------|---------------------------------|---------------|---------------|------|-------------------|------|------------|---------------|-------|-------|------|
|                    | Ca(OH) <sub>2</sub>             | PKD<br>Copper | A317<br>3418A | MIBC | CuSO <sub>4</sub> | A343 | DF<br>1012 | GRIND         | COND. | FROTH |      |
| Primary Grind      | 750                             | 400           | 8             |      |                   |      |            | 40            |       |       |      |
| Pb Ro. Conc. No. 1 |                                 |               | 40            | 10   |                   |      |            |               | 1     | 5     | 10.1 |
| Pb Ro. Conc. No. 2 |                                 |               | 20            | 5    |                   |      |            |               | 1     | 3     |      |
| Pb Ro. Conc. No. 3 |                                 |               | 10            | 5    |                   |      |            |               | 1     | 3     |      |
| Condition          | 2000                            |               |               |      |                   |      |            |               | 5     |       |      |
|                    |                                 |               |               | 800  |                   |      |            |               | 5     |       | 11.7 |
| Zn Ro. Conc. No. 1 |                                 |               |               |      |                   | 20   | 5          |               | 1     | 2     |      |
| Zn Ro. Conc. No. 2 |                                 |               |               |      |                   | 10   | 2.5        |               | 1     | 2     |      |
| Zn Ro. Conc. No. 3 |                                 |               |               |      |                   | 10   | 2.5        |               | 1     | 2     |      |
|                    |                                 |               |               |      |                   |      |            |               |       |       |      |
|                    |                                 |               |               |      |                   |      |            |               |       |       |      |
|                    |                                 |               |               |      |                   |      |            |               |       |       |      |
|                    |                                 |               |               |      |                   |      |            |               |       |       |      |
|                    |                                 |               |               |      |                   |      |            |               |       |       |      |
|                    |                                 |               |               |      |                   |      |            |               |       |       |      |
|                    |                                 |               |               |      |                   |      |            |               |       |       |      |
|                    |                                 |               |               |      |                   |      |            |               |       |       |      |

|                |  |  |  |  |
|----------------|--|--|--|--|
| Stage          |  |  |  |  |
| Flotation Cell |  |  |  |  |
| Speed: r.p.m.  |  |  |  |  |
| % Solids       |  |  |  |  |
| % - mesh       |  |  |  |  |

LAKEFIELD RESEARCH

Test No.: 128

Project No.: \_\_\_\_\_

Date: \_\_\_\_\_

Metallurgical Results

|    | PRODUCT            | WEIGHT |        | ASSAYS, % |      |  |  | % DISTRIBUTION |       |  |  | METAL UNITS |        |  |  |
|----|--------------------|--------|--------|-----------|------|--|--|----------------|-------|--|--|-------------|--------|--|--|
|    |                    | g      | %      | Pb        | Zn   |  |  | Pb             | Zn    |  |  |             |        |  |  |
| 1  | Pb Ro. Cone. No. 1 | 355.9  | 17.87  | 20.2      | 18.6 |  |  | 87.0           | 44.7  |  |  | 360.97      | 332.38 |  |  |
| 2  | Pb Ro. Cone. No. 2 | 167.8  | 8.42   | 2.19      | 23.9 |  |  | 4.4            | 27.1  |  |  | 18.44       | 201.24 |  |  |
| 3  | Pb Ro. Cone. No. 3 | 110.3  | 5.54   | 1.41      | 12.1 |  |  | 1.9            | 9.0   |  |  | 7.81        | 67.03  |  |  |
| 4  | Zn Ro. Cone. No. 1 | 101.2  | 5.08   | 0.97      | 13.2 |  |  | 1.2            | 9.0   |  |  | 4.93        | 67.06  |  |  |
| 5  | Zn Ro. Cone. No. 2 | 64.8   | 3.25   | 0.93      | 3.46 |  |  | 0.7            | 1.5   |  |  | 3.02        | 11.25  |  |  |
| 6  | Zn Ro. Cone. No. 3 | 50.0   | 2.51   | 0.79      | 2.14 |  |  | 0.5            | 0.7   |  |  | 1.98        | 5.37   |  |  |
| 7  | Zn Rougher Tail.   | 1142.0 | 57.33  | 0.31      | 1.03 |  |  | 4.3            | 8.0   |  |  | 17.77       | 59.05  |  |  |
| 8  | V                  |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 9  |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 10 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 11 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 12 |                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
|    | Head (calc.)       | 1992.0 | 100.00 | 4.15      | 7.43 |  |  | 100.0          | 100.0 |  |  | 414.92      | 743.38 |  |  |

Calculated Grades and Recoveries

|                    |       |      |      |  |  |      |      |  |  |        |        |
|--------------------|-------|------|------|--|--|------|------|--|--|--------|--------|
| Pb Ro. Cones 1+2   | 26.29 | 14.4 | 20.3 |  |  | 91.4 | 71.8 |  |  | 379.41 | 533.62 |
| Pb Ro. Cones 1-3   | 31.83 | 12.2 | 18.9 |  |  | 93.3 | 80.8 |  |  | 387.22 | 600.65 |
| Zn Ro. Cones 1+2   | 8.33  | 0.95 | 9.40 |  |  | 1.9  | 10.5 |  |  | 7.95   | 78.31  |
| Zn Ro. Cones 1-3   | 10.84 | 0.92 | 7.72 |  |  | 2.4  | 11.2 |  |  | 9.93   | 83.68  |
| Zn Fl. Prod. Final | 68.17 | 0.41 | 2.09 |  |  | 6.7  | 19.2 |  |  | 27.70  | 142.73 |
|                    |       |      |      |  |  |      |      |  |  |        |        |
|                    |       |      |      |  |  |      |      |  |  |        |        |

Project No: 3733

Product: Combined Product

Test No: 128

S.G.-4.19

| Mesh       | Weight Grams | % Weight |       |         |
|------------|--------------|----------|-------|---------|
|            |              | Ind.     | Cum.  | Passing |
| 150        | 0.12         | 0.2      | 0.2   | 99.8    |
| 200        | 1.28         | 2.6      | 2.8   | 97.2    |
| 270        | 3.52         | 7.0      | 9.8   | 90.2    |
| 30.5 $\mu$ | 10.58        | 21.2     | 31.0  | 69.0    |
| 23.6       | 6.54         | 13.1     | 44.1  | 55.9    |
| 16.5       | 7.47         | 14.9     | 59.0  | 41.0    |
| 11.3       | 6.26         | 12.5     | 71.5  | 28.5    |
| 8.8        | 2.13         | 4.3      | 75.8  | 24.2    |
| -8.8       | 12.10        | 24.2     | 100.0 | -       |
| Total      | 50.00        | 100.0    | -     | -       |

Table No. Effect of Regrind Fineness on Lead Cleaning from Composite G-3.

| Test No. | Regrind    |        |        | Product                   | Weight % | Assay % |      | % Dist. |       |
|----------|------------|--------|--------|---------------------------|----------|---------|------|---------|-------|
|          | Time (min) | Kg/ftm | %-20µm |                           |          | Pb      | Zn   | Pb      | Zn    |
| 132      | 20         | 21     | 78     | Pb 4th Cl. Cone.          | 5.99     | 50.5    | 7.67 | 75.5    | 6.3   |
|          |            |        |        | Pb 1st Cl. + Scav. Cones. | 13.81    | 25.4    | 11.1 | 87.7    | 21.0  |
|          |            |        |        | Pb 1st Cl. Scav. Tail.    | 13.39    | 0.85    | 8.23 | 2.8     | 15.1  |
|          |            |        |        | Pb Rougher Tail.          | 72.80    | 0.52    | 6.41 | 9.5     | 63.9  |
|          |            |        |        | Head (Calc.)              | 100.00   | 4.01    | 7.30 | 100.0   | 100.0 |
| 133      | 30         | 18     | 86     | Pb 4th Cl. Cone.          | 4.64     | 57.0    | 6.56 | 66.4    | 4.2   |
|          |            |        |        | Pb 1st Cl. + Scav. Cones. | 12.08    | 28.8    | 11.0 | 87.2    | 18.5  |
|          |            |        |        | Pb 1st Cl. Scav. Tail.    | 13.68    | 0.97    | 9.21 | 3.3     | 17.4  |
|          |            |        |        | Pb Rougher Tail.          | 74.18    | 0.51    | 6.24 | 9.5     | 64.1  |
|          |            |        |        | Head (Calc.)              | 100.00   | 3.99    | 7.27 | 100.0   | 100.0 |
| 134      | 40         | 15     | 92     | Pb 4th Cl. Cone.          | 3.96     | 57.1    | 6.56 | 56.7    | 3.5   |
|          |            |        |        | Pb 1st Cl. + Scav. Cones. | 11.94    | 28.0    | 10.1 | 83.9    | 16.2  |
|          |            |        |        | Pb 1st Cl. Scav. Tail.    | 12.21    | 1.40    | 10.3 | 4.3     | 17.0  |
|          |            |        |        | Pb Rougher Tail.          | 75.85    | 0.62    | 6.53 | 11.8    | 66.8  |
|          |            |        |        | Head (Calc.)              | 100.00   | 3.99    | 7.41 | 100.0   | 100.0 |

LAKEFIELD RESEARCH

Test No.: 132 Project No.: 3733 Date: 15 Nov. 89 Operator: CP

Purpose: To investigate the effect of regrinding the lead rougher concentrate on lead recovery and zinc rejection.

Procedure: Grind and float a lead rougher concentrate. Regrind the concentrate and clean four times, floating a lead scavenger concentrate from the 1st clean tailing.

Feed: 2000 grams minus 10 mesh Composite G-3.

Grind: 40 minutes at 65% solids in the lab ball mill.

Conditions:

|                  | REAGENTS ADDED, GRAMS PER TONNE |             |                         |      |     | TIME, MINUTES |       |       |     |
|------------------|---------------------------------|-------------|-------------------------|------|-----|---------------|-------|-------|-----|
|                  | $\text{Na}_2\text{CO}_3$        | PKD Complex | <del>A317</del><br>318A | MIBC |     | GRIND         | COND. | FROTH | pH  |
| Primary Grind    | 1500                            | 150         | 8                       |      |     | 40            |       |       |     |
| Pb Rougher       |                                 |             | 10                      | 10   |     |               | 1     | 5     | 9.2 |
|                  |                                 |             | 10                      | 5    |     |               | 1     | 3     |     |
|                  |                                 |             | 5                       | 5    |     |               | 1     | 3     |     |
| Pb Conc. Regrind | 250                             | 50          | 20                      |      |     | 20            |       |       |     |
| Pb 1st Cleaner   |                                 |             |                         | 5    |     |               | 1     | 3     | 9.4 |
|                  |                                 |             |                         | 5    | 2.5 |               | 1     | 3     |     |
| Pb 1st Cl. Scav. |                                 |             |                         | 5    | 2.5 |               | 1     | 2     |     |
| Pb 2nd Cleaner   |                                 | 10          |                         |      |     |               | 1     | 3     | 9.1 |
|                  |                                 |             |                         | 5    | 2.5 |               | 1     | 2     |     |
| Pb 3rd Cleaner   |                                 | 5           |                         |      |     |               | 1     | 2     | 9.0 |
|                  |                                 |             |                         | 2.5  | 2.5 |               | 1     | 2     |     |
| Pb 4th Cleaner   |                                 | 5           |                         |      | 2.5 |               | 1     | 3     |     |

| Stage          | Rougher    | Regrind   | 1st & 2nd Clean. | 3rd & 4th Clean. |
|----------------|------------|-----------|------------------|------------------|
| Flotation Cell | 1000 g D-1 | Roll Mill | 500 g D-1        | 250 g D-1        |
| Speed: r.p.m.  | 1400       |           | 1400             | 1100             |
| % Solids       |            |           |                  |                  |
| % - mesh       |            |           |                  |                  |

LAKEFIELD RESEARCH

Test No.: 132

Project No.: \_\_\_\_\_

Date: \_\_\_\_\_

Metallurgical Results

|    | PRODUCT                | WEIGHT |        | ASSAYS, % |      |  | % DISTRIBUTION |       |  |  | METAL UNITS |        |
|----|------------------------|--------|--------|-----------|------|--|----------------|-------|--|--|-------------|--------|
|    |                        | g      | %      | Pb        | Zn   |  | Pb             | Zn    |  |  |             |        |
| 1  | Pb 4th Cl. Conc.       | 119.8  | 5.99   | 50.5      | 7.67 |  | 75.5           | 6.3   |  |  | 302.50      | 45.94  |
| 2  | Pb 4th Cl. Tail.       | 22.1   | 1.11   | 14.8      | 14.6 |  | 4.1            | 2.2   |  |  | 16.43       | 16.21  |
| 3  | Pb 3rd Cl. Tail.       | 26.0   | 1.30   | 7.08      | 15.2 |  | 2.3            | 2.7   |  |  | 9.20        | 19.76  |
| 4  | Pb 2nd Cl. Tail.       | 75.5   | 3.78   | 5.33      | 14.2 |  | 5.0            | 7.4   |  |  | 20.15       | 53.68  |
| 5  | Pb 1st Cl. Seav. Conc. | 32.5   | 1.63   | 1.90      | 10.6 |  | 0.8            | 2.4   |  |  | 3.10        | 17.28  |
| 6  | Pb 1st Cl. Seav. Tail. | 267.8  | 13.39  | 0.85      | 8.23 |  | 2.8            | 15.1  |  |  | 11.38       | 110.20 |
| 7  | Pb Rougher Tail        | 1455.7 | 72.80  | 0.52      | 6.41 |  | 9.5            | 63.9  |  |  | 37.86       | 466.65 |
| 8  |                        |        |        |           |      |  |                |       |  |  |             |        |
| 9  |                        |        |        |           |      |  |                |       |  |  |             |        |
| 10 |                        |        |        |           |      |  |                |       |  |  |             |        |
| 11 |                        |        |        |           |      |  |                |       |  |  |             |        |
| 12 |                        |        |        |           |      |  |                |       |  |  |             |        |
|    | Head (calc.)           | 1999.4 | 100.00 | 4.01      | 7.30 |  | 100.0          | 100.0 |  |  | 400.62      | 729.72 |

Calculated Grades and Recoveries

|                                |       |      |      |      |      |        |        |
|--------------------------------|-------|------|------|------|------|--------|--------|
| Pb 3rd Cl. Conc. (1+2)         | 7.10  | 44.9 | 8.75 | 79.6 | 8.5  | 318.93 | 62.15  |
| Pb 2nd Cl. Conc. (1-3)         | 8.40  | 39.1 | 9.75 | 81.9 | 11.2 | 328.13 | 81.91  |
| Pb 1st Cl. Conc. (1-4)         | 12.18 | 28.6 | 11.1 | 86.9 | 18.6 | 348.28 | 135.59 |
| Pb 1st Cl. + Seav. Conc. (1-5) | 13.81 | 25.4 | 11.1 | 87.7 | 21.0 | 351.38 | 152.97 |
| Pb Rougher Conc. (1-6)         | 27.20 | 13.3 | 9.67 | 90.5 | 36.1 | 362.76 | 263.07 |
| Pb Comb. Tails (6+7)           | 86.19 | 0.57 | 6.69 | 12.3 | 79.0 | 49.24  | 576.85 |
|                                |       |      |      |      |      |        |        |
|                                |       |      |      |      |      |        |        |

Project No: 3733

Product: Combined Pb. Cl. Product Test No: 132 S.G.- 4.74

| Microns | Weight Grams | % Weight |       |         |
|---------|--------------|----------|-------|---------|
|         |              | Ind.     | Cum.  | Passing |
| 28.2μ   | 1.66         | 3.3      | 3.3   | 96.7    |
| 21.9    | 5.87         | 11.7     | 15.1  | 84.9    |
| 15.2    | 11.99        | 24.0     | 39.0  | 61.0    |
| 10.5    | 10.82        | 21.6     | 60.7  | 39.3    |
| 8.1     | 3.66         | 7.3      | 68.0  | 32.0    |
| -8.1    | 16.00        | 32.0     | 100.0 | -       |
| Total   | 50.00        | 100.0    | -     | -       |

LAKEFIELD RESEARCH

Test No.: 133 Project No.: 3733 Date: 16 Nov. 89 Operator: CP

Purpose: To repeat test No. 132, but increase regrind time to 30 minutes.

Procedure: As for test No. 132.

Feed: 2000 grams minus 10 mesh Composite G-3.

Grind: 40 minutes at 65% solids in the lab. ball mill.

Conditions:

|                  | REAGENTS ADDED, GRAMS PER TONNE |                |               |      |  | TIME, MINUTES |       |       |     |
|------------------|---------------------------------|----------------|---------------|------|--|---------------|-------|-------|-----|
|                  | $\text{Na}_2\text{CO}_3$        | PKO<br>Complex | A317<br>7418A | MIBC |  | GRIND         | COND. | FROTH | pH  |
| Primary Grind    | 1500                            | 150            | 8             |      |  | 40            |       |       |     |
| Pb Rougher       |                                 |                | 40            | 10   |  |               | 1     | 5     | 9.3 |
|                  |                                 |                | 10            | 5    |  |               | 1     | 3     |     |
|                  |                                 |                | 5             | 5    |  |               | 1     | 3     |     |
| Pb Conc. Regrind | 250                             | 50             | 20            |      |  | 30            |       |       |     |
| Pb 1st Cleaner   |                                 |                |               | 5    |  |               | 1     | 3     | 9.3 |
|                  |                                 |                | 5             | 2.5  |  |               | 1     | 3     |     |
| Pb 1st Fl. Sev.  |                                 |                | 5             | 2.5  |  |               | 1     | 2     |     |
| Pb 2nd Cleaner   |                                 | 10             |               |      |  |               | 1     | 3     | 9.1 |
|                  |                                 |                | 5             | 2.5  |  |               | 1     | 2     |     |
| Pb 3rd Cleaner   |                                 | 5              |               |      |  |               | 1     | 2     |     |
|                  |                                 |                | 2.5           | 2.5  |  |               | 1     | 2     |     |
| Pb 4th Cleaner   |                                 | 5              |               | 2.5  |  |               | 1     | 3     | 8.9 |

|                |  |  |  |  |
|----------------|--|--|--|--|
| Stage          |  |  |  |  |
| Flotation Cell |  |  |  |  |
| Speed: r.p.m.  |  |  |  |  |
| % Solids       |  |  |  |  |
| % — mesh       |  |  |  |  |

LAKEFIELD RESEARCH

Test No.: 133

Project No.: \_\_\_\_\_

Date: \_\_\_\_\_

Metallurgical Results

|    | PRODUCT                | WEIGHT |        | ASSAYS, % |      |  |  | % DISTRIBUTION |       |  |  | METAL UNITS |        |  |  |
|----|------------------------|--------|--------|-----------|------|--|--|----------------|-------|--|--|-------------|--------|--|--|
|    |                        | g      | %      | Pb        | Zn   |  |  | Pb             | Zn    |  |  |             |        |  |  |
| 1  | Pb 4th Cl. Conc.       | 92.4   | 4.64   | 57.0      | 6.56 |  |  | 66.4           | 7.2   |  |  | 264.18      | 30.14  |  |  |
| 2  | Pb 4th Cl. Tail.       | 32.5   | 1.63   | 23.1      | 14.5 |  |  | 9.4            | 3.3   |  |  | 37.65       | 23.63  |  |  |
| 3  | Pb 3rd Cl. Tail.       | 23.2   | 1.17   | 14.5      | 15.7 |  |  | 4.3            | 2.5   |  |  | 16.27       | 18.37  |  |  |
| 4  | Pb 2nd Cl. Tail.       | 63.7   | 3.10   | 7.72      | 13.7 |  |  | 6.2            | 6.1   |  |  | 24.70       | 43.84  |  |  |
| 5  | Pb 1st Cl. Scar. Conc. | 29.8   | 1.50   | 2.40      | 11.4 |  |  | 0.9            | 2.4   |  |  | 3.60        | 17.10  |  |  |
| 6  | Pb 1st Cl. Scar. Tail. | 272.3  | 13.68  | 0.97      | 9.21 |  |  | 3.3            | 17.4  |  |  | 13.27       | 125.99 |  |  |
| 7  | Pb Rougher Tail        | 176.1  | 7.18   | 0.51      | 6.24 |  |  | 9.5            | 64.1  |  |  | 37.83       | 42.88  |  |  |
| 8  |                        |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 9  |                        |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 10 |                        |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 11 |                        |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 12 |                        |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
|    | Head (calc.)           | 1990.0 | 100.00 | 3.99      | 7.22 |  |  | 100.0          | 100.0 |  |  | 398.50      | 722.25 |  |  |

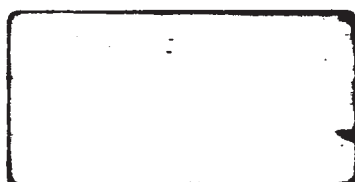
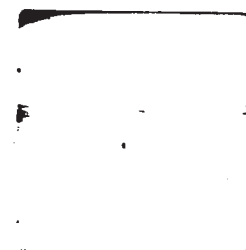
Calculated Grades and Recoveries

|                                |       |      |      |  |  |      |      |  |  |        |        |  |  |
|--------------------------------|-------|------|------|--|--|------|------|--|--|--------|--------|--|--|
| Pb 3rd Cl. Conc. (1+2)         | 6.24  | 48.4 | 8.67 |  |  | 75.8 | 7.5  |  |  | 302.18 | 54.07  |  |  |
| Pb 2nd Cl. Conc. (1-3)         | 7.40  | 43.1 | 9.79 |  |  | 80.1 | 10.0 |  |  | 319.10 | 72.44  |  |  |
| Pb 1st Cl. Conc. (1-4)         | 10.59 | 32.5 | 11.0 |  |  | 86.3 | 16.1 |  |  | 348.80 | 116.28 |  |  |
| Pb 1st Cl. + Scar. Conc. (1-5) | 12.08 | 28.8 | 11.0 |  |  | 87.2 | 18.5 |  |  | 347.40 | 133.38 |  |  |
| Pb Rougher Conc. (1-6)         | 25.69 | 14.0 | 10.1 |  |  | 90.5 | 35.9 |  |  | 360.67 | 259.37 |  |  |
| Pb Comb. Tails (6+7)           | 87.92 | 0.58 | 6.70 |  |  | 12.8 | 81.5 |  |  | 51.10  | 588.87 |  |  |
|                                |       |      |      |  |  |      |      |  |  |        |        |  |  |
|                                |       |      |      |  |  |      |      |  |  |        |        |  |  |

Project No: 3733

Product: Comb. Pb Cleaner Product Test No: 133 S.G.-4.74

| Mesh       | Weight<br>Grams | % Weight |       |         |
|------------|-----------------|----------|-------|---------|
|            |                 | Ind.     | Cum.  | Passing |
| 28.4 $\mu$ | 1.96            | 3.9      | 3.9   | 96.1    |
| 22.0       | 2.47            | 4.9      | 8.9   | 91.1    |
| 15.4       | 8.74            | 17.5     | 26.3  | 73.7    |
| 10.6       | 10.83           | 21.7     | 48.0  | 52.0    |
| 8.2        | 3.73            | 7.5      | 55.5  | 44.5    |
| -8.2       | 22.27           | 44.5     | 100.0 | -       |
| Total      | 50.00           | 100.0    | -     | -       |



LAKEFIELD RESEARCH

Test No.: 134 Project No.: 3733 Date: 16 Nov. 89 Operator: CP  
 Purpose: To repeat test No. 132, but increase regrind time to 40 minutes.

Procedure: As for test No. 132.

Feed: 2000 grams minus 10 mesh Composite B-3.  
 Grind: 40 minutes at 65% solids in the lab. ball mill.

Conditions:

|                          | REAGENTS ADDED, GRAMS PER TONNE            |            |             |             |  | TIME, MINUTES |              |              |            |
|--------------------------|--------------------------------------------|------------|-------------|-------------|--|---------------|--------------|--------------|------------|
|                          | <u>N<sub>2</sub>CO<sub>3</sub> Complex</u> | <u>PKD</u> | <u>A317</u> | <u>MIBC</u> |  | <u>GRIND</u>  | <u>COND.</u> | <u>FROTH</u> | <u>pH</u>  |
| <u>Primary Grind</u>     | <u>1500</u>                                | <u>150</u> | <u>8</u>    |             |  | <u>40</u>     |              |              |            |
| <u>Pb Rougher</u>        |                                            |            | <u>40</u>   | <u>10</u>   |  |               | <u>1</u>     | <u>5</u>     | <u>9.3</u> |
|                          |                                            |            | <u>10</u>   | <u>5</u>    |  |               | <u>1</u>     | <u>3</u>     |            |
|                          |                                            |            | <u>5</u>    | <u>5</u>    |  |               | <u>1</u>     | <u>3</u>     |            |
| <u>Pb Conc. Re-grind</u> | <u>250</u>                                 | <u>50</u>  | <u>20</u>   |             |  | <u>40</u>     |              |              |            |
| <u>Pb 1st Cleaner</u>    |                                            |            |             | <u>5</u>    |  |               | <u>1</u>     | <u>3</u>     | <u>9.1</u> |
|                          |                                            |            | <u>5</u>    | <u>2.5</u>  |  |               | <u>1</u>     | <u>3</u>     |            |
| <u>Pb 1st Cl. Scav.</u>  |                                            |            | <u>5</u>    | <u>2.5</u>  |  |               | <u>1</u>     | <u>2</u>     |            |
| <u>Pb 2nd Cleaner</u>    |                                            | <u>10</u>  |             |             |  |               | <u>1</u>     | <u>3</u>     | <u>9.0</u> |
|                          |                                            |            | <u>5</u>    | <u>2.5</u>  |  |               | <u>1</u>     | <u>2</u>     |            |
| <u>Pb 3rd Cleaner</u>    |                                            | <u>5</u>   |             |             |  |               | <u>1</u>     | <u>2</u>     |            |
|                          |                                            |            | <u>2.5</u>  | <u>2.5</u>  |  |               | <u>1</u>     | <u>2</u>     |            |
| <u>Pb 4th Cleaner</u>    |                                            | <u>5</u>   |             | <u>2.5</u>  |  |               | <u>1</u>     | <u>3</u>     | <u>8.9</u> |

|                |  |  |  |  |
|----------------|--|--|--|--|
| Stage          |  |  |  |  |
| Flotation Cell |  |  |  |  |
| Speed: r.p.m.  |  |  |  |  |
| % Solids       |  |  |  |  |
| % - mesh       |  |  |  |  |

LAKEFIELD RESEARCH

Test No.: 134

Project No.: \_\_\_\_\_

Date: \_\_\_\_\_

Metallurgical Results

|    | PRODUCT                | WEIGHT |        | ASSAYS, % |      |  |  | % DISTRIBUTION |       |  |  | METAL UNITS |        |  |  |
|----|------------------------|--------|--------|-----------|------|--|--|----------------|-------|--|--|-------------|--------|--|--|
|    |                        | g      | %      | Pb        | Zn   |  |  | Pb             | Zn    |  |  |             |        |  |  |
| 1  | Pb 4th Cl. Conc.       | 78.8   | 3.96   | 57.1      | 6.56 |  |  | 56.7           | 3.5   |  |  | 226.12      | 25.98  |  |  |
| 2  | Pb 4th Cl. Tail.       | 22.4   | 1.13   | 29.0      | 12.1 |  |  | 8.2            | 1.8   |  |  | 32.77       | 13.67  |  |  |
| 3  | Pb 3rd Cl. Tail.       | 26.2   | 1.32   | 19.6      | 12.8 |  |  | 6.5            | 2.3   |  |  | 25.87       | 16.89  |  |  |
| 4  | Pb 2nd Cl. Tail.       | 66.4   | 3.34   | 12.4      | 11.9 |  |  | 10.4           | 5.4   |  |  | 41.42       | 39.75  |  |  |
| 5  | Pb 1st Cl. Scav. Conc. | 43.5   | 2.19   | 3.86      | 11.0 |  |  | 2.1            | 3.2   |  |  | 8.45        | 24.09  |  |  |
| 6  | Pb 1st Cl. Scav. Tail. | 243.0  | 12.21  | 1.40      | 10.3 |  |  | 4.3            | 17.0  |  |  | 17.09       | 125.76 |  |  |
| 7  | Pb Rougher Tail        | 1509.5 | 75.85  | 0.62      | 6.53 |  |  | 11.8           | 66.8  |  |  | 47.03       | 495.30 |  |  |
| 8  |                        |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 9  |                        |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 10 |                        |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 11 |                        |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 12 |                        |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
|    | Head (calc.)           | 1989.8 | 100.00 | 3.99      | 7.41 |  |  | 100.0          | 100.0 |  |  | 398.75      | 741.44 |  |  |

Calculated Grades and Recoveries

|                                |       |      |      |      |      |        |        |
|--------------------------------|-------|------|------|------|------|--------|--------|
| Pb 3rd Cl. Conc. (1+2)         | 5.09  | 50.9 | 7.79 | 64.9 | 5.3  | 258.89 | 39.65  |
| Pb 2nd Cl. Conc. (1-3)         | 6.41  | 44.4 | 8.82 | 71.4 | 7.6  | 284.76 | 56.54  |
| Pb 1st Cl. Conc. (1-4)         | 9.75  | 33.5 | 9.88 | 81.8 | 13.0 | 326.18 | 96.29  |
| Pb 1st Cl. + Scav. Conc. (1-5) | 11.94 | 28.0 | 10.1 | 83.9 | 16.2 | 334.63 | 120.38 |
| Pb Rougher Conc. (1-6)         | 24.15 | 14.6 | 10.2 | 88.2 | 33.2 | 351.72 | 246.14 |
| Pb Comb. Tails (6+7)           | 88.06 | 0.73 | 7.05 | 16.1 | 83.8 | 64.12  | 621.06 |
|                                |       |      |      |      |      |        |        |
|                                |       |      |      |      |      |        |        |

Product: Comb. Pb Cleaner Product Test No: 134 S.G.-4.75

| Mesh  | Weight Grams | % Weight |       |         |
|-------|--------------|----------|-------|---------|
|       |              | Ind.     | Cum.  | Passing |
| 28.4μ | 1.41         | 2.8      | 2.8   | 97.2    |
| 22.0  | 1.14         | 2.3      | 5.1   | 94.9    |
| 15.4  | 6.28         | 12.6     | 17.7  | 82.3    |
| 10.6  | 11.24        | 22.5     | 40.1  | 59.9    |
| 8.2   | 4.63         | 9.3      | 49.4  | 50.6    |
| -8.2  | 25.30        | 50.6     | 100.0 | -       |
| Total | 50.00        | 100.0    | -     | -       |

Table No. \_\_\_\_\_

Effect of Various Amounts of PKD Complex Added to Primary Grind and Cleaners on Lead Cleaning from Comp. G-3

| Test No. | PKD Grind | Complex Re grind | g/t Cleaners | Product                   | Weight % | Assay % |      | % Dist. |       |
|----------|-----------|------------------|--------------|---------------------------|----------|---------|------|---------|-------|
|          |           |                  |              |                           |          | Pb      | Zn   | Pb      | Zn    |
| 136      | 150       | 100              | 40           | Pb 4th Cl. Cone.          | 5.43     | 55.4    | 6.93 | 74.9    | 5.1   |
|          |           |                  |              | Pb 1st Cl. + Scav. Cones. | 15.58    | 23.1    | 11.3 | 89.6    | 24.0  |
|          |           |                  |              | Pb 1st Cl. Scav. Tail.    | 16.75    | 0.68    | 10.2 | 2.8     | 23.3  |
|          |           |                  |              | Pb Rougher Tail.          | 67.67    | 0.45    | 5.70 | 7.6     | 52.7  |
|          |           |                  |              | Head (Calc.)              | 100.00   | 4.02    | 7.33 | 100.0   | 100.0 |
| 137      | 250       | 75               | 60           | Pb 4th Cl. Cone.          | 5.08     | 57.0    | 7.28 | 71.9    | 5.1   |
|          |           |                  |              | Pb 1st Cl. + Scav. Cones. | 13.04    | 27.2    | 12.1 | 88.2    | 21.7  |
|          |           |                  |              | Pb 1st Cl. Scav. Tail.    | 19.09    | 0.68    | 12.2 | 3.2     | 32.1  |
|          |           |                  |              | Pb Rougher Tail.          | 67.87    | 0.51    | 4.95 | 8.6     | 46.2  |
|          |           |                  |              | Head (Calc.)              | 100.00   | 4.03    | 7.27 | 100.0   | 100.0 |
| 138      | 350       | 50               | 60           | Pb 4th Cl. Cone.          | 4.35     | 60.4    | 6.34 | 66.9    | 3.8   |
|          |           |                  |              | Pb 1st Cl. + Scav. Cones. | 12.70    | 27.4    | 12.1 | 88.5    | 21.4  |
|          |           |                  |              | Pb 1st Cl. Scav. Tail.    | 18.91    | 0.65    | 13.0 | 3.1     | 34.2  |
|          |           |                  |              | Pb Rougher Tail.          | 68.39    | 0.48    | 4.67 | 8.4     | 44.4  |
|          |           |                  |              | Head (Calc.)              | 100.00   | 3.93    | 7.19 | 100.0   | 100.0 |
| 139      | 250       | 75*              | 60           | Pb 4th Cl. Cone.          | 3.69     | 63.1    | 5.89 | 59.1    | 3.1   |
|          |           |                  |              | Pb 1st Cl. + Scav. Cones. | 11.60    | 30.0    | 11.5 | 88.4    | 19.0  |
|          |           |                  |              | Pb 1st Cl. Scav. Tail.    | 18.15    | 0.80    | 12.9 | 3.7     | 33.2  |
|          |           |                  |              | Pb Rougher Tail.          | 70.25    | 0.44    | 4.79 | 7.9     | 47.8  |
|          |           |                  |              | Head (Calc.)              | 100.00   | 3.94    | 7.04 | 100.0   | 100.0 |

\* Reduced collector addition to re grind by one-half.

LAKEFIELD RESEARCH

Test No.: 136 Project No.: 3733 Date: 20 Nov. 89 Operator: CP

Purpose: To repeat test No. 133, but use a different PKD complex, with increased additions to the cleaners.

Procedure: As for test No. 132, but replace the 1:1 mixture of PKD:Na<sub>2</sub>CO<sub>3</sub> used in the previous tests with a 3:7 mixture of PKD:Na<sub>2</sub>CO<sub>3</sub>

Feed: 2000 grams minus 10 mesh Composite G-3.

Grind: 40 minutes at 65% solids in the lab. ball mill.

Conditions:

|                   | REAGENTS ADDED, GRAMS PER TONNE |             |            |      | TIME, MINUTES |       |       |     |
|-------------------|---------------------------------|-------------|------------|------|---------------|-------|-------|-----|
|                   | Na <sub>2</sub> CO <sub>3</sub> | PKD Complex | A317 3T18A | MIBC | GRIND         | COND. | FROTH | pH  |
| Primary Grind     | 1500                            | 150         | 8          |      | 40            |       |       |     |
| Pb Rougher        |                                 |             | 40         | 10   |               | 1     | 5     | 9.2 |
|                   |                                 |             | 15         | 5    |               | 1     | 3     |     |
|                   |                                 |             | 10         | 5    |               | 1     | 3     |     |
| Pb Conc. Re-grind | 250                             | 100         | 20         |      | 30            |       |       |     |
| Pb 1st Cleaner    |                                 |             |            | 5    |               | 1     | 3     | 9.2 |
|                   |                                 |             | 5          | 2.5  |               | 1     | 3     |     |
| Pb 1st Cl. Scav.  |                                 |             | 5          | 2.5  |               | 1     | 2     |     |
| Pb 2nd Cleaner    |                                 | 20          |            |      |               | 1     | 3     | 9.2 |
|                   |                                 |             | 5          | 2.5  |               | 1     | 2     |     |
| Pb 3rd Cleaner    |                                 | 10          |            |      |               | 1     | 2     |     |
|                   |                                 |             | 2.5        | 2.5  |               | 1     | 2     |     |
| Pb 4th Cleaner    |                                 | 10          |            | 2.5  |               | 1     | 3     | 9.1 |

|                |  |  |  |  |
|----------------|--|--|--|--|
| Stage          |  |  |  |  |
| Flotation Cell |  |  |  |  |
| Speed: r.p.m.  |  |  |  |  |
| % Solids       |  |  |  |  |
| % - mesh       |  |  |  |  |

LAKEFIELD RESEARCH

Test No.: 136

Project No.: \_\_\_\_\_

Date: \_\_\_\_\_

Metallurgical Results

| PRODUCT                  | WEIGHT |        | ASSAYS, % |      |  |  | % DISTRIBUTION |       |  |  | METAL UNITS |        |  |  |
|--------------------------|--------|--------|-----------|------|--|--|----------------|-------|--|--|-------------|--------|--|--|
|                          | g      | %      | Pb        | Zn   |  |  | Pb             | Zn    |  |  |             |        |  |  |
| Pb 4th Cl. Conc.         | 108.1  | 5.43   | 55.4      | 6.93 |  |  | 74.9           | 5.1   |  |  | 300.82      | 37.63  |  |  |
| Pb 4th Cl. Tail.         | 26.4   | 1.33   | 17.1      | 13.6 |  |  | 5.7            | 2.5   |  |  | 22.74       | 18.09  |  |  |
| Pb 3rd Cl. Tail.         | 52.0   | 2.61   | 7.52      | 15.3 |  |  | 4.9            | 5.4   |  |  | 19.63       | 39.93  |  |  |
| Pb 2nd Cl. Tail.         | 86.2   | 4.33   | 3.08      | 13.6 |  |  | 3.3            | 8.0   |  |  | 13.34       | 58.89  |  |  |
| 5 Pb 1st Cl. Seav. Conc. | 37.5   | 1.88   | 1.64      | 11.7 |  |  | 0.8            | 3.0   |  |  | 3.08        | 22.00  |  |  |
| 6 Pb 1st Cl. Seav. Tail. | 338.7  | 16.75  | 0.68      | 10.2 |  |  | 2.8            | 23.3  |  |  | 11.39       | 170.85 |  |  |
| 7 Pb Rougher Tail.       | 1347.8 | 67.67  | 0.45      | 5.70 |  |  | 7.6            | 52.7  |  |  | 30.45       | 385.72 |  |  |
| 8                        |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 9                        |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 10                       |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 11                       |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| 12                       |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| Head (calc.)             | 1991.7 | 100.00 | 4.02      | 7.33 |  |  | 100.0          | 100.0 |  |  | 401.45      | 733.11 |  |  |

Calculated Grades and Recoveries

|                                |       |      |      |      |      |        |        |
|--------------------------------|-------|------|------|------|------|--------|--------|
| Pb 3rd Cl. Conc. (1+2)         | 6.76  | 47.9 | 8.24 | 80.6 | 7.6  | 323.56 | 55.72  |
| Pb 2nd Cl. Conc. (1-3)         | 9.37  | 36.6 | 10.2 | 85.5 | 13.0 | 343.19 | 95.65  |
| Pb 1st Cl. Conc. (1-4)         | 13.70 | 26.0 | 11.3 | 88.8 | 21.0 | 356.53 | 154.54 |
| Pb 1st Cl. + Seav. Conc. (1-5) | 15.58 | 23.1 | 11.3 | 89.6 | 24.0 | 359.61 | 176.54 |
| Pb Rougher Conc. (1-6)         | 32.33 | 11.5 | 10.7 | 92.4 | 47.3 | 371.00 | 347.39 |
| Pb Comb. Tails (6+7)           | 34.42 | 0.50 | 6.59 | 10.4 | 76.0 | 41.84  | 556.57 |

LAKEFIELD RESEARCH

Test No.: 137 Project No.: 3733 Date: 20 Nov. 89 Operator: CP

Purpose: To repeat test No. 136, but increase PKD complex to the primary grind and decrease PKD to regrind.

Procedure: As for test No. 136 -

Feed: 2000 grams minus 10 mesh Composite C-3.

Grind: 40 minutes at 65% solids in the lab. ball mill.

Conditions: \_\_\_\_\_

|                  | REAGENTS ADDED, GRAMS PER TONNE |             |       |      |  | TIME, MINUTES |       |       |     |
|------------------|---------------------------------|-------------|-------|------|--|---------------|-------|-------|-----|
|                  | Na <sub>2</sub> CO <sub>3</sub> | PKD Complex | A317  | MIBC |  | GRIND         | COND. | FROTH | pH  |
|                  |                                 |             | 3A18A |      |  |               |       |       |     |
| Primary Grind    | 1500                            | 250         | 8     |      |  | 40            |       |       |     |
| Pb Rougher       |                                 |             | 40    | 10   |  |               | 1     | 5     | 9.3 |
|                  |                                 |             | 15    | 5    |  |               | 1     | 3     |     |
|                  |                                 |             | 10    | 5    |  |               | 1     | 3     |     |
| Pb Conc. Regrind | 250                             | 75          | 20    |      |  | 30            |       |       |     |
| Pb 1st Cleaner   |                                 |             |       | 5    |  |               | 1     | 3     | 9.3 |
|                  |                                 |             | 5     | 2.5  |  |               | 1     | 3     |     |
| Pb Hot Cl. Scav. |                                 |             | 5     | 2.5  |  |               | 1     | 2     |     |
| Pb 2nd Cleaner   |                                 | 20          |       |      |  |               | 1     | 3     | 9.1 |
|                  |                                 |             | 5     | 2.5  |  |               | 1     | 2     |     |
| Pb 3rd Cleaner   |                                 | 20          |       |      |  |               | 1     | 2     | 9.1 |
|                  |                                 |             | 2.5   | 2.5  |  |               | 1     | 2     |     |
| Pb 4th Cleaner   |                                 | 20          |       | 2.5  |  |               | 1     | 3     | 9.0 |

|                |  |  |  |  |
|----------------|--|--|--|--|
| Stage          |  |  |  |  |
| Flotation Cell |  |  |  |  |
| Speed: r.p.m.  |  |  |  |  |
| % Solids       |  |  |  |  |
| % - mesh       |  |  |  |  |

LAKEFIELD RESEARCH

Test No.: 137

Project No.: \_\_\_\_\_

Date: \_\_\_\_\_

Metallurgical Results

| PRODUCT                            | WEIGHT |        | ASSAYS, % |      |  |  | % DISTRIBUTION |       |  |  | METAL UNITS |        |  |  |
|------------------------------------|--------|--------|-----------|------|--|--|----------------|-------|--|--|-------------|--------|--|--|
|                                    | g      | %      | Pb        | Zn   |  |  | Pb             | Zn    |  |  |             |        |  |  |
| Pb 1 <sup>th</sup> Cl. Conc.       | 101.3  | 5.08   | 57.0      | 7.28 |  |  | 71.9           | 5.1   |  |  | 289.56      | 36.98  |  |  |
| Pb 1 <sup>th</sup> Cl. Tail.       | 26.9   | 1.35   | 23.3      | 14.7 |  |  | 7.8            | 2.7   |  |  | 31.46       | 19.85  |  |  |
| Pb 3 <sup>rd</sup> Cl. Tail.       | 31.0   | 1.56   | 10.7      | 16.3 |  |  | 4.1            | 3.5   |  |  | 16.69       | 25.43  |  |  |
| Pb 2 <sup>nd</sup> Cl. Tail.       | 70.2   | 3.52   | 3.96      | 14.7 |  |  | 3.5            | 7.1   |  |  | 13.94       | 51.74  |  |  |
| Pb 1 <sup>st</sup> Cl. Scav. Conc. | 30.6   | 1.53   | 2.28      | 15.5 |  |  | 0.9            | 3.3   |  |  | 3.49        | 23.72  |  |  |
| Pb 1 <sup>st</sup> Cl. Scav. Tail. | 380.6  | 19.09  | 0.68      | 12.2 |  |  | 3.2            | 32.1  |  |  | 12.98       | 232.90 |  |  |
| Pb Rougher Tail                    | 1352.7 | 67.87  | 0.51      | 4.95 |  |  | 8.6            | 46.2  |  |  | 34.61       | 335.96 |  |  |
|                                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
|                                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
|                                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
|                                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
|                                    |        |        |           |      |  |  |                |       |  |  |             |        |  |  |
| Head (calc.)                       | 1993.3 | 100.00 | 4.03      | 7.27 |  |  | 100.0          | 100.0 |  |  | 402.73      | 726.58 |  |  |

Calculated Grades and Recoveries

|                                            |       |      |      |  |  |      |      |  |  |        |        |  |  |
|--------------------------------------------|-------|------|------|--|--|------|------|--|--|--------|--------|--|--|
| Pb 3 <sup>rd</sup> Cl. Conc. (1+2)         | 6.43  | 49.9 | 8.84 |  |  | 79.7 | 7.8  |  |  | 321.02 | 56.83  |  |  |
| Pb 2 <sup>nd</sup> Cl. Conc. (1-3)         | 7.99  | 42.3 | 10.3 |  |  | 83.8 | 11.3 |  |  | 337.71 | 82.26  |  |  |
| Pb 1 <sup>st</sup> Cl. Conc. (1-4)         | 11.51 | 30.6 | 11.6 |  |  | 87.3 | 18.4 |  |  | 351.65 | 134.00 |  |  |
| Pb 1 <sup>st</sup> Cl. + Scav. Conc. (1-5) | 13.04 | 27.2 | 12.1 |  |  | 88.2 | 21.7 |  |  | 355.14 | 157.72 |  |  |
| Pb Rougher Conc. (1-6)                     | 32.13 | 11.5 | 12.2 |  |  | 91.4 | 53.8 |  |  | 368.12 | 390.62 |  |  |
| Pb Comb. Tails (6+7)                       | 86.96 | 0.55 | 6.54 |  |  | 11.8 | 78.3 |  |  | 47.59  | 568.86 |  |  |

LAKEFIELD RESEARCH

Test No.: 138 Project No.: 3733 Date: 25 Nov-89 Operator: CP

Purpose: To repeat tests No. 136 and 137, but further increase PKD to the primary grind and reduce PKD to re-grind.

Procedure: As for test No. 136.

Feed: 7000 grams minus 10 mesh Composite G-3.

Grind: 40 minutes at 65% solids in the lab-ball mill.

Conditions:

|                   | REAGENTS ADDED, GRAMS PER TONNE               |             |            |      |  | TIME, MINUTES |       |       | pH  |
|-------------------|-----------------------------------------------|-------------|------------|------|--|---------------|-------|-------|-----|
|                   | Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> | PKD Complex | A317 3A18A | MIBC |  | GRIND         | COND. | FROTH |     |
| Primary Grind     | 1500                                          | 350         | 8          |      |  | 40            |       |       |     |
| Pb Rougher        |                                               |             | 40         | 10   |  |               | 1     | 5     | 9.3 |
|                   |                                               |             | 1.5        | 5    |  |               | 1     | 3     |     |
|                   |                                               |             | 10         | 5    |  |               | 1     | 3     |     |
| Pb Conc. Re-grind | 250                                           | 50          | 20         |      |  | 30            |       |       |     |
| Pb 1st Cleaner    |                                               |             |            | 5    |  |               | 1     | 3     | 9.2 |
|                   |                                               |             | 5          | 2.5  |  |               | 1     | 3     |     |
| Pb 1st Cl. Sev.   |                                               |             | 5          | 2.5  |  |               | 1     | 2     |     |
| Pb 2nd Cleaner    |                                               | 20          |            |      |  |               | 1     | 3     | 9.1 |
|                   |                                               |             | 5          | 2.5  |  |               | 1     | 2     |     |
| Pb 3rd Cleaner    |                                               | 20          |            |      |  |               | 1     | 2     | 9.1 |
|                   |                                               |             | 2.5        | 2.5  |  |               | 1     | 2     |     |
| Pb 4th Cleaner    |                                               | 20          |            | 2.5  |  |               | 1     | 3     | 9.0 |

|                |  |  |  |  |
|----------------|--|--|--|--|
| Stage          |  |  |  |  |
| Flotation Cell |  |  |  |  |
| Speed: r.p.m.  |  |  |  |  |
| % Solids       |  |  |  |  |
| % - mesh       |  |  |  |  |

LAKEFIELD RESEARCH

Test No.: 138

Project No.: \_\_\_\_\_

Date: \_\_\_\_\_

Metallurgical Results

| PRODUCT                  | WEIGHT |        | ASSAYS, % |      |  |  | % DISTRIBUTION |       |  |  | METAL UNITS |        |        |  |
|--------------------------|--------|--------|-----------|------|--|--|----------------|-------|--|--|-------------|--------|--------|--|
|                          | g      | %      | Pb        | Zn   |  |  | Pb             | Zn    |  |  |             |        |        |  |
| Pb 4th Cl. Conc.         | 86.5   | 4.35   | 60.4      | 6.34 |  |  | 66.9           | 3.8   |  |  |             | 262.74 | 27.58  |  |
| Pb 4th Cl. Tail.         | 34.9   | 1.75   | 26.1      | 13.3 |  |  | 11.6           | 3.2   |  |  |             | 45.68  | 23.28  |  |
| Pb 3rd Cl. Tail.         | 31.3   | 1.57   | 13.6      | 18.1 |  |  | 5.4            | 4.0   |  |  |             | 21.35  | 28.42  |  |
| Pb 2nd Cl. Tail.         | 73.1   | 3.67   | 4.10      | 14.8 |  |  | 3.8            | 7.6   |  |  |             | 15.05  | 54.32  |  |
| 5 Pb 1st Cl. Scav. Conc. | 27.1   | 1.36   | 2.24      | 14.9 |  |  | 0.8            | 2.8   |  |  |             | 3.05   | 20.26  |  |
| 6 Pb 1st Cl. Scav. Tail. | 376.3  | 18.91  | 0.65      | 13.0 |  |  | 3.1            | 34.2  |  |  |             | 12.29  | 245.83 |  |
| 7 Pb Rougher Tail        | 1361.3 | 68.39  | 0.48      | 4.67 |  |  | 8.4            | 44.4  |  |  |             | 32.83  | 319.38 |  |
| 8                        |        |        |           |      |  |  |                |       |  |  |             |        |        |  |
| 9                        |        |        |           |      |  |  |                |       |  |  |             |        |        |  |
| 10                       |        |        |           |      |  |  |                |       |  |  |             |        |        |  |
| 11                       |        |        |           |      |  |  |                |       |  |  |             |        |        |  |
| 12                       |        |        |           |      |  |  |                |       |  |  |             |        |        |  |
| Head (calc.)             | 1990.5 | 100.00 | 3.93      | 7.19 |  |  | 100.0          | 100.0 |  |  |             | 392.99 | 719.07 |  |

Calculated Grades and Recoveries

|                                |       |      |      |  |  |      |      |  |  |        |        |  |
|--------------------------------|-------|------|------|--|--|------|------|--|--|--------|--------|--|
| Pb 3rd Cl. Conc. (1+2)         | 6.10  | 50.6 | 8.34 |  |  | 78.5 | 7.0  |  |  | 308.42 | 50.86  |  |
| Pb 2nd Cl. Conc. (1-3)         | 7.67  | 43.0 | 10.3 |  |  | 83.9 | 11.0 |  |  | 329.77 | 79.28  |  |
| Pb 1st Cl. Conc. (1-4)         | 11.34 | 30.4 | 11.8 |  |  | 87.7 | 18.6 |  |  | 344.82 | 133.60 |  |
| Pb 1st Cl. + Scav. Conc. (1-5) | 12.70 | 27.4 | 12.1 |  |  | 88.5 | 21.4 |  |  | 347.87 | 153.86 |  |
| Pb Rougher Conc. (1-6)         | 31.61 | 11.4 | 12.6 |  |  | 91.6 | 55.6 |  |  | 360.16 | 399.69 |  |
| Pb Comb. Tails (6+7)           | 87.30 | 0.52 | 6.47 |  |  | 11.5 | 78.6 |  |  | 45.12  | 565.21 |  |
|                                |       |      |      |  |  |      |      |  |  |        |        |  |
|                                |       |      |      |  |  |      |      |  |  |        |        |  |

LAKEFIELD RESEARCH

Test No.: 139 Project No.: 3733 Date: 22 Nov. 89 Operator: CP  
 Purpose: To repeat test No. 137, but reduce collector addition to the lead regrind.  
 Procedure: As for test No. 136.

Feed: 2000 grams minus 10 mesh Composite C-3.  
 Grind: 40 minutes at 65% solids in the lab. ball mill.  
 Conditions: \_\_\_\_\_

|                  | REAGENTS ADDED, GRAMS PER TONNE     |                    |                   |             |  | TIME, MINUTES |       |       |     |
|------------------|-------------------------------------|--------------------|-------------------|-------------|--|---------------|-------|-------|-----|
|                  | <u>Na<sub>2</sub>CO<sub>3</sub></u> | <u>PKD Complex</u> | <u>A317 3418A</u> | <u>MIBC</u> |  | GRIND         | COND. | FROTH | pH  |
| Primary Grind    | 1500                                | 250                | 8                 |             |  | 40            |       |       |     |
| Pb Rougher       |                                     |                    | 40                | 10          |  |               | 1     | 5     | 9.2 |
|                  |                                     |                    | 20                | 5           |  |               | 1     | 3     |     |
|                  |                                     |                    | 10                | 5           |  |               | 1     | 3     |     |
| Pb Conc. Regrind | 250                                 | 75                 | 10                |             |  | 30            |       |       |     |
| Pb 1st Cleaner   |                                     |                    |                   | 5           |  |               | 1     | 3     | 9.3 |
|                  |                                     |                    | 5                 | 2.5         |  |               | 1     | 3     |     |
| Pb 1st Cl. Scav. |                                     |                    | 5                 | 2.5         |  |               | 1     | 2     |     |
| Pb 2nd Cleaner   |                                     | 20                 |                   |             |  |               | 1     | 3     |     |
|                  |                                     |                    | 5                 | 2.5         |  |               | 1     | 2     |     |
| Pb 3rd Cleaner   |                                     | 20                 |                   |             |  |               | 1     | 2     | 9.7 |
|                  |                                     |                    | 2.5               | 2.5         |  |               | 1     | 2     |     |
| Pb 4th Cleaner   |                                     | 20                 |                   | 2.5         |  |               | 1     | 3     | 9.1 |

|                |  |  |  |  |
|----------------|--|--|--|--|
| Stage          |  |  |  |  |
| Flotation Cell |  |  |  |  |
| Speed: r.p.m.  |  |  |  |  |
| % Solids       |  |  |  |  |
| % - mesh       |  |  |  |  |

LAKEFIELD RESEARCH

Test No.: 139

Project No.: \_\_\_\_\_

Date: \_\_\_\_\_

Metallurgical Results

|    | PRODUCT               | WEIGHT |        | ASSAYS, % |      |  |  | % DISTRIBUTION |       |  |  | METAL UNITS |        |
|----|-----------------------|--------|--------|-----------|------|--|--|----------------|-------|--|--|-------------|--------|
|    |                       | g      | %      | Pb        | Zn   |  |  | Pb             | Zn    |  |  |             |        |
| 1  | Pb 4th Cl. Conc.      | 73.5   | 3.69   | 63.1      | 5.89 |  |  | 59.1           | 3.1   |  |  | 232.84      | 21.73  |
| 2  | Pb 4th Cl. Tail.      | 37.9   | 1.90   | 32.9      | 11.9 |  |  | 15.9           | 3.2   |  |  | 62.51       | 22.61  |
| 3  | Pb 3rd Cl. Tail.      | 32.4   | 1.63   | 17.9      | 14.8 |  |  | 7.4            | 3.4   |  |  | 29.18       | 24.12  |
| 4  | Pb 2nd Cl. Tail.      | 57.1   | 2.86   | 6.63      | 14.9 |  |  | 4.8            | 6.1   |  |  | 18.96       | 42.61  |
| 5  | Pb 1st Cl. Seam Conc. | 30.3   | 1.52   | 3.11      | 14.8 |  |  | 1.2            | 3.2   |  |  | 4.73        | 22.50  |
| 6  | Pb 1st Cl. Seam Tail. | 361.9  | 18.15  | 0.80      | 12.9 |  |  | 3.7            | 33.2  |  |  | 14.52       | 234.14 |
| 7  | Pb Rougher Tail       | 1400.7 | 70.25  | 0.44      | 4.79 |  |  | 7.9            | 47.8  |  |  | 30.91       | 336.50 |
| 8  |                       |        |        |           |      |  |  |                |       |  |  |             |        |
| 9  |                       |        |        |           |      |  |  |                |       |  |  |             |        |
| 10 |                       |        |        |           |      |  |  |                |       |  |  |             |        |
| 11 |                       |        |        |           |      |  |  |                |       |  |  |             |        |
| 12 |                       |        |        |           |      |  |  |                |       |  |  |             |        |
|    | Head (calc.)          | 1993.8 | 100.00 | 3.94      | 7.04 |  |  | 100.0          | 100.0 |  |  | 393.65      | 704.21 |

Calculated Grades and Recoveries

|                               |       |      |      |  |  |      |      |  |  |        |        |
|-------------------------------|-------|------|------|--|--|------|------|--|--|--------|--------|
| Pb 3rd Cl. Conc. (1+2)        | 5.59  | 52.8 | 7.93 |  |  | 75.0 | 6.3  |  |  | 295.35 | 44.34  |
| Pb 2nd Cl. Conc. (1-3)        | 7.22  | 44.9 | 9.48 |  |  | 82.4 | 9.7  |  |  | 324.53 | 68.46  |
| Pb 1st Cl. Conc. (1-4)        | 10.08 | 34.1 | 11.0 |  |  | 87.2 | 15.8 |  |  | 343.49 | 111.07 |
| Pb 1st Cl. + Seam Conc. (1-5) | 11.60 | 30.0 | 11.5 |  |  | 88.4 | 19.0 |  |  | 348.22 | 133.57 |
| Pb Rougher Conc. (1-6)        | 29.75 | 12.2 | 12.4 |  |  | 92.1 | 52.2 |  |  | 362.74 | 367.71 |
| Pb Comb. Tails (6+7)          | 88.40 | 0.51 | 6.46 |  |  | 11.6 | 81.0 |  |  | 45.43  | 570.61 |
|                               |       |      |      |  |  |      |      |  |  |        |        |
|                               |       |      |      |  |  |      |      |  |  |        |        |

LAKEFIELD RESEARCH

Test No.: 140 Project No.: 3733 Date: 23 Nov. 89 Operator: CP

Purpose: To perform a complete test (Pb and Zn circuits) following the lead conditions of test 138 and attempting to improve Zn recovery.

Procedure: As for test No. 135.

Feed: 2000 grams minus 10 mesh Composite G-3.

Grind: 40 minutes at 65% solids in the lab. ball mill.

Conditions: \_\_\_\_\_

|                                                                  | REAGENTS ADDED, GRAMS PER TONNE |                |               |      |     | TIME, MINUTES |       |       |     |
|------------------------------------------------------------------|---------------------------------|----------------|---------------|------|-----|---------------|-------|-------|-----|
|                                                                  | $\text{Na}_2\text{CO}_3$        | PKD<br>Complex | A31Z<br>3A18A | MIBC |     | GRIND         | COND. | FROTH | pH  |
| Primary Grind                                                    | 1500                            | 350            | 8             |      |     | 40            |       |       |     |
| Pb Rougher                                                       |                                 |                | 40            | 10   |     |               | 1     | 5     | 9.3 |
|                                                                  |                                 |                | 20            | 5    |     |               | 1     | 3     |     |
|                                                                  |                                 |                | 10            | 5    |     |               | 1     | 3     |     |
| Pb Conc. Regrind                                                 | 250                             | 50             | 20            |      |     | 30            |       |       |     |
| Pb 1st Cleaner                                                   |                                 |                |               | 5    |     |               | 1     | 3     | 9.1 |
|                                                                  |                                 |                |               | 5    | 2.5 |               | 1     | 3     |     |
| Pb 1st Cl. Scav.                                                 |                                 |                |               | 5    | 2.5 |               | 1     | 2     |     |
| Pb 2nd Cleaner                                                   |                                 | 30             |               |      |     |               | 1     | 3     |     |
|                                                                  |                                 |                |               | 5    | 2.5 |               | 1     | 2     |     |
| Pb 3rd Cleaner                                                   |                                 | 20             |               |      |     |               | 1     | 2     | 9.0 |
|                                                                  |                                 |                |               | 2.5  | 2.5 |               | 1     | 2     |     |
| Pb 4th Cleaner                                                   |                                 | 20             |               |      | 2.5 |               | 1     | 3     |     |
| Combine lead rougher and 1st cleaner tailings for zinc flotation |                                 |                |               |      |     |               |       |       |     |

|                |  |  |  |  |
|----------------|--|--|--|--|
| Stage          |  |  |  |  |
| Flotation Cell |  |  |  |  |
| Speed: r.p.m.  |  |  |  |  |
| % Solids       |  |  |  |  |
| % - mesh       |  |  |  |  |

# LAKEFIELD RESEARCH

Test No.: 140 (Contd) Project No.: \_\_\_\_\_ Date: \_\_\_\_\_ Operator: \_\_\_\_\_

Purpose: \_\_\_\_\_

Procedure: \_\_\_\_\_

Feed: \_\_\_\_\_

Grind: \_\_\_\_\_

Conditions: \_\_\_\_\_

|                   | REAGENTS ADDED, GRAMS PER TONNE |                   |      |            |  |  | TIME, MINUTES |       |       |      |
|-------------------|---------------------------------|-------------------|------|------------|--|--|---------------|-------|-------|------|
|                   | Ca(OH) <sub>2</sub>             | CuSO <sub>4</sub> | A743 | DF<br>1012 |  |  | GRIND         | COND. | FROTH | pH   |
| Condition         | 2000                            |                   |      |            |  |  |               | 5     |       |      |
| Zn Rougher        |                                 | 1000              | 40   | 5          |  |  |               | 5     | 3     | 11.6 |
|                   |                                 |                   | 20   | 2.5        |  |  |               | 1     | 2     |      |
|                   |                                 |                   | 10   | 2.5        |  |  |               | 1     | 2     |      |
| Zn Conc. Re-grind | 1000                            | 100               | 25   |            |  |  | 30            |       |       |      |
| Zn 1st Cleaner    |                                 |                   |      | 2.5        |  |  |               |       | 5     | 11.7 |
|                   |                                 |                   | 10   |            |  |  |               | 1     | 2     |      |
| Zn 1st Cl. Scav.  |                                 |                   | 5    |            |  |  |               | 1     | 2     |      |
| Zn 2nd Cleaner    | 500                             |                   |      |            |  |  |               | 1     | 5     |      |
| Zn 3rd Cleaner    | 500                             |                   |      |            |  |  |               | 1     | 4     | 12.0 |
| Zn 4th Cleaner    | 500                             |                   |      |            |  |  |               | 1     | 3     |      |

|                |  |  |  |  |  |
|----------------|--|--|--|--|--|
| Stage          |  |  |  |  |  |
| Flotation Cell |  |  |  |  |  |
| Speed: r.p.m.  |  |  |  |  |  |
| % Solids       |  |  |  |  |  |
|                |  |  |  |  |  |
| % — mesh       |  |  |  |  |  |

## LAKEFIELD RESEARCH

 Test No.: 140

Project No.: \_\_\_\_\_

Date: \_\_\_\_\_

### Metallurgical Results

|    | PRODUCT                | WEIGHT |        | ASSAYS, % |      |  | % DISTRIBUTION |       |            | METAL UNITS |        |
|----|------------------------|--------|--------|-----------|------|--|----------------|-------|------------|-------------|--------|
|    |                        | g      | %      | Pb        | Zn   |  | Pb             | Zn    | Zn Circuit |             |        |
| 1  | Pb 4th Cl. Cone.       | 105.8  | 5.29   | 52.2      | 8.11 |  | 70.0           | 6.1   | -          | 276.14      | 42.90  |
| 2  | Pb 4th Cl. Tail.       | 35.3   | 1.76   | 17.8      | 13.6 |  | 7.9            | 3.4   | -          | 31.33       | 23.94  |
| 3  | Pb 3rd Cl. Tail.       | 35.0   | 1.75   | 9.70      | 11.1 |  | 4.3            | 2.8   | -          | 16.98       | 19.43  |
| 4  | Pb 2nd Cl. Tail.       | 103.2  | 5.16   | 4.14      | 11.7 |  | 5.4            | 8.6   | -          | 21.36       | 60.37  |
| 5  | Pb 1st Cl. Scav. Cone. | 30.9   | 1.55   | 2.73      | 13.2 |  | 1.1            | 2.9   | -          | 4.23        | 20.46  |
| 6  | Zn 4th Cl. Cone.       | 125.4  | 6.27   | 0.68      | 57.2 |  | 1.1            | 51.1  | 67.0       | 4.26        | 358.64 |
| 7  | Zn 4th Cl. Tail.       | 20.1   | 1.01   | 1.49      | 37.8 |  | 0.4            | 5.4   | 7.2        | 1.50        | 38.18  |
| 8  | Zn 3rd Cl. Tail.       | 27.7   | 1.38   | 1.64      | 20.3 |  | 0.6            | 4.0   | 5.2        | 2.26        | 28.01  |
| 9  | Zn 2nd Cl. Tail.       | 51.1   | 2.56   | 1.32      | 6.44 |  | 0.9            | 2.3   | 3.1        | 3.38        | 16.49  |
| 10 | Zn 1st Cl. Scav. Cone. | 26.8   | 1.34   | 1.47      | 5.79 |  | 0.5            | 1.1   | 1.4        | 1.97        | 7.76   |
| 11 | Zn 1st Cl. Scav. Tail. | 104.4  | 5.22   | 0.85      | 2.06 |  | 1.1            | 1.5   | 2.0        | 4.44        | 10.75  |
| 12 | Zn Rougher Tail.       | 1333.9 | 66.71  | 0.40      | 1.13 |  | 6.7            | 10.8  | 14.1       | 26.68       | 75.38  |
|    | Head (calc.)           | 1999.6 | 100.00 | 3.95      | 7.02 |  | 100.0          | 100.0 | 100.0      | 394.53      | 702.31 |

### Calculated Grades and Recoveries

|                                 |       |      |      |      |      |       |        |        |
|---------------------------------|-------|------|------|------|------|-------|--------|--------|
| Pb 3rd Cl. Cone. (1+2)          | 7.05  | 43.6 | 9.48 | 77.9 | 9.5  | -     | 307.47 | 66.84  |
| Pb 2nd Cl. Cone. (1-3)          | 8.80  | 36.9 | 9.80 | 82.2 | 12.3 | -     | 324.45 | 86.27  |
| Pb 1st Cl. + Scav. Cones (1-5)  | 15.51 | 22.6 | 10.8 | 88.7 | 23.8 | -     | 350.04 | 167.10 |
| Zn 3rd Cl. Cone. (6+7)          | 7.28  | 0.79 | 54.5 | 1.5  | 56.5 | 74.2  | 5.76   | 396.82 |
| Zn 2nd Cl. Cone. (6-8)          | 8.66  | 0.93 | 49.1 | 2.1  | 60.5 | 79.4  | 8.02   | 424.83 |
| Zn 1st Cl. + Scav. Cones (6-10) | 12.56 | 1.06 | 35.8 | 3.5  | 63.9 | 83.9  | 13.37  | 449.08 |
| Zn Rougher Cone. (6-11)         | 17.78 | 1.00 | 25.9 | 4.6  | 65.4 | 85.9  | 17.81  | 459.83 |
| Zn Flat Feed (6-12)             | 84.49 | 0.53 | 6.33 | 11.3 | 76.2 | 100.0 | 44.49  | 535.21 |