

006528
Vangorda

| Test no. | Product | Weight % | Assays, % g/t | | | | % Distribution | | | |
|---|------------------|----------|---------------|------|------|-------|----------------|-------|-------|-------|
| | | | Pb | Zn | Au | Ag | Pb | Zn | Au | Ag |
| 1 V.G. Magnesian | Pb 4TH Cl. Conc. | 4.28 | 53.8 | 12.3 | — | — | 63.3 | 10.2 | — | — |
| | Pb 1ST Cl. Conc. | 9.83 | 29.4 | 16.6 | — | — | 79.3 | 31.7 | — | — |
| | Zn 4TH Cl. Conc. | 4.98 | 2.08 | 51.1 | — | — | 2.8 | 49.6 | — | — |
| | Zn Ro. Conc. | 14.43 | 2.29 | 20.5 | — | — | 9.1 | 57.6 | — | — |
| | Zn Ro. Tail | 74.71 | 0.46 | 0.45 | — | — | 9.4 | 6.5 | — | — |
| | Head (calc.) | 100.00 | 3.64 | 5.14 | — | — | 100.0 | 100.0 | — | — |
| 2 V.G. Flint + Magnesian | Pb 4TH Cl. Conc. | 4.52 | 54.8 | 12.1 | — | — | 69.4 | 11.4 | — | — |
| | Pb 1ST Cl. Conc. | 8.11 | 36.4 | 14.4 | — | — | 82.7 | 24.3 | — | — |
| | Zn 4TH Cl. Conc. | 3.33 | 0.95 | 54.3 | — | — | 0.9 | 37.7 | — | — |
| | Zn Ro. Conc. | 13.43 | 1.68 | 23.3 | — | — | 6.3 | 65.2 | — | — |
| | Zn Ro. Tail | 78.12 | 0.48 | 0.50 | — | — | 10.5 | 8.1 | — | — |
| | Head (calc.) | 100.00 | 3.57 | 4.80 | — | — | 100.0 | 100.0 | — | — |
| 3 V.G. Flint + Magnesian 50/50 | Pb 4TH Cl. Conc. | 3.64 | 61.6 | 10.8 | — | — | 65.0 | 8.2 | — | — |
| | Pb 1ST Cl. Conc. | 6.60 | 42.0 | 15.8 | — | — | 80.5 | 21.7 | — | — |
| | Zn 4TH Cl. Conc. | 4.83 | 1.50 | 55.4 | — | — | 2.1 | 55.7 | — | — |
| | Zn Ro. Conc. | 13.82 | 1.96 | 23.2 | — | — | 7.9 | 66.9 | — | — |
| | Zn Ro. Tail | 79.21 | 0.47 | 0.49 | — | — | 10.8 | 8.1 | — | — |
| | Head (calc.) | 100.00 | 3.44 | 4.80 | — | — | 100.0 | 100.0 | — | — |
| 4 Diff. calc. | Pb 4TH Cl. Conc. | 3.03 | 57.4 | 12.4 | — | — | 51.5 | 7.9 | — | — |
| | Pb 1ST Cl. Conc. | 9.28 | 28.6 | 22.4 | — | — | 78.5 | 43.9 | — | — |
| | Pb Ro. Conc. | 21.25 | 14.0 | 13.8 | — | — | 88.1 | 61.8 | — | — |
| | Pb Ro. Tail | 78.75 | 0.51 | 2.29 | — | — | 11.9 | 38.2 | — | — |
| | Head (calc.) | 100.00 | 3.38 | 4.73 | — | — | 100.0 | 100.0 | — | — |
| 5 Hav. S. | Pb 4TH Cl. Conc. | 3.57 | 56.4 | 13.1 | 17.0 | 572.7 | 60.9 | 10.0 | 57.6 | 41.0 |
| | Pb 1ST Cl. Conc. | 6.69 | 38.2 | 19.0 | 10.2 | 458.4 | 77.2 | 27.2 | 64.7 | 61.5 |
| | Zn 4TH Cl. Conc. | 4.48 | 1.65 | 53.9 | 1.39 | 67.5 | 2.2 | 51.6 | 5.9 | 6.1 |
| | Zn Ro. Conc. | 14.26 | 1.88 | 19.4 | 0.89 | 63.9 | 8.1 | 59.1 | 12.0 | 18.3 |
| | Zn Ro. Tail | 78.13 | 0.50 | 0.43 | 0.27 | 9.8 | 11.8 | 7.2 | 20.0 | 15.4 |
| | Head (calc.) | 100.00 | 3.31 | 4.68 | 1.06 | 49.8 | 100.0 | 100.0 | 100.0 | 100.0 |

Table no. Preliminary Lead and Zinc Plotation Tests
using Different Reagent Schemes - Vangorda Ore

a) Conditions

| Test no. | Pb. Grind Time | | Reagent Additions, g/t | | | | pH | |
|----------|----------------|---------|--|-------------------|--|------------|---------|---------|
| | Primary | Regrind | Pb Circuit | | Zn Circuit | | Pb | Zn |
| | | | Degr. & Mod. | Collector | Degr. & Mod. | Collector | | |
| 1 | 40 | 20 | Na ₂ CO ₃ = 2000, NaCN = 320, Na ₂ SiO ₃ = 250 | A317/3418A = 54 | Ca(OH) ₂ = 2250, CuSO ₄ = 800 | A350 = 45 | 9.4-9.8 | 11.5 |
| 2 | 40 | 20 | Na ₂ CO ₃ = 2000, NaCN = 395, Na ₂ SiO ₃ = 250 | A317/3418A = 51.5 | Ca(OH) ₂ = 5000, CuSO ₄ = 800 | A350 = 55 | 9.7 | 11.8-12 |
| 3 | 40 | 30 | Na ₂ CO ₃ = 2500, PKD = 395 | A317/3418A = 56 | Ca(OH) ₂ = 4500, CuSO ₄ = 1700 | A343 = 100 | 9.6 | 11.5-12 |
| 4 | 40 | 30 | Na ₂ CO ₃ = 2500, PKD = 395 | A317/LSB1 = 81.5 | — | — | 9.5-9.8 | — |
| 5 | 40 | 30 | Na ₂ CO ₃ = 2500, Na ₂ S = 800, PKD = 395 | A317/3418A = 54 | Ca(OH) ₂ = 4500, CuSO ₄ = 1700 | A343 = 100 | 9.8-9.5 | 11.8-12 |

| Core | Prod | Pb | Zn | Au | Ag | Pb | Zn | Au | Ag |
|------------------|-------------------|------|-------|----|----|------|------|----|----|
| Mos | Pb Conc | 58.0 | 9.5 | - | - | 81.7 | 11.6 | - | - |
| Batch | Zn | 1.34 | 52.6 | | | 1.7 | 58.4 | | |
| NS. | Pb conc | 61.6 | 10.8 | | | 65.0 | 8.1 | | |
| Batch | Zn Conc | 1.5 | 55.4 | | | 2.1 | 55.7 | | |
| Batch | | | | | | | | | |
| Ma | 1st Cl. Cou | 42.2 | 9.6 | | | 89.6 | 17.6 | | |
| N.S | 1st Cl Con | 42.0 | 15.8 | | | 80.5 | 21.7 | | |
| AT | Pb Con | 44.0 | 14.2 | | | 44.0 | 13.2 | | |
| Batch | Zn Cou | 1.22 | 53.0 | | | 0.8 | 32.8 | | |
| | Pb 1st Cl | 32.0 | 15.2 | | | 75.1 | 33.2 | | |
| L.C | Pb | 43.1 | 12.6 | | | 61.3 | 17.0 | | |
| IA | Zn | 2.92 | 52.4 | | | 3.5 | 59.6 | | |
| 4. | Pb Co | 59.2 | 5.27 | | | 80.9 | 3.9 | | |
| <u>LC</u> | Zn | 0.61 | 53.60 | | | 1.1 | 88.1 | | |
| <u>Batch</u> | PbC | 53.8 | 5.49 | | | 71.4 | 4.1 | | |
| | Pb 1st | 30.7 | 6.39 | | | 81.0 | 9.4 | | |
| | Zn Cou | | | | | | | | |

| | | | | | | | |
|-----|----|--------|------|------|--|------|------|
| NS. | Pb | Pb con | 60.0 | 10.5 | | 79.5 | 8.2 |
| | | Zn con | 1.5 | 54.0 | | 2.0 | 83.3 |

Projected for Near Surface Metallurgy.

Conventional flowsheet

Table No. : Effect of Primary Grind Fineness

a) Conditions

| Test No. | Primary Grind min | Grind $\frac{kg}{mm}$ | Reagent Additions g/t | | |
|----------|-------------------|-----------------------|---|------------------------------|------------|
| | | | Prim. Grind | Pb Rougher | Pb Scav |
| 15 | 20 | 67 | $Na_2CO_3 = 1500$ $NaCN = 150$ $242 = 20$ | $317 = 120$ $H18C = 22.5$ | $317 = 20$ |
| 16 | 30 | 38 | $Na_2CO_3 = 1500$ $NaCN = 150$ $242 = 20$ | $317 = 120$ $H18C = 17.5$ | $317 = 20$ |
| 17 | 40 | 32 | $Na_2CO_3 = 1500$ $NaCN = 150$ $242 = 20$ | $317 = 120$ $H18C = 20$ | $317 = 20$ |
| 18 | 50 | 27 | $Na_2CO_3 = 1500$ $NaCN = 150$ $242 = 20$ | $317 = 120$ $H18C = 25$ | $317 = 20$ |
| 19 | 60 | 24 | $Na_2CO_3 = 1500$ $NaCN = 150$ $242 = 20$ | $317 = 120$ $H18C = 25$ | $317 = 20$ |
| 20 | 70 | 21 | $Na_2CO_3 = 1500$ $NaCN = 150$ $242 = 20$ | $317 = 120$ $H18C = 25$ | $317 = 20$ |

b) Results

| Test No | Product | Weight % | Assays, % | | % Distribution | |
|---------|--------------------|----------|-----------|-------|----------------|-------|
| | | | Pb | Zn | Pb | Zn |
| 15 | Pb Ro Concl | 17.69 | 19.80 | 16.30 | 83.5 | 23.5 |
| | Pb Ro Concs 1-3 | 44.12 | 8.76 | 20.44 | 92.2 | 73.5 |
| | Pb Ro + Scav Concs | 50.54 | 7.81 | 19.72 | 94.1 | 81.1 |
| | Pb Scav Tail | 49.46 | 0.50 | 4.70 | 5.9 | 18.9 |
| | Head (calc) | 100.00 | 4.20 | 12.29 | 100.0 | 100.0 |
| 16 | Pb Ro Concl | 12.98 | 26.90 | 9.30 | 80.2 | 10.0 |
| | Pb Ro Concs 1-3 | 30.80 | 12.79 | 19.17 | 90.5 | 49.0 |
| | Pb Ro + Scav Concs | 36.99 | 10.85 | 19.71 | 92.2 | 60.5 |
| | Pb Scav Tail | 63.01 | 0.54 | 7.56 | 7.8 | 39.5 |
| | Head (calc) | 100.00 | 4.36 | 12.06 | 100.0 | 100.0 |
| 17 | Pb Ro Concl | 13.13 | 27.10 | 8.24 | 83.9 | 9.1 |
| | Pb Ro Concs 1-3 | 30.66 | 12.67 | 19.76 | 91.6 | 55.8 |
| | Pb Ro + Scav Concs | 40.09 | 9.93 | 20.24 | 93.8 | 68.7 |
| | Pb Scav Tail | 59.91 | 0.44 | 6.35 | 6.2 | 31.9 |
| | Head (calc) | 100.00 | 4.24 | 11.92 | 100.0 | 100.0 |
| 18 | Pb Ro Concl | 9.35 | 36.3 | 5.22 | 78.9 | 4.1 |
| | Pb Ro Concs 1-3 | 22.25 | 17.38 | 14.35 | 89.8 | 27.0 |
| | Pb Ro + Scav Concs | 28.72 | 13.74 | 16.50 | 91.7 | 40.1 |
| | Pb Scav Tail | 71.28 | 0.50 | 9.92 | 8.3 | 59.9 |
| | Head (calc) | 100.00 | 4.30 | 11.81 | 100.0 | 100.0 |
| 19 | Pb Ro Concl | 8.05 | 40.2 | 8.24 | 75.2 | 6.5 |
| | Pb Ro Concs 1-3 | 21.72 | 17.80 | 21.17 | 89.9 | 45.1 |
| | Pb Ro + Scav Concs | 25.81 | 15.29 | 21.27 | 91.7 | 53.8 |
| | Pb Scav | 74.19 | 0.48 | 6.35 | 8.2 | 46.2 |
| | Head (calc) | 100.00 | 4.30 | 10.20 | 100.0 | 100.0 |
| 20 | Pb Ro Concl | 6.79 | 42.30 | 4.20 | 67.4 | 2.3 |
| | Pb Ro Concs 1-3 | 19.52 | 19.44 | 9.05 | 89.1 | 14.5 |
| | Pb Ro + Scav Concs | 24.36 | 15.93 | 10.85 | 91.1 | 21.7 |
| | Pb Scav Tail | 75.64 | 0.50 | 12.60 | 8.9 | 78.3 |
| | Head (calc) | 100.00 | 4.26 | 12.17 | 100.0 | 100.0 |

Table No. : Effect of Depressant Types
a) Conditions

| Test No. | Primary Grind | | Prim Grind | Reagent Additions g/t | |
|----------|---------------|-----------------------|---|--------------------------|----------|
| | min | K ₈₀ µm | | Pb Rougher | Pb Scav |
| 17 | 40 | 32 | Na ₂ CO ₃ = 1500 NaCN = 150 242 = 20 | 317 = 120 MIBC = 20 | 317 = 20 |
| 22 | 40 | 32 | Na ₂ CO ₃ = 1500 PKD-c = 150 242 = 20 | 317 = 120 MIBC = 22.5 | 317 = 20 |
| 23 | 40 | 32 | Ca(OH) ₂ = 900 NaCN = 150 242 = 20 | 317 = 120 MIBC = 22.5 | 317 = 20 |
| 24 | 40 | 32 | Ca(OH) ₂ = 900 PKD-c = 150 242 = 20 | 317 = 120 MIBC = 22.5 | 317 = 20 |

2-) Results

| Test No. | Product | Weight % | Assays % | | % Distribution | |
|----------|--------------------|----------|----------|-------|----------------|-------|
| | | | Pb | Zn | Pb | Zn |
| 17 | Pb Ro Conc 1 | 13.13 | 27.10 | 8.24 | 83.9 | 9.1 |
| | Pb Ro Concs 1-3 | 30.66 | 12.67 | 19.76 | 91.6 | 50.8 |
| | Pb Ro + Scav Concs | 40.09 | 9.93 | 20.24 | 93.8 | 68.1 |
| | Pb Scav Tail | 59.91 | 0.44 | 6.35 | 6.2 | 31.9 |
| | Head (calc) | 100.00 | 4.24 | 11.92 | 100.0 | 100.0 |
| 22 | Pb Ro Conc 1 | 13.06 | 26.50 | 7.10 | 84.2 | 8.1 |
| | Pb Ro Concs 1-3 | 35.47 | 10.74 | 16.47 | 92.6 | 51.1 |
| | Pb Ro + Scav Concs | 41.95 | 9.22 | 16.55 | 94.1 | 60.8 |
| | Pb Scav Tail | 58.05 | 0.42 | 7.72 | 5.9 | 39.2 |
| | Head (calc) | 100.00 | 4.11 | 11.42 | 100.0 | 100.0 |
| 23 | Pb Ro Conc 1 | 11.29 | 25.00 | 16.30 | 72.9 | 16.1 |
| | Pb Ro Concs 1-3 | 37.07 | 9.40 | 23.60 | 90.0 | 76.8 |
| | Pb Ro + Scav Concs | 50.71 | 7.25 | 20.43 | 94.9 | 90.9 |
| | Pb Scav Tail | 49.29 | 0.40 | 2.11 | 5.1 | 9.1 |
| | Head (calc) | 100.00 | 3.87 | 11.40 | 100.0 | 100.0 |
| 24 | Pb Ro Conc 1 | 12.52 | 21.40 | 20.60 | 72.2 | 22.4 |
| | Pb Ro Concs 1-3 | 37.90 | 8.78 | 24.72 | 89.7 | 81.5 |
| | Pb Ro + Scav Concs | 48.96 | 7.15 | 21.24 | 94.4 | 90.5 |
| | Pb Scav Tail | 51.04 | 0.41 | 2.15 | 5.6 | 9.5 |
| | Head (calc) | 100.00 | 3.71 | 11.50 | 100.0 | 100.0 |

Figure No. : Effect of Depressant Type

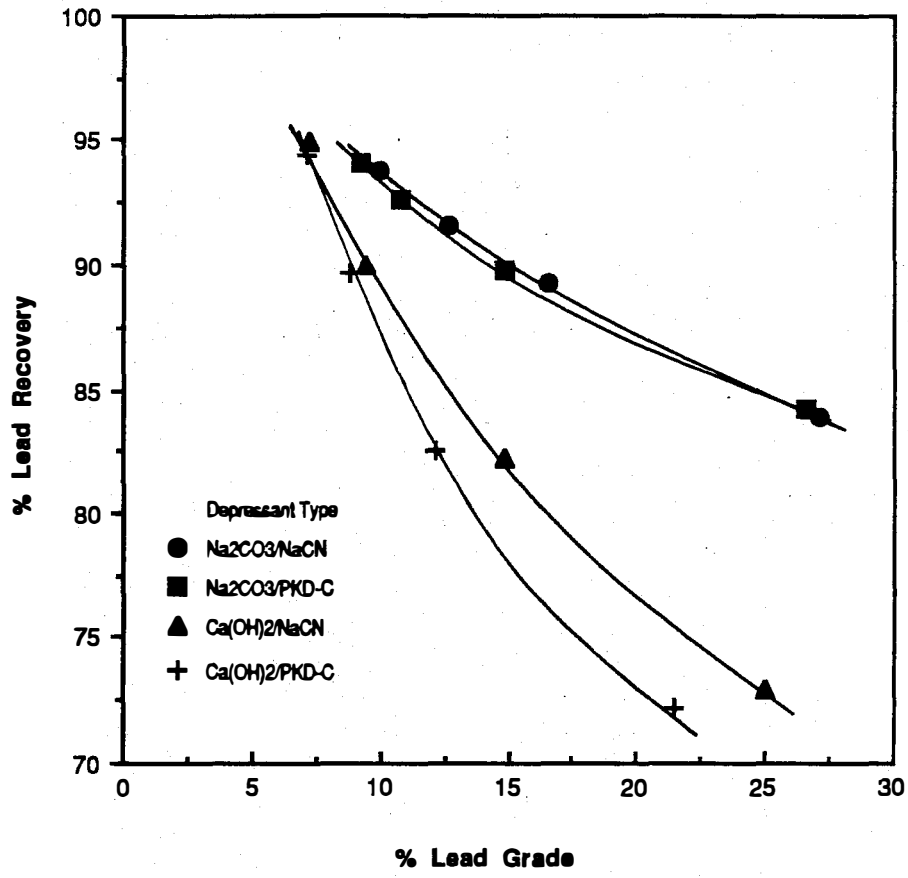


Table No. : Regrinding and High Intensity Conditioning
a) Conditions

| Test No | Regr. μm | Cond. min | Prim Grind | Reagent | | Additions, g/t | | | |
|---------|---------------------|-----------|---|----------------------------------|-------------------|--|--------------------------------|--|--------------------------------|
| | | | | Pb Ro | Pb Scav | Pb Regrind | H.I. Cond + 1st Cl. Scav | Pb 2nd Cl | Pb 3rd + 4th Cl |
| 48 | 13* | 40 | $\text{Na}_2\text{CO}_3=1500$ PKD-C=150 242=20 | 317=120 MIBC=22.5 | 317=20 | $\text{Na}_2\text{CO}_3=500$ PKD-C=50 | 242=40 317=25 MIBC=15 | PKD-C=30 242=4 317=15 MIBC=5 | PKD-C=60 317=10 MIBC=7.5 |
| 49 | 13* | 40 | $\text{Na}_2\text{CO}_3=1500$ PKD-C=150 LSBM-1=20 | 317=50 LSBM-1=50 MIBC=22.5 | 317=5 LSBM-1=5 | $\text{Na}_2\text{CO}_3=500$ PKD-C=50 | LSBM-1=10 317=45 MIBC=15 | PKD-C=30 LSBM-1=4 317=15 MIBC=5 | PKD-C=60 317=15 MIBC=5 |

* 40 minute regrind

b) Results

| Test No. | Product | Weight % | Assays, % | | % Distribution | |
|----------|--------------------------|----------|-----------|-------|----------------|-------|
| | | | Pb | Zn | Pb | Zn |
| 48 | Pb 4th Cl Conc | 5.67 | 52.60 | 2.98 | 77.6 | 1.5 |
| | Pb 1st Cl + Cl Scav Conc | 15.85 | 21.23 | 6.46 | 87.5 | 9.2 |
| | Pb Cl Scav Tail | 25.74 | 0.91 | 17.3 | 6.1 | 39.9 |
| | Pb Ro + Scav Conc | 41.59 | 8.65 | 13.17 | 93.6 | 49.0 |
| | Pb Scav Tail | 58.41 | 0.42 | 9.74 | 6.4 | 51.0 |
| | Head (calc) | 100.00 | 3.84 | 11.7 | 100.0 | 100.0 |
| 49 | Pb 4th Cl Conc | 5.40 | 51.50 | 4.56 | 73.2 | 2.2 |
| | Pb 1st Cl + Cl Scav Conc | 18.88 | 17.38 | 11.81 | 86.4 | 20.1 |
| | Pb Cl Scav Tail | 18.48 | 1.38 | 20.0 | 6.7 | 33.3 |
| | Pb Ro + Scav Conc | 37.36 | 9.47 | 15.86 | 93.1 | 53.3 |
| | Pb Scav Tail | 62.64 | 0.42 | 8.28 | 6.9 | 46.7 |
| | Head (calc) | 100.00 | 3.80 | 11.1 | 100.0 | 100.0 |