

1152
1146
1140
1134
1128

1137 Total R&G:	43,039	4.00	172,155	4.55	5.22	9.76	7,826	8,978	40,970	3.98	163,150	4.61	5.17	9.78	7,518	8,440
"R" ore 165	25,579	4.00	102,315	4.73	5.07	9.80	4,836	5,192	24,340	4.01	97,680	4.81	5.17	9.98	4,698	5,051
"G" ore 160	17,460	4.00	69,839	4.28	5.42	9.70	2,989	3,786	16,630	3.94	65,470	4.31	5.18	9.48	2,820	3,389
Siliceous:20	1,523	2.94	4,479	NO GRADE DATA AVAILABLE												
1134	41,389	4.00	165,555	4.62	5.38	10.00	7,652	8,904	35,830	4.03	144,460	4.69	5.42	10.11	6,780	7,828
"R" ore 165	25,435	4.00	101,741	4.79	5.29	10.08	4,869	5,387	13,660	4.05	55,380	4.93	5.42	10.35	2,731	3,002
"G" ore 160	15,954	4.00	63,814	4.36	5.51	9.87	2,783	3,517	22,170	4.02	89,080	4.54	5.42	9.96	4,048	4,826
Siliceous:20	2,632	2.94	7,739	NO GRADE DATA AVAILABLE												
1134 Total R&G:	84,427	4.00	337,709	4.58	5.29	9.88	15,478	17,881	76,800	4.01	307,610	4.23	4.82	9.05	14,297	16,268
"R" ore	51,014	4.00	204,056	4.76	5.18	9.94	9,706	10,579	38,000	4.03	153,060	3.64	3.95	7.59	7,430	8,053
"G" ore 160	33,413	4.00	133,653	4.32	5.46	9.78	5,772	7,302	38,800	3.98	154,550	4.44	5.32	9.76	6,868	8,215
Siliceous:20	4,156	2.94	12,218	NO GRADE DATA AVAILABLE												

1134 VARIANCE	Volume	Dens.	Tonnage	XPb	XZn	XPb+Zn	t Pb	t Zn	Volume	Dens.	Tonnage	XPb	XZn	XPb+Zn	t Pb	t Zn	
Blasthole-Geomodel	(15,658)	0.09	(56,744)	(0.32)	(0.83)	(1.16)	(3,509)	(5,350)	Blasthole-Pcmine	(8,031)	0	(26,645)	0	(0)	(0)	(2,328)	(3,737)
X Variance									X Variance								
(Blasthole-Geomodel)	(19)	2	(17)	(7)	(16)	(12)	(23)	(30)	(Blasthole-Pcmine)	(10)	2	(9)	1	(7)	(4)	(16)	(23)
/Geomodel:									/Pcmine								

TOTAL TONNAGES FOR 1990	Geomodel Polygonal Calculations.								PCMINE Block Model Calculation - V9009								Blast Hole Database - Actual Mined							
"R" ore	131,622	4.00	526,489	4.75	5.34	10.09	25,004	28,117	99,550	3.98	396,540	4.76	5.39	10.15	18,865	21,385								
"G" ore	33,413	4.00	133,653	4.32	5.46	9.78	5,772	7,302	59,220	3.96	234,680	4.57	5.38	9.95	10,728	12,630								
									1,310	3.17	4,150	3.15	5.04	8.19	131	209								
TOTAL R&G ORE	165,036	4.00	660,143	4.66	5.37	10.03	30,777	35,419	160,080	3.97	635,370	4.68	5.39	10.06	29,723	34,224								
+/- Siliceous																								

1990 MINED ORE RESERVE VARIANCES FOR TOTAL "R" & "G" ORE

	Volume	Dens.	Tonnage	XPb	XZn	XPb+Zn	t Pb	t Zn	Volume	Dens.	Tonnage	XPb	XZn	XPb+Zn	t Pb	t Zn	
Blasthole-Geomodel	(7,351)	0.01	(27,226)	(0.42)	(0.91)	(1.33)	(3,924)	(7,244)	Blasthole-Pcmine	(2,395)	0.04	(2,453)	(0.44)	(0.93)	(1.37)	(2,871)	(6,049)
X Variance									X Variance								
(Blasthole-Geomodel)	(4)	0	(4)	(9)	(17)	(13)	(13)	(20)	(Blasthole-Pcmine)	(1)	1	(0)	(9)	(17)	(14)	(10)	(18)
/Geomodel									/Pcmine								

16% metal lost
of ore is discarded and replaced with waste.

Blasthole & PC mine tonnage are same!!!
INTERNAL GRADE situation = 16%
10.06-8.69
8.69

The existing interpretation for Vangorda shows several thin discontinuous baritic ore horizons (62) above the main horizon (61). The 62 horizon has undergone more extreme deformational events. When comparing blasthole assay maps with interpreted planviews these 62 bands do not compare favourably. The folded and faulted nature of these thin bands makes mining a difficult task. A significant amount of the 62 horizon has not been recovered due to the structural complexity of these bands. Several times shovels have dug past blasted limits into areas of ore. Over digging blast limits has caused ore to be wasted. In addition to ore being wasted, over digging inhibits an accurate blasthole inventory. The 1140 bench was over excavated in several instances. The present V9009 interpretation has a band of 61 smeared along a fault zone. This thin band is moderately discontinuous and does not show up on some of the benches.

Upon visual comparisons between geomodel bench plans and blasthole plans, several 62 horizon polygons were not recovered, or no blast hole record was kept. (Due to Overdigging) The polygon tonnages and grades are:

Volume	Dens.	Tonnage	XPb	XZn	XPb+Zn	t Pb	t Zn
bcm	t/bcm	tonnes					
21,453	4.00	85,810	5.30	5.01	10.31	4,549	4,299

MINING LOSS & DILUTION CALCULATIONS

Assuming the grade of the dilution is 0 a rough estimate of the dilution and the recovery

can be done through ratios.

% Apparent Internal Dilution = ((Undiluted Grade - Diluted Grade)/Diluted Grade)*100
 % Apparent Internal Dilution = 15.33 %

% Recovery = (Tonnes Metal Recovered/Tonnes insitu-metal)*100
 % Recovery = 83.13 %

RESERVE CALCULATIONS AND METHODS

Geomodel Polygonal Reserves 3 meter Bench

Geomodel tonnes, volumes and grades were calculated by using the MINE MODEL module in GEOMODEL. Actual pit mining limits were digitized from the survey year end status map. These outlines were then merged into GEOMODEL. The MINE MODEL module produced polygonal areas & average grades for baritic polygons. Bench Heights were adjusted in areas of High floors. Refractory & Good ore was calculated from a visual inspection of the oxidation surface on sections. This enabled plan polygons to be labeled as "G" or "R" ore. Reserves are undiluted with no mining loss.

Pcmine V9009 Block Model Reserves 3 meter Bench

Pcmine tonnes, grades and volumes were calculated from the V9009 block model. The surveyed topographic surface was used for the top mining surface. The bottom surface used was the Dec 1990 month end surface. The baritic ore was calculated using only massive pyritic & baritic ore types (50 & 60). No cut off grades were used. The siliceous ore calculations only used rock types 20 & 80, a 6% Pb+Zn cut off was used. Refractory ore determination was done using a contoured oxidation surface derived from DDH information. Good ore was determined from subtracting refractory ore from the total baritic ore. Reserves are undiluted with no mining loss.

Actual Mined Reserves From Blastholes. 6 meter Bench

Blasthole values were calculated from a daily inventory symphony spread sheet. Grades were determined from blasthole assays, sampling only ore. Volumes were calculated using polygons encompassing each blasthole. Partial polygon volumes were used for blastholes containing waste and ore. Tonnes were calculated from a specific gravity determined from a regression formula.

REMAINING RESERVES ACCORDING TO THE V9009 PCMINE INTERPRETATION - AS OF DEC 28TH 1990

	Volume	Dens.	Tonnage	XPb	ZZn	XPb+Zn	Ag g/t	Au g/t	t Pb	t Zn	Oz Ag	Oz Au
	bcm	t/bcm	t									
Good Baritic Ore > 0%	1,032,290	4.10	4,230,810	4.36	5.39	9.74	54.32	0.842	184,284	227,886	7,388,152	114,540
Refractory Baritic Ore > 0%	95,920	4.05	388,140	4.78	5.29	10.06	57.23	0.770	18,534	20,521	714,174	9,609
Non-Baritic Ore > 6%	166,710	3.09	514,750	3.07	4.73	7.80	40.62	0.682	15,808	24,337	672,246	11,287
Non-Baritic Ore 5 - 6 %	101,320	2.92	296,280	2.18	3.30	5.49	28.64	0.535	6,468	9,783	272,815	5,096
Non-Baritic Ore 4 - 5 %	117,570	2.96	348,210	1.80	2.69	4.49	24.32	0.528	6,268	9,367	272,268	5,911
Sulfide Waste	3,330,600	2.98	9,909,350	0.00	0.00	0.00	0.00	0.000	0	0	0	0
Phyllite Waste	936,120	2.70	2,527,520	0.00	0.00	0.00	0.00	0.000	0	0	0	0
Overburden	2,349,930	2.10	4,932,640	0.00	0.00	0.00	0.00	0.000	0	0	0	0
Total Material	8,130,460	2.85	23,147,700									
Total Ore	1,513,810	3.82	5,778,190	4.00	5.05	9.06	50.17	0.788	231,362	291,895	9,319,656	146,443

No mining Recovery or dilution factors have been applied for the remaining reserves listed above.
 The west ramp pit design was used for the remaining reserve calculation.

REMAINING RESERVES WITH MINING LOSS AND DILUTION ADDED - 17 % MINING LOSS AND 15 % DILUTION (TO EQUATE TO BLASTHOLE RESERVES)
 (USING DILUTION AND MINING LOSS CALCULATED FROM ALREADY MINED MATERIAL)

	Volume bcm	Dens. t/bcm	Tonnage	ZPb	ZZn	ZPb+Zn	Ag g/t	Au g/t	t Pb	t Zn	Oz Ag	Oz Au
Good Baritic Ore > 0%	1,011,644	4.10	4,146,194	3.69	4.56	8.25	46.00	0.713	152,956	189,146	6,132,167	95,068
Refractory Baritic Ore > 0%	94,002	4.05	380,377	4.04	4.48	8.52	48.47	0.652	15,383	17,032	592,765	7,975
Non-Baritic Ore > 6%	163,376	3.09	504,455	2.60	4.00	6.61	34.40	0.578	13,121	20,200	557,964	9,368
Non-Baritic Ore 5 - 6 %	99,294	2.92	290,354	1.85	2.80	4.65	24.26	0.453	5,368	8,120	226,436	4,230
Non-Baritic Ore 4 - 5 %	115,219	2.96	341,246	1.52	2.28	3.80	20.60	0.447	5,202	7,774	225,983	4,906
Sulfide Waste	3,360,876	2.98	10,024,914	0.00	0.00	0.00	0.00	0.00	0	0	0	0
Phyllite Waste	936,120	2.70	2,527,520	0.00	0.00	0.00	0.00	0.00	0	0	0	0
Overburden	2,349,930	2.10	4,932,640	0.00	0.00	0.00	0.00	0.00	0	0	0	0
Total Material	8,130,460	2.85	23,147,700									
Total Ore	1,483,534	3.82	5,662,626	3.39	4.28	7.67	42.49	0.668	192,030	242,272	7,735,314	121,547

Dilution grades are assumed to be equal to zero.

The ore which contributes to the high mining loss is the baritic 6% horizon. This horizon is most prevalent in the areas where mining occurred in 1990. As mining progresses in 1991 the main horizon ore becomes the dominant source of high grade. The result should be a lower mining loss.

REMAINING RESERVES WITH MINING LOSS AND DILUTION ADDED - 10 % MINING LOSS AND 20 % DILUTION (AS USED BY J. HENDRY & C. REED)

	Volume bcm	Dens. t/bcm	Tonnage	ZPb	ZZn	ZPb+Zn	Ag g/t	Au g/t	t Pb	t Zn	Oz Ag	Oz Au
Good Baritic Ore > 0%	1,135,519	4.10	4,653,891	3.56	4.41	7.97	44.44	0.689	165,856	205,098	6,649,337	103,086
Refractory Baritic Ore > 0%	105,512	4.05	426,954	3.91	4.33	8.23	46.82	0.630	16,680	18,469	642,757	8,648
Non-Baritic Ore > 6%	183,381	3.09	566,225	2.51	3.87	6.38	33.23	0.558	14,227	21,904	605,022	10,158
Non-Baritic Ore 5 - 6 %	111,452	2.92	325,908	1.79	2.70	4.49	23.43	0.438	5,821	8,805	245,533	4,587
Non-Baritic Ore 4 - 5 %	129,327	2.96	383,031	1.47	2.20	3.67	19.90	0.432	5,641	8,430	245,041	5,320
Sulfide Waste	3,179,219	2.94	9,331,531	0.00	0.00	0.00	0.00	0.00	0	0	0	0
Phyllite Waste	936,120	2.70	2,527,520	0.00	0.00	0.00	0.00	0.00	0	0	0	0
Overburden	2,349,930	2.10	4,932,640	0.00	0.00	0.00	0.00	0.00	0	0	0	0
Total Material	8,130,460	2.85	23,147,700									
Total Ore	1,665,191	3.82	6,356,009	3.28	4.13	7.41	41.05	0.645	208,225	262,705	8,387,690	131,798

Dilution grades are assumed to be equal to zero.