

## COORDINATE SYSTEM

The first surveys for the Vangorda Plateau were completed in the 1950's to provide survey control for exploration activities in the areas of the Vangorda and Swim Lake mineral deposits. The Vangorda coordinate system was oriented N-S, E-W with units being measured in feet.

In 1966 Sutcliffe and Co. Ltd surveyed an exploration base line on Grum running approximately northwest-southeast relative to the original Vangorda grid. Cross lines were established at 200 foot intervals (68W, 70W, etc.) and tie lines parallel to the base line were established at 1000 foot intervals (10S, 10N, etc). These cut lines were used to locate and guide all exploration geochemical sampling, geophysics, and diamond drilling in the Grum area. The south end of the base line was located at (30,000 E, 30,000 N) using the Vangorda grid coordinate system.

With the beginning of underground mining on Grum by Kerr-Addison in 1975, it was imperative that surface and underground activities be completed using a common and accurate survey control. Hosford, Impey, and Welter established a new metric survey control which was parallel to the original Vangorda survey grid system. The south end of the Grum base line therefore was located at (9144.0 E, 9144.0 N) relative to the HIW survey control. Resurveying of the Sutcliffe base line established that although the direction of the baseline was accurate as represented (N46 12' 02" W), there was a systematic chaining error along its length. If this chaining error was evenly distributed among the cross lines, the distance between the cross sections was actually 199.123 feet (60.693 metres) rather than 200 feet (60.96 metres). All drill hole collars and underground development were surveyed and reported using the 1975 HIW survey control.

In 1979 Cyprus Anvil Mining Corporation acquired mineral rights to all the deposits in the Anvil District. Northwest Survey Corporation (Yukon) Ltd. completed a new survey control for the entire district. All survey control points used in earlier local surveys were incorporated into the 1979 District survey. This control survey was then tied into the international UTM (Universal Transverse Mercator) grid system using Canada Geodetic Survey control points in the Faro-Ross River areas. The locations of these CGS control points were adjusted in mid-1979 using satellite control; these adjusted coordinates were incorporated into the Anvil District control survey. Any subsequent adjustments have not been incorporated into this district wide survey control. These UTM coordinates and elevations have become the

"common denominator" coordinates for exploration and development activities in the Anvil District. All regional surveys completed subsequently to 1979 have used the 1979 UTM survey control as the basis for their activities.

Several local grids in the Grum area have been utilized for the generation of computer block models and ore reserve estimates. The model coordinate systems have generally been established parallel to the blocks to facilitate the computer intensive model calculations. Figure 1 illustrates the orientations of the different model coordinate systems.

Kerr-Addison used a NE-SW coordinate system for the Grum NORCOMP computer model of the Grum deposit. Model North was rotated 43 47'58" east relative to the HIW survey control. The south end of the Grum base line was constrained to be (9144.0E, 9144.0N) in the model coordinate system. This coordinate system was retained for the the initial G8606 model completed by Curragh Resources Inc. in 1986.

Beginning in 1987, the various ore reserve models generated by Curragh Resources Inc. utilized a coordinate system with model North oriented parallel to the exploration grid base line. The coordinate system is therefore rotated 90 anticlockwise relative to the NORCOMP-G8606 models. Models G8705, G9008, G9108, G9009, and G9110 all use this same coordinate system.

The G9110 coordinate system is tied to survey control station 1404 (earlier named VG4) located on the Blind Creek road between the Grum and Vangorda areas. Table 1 lists the UTM and Grum G9110 model coordinates for this survey station.

Table 1. Coordinates for 1404 (VG4)		
UTM	Northing	6,904,623.172
	Easting	593,847.979
	elevation	1,300.062
GRUM LOCAL	Northing	5,000.000
	Easting	3,500.000
	elevation	1,300.062

The Grum G9110 coordinate grid has been adopted by Operations as the

Grum local mine grid. It is an orthogonal grid oriented parallel to the exploration cross and long sections. It is also parallel to the current PC-MINE model blocks. Local north (for this grid) is rotated 47.7741667 degrees (0.833816 radians) counterclockwise from UTM north.

Conversion between Grum Local and Anvil District UTM coordinate systems can be completed using the following equations:

$$\begin{aligned} \text{Nutm} &= \text{No} + \text{Sh} * (\text{Nlocal} * \cos(x) + \text{Elocal} * \sin(x)) \\ \text{Eutm} &= \text{Eo} + \text{Sh} * (\text{Elocal} * \cos(x) - \text{Nlocal} * \sin(x)) \end{aligned}$$

where

No	=	6,898,674.069
Eo	=	595,197.633
Sh	=	0.99950853
x	=	47.7741667 degrees (0.833816 radians).

These equations have been incorporated into the spreadsheet GRIDS. The Sh scaling factor is averaged for the elevations typically encountered on the Vangorda Plateau.

#### GRUM MODEL PROPERTY DEFINITION

The plan size, plan location, and block size of the Grum G9110 model have been slightly modified from the earlier Grum models. These changes were made to allow the G9110 rows and columns to correlate exactly with the exploration drill grid pattern. Table 2 lists the new overall coordinate information for the G9110 locations.

Table 2. GRUM G9110 Model Coordinates			
Lower Left Corner	UTM	Northing	6,903,968.48
		Easting	592,687.06
	LOCAL	Northing	5,419.88
		Easting	2,234.37
Lower Right Corner	UTM	Northing	6,904,684.74
		Easting	593,337.11
	LOCAL	Northing	5,419.88
		Easting	3,202.11

Upper Left Corner	UTM	Northing	6,905,083.55
		Easting	591,458.41
	LOCAL	Northing	7,079.90
		Easting	2,234.37

Upper Right Corner	UTM	Northing	6,905,799.81
		Easting	592,108.47
	LOCAL	Northing	7,079.90
		Easting	3,202.11

Row Length = 7.5866 m (219 rows total)  
 Column Length = 7.62 m (127 columns total)

Column centres for the G9110 model correspond exactly to the long section lines. The cross section lines also pass through the centres of a particular row of blocks. The correspondence between the model blocks and the long and cross sections is listed in Tables 3 and 4 respectively.

Section	Local Easting	Model Column
12 S	2,245.8	2
10 S	2,306.8	10
08 S	2,367.8	18
06 S	2,428.7	26
04 S	2,489.7	34
02 S	2,550.6	42
00 B/L	2,611.6	50
02 N	2,672.6	58
04 N	2,733.5	66
06 N	2,794.5	74
08 N	2,855.4	82
10 N	2,916.4	90
12 N	2,977.3	98
14 N	3,038.3	106
16 N	3,099.3	114

row 100 → 50  
 69-82  
 2700-3100  
 col 60 → col 114

18 N	3,160.2	122
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Even long sections are spaced every 60.96 metres (200 feet)

Section	Local Northing	Model Rows
42 W	5,423.7	218
44 W	5,484.3	210
46 W	5,545.0	202
48 W	5,605.7	194
50 W	5,666.4	186
52 W	5,727.1	178
54 W	5,787.8	170
56 W	5,848.5	162
58 W	5,910.0	154
60 W	5,969.9	146
62 W	6,030.6	138
64 W	6,091.3	130
66 W	6,152.0	122
68 W	6,212.7	114
70 W	6,273.4	106
72 W	6,334.1	98
74 W	6,394.7	90
76 W	6,455.4	82
78 W	6,516.1	74
80 W	6,576.8	66
82 W	6,637.5	58
84 W	6,698.2	50

86 W	6,758.9	42
88 W	6,819.6	34
90 W	6,880.3	26
92 W	6,941.0	18
94 W	7,001.7	10
96 W	7,062.4	2

Even cross sections are spaced every 60.693 metres (199.1 feet).

The elevation at the top of the model is 1336.0m. Bench height is 6.0m. There are 70 benches in the model. A printout of the property definition is included at the end of this documentation.

*Property definition*

### SURFACE GRIDS

In 1979 the surface topography for the Grum area was mapped by Northwest Survey (Yukon) Ltd. from low level aerial photography completed in August 1979. The resultant base map was at 1:2,000 scale and contained 2.5m elevation contours. In October 1990 the Grum area was re-mapped by Orthophoto Shop using new low level aerial photographs completed in September 1990. This map was at 1:2,000 scale with a 2m elevation contour interval.

The two maps are not strictly comparable because portions of the Grum area topography had been excavated before the second (1990) set of aerial photographs. In addition the haul road between the Vangorda deposit and the Faro mill had been constructed through the area. In scattered areas which have not been disturbed the two maps show inconsistencies with elevation differences of up to +/- 2 metres. Spot checks by Mine Survey crews indicate that the 1990 surface topography is reasonably accurate.

All of the surface grids in the G9110 model were created in GEOMODEL from digitized surface elevation contours. The surfaces were calculated using the average of row and column elevation calculations. Each row and column was further subdivided into four subrows and subcolumns for the resultant average value.

The 1979 surface grid was digitized from the 1979 Northwest Survey Ltd. of the Grum area completed for Cyprus Anvil Mining Corporation (1:2000

*Bench 2000  
240 -*

*306 -*

*30.3475  
5.12375*

scale). The 1990 surface grid was imported into GEOMODEL from a DXF file of the Autocad drawings for Grum sheets 1 and 2 prepared by Orthoshop using the 1990 aerial photography (1:2000 scale). Before the DXF file was imported all coordinates for the contour lines were changed from UTM grid to Grum Mine grid. This conversion was accomplished using a small BASIC program written specifically for the conversion. Conversion factors were identical to those contained in the GRIDS spreadsheet.

The "best initial surface" was prepared by using the digitized lines from the 1979 Grum map and re-assigning elevations to these contour lines using the 1990 map as a guideline. These changes were made only for the contour lines north (Mine Grid) of Doal Lake. In addition spot elevations from the 1990 map corresponding to the exposed bottom of Doal Lake were digitized as spot traverses.

The Ion Vintila design pits were digitized in Autocad and imported into GEOMODEL from the Autocad DXF files. The Quick Sink pits were digitized directly into GEOMODEL and created from the resulting surface topography files.

## **ROCK TYPE MODEL**

Geology for the rock type model involved a new interpretation of the cross, long, and plan sections using all drill hole information through the 1991 drilling program. Drill holes on cross section were projected using a plunge correction of -11 degrees in the North direction (Grum Mine grid). This plunge correction accounts for the overall structural plunge of the deposit along the F2 fold axial hinge line. Drill hole information on long section was projected horizontally perpendicular to the long section lines.

The initial geological interpretation was completed on the cross sections, and the resulting geology was digitized into GEOMODEL. Long sections were then cut from the cross sections and compared to the projected drill hole information. The long sections were interpreted from this information and also digitized into GEOMODEL.

Plan maps corresponding to mid-bench elevations were then cut from the cross and long section interpretations. The mid-bench geology was then re-interpreted on plan and digitized in GEOMODEL. Rock type polygons were transferred to PCMINE from the GEOMODEL plan map geological interpretations. The resulting PCMINE geology is based on the GEOMODEL plan view geological interpretation. The creation of the PCMINE model from the plan geology results in a more realistic resolution

of fault and fold geometries.

To ensure internal compatibility between the section and plan interpretations, the long and cross sections were then re-interpreted from the mid-bench plan geology. This final interpretation is contained within the Grum cross and long sections.

Rock types have been modified to correspond to the new lithostratigraphic code. A printout of the rock codes is included at the end of this documentation. This model differentiates among noncalcareous phyllites (20,22), calcareous phyllites (40), carbonaceous phyllites (30), greenstones (48), and altered phyllites (56). Mineralization lithologies incorporated into the model include carbonaceous quartzite (2), noncarbonaceous quartzite (3), pyritic massive sulphides (5), baritic massive sulphides (7), mixed carbonaceous and noncarbonaceous quartzite (12), mixed quartzite and massive sulphides (15), and mixed pyritic and baritic massive sulphides (18). In addition the geological interpretation differentiated between different ore horizons within the Grum deposit. Table 5 lists the different ore horizons incorporated into the current geological interpretation. For the bench composite interpolation the horizon codes were deleted from the rock type model.

Horizon Code	Description
100	Lower main horizon (overturned limb on F1)
200	Upper main horizon (upright limb on F1)
300	Upper horizon (upright limb on F1)
400	Champ horizon
500	Upright panel horizon
600	Gnome's cap horizon
700	Upper horizon (overturned limb on F1)

Overburden as rock type 82 was entered into the model as a surface grid using GEO-MODEL. The overburden surface grid was prepared by hand contouring the triconed elevations in plan at five metre intervals. This surface was digitized into GEOMODEL and converted to a surface grid using the average from both rows and columns. Mid-bench elevation contour lines of

this surface grid were then incorporated into the plan geological interpretation. Air (rock type 500) was entered into the rock type model using the contoured bench toe elevations in the plan geological interpretation. The preferred initial starting surface was used to generate the toe elevation contour lines.

## COMPOSITES

Drill holes were entered into PC-XPLOR database B. The database contains header information in table 1, downhole deviations in table 2, lithologies in table 3, assays in table 4, and composites in tables 5.

The Anvil District alphanumeric rock codes in Tables 3 and 4 were converted to numeric values using a SYMPHONY spreadsheet with extensive lookup tables.

Assays for the quartzose ores (rock codes 2, 3) and massive sulphide ores (4, 5, 7, 8) were grouped and analyzed using univariate histograms. Pb, Zn, Ag, Au, and pulp SG assays for each of these two groups were then cut to the 95th percentile. Table 6 contains the 95th percentile values used to cut the assays.

ROCK CODE	Table 6. 95th PERCENTILE CUT OFF VALUES				
	Pb %	Zn %	Ag g/t	Au g/t	SG
2-3	6.24	10.77	102.0	1.85	3.86
4-8	9.72	17.19	157.0	2.36	4.85

### COMPOSITES (6 m bench)

Drill holes inclined at an angle greater than 60° (ie. near vertical to vertical) were composited in 6m bench intervals starting at 1336m elevation. The composite location is given by the mid bench elevation. The shallower holes (mostly underground) were composited using 6 metre equal length intervals starting at the drill hole collar. The composite location is given by the elevation of the centre of the interval. G9110 composites are length weighted only.

Missing assays for the composites were ignored except where they comprised

more than 25% of the composite interval. In this case, the composite was discarded. Waste rock type intervals are assigned a 0.0 assay value for all elements. Composites with a total length of less than 1.0 metre were discarded for consideration during interpolation.

PC-XPLOR assigns a rock code to the composited interval based on the lithology at the centre of the interval. It does not take into account whether that particular rock type is the dominant lithology in the interval. To overcome this problem, the Fortran program RKCOMP1 (Pigage 1990 - modified in 1991) was written to incorporate a weighting factor when assigning the rock code to a particular composite interval. In this program the rock code assigned to the composite consisted of the dominant rock type based on total length over the compositing interval. These composite rock codes were calculated from the assay Table 4 for each drill hole. Because the different waste rock types are all assigned the same rock code in the assay database, the non-ore types were lumped as a single unit when determining the dominant rock type. Horizon codes were not utilized for the ore rock type codes.

#### **COMPOSITES (geological intervals)**

PC-XPLOR database B was used to calculate equal length composites for geological intervals based on the plan, cross, and long geological interpretation. For each drill hole the "to" intervals for the different ore lithologies to be composited were specified based on the cross section geological interpretation. Only those intervals containing assays were defined for compositing. Internal waste intervals which were not separated out in the geological interpretation were also not differentiated in the compositing interval. These waste intervals were included with 0.0 grade assays for all elements. Rock type codes assigned to the compositing intervals included the full horizon coding described for the ore types (see Table 5).

A small BASIC program (COMP.BAS) was written to further subdivide these geological intervals into equal length composite intervals. The equal length intervals were calculated from the start of the geological interval. The final composite interval using this algorithm consisted of an partial length less than the selected composite length. The resulting calculated composites were length weighted.

#### **GRADE INTERPOLATION (bench)**

Models for SG, Pb, Zn, Ag, and Au were interpolated using exactly the same parameters as defined for the G9009 geological interpretation. The Pb+Zn model was calculated by adding the interpolated values for Pb and Zn for each block. The different models were interpolated in four passes. Table 8 contains the pertinent search parameters for each of the passes.

Table 8. Interpolation parameters for G9110				
	Pass 1	Pass 2	Pass 3	Pass 4
North search	50 m	75 m	75 m	75 m
East search	50 m	50 m	50 m	50 m
Elev search	11 m	11 m	20 m	50 m
Tilt	-11	-11	-11	-11
Weighting	inverse distance	inverse distance	inverse distance	inverse distance
Power	1	1	1	1
Minimum #	2	2	2	2
Maximum #	10	10	10	10

Loose rock matching was used during the interpolation. All massive sulphides (rock codes 4, 5, 6, 7, 18) were considered equivalent, and all quartzites with disseminated sulphides were considered equivalent (rock codes 2, 3, 12). Rock type 15 was equated with all ore types during interpolation.

After the interpolation was completed the specific gravity model was edited using program RKDENS (Pigage 1987) to put in the missing SG values. All waste phyllite blocks were assigned an SG of 2.7. All overburden blocks were assigned an SG value of 2.2. The uninterpolated ore blocks were assigned the average SG values (sg assays reduced by 2 %) of the interpolated blocks for each ore type (2=3.06, 3=3.29, 4=4.00, 5=4.00, 7=3.89, 12=3.17, 15=3.65, 18=3.96).

#### **GRADE INTERPOLATION (geological)**

Models for SG, Pb, Zn, Ag, and Au were interpolated using the same parameters as used in the bench composite interpolation. Pb+Zn grades were calculated by adding the interpolated grades for Pb and Zn. The

interpolation was completed in 4 passes. Table 8 contains the parameters used in the interpolation for each pass.

Horizon coding was incorporated into the rock type matching during the grade interpolation. All quartzites (rock codes 2, 3, 12) within a particular mineralized horizon were considered equivalent during interpolation. Similarly all massive sulphides (rock codes 4, 5, 7, 18) within a mineralized horizon were equivalent during interpolation. Rock type 15 was correlated with both massive sulphides and quartzites for that horizon during the interpolation.

Program RKDENS was used to assign average SG values to uninterpolated blocks for each ore type. Waste model blocks were assigned an SG value of 2.7 (phyllite), 2.2 (overburden), or 2.85 (altered phyllite).

## **GEOLOGICAL AND MINING RESERVES**

The pass 4 interpolation compares closely to the G8606, G8705, G9008, and G9009 models in terms of search parameters used for the block interpolation. The following tables contain incremental and cumulative mining reserves for the G8705, G8911, and G9108 models. All of the reserves use the Ion Vintila 6-metre ultimate Grum open pit (stage 3 pit). All tables are reporting reserves with no dilution and no mining loss.

For a 4% (Pb+Zn) cutoff, the tonnages for the 6 metre (G9108) and 7 metre (G8911) models are essentially identical. In contrast the tonnage for the 4.5 metre model (G8705) is significantly reduced. The 6 metre (G9108) and 7 metre (G8911) model also give similar total Pb+Zn grades at a 4% cutoff. The 4.5 metre model (G8705) has a substantially higher deposit Pb+Zn value for the same cutoff grade.

## **DISCUSSION**

The loss in grade for the more recent models (G8911, G9108) probably is related to the strict rock type matching used for grade interpolation of the G8705 model and the looser rock type matching used for the G8911 and G9108 models. The more recent models, for example, did not differentiate between a high grade and low grade 4A ore type during the interpolation.

## **SUMMARY**

Recent 6 metre (G9108) and 7 metre (G8911) bench composite grade interpolations for the Grum deposit have similar reported mining reserves using a 4% (Pb+Zn) cutoff. These reserves contain significantly less metal than the 1989 Curragh official G8606 (=G8705) reserves for the Grum deposit.

At least part of this difference is related to the looser rock type matching incorporated into the G9108 and G8911 grade interpolations. These two models used a rock type matching which did not distinguish between low and high grade composites for the same ore type during the interpolation. This approach contrasts with the more stringent rock type matching during the grade interpolation in the G8606 model (especially for rock types 4A and 4A4).

Long term planning and budgeting must consider the differences in total metal implied with the G9108 and G8911 grade interpolations compared to the G8606 grade interpolation. Part of the consideration should encompass the assumptions used in the grade interpolations for the different models. The lower grade results from the newer models is based on what appears to be more reasonable rock type matching constraints. Possible further testing of these assumptions could be conducted and the results compared to the existing models.

**CURRAGH RESOURCES INC.**  
**GRUM DEPOSIT - GEOLOGICAL RESERVES**  
 in-situ reserves / no dilution / no mining loss

Geological Model	GEOLOGICAL RESERVES									CONTAINED METAL			
	Cut-off (wt%)	Volume (c. m.)	Density (t/m <sup>3</sup> )	Tonnage (tonnes)	Pb+Zn (wt%)	Pb (wt%)	Zn (wt%)	Ag (g/t)	Au (g/t)	lead tonnes	zinc tonnes	silver kg	gold kg
	Pb+Zn	*1000		*1000						*1000	*1000		
Main Zone (61W-87W) all horizons	8	4,159.73	3.818	15,882.26	11.438	4.385	7.054	72.610	1.052	696.437	1,120,335	1,153,211	16,708
	6	7,044.82	3.595	25,326.32	9.745	3.732	6.013	61.803	0.928	945.178	1,522,872	1,565,243	23,503
	5	9,061.44	3.508	31,785.05	8.881	3.403	5.478	55.542	0.875	1,081.645	1,741,185	1,797,190	27,812
	4	10,914.13	3.455	37,704.48	8.194	2.146	3.048	52.477	0.836	1,186.183	1,903,322	1,978,618	31,521
	3	12,597.71	3.432	43,247.25	7.594	2.935	4.663	49.136	0.816	1,269.101	2,014,996	2,124,653	35,284
	0	16,293.25	3.405	55,503.12	6.321	2.456	3.865	42.010	0.774	1,363.083	2,145,080	2,331,560	42,957
	uninterp	487.60	3.319	1,613.19									
Total Model (52W-80W) including Champ Zone	8	4,374.59	3.801	16,627.59	11.438	4.386	7.052	72.558	1.029	729.286	1,172.578	1,206,465	17,110
	6	7,612.13	3.774	27,205.38	9.665	3.705	5.900	61.165	0.895	1,007.596	1,621,500	1,664,078	24,350
	5	9,932.68	3.687	34,632.22	8.771	3.366	5.405	55.725	0.858	1,165.721	1,871,871	1,929,880	29,022
	4	12,113.22	3.637	41,635.61	8.053	3.102	4.951	51.485	0.797	1,291.537	2,061,379	2,143,609	33,184
	3	14,264.65	3.616	48,723.02	7.390	2.870	4.519	47.789	0.773	1,398.351	2,201,793	2,328,424	37,663
	0	18,726.93	3.589	63,455.30	6.113	2.392	3.721	40.658	0.754	1,517.875	2,361,309	2,580,006	46,577
	uninterp	621.73	3.332	2,071.67									
Champ Zone (52W-61W) all horizons	8	83.17	3.742	312.54	11.312	4.596	6.715	73.594	0.978	14.686	21,457	23,516	313
	6	207.67	3.724	780.80	8.698	3.651	5.046	55.891	0.842	28.507	39,399	43,640	657
	5	344.13	3.653	1,257.22	7.480	3.194	4.286	48.701	0.774	40.156	53,884	61,238	973
	4	557.96	3.597	2,006.72	6.358	2.772	3.586	42.016	0.673	55.626	71,961	84,314	1,351
	3	935.71	3.512	3,285.84	5.215	2.317	2.899	35.584	0.620	76.133	95,257	116,923	2,337
	0	1,624.31	3.404	5,528.95	3.995	1.798	2.195	28.669	0.581	99.411	121,416	158,509	3,212
	uninterp	59.27	3.587	212.58									

**CURRAGH RESOURCES INC.**  
**GRUM DEPOSIT - GEOLOGICAL RESERVES**  
 in-situ reserves / no dilution / no mining loss

Geological Model	GEOLOGICAL RESERVES									CONTAINED METAL			
	Cutoff	Volume	Density	Tonnage	Pb+Zn	Pb	Zn	Ag	Au	lead	zinc	silver	gold
	(wt%)	(cu. m.)	(t/m <sup>3</sup> )	(tonnes)	(wt %)	(wt %)	(wt %)	(g/t)	(g/t)	tonnes	tonnes	kg	kg
	Pb+Zn	*1000		*1000						*1000	*1000		
Main Zone (61W-87W)	8	2,718.40	3.880	10,546.63	10.917	4.102	6.815	68.706	1.024	432.623	718.753	724,617	10,905
all horizons	6	5,410.80	3.614	19,552.17	9.071	3.425	5.647	51.378	0.907	669.662	1,104.111	1,121,864	17,734
	5	7,419.10	3.515	26,076.73	8.178	3.057	5.081	51.941	0.851	807.596	1,324.959	1,354,451	22,191
	4	9,703.26	3.440	33,380.75	7.371	2.802	4.569	47.116	0.794	935.329	1,525.166	1,572,767	26,504
	3	12,111.14	3.401	41,193.07	6.640	2.543	4.097	42.800	0.744	1,047.540	1,687.680	1,763,063	30,648
	0	16,096.90	3.378	54,381.41	5.500	2.120	3.371	36.229	0.697	1,157.780	1,833.197	1,970,184	37,904
	uninterp	688.96	3.404	2,345.50									
Total Model (62W-88W)	8	2,822.02	3.865	10,906.73	10.890	4.100	6.790	68.468	1.021	447.170	740.567	746,762	11,136
all horizons	6	5,736.22	3.602	20,663.11	9.007	3.416	5.590	56.895	0.889	705.852	1,155.068	1,175,628	18,370
	5	7,991.96	3.500	27,972.43	8.090	3.077	5.013	51.298	0.823	860.712	1,402.258	1,434,930	23,189
	4	10,650.75	3.426	36,494.54	7.248	2.770	4.478	47.258	0.763	1,010.899	1,634.226	1,688,164	28,028
	3	13,631.49	3.388	46,185.44	6.462	2.494	3.968	41.633	0.713	1,151.865	1,832.638	1,922,838	32,792
	0	18,514.14	3.354	62,284.66	5.311	2.078	3.233	35.020	0.665	1,294.275	2,013.663	2,181,209	41,419
	uninterp	834.52	3.400	2837.33									
Champ Zone (52W-61W)	8	60.99	3.645	222.31	9.694	4.125	5.569	59.175	0.904	9.170	12.380	13,155	201
all horizons	6	210.01	3.585	752.86	7.678	3.354	4.325	47.787	0.792	25.251	32.561	35,977	596
	5	315.18	3.565	1,137.92	6.941	3.040	3.902	44.073	0.764	34.593	44.402	50,152	369
	4	525.54	3.515	1,861.52	5.960	2.627	3.333	38.656	0.708	48.902	62.044	71,959	1,318
	3	888.92	3.486	3,098.67	4.963	2.233	2.730	33.106	0.614	69.193	84.594	102,585	1,903
	0	1,626.74	3.403	5,535.02	3.813	1.762	2.052	26.720	0.570	97.527	113.579	147,896	3,155
	uninterp	56.84	3.489	198.30									

**CURRAGH RESOURCES INC.**  
**GRUM DEPOSIT - GEOLOGICAL RESERVES**  
 in-situ reserves / no dilution / no mining loss

Geological Model	Cut-off (wt%)	Volume (cu. m.)	Density (t/m <sup>3</sup> )	GEOLOGICAL RESERVES						CONTAINED METAL			
				Tonnage (tonnes)	Pb+Zn (wt %)	Pb (wt %)	Zn (wt %)	Ag (g/t)	Au (g/t)	lead tonnes	zinc tonnes	silver kg	gold kg
G9110-GEOL.(2m)	Pb+Zn	*1000		*1000						*1000	*1000		
Main Zone (61W-87W)	8	4,159.73	3.818	15,882.26	11.438	4.385	7.054	72.610	1.052	696.437	1,120.335	1,153,211	16,708
all horizons	6	7,044.82	3.595	25,326.32	9.745	3.732	6.013	61.803	0.928	945.178	1,522.972	1,565,243	23,503
	5	9,061.44	3.508	31,785.05	8.857	3.405	5.473	56.542	0.875	1,081.645	1,741.183	1,797,190	27,312
	4	10,914.13	3.455	37,704.48	8.194	3.146	5.043	52.477	0.836	1,186.183	1,903.322	1,978,618	31,521
	3	12,597.71	3.432	43,249.25	7.594	2.935	4.660	49.136	0.816	1,269.101	2,014.996	2,124,653	35,284
	0	16,298.25	3.405	55,500.12	6.321	2.456	3.865	42.010	0.774	1,363.033	2,145.980	2,331,560	42,957
	uninterp	487.60	3.319	1,618.19									
Geological Model:	Cut-off	Volume	Density	Tonnage	Pb+Zn	Pb	Zn	Ag	Au	lead	zinc	silver	gold
G8705-GEOL.(4.5m)	(wt%)	(cu. m.)	(t/m <sup>3</sup> )	(tonnes)	(wt %)	(wt %)	(wt %)	(g/t)	(g/t)	tonnes	tonnes	kg	kg
	Pb+Zn	*1000		*1000						*1000	*1000		
Main Zone (61W-87W)	8												
all horizons	6	6,558.30	3.650	23,963.52	10.360	3.900	6.460	66.000	1.000	934.577	1,548.943	1,581,592	23,964
	5	7,711.20	3.610	27,855.47	9.680	3.660	6.020	61.000	0.980	1,019.510	1,676.399	1,699,184	27,298
	4	9,023.94	3.570	32,181.62	8.980	3.400	5.580	57.000	0.950	1,094.175	1,795.734	1,834,352	30,573
	3	10,087.20	3.540	35,723.39	8.450	3.220	5.230	54.000	0.930	1,150.293	1,868.334	1,925,063	33,223
	0												
	uninterp												
	Cut-off	Volume	Density	Tonnage	Pb+Zn	Pb	Zn	Ag	Au	lead	zinc	silver	gold
	(wt%)	(cu. m.)	(t/m <sup>3</sup> )	(tonnes)	(wt %)	(wt %)	(wt %)	(g/t)	(g/t)	tonnes	tonnes	kg	kg
	Pb+Zn	*1000		*1000						*1000	*1000		
Difference	8												
G9110-G8705	6	486.52	-0.055	1,362.80	(0.615)	(0.168)	(0.447)	(4.197)	(0.072)	10.691	(25.172)	(16,330)	(461)
	5	1,350.24	-0.132	3,925.58	(0.799)	(0.257)	(0.542)	(4.458)	(0.105)	62.135	64.286	98,007	514
	4	1,890.19	-0.115	5,522.86	(0.786)	(0.254)	(0.532)	(4.523)	(0.114)	92.018	107.588	144,266	948
	3	2,510.51	-0.138	7,516.86	(0.856)	(0.285)	(0.570)	(4.864)	(0.114)	118.898	146.662	195,590	2,061
	0												

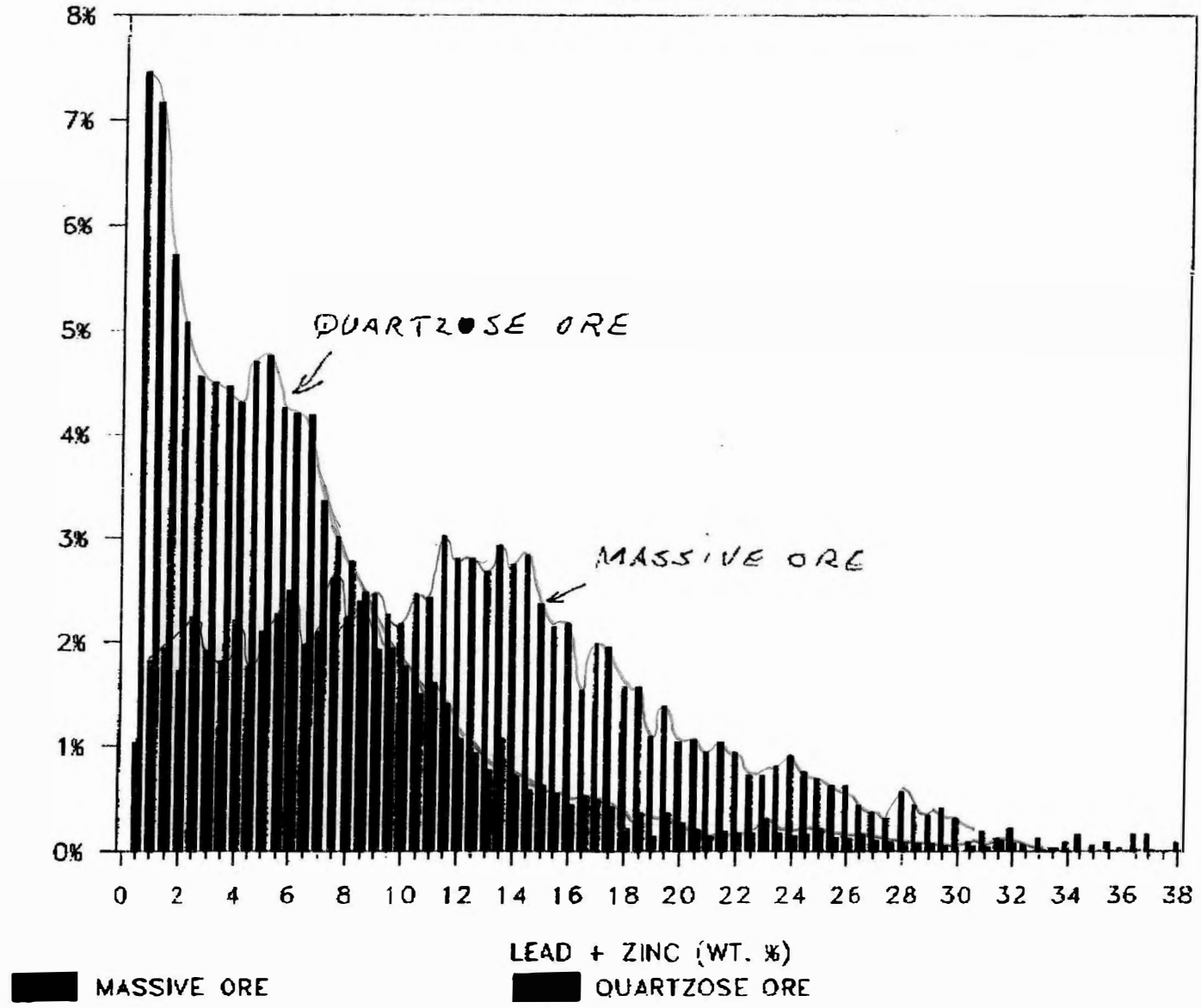
**CURRAGH RESOURCES INC.**  
**GRUM DEPOSIT - MINING RESERVES**  
in-situ reserves / no dilution / no mining loss

Geological Model	GEOLOGICAL RESERVES									CONTAINED METAL			
	Cumulative (wt %) Pb+Zn	Volume (cu. m.) *1000	Density (t/m <sup>3</sup> )	Tonnage (tonnes) *1000	Pb+Zn (wt %)	Pb (wt %)	Zn (wt %)	Ag (g/t)	Au (g/t)	lead tonnes *1000	zinc tonnes *1000	silver kg	gold kg
I.V. STAGE 3 PIT													
Total Model (52W-88W)	8	2,797.59	3.799	10,604.09	11.765	4.485	7.280	74.210	1.055	475.593	771.978	786,930	11,187
all horizons	6	4,652.67	3.541	16,476.35	10.042	3.798	6.244	63.110	0.943	625.772	1,028.783	1,039,822	15,537
	5	5,947.05	3.430	20,407.23	9.167	3.450	5.716	57.640	0.881	703.842	1,166.134	1,175,927	17,973
	4	6,939.07	3.376	23,423.28	8.568	3.222	5.346	54.030	0.847	754.698	1,252.209	1,265,560	19,340
	3	7,591.00	3.356	25,498.40	8.168	3.074	5.087	51.680	0.832	783.513	1,296.595	1,317,241	21,206
	0	8,494.97	3.338	28,358.74	7.521	2.830	4.692	48.040	0.811	802.552	1,330.592	1,362,354	22,999
Total Model (52W-88W)	8	248.23	4.217	1,046.86	10.387	5.148	5.239	80.710	0.908	53.892	54.845	84,492	951
Champ horizon	6	331.75	4.143	1,374.37	9.613	4.773	4.840	77.930	0.892	65.599	66.520	107,982	1,226
	5	380.81	4.124	1,570.30	9.099	4.513	4.586	71.320	0.896	70.868	72.014	111,994	1,407
	4	415.53	4.109	1,706.80	8.720	4.327	4.393	68.650	0.885	73.853	74.980	117,172	1,511
	3	441.70	4.102	1,811.84	8.425	4.186	4.238	66.520	0.871	75.844	76.786	120,524	1,578
	0	452.60	4.087	1,849.92	8.286	4.117	4.169	65.480	0.858	76.151	77.123	121,133	1,587
Total Model (52W-88W)	8	2,545.36	3.758	9,557.23	11.916	4.412	7.504	73.498	1.071	421.791	717.133	702,437	10,237
excluding Champ horizon	6	4,320.92	3.495	15,101.98	10.081	3.709	6.372	62.034	0.948	560.173	962.264	936,841	14,311
	5	5,566.24	3.383	18,830.93	9.172	3.361	5.810	56.499	0.883	632.975	1,094.120	1,063,933	16,566
	4	6,525.55	3.329	21,716.48	8.556	3.135	5.427	52.881	0.844	680.845	1,177.229	1,148,388	18,329
	3	7,153.30	3.310	23,676.56	8.141	2.989	5.152	50.544	0.829	707.670	1,219.809	1,196,717	19,628
	0	8,042.37	3.276	26,508.82	7.469	2.740	4.728	46.823	0.808	726.391	1,253.469	1,241,221	21,412

# CURRAGH RESOURCES - GRUM MINE

## HISTOGRAM OF LEAD+ZINC BY ORE TYPE

PERCENT FREQUENCY



GRUM MINING RESERVES - BY PHASE  
BASED ON DILUTE G9110 BLOCK MODEL

	TOTAL MATERIAL TONNES	WASTE TONNES	HIGH GRADE TONNES	Pb %	Zn %	Ag g/t	Au g/t	LOW GRADE TONNES	Pb %	Zn %	Ag g/t	Au g/t
PHASE I	69778	61923	6388	3.27%	5.47%	53.3	0.30	1468	1.48%	2.69%	27.2	0.15
PHASE II	84499	73086	8095	3.24%	5.28%	54.6	0.34	3318	1.53%	2.56%	27.0	0.15
PHASE III	38903	33408	3433	2.95%	5.05%	50.2	0.32	2052	1.54%	2.45%	26.2	0.14
TOTAL IV PIT DESIGN	193180	168417	17916	3.20%	5.30%	53.3	0.32	6848	1.52%	2.56%	26.8	0.15

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