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CURRAGH RESOURCES INC.
Inter-Office Memorandum

TO: Ralf Kintzi, Chief Mine Engineer
Dave Tenny, Senior Geologist
Faro Minesite

FROM: Gregg A. Jilson, Vice-President, Exploration
Cam Reed, Geologist
Whitehorse Office

RE: RELEASE OF VANGORDA V8912 COMPUTER MODEL

DATE: 02 09 1990

Table 1 details V8912 calculated reserves by bench at 3%, 4% and 5% Pb+Zn cutoff values. V8912 mining reserves are calculated within the new (December, 1989) VIV ultimate pit design. Table 2 summarizes overburden, undifferentiated rock/overburden, rock waste, sulphide waste and ore tonnes by bench.

For comparison I have included global mining reserves calculated by the old V8809 model within the VIV 1988 Ultimate Pit design at 3%, 4% and 5% Pb+Zn cutoffs in Table 3.

Note that the new model (V8912) was calculated using bench composites rather than geological composite. Geological composites were used in the old V8803 model. V8803 model reserves were diluted 10% with material grading 0% Pb+Zn. As a result of the bench composite method, the new V8912 model reserves do not require any dilution adjustment. It is recommended that a 5% mining loss be applied to the new V8912 reserves, similar to the mining loss applied to the Faro model reserves.

The new V8912 reserves shall be regarded as official and all subsequent mine planning be carried out with this model. Table 4 lists the names and creation dates for each of the V8912 block model files.

Table 5 summarizes the key modelling parameters of the V8912 model.

I have included contour plots of the starting Vangorda topography, bedrock topography and VIV December, 1989 pit at the end of this report.

Detailed documentation of the V8912 datafiles, interpretation and computer modelling is nearly complete and will be forwarded to you as soon as it is finished. Cross-sections showing the geological interpretation, drillhole traces and assays, and pit design outlines are currently being drafted. Mylar copies of these will be sent to Faro when they are completed.

CR*geb

GOOD DRAFT - JUST A FEW MINOR CHANGES!

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TABLE 5
VANGORDA V8912 KEY MODELLING ASSUMPTIONS, PARAMETERS AND PROCEDURES

MODEL TYPE: PCMINE 3 DIMENSIONAL BLOCK MODEL

MODEL LIMITS: 10,647.7 n

TOP ELEVATION: 1,230m
BOTTOM ELEVATION: 990m
NUMBER OF BENCHES: 40

9,276.1m

BLOCK MODEL DIMENSIONS:
Width of column 4.5 m (model easting direction)
Width of row 15.24m (model northing direction)

BENCH HEIGHT: 6.0m

GEOLOGICAL INTERPRETATION:
By C. Reed, Completed in April, 1989

ULTIMATE PIT DESIGN:
By Ion Vintila, Completed in December, 1989

ELEMENTS MODELLED: %Pb, %Zn, Ag (g/mt), Au (g/mt), Density (mt/m^3)

GRADE ~~INTERPRETATION~~ INTERPOLATION METHOD:
Inverse distance squared

GRADE COMPOSITE TYPE:
Bench Composites. Datum elevation = 1,230m

MAXIMUM RANGE FOR SAMPLE INCLUSION:
First Pass - 50m
Second Pass - 90m

GRADE SEARCH ELLIPSOID PARAMETERS

MINIMUM # OF SAMPLES = 2
MAXIMUM # OF SAMPLES = 8
HORIZONTAL ANISTROPY FACTOR = 1.41
VERTICAL ANISTROPY FACTOR = 1.41
MAXIMUM RANGE PASS 1 = 50m
MAXIMUM RANGE PASS 2 = 90m.

MEMO TO: RALPH KINZI
DAVE TENNANT

RE: RELEASE OF VANGORDA V8912 COMPUTER MODEL

FROM: G. JICSON C. REED.

TABLE 1 details V8912 ~~gross~~ calculated reserves by bench at 3%, 4% and 5% Pb+Zn cutoff values. V8912 mining reserves are calculated within the new (December 1989) V1V ultimate pit design. TABLE 2 ~~summarises~~ summarises overburden, undifferentiated rock/overburden, ~~and~~ rock waste, ~~and ore~~ sulphide waste and ore tonnes by bench.

For comparison I have included global mining reserves calculated by the old V8803 model within the V1V 1988 ~~Pit~~ ultimate Pit design. at 3%, 4% and 5% Pb+Zn cutoffs in TABLE 3.

~~It is important~~ Note that the new model (V8912) was calculated ~~on~~ using bench composites ~~and~~ rather than geological composites ~~which were used in the old V8803 model.~~

→ Geological composites were used in the old V8803 model. V8803 model ~~reserves~~ reserves were

as a result of the bench composite method,

diluted 10% of 0% Pb+Zn. The new V8912 model reserves do not require any dilution adjustments. It is recommended that a 5% mining loss be applied to the new V8912 reserves, similar to the mining loss applied to the Feno model reserves.

The new V8912 reserves shall be regarded as official and all subsequent mine planning be carried out with this model. TABLE 4 lists the names and creation dates for each of the V8912 block model files.

TABLE 5 summarizes the key modelling parameters of the V8912 model.

I have included contour plots of the Starting Vansoda topography, Bedrock topography, and V1V December 1989 pit at the end of this report.

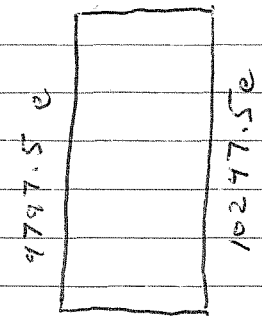
Detailed documentation of the V8912 ~~interpretation~~, datafiles, interpretation, and computer modelling is nearly complete and will be forwarded to you as soon

as it is finished. Cross sections showing the geological interpretation, drillhole traces and assays, and pit design outlines are currently being drafted. Mylar copies of these will be sent to Faro when they are completed.

TABLE 5 : VANCOUVER V8912 KEY MODELLING ASSUMPTIONS, PARAMETERS AND PROCEDURES

MODEL TYPE : PCMINE 3 Dimensional block model.

MODEL LIMITS :



TOP ELEVATION : 1230 m
BOTTOM ELEVATION : 990 m
NUMBER OF BENCHES: 40

BLOCK MODEL DIMENSIONS : Width of column 4.5m (model easting direction)
Width of row 15.24m (model northing direction)

BENCH HEIGHT : 6.0 m.

GEOLOGICAL INTERPRETATION : By C. REED Completed in April 1989.

ULTIMATE PIT DESIGN : By Tom Vinella Completed in December 1989.

ELEMENTS MODELLED : %Pb, %Zn, Ag (g/mt), Au (g/mt), Density (mt/m³)

GRADE INTERPOLATION METHOD : Inverse distance squared

GRADE COMPOSITE TYPE : 6 Bench Composites. Datum elevation = 1230 m.

MAXIMUM RANGE FOR SAMPLE INCLUSION : 1ST PASS - 50 m
2ND PASS - 90 m

The blasthole database has been used daily since September 1986

The accuracy of the reports are entirely dependent on the accuracy of the ~~descriptions~~, methods, and methods and assumptions adopted in the design of the database programming. ~~This study~~ ~~is~~ ~~the purpose~~ ~~This report will~~ This is a study is an attempt ~~of~~ the performance of database programming, ~~to state~~ ~~to~~ an attempt to improve blasthole record reporting and to define objectives for future and capability.

~~Research~~ to gauge the accuracy ~~ability of~~ database programming overall performance of database programming + to assess the ability ~~of the~~ of the programming to accurately calculate grades + tonnages by blast hole ~~accuracy~~ calculation.

Brief Description of Blast Hole Database

Current blast hole ~~calculations~~ processing programs incorporate ~~utilize~~ a simple ~~poly~~ polygonal reserve calculation algorithm. Each blast hole is stored as a

separate record in the database. ~~containing~~

~~record containing blast hole record is containing~~

~~fated~~ ~~A total of 32 individual entries are stored for each blasthole.~~ ~~A~~ The ~~techns~~ ~~technician~~ user. enters ~~blast hole assays~~ each blast hole assay and defines a volume ~~zone~~ of influence to that assay. This volume ~~zone of influence~~ is usually defined by the grid dimensions and ~~bench~~ height of the blast pattern. ~~A volume is automatically calculated by the and the volume~~ and may be adjusted by entering a "partial factor" if a portion of the ore block volume is waste.

~~Density factors used to convert volumes to tonnes~~ The blast hole database

~~Density factors used to convert volumes to tonnes are different depending on the data processing programs.~~ are not stored in the database.

A calculated "ore block ~~grid~~" volume ~~in cubic yards~~ (ey^3) is automatically stored ~~assigned~~ for each blast hole in the database. ~~and is~~ in cubic yards. in the database ~~as the units~~ stored ~~as ft.~~ cubic yards. ~~while~~

to total ore block ~~tonnages~~ tonnages and metal tonnages.

and prepare a simple weight average using Symphony database functions. The results are outputted to a spreadsheet report and may be printed. See figure 2.1 for an example of ~~the~~ the DSCUM WRI report.

(2) (CRUSHER.WRI) Daily crusher feed reports also access the blasthole database to compute forecast, available, and actual crusher feed tonnes and grades. CRUSHER is an autoexecute macro program which prompts the ~~user~~ user via a series of menus ~~as to be~~ to compute the report. to input ~~the required information to compute~~ required information.

→ This is accomplished by an autoexecute ~~Symphony~~ macro named CRUSHER which guides the user ~~through~~ via a series of menus to input appropriate information into ~~the~~ a spreadsheet report ~~through~~ via a series of menus. The program

selectively weight averages ore blocks depending on the criteria specified by the user. Results Tonnage and grade result are outputted to the spreadsheet report and may be printed. See figure 2.2. for an example of the CRUSHER report. Again, as in DSUM, an average density factor of 3 tonnes / BCY is used in tonnage calculations.

~~It was assumed that~~

It has been assumed that for the purpose of producing daily crusher feed reports and ~~that~~ individual blast reserves, an average density factor of 3. tonnes / yd^3 is adequate. However, given the heterogenous nature of the orebody and the high variation of the pulp ~~std~~ specific gravities of the ore types, ~~find tuning of the density factors~~ need to fine tune the density factors became apparent.

ore types. (See Table 2.3 Density Factors.) Non sulphide waste is converted to tonnes in a similar manner. This tonnage is in turn multiplied by the ~~density~~ specific gravity

of ~~contained~~ Pb, Zn, Fe + Ag metal which is pulled from the database ~~for each assayed element~~. When each block is processed, a running total of the total tonnes ~~is stored~~ of ore and total tonnes of metal for each assayed element is stored. After the final block is processed, total metal tonnage of each element is divided by the total ore tonnage to calculate ~~report~~ a weight average grade for each element. The program runs through this process three times, each time selectively pulling out ore blocks classified as high grade, i.e. stockpile "C" and "A" ore. (See figure 2.4 for example of "Statistical Summary Report".)

The results are outputted to a Symphony spreadsheet report and may be printed.

Discussion

For the purposes of this study, high + low grade ore polygons for benches AY3530 to AY 3430 were digitized and an area calculated. Ore polygons represent surveyed flagged limits of ore pockets mined in the pit. Volumes were calculated using a bench height of 20'. ~~Results are summarized in the following table.~~ Both

Geology Year End, 1987.

After completion of the first full year of mine and mill operation, sufficient data has been accumulated to complete a detailed assessment of the reliability of mine model and blast hole reserve calculations. [This study includes ~~compares~~ ~~Model~~ benches mined ~~during~~ between November 30 1986 and Dec 31 1987 (13 months) ~~& earlier~~ ~~primarily~~ ~~obtained~~ ~~to the A/Y phase~~ and is primarily concerned with ~~mixed resources~~ ore mined ~~originating~~ from the A/Y phase.] The conclusions drawn from this report ~~will be useful~~ will have practical applications for ~~future~~ future Garo modeling and will be useful for improved ~~grade~~ daily grade control at the Garo pit.

engineering planning purposes. [Previous experience has in the J.B pit lake brought to light problems with ~~some differences~~ ~~differences~~ differences in the predictive reliability of the FI models, particularly in the SE portion of the orebody. ~~Those experiences~~ in the SE portion of the orebody.]