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PRELIMINARY

REPORT ON THE UNIVIARANT STATSISTICS OF THE SPECIFIC GRAVITY OF PULP FOR THE GRUM DEPOSIT

FOR: **CURRAGH RESOURCES INC.**
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SUMMARY

Univarant statsistical analysis has been applied to the Grum Deposit specific gravity of pulp (sg-pulp) data. This analysis was done on drill core samples. The objecive of the analysis was to determine arithmetic mean values for ore and subore rock types. The analysis was done by specific rock type.

Numerous drill core samples taken from the Grum Deposit have not been analysed for specific gravity. The calculated mean values have been entered into database for all samples not contianing analysed values for sg-pulp.

Drill holes from up to 1989 520 drill holes

INTRODUCTION

This report summarizes the statistical analysis implemented for the specific gravity of pulp (sg-pulp) data from drill core samples collected at the Grum Property. Core of differing rock types have been issued unique rock codes. integer

Rock codes 20, 30, 50, 60, 70, 200, and 210 have been statistically analysed and the sg-pulp arithmetic means determined. Several samples collected at the Grum Property have not been analysed for sg-pulp. These samples have been issued a default value of -1 in the database. Arithmetic mean values have been assigned to samples containing the -1 default.

PROCEDURE

Univariant statistical anaylsis has been applied to sg-pulp data for rock codes 20, 30, 50, 60, 70, 200, and 210. Data for these rock codes have been extracted from the Grum Pcxplor Database B. Indivdual extraction files were created for each rock code and consisted of all sg-pulp values, including the -1 default. To avoid biased mean calculation by the default values, the statistical analysis is limited to samples which contain a specific gravity analysis.

RESULTS

i) Rock Code 20

A total of 4,791 sg-pulp values were extracted for rock code 20 and 3,430 of these were used in the statistical analysis. The arithmetic mean calculated for this rock code is 3.16 gm/cm^3. Variance of sg-pulp data for this rock code is 0.10 and the coefficent of variation is also 0.10. Statistical data for this rock code are displayed on figure 1 and table 1.

ii) Rock Code 30

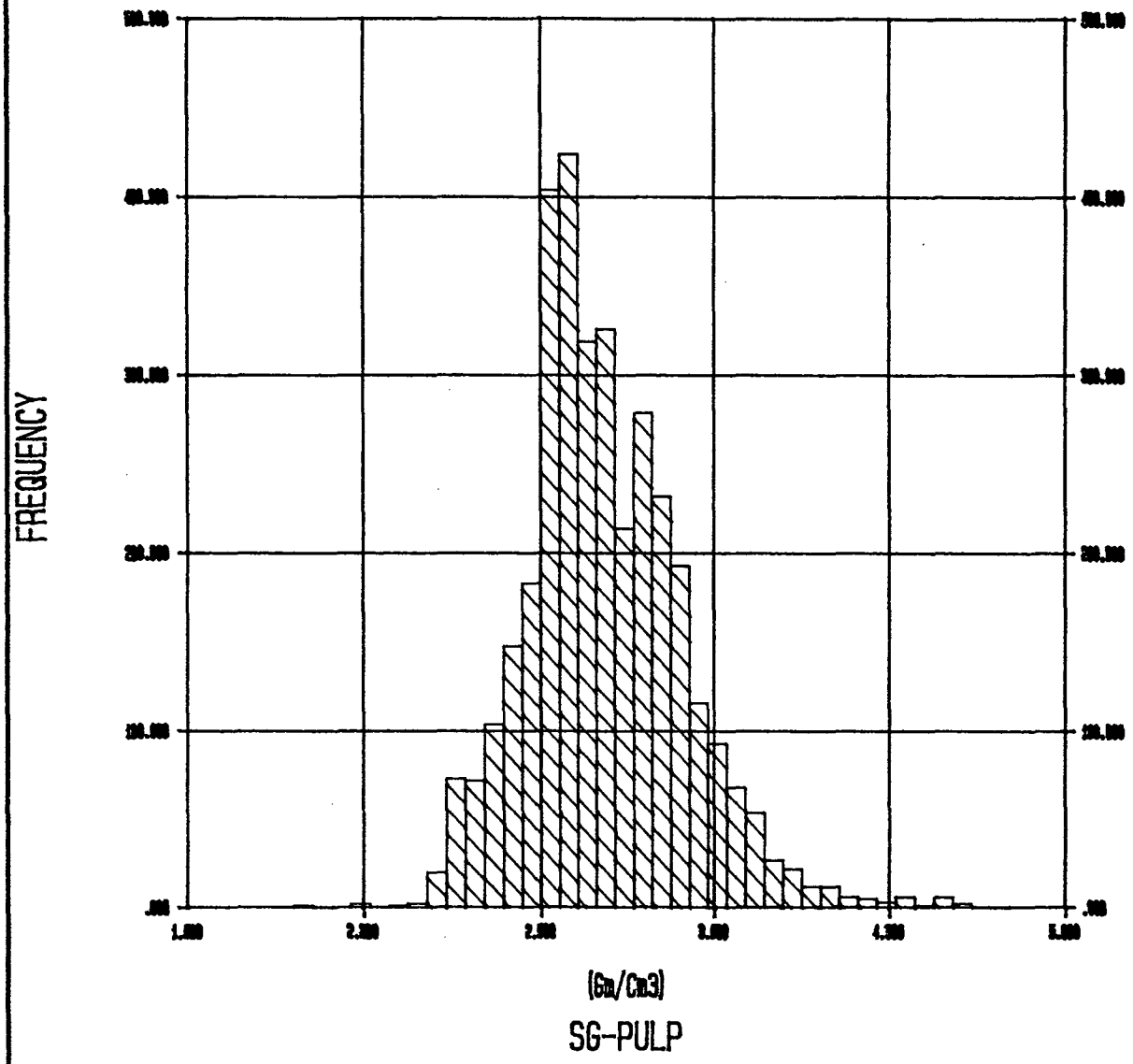
A total of 1,933 values for sg-pulp were extracted for rock code 30 and 1,392 of these were used in the univariant analysis. The calculated arithmetic mean is 3.42 gm/cm^3. Variance of data is 0.19 and coefficent of variation is 0.13. Figure 2 and table 2 display the related statistical data.

iii) Rock Code 50

Extraction from database B collected 2,035 sg-pulp values for rock code 50, 1,531 of these were statistically analysed. The arithmetic mean is 4.23 gm/cm^3 with a variance of 0.23. The coefficient of variation is 0.11. Related statisical data are found on figure 3 and table 3.

iv) Rock Code 60

A total of 854 sg-pulp values have been extracted for rock code 60 and 689 of these were used in univariant anaylisis. The arithmetic mean calculated is 4.41 gm/cm^3. The data contains a variance of 0.13 and a coefficent of variation of 0.08. Figure 4 and table 4 display the statistical results.



SG-PULP PLOT FOR ROCK CODE 20

QUICK-PLOT GEMCOM Services Inc.	DATE = 08-02-90 TIME = 16:16:22	GEMCOM Services Inc. Vancouver Office	
HORIZONTAL SCALE = 1 : 40		VERTICAL SCALE = 1 : 40	

PC-XPLOR VERSION 1.22 ***
Exploration Data Manager ***
By GEMCOM SERVICES INC.

GRUM DRILLHOLE DATABASE ***

CLASSICAL STATISTICS AND HISTOGRAMS

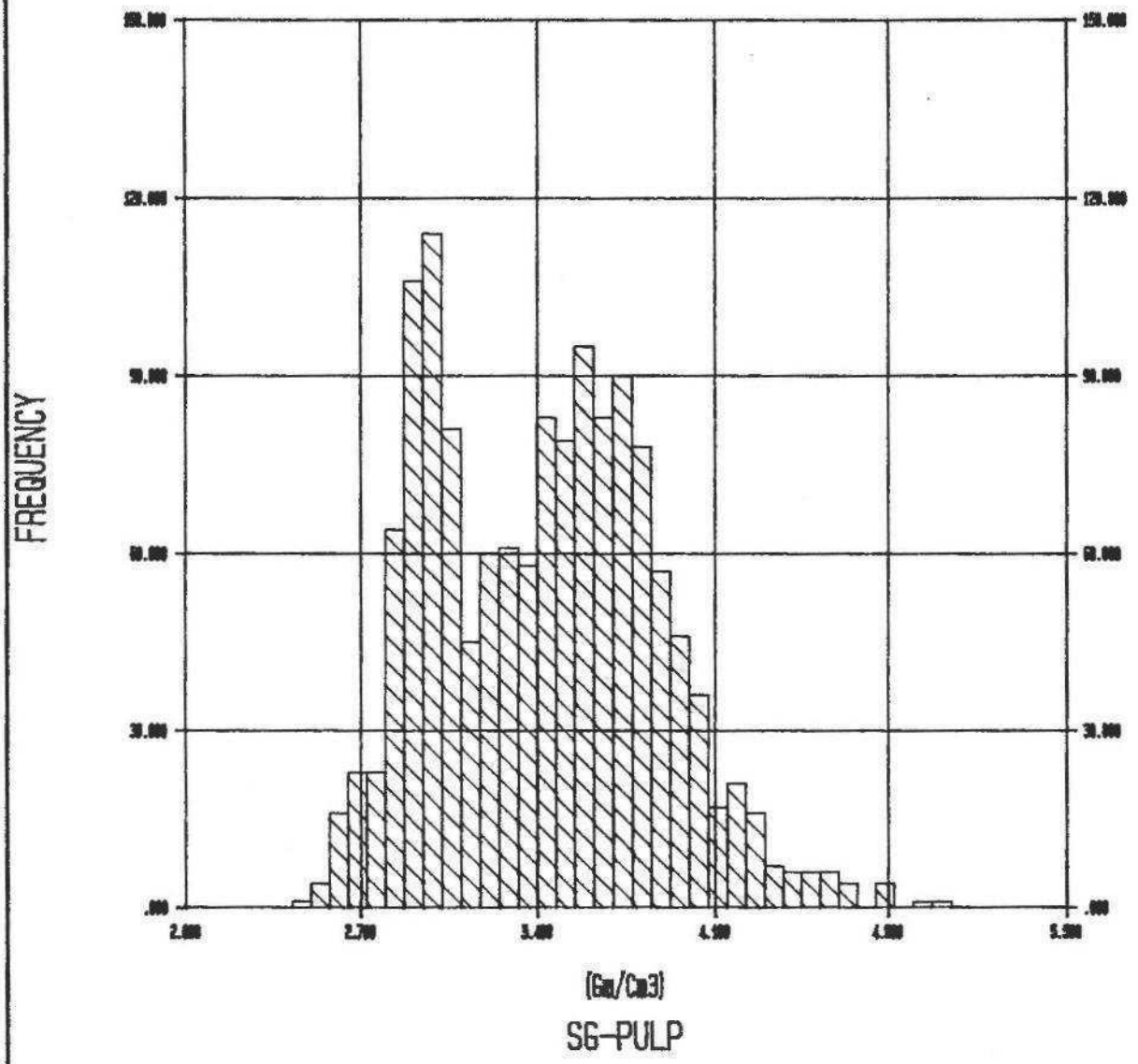
EXTRACTION FILENAME : E:\GRUM\SGDATA20
DATA DESCRIPTION : ALL SG-PULP DATA FOR ROCK CODE 20
DATA DESCRIPTION : SG-PULP PLOT FOR ROCK CODE 20

DATA VALUES ENTERED

MINIMUM CUTOFF VALUE	:	1.850
MAXIMUM CUTOFF VALUE	:	4.775
TOTAL NUMBER OF SAMPLES USED	:	3430
MINIMUM HISTOGRAM VALUE	:	1.850
MAXIMUM HISTOGRAM VALUE	:	4.775
CLASS INTERVAL	:	.075
MINIMUM POPULATION DATA POINT	:	2.000
MAXIMUM POPULATION DATA POINT	:	4.620
TOTAL POPULATION	:	~~[illegible]~~ → 4791

	UNGROUPED DATA	GROUPED DATA
TOTAL NO OF SAMPLES	3430	
ARITHMETIC MEAN	3.1559	3.1551
MEDIAN		3.1181
GEOMETRIC MEAN	3.1404	3.1396
NATURAL LOG MEAN	1.1444	1.1441
STANDARD DEVIATION	.3166	.3163
VARIANCE	.1002	.1000
COEFFICIENT OF VARIATION	.1003	.1002
MOMENT 1 ABOUT ARITHMETIC MEAN	.0000	.0000
MOMENT 2 ABOUT ARITHMETIC MEAN	.1002	.1000
MOMENT 3 ABOUT ARITHMETIC MEAN	.0201	.0200
MOMENT 4 ABOUT ARITHMETIC MEAN	.0412	.0414
MOMENT COEFFICIENT OF SKEWNESS	.6336	.6320
MOMENT COEFFICIENT OF KURTOSIS	4.1041	4.1374

NB. LOG MEANS CALCULATED ON SAMPLES ABOVE ZERO



SG-PULP PLOT FOR ROCK CODE 30

QUICK-PLOT GEMCON Services Inc.	DATE = 10-02-90 TIME = 10:55:39	GEMCON Services Inc. Vancouver Office	
HORIZONTAL SCALE = 1 : 40		VERTICAL SCALE = 1 : 40	

CLASSICAL STATISTICS AND HISTOGRAMS

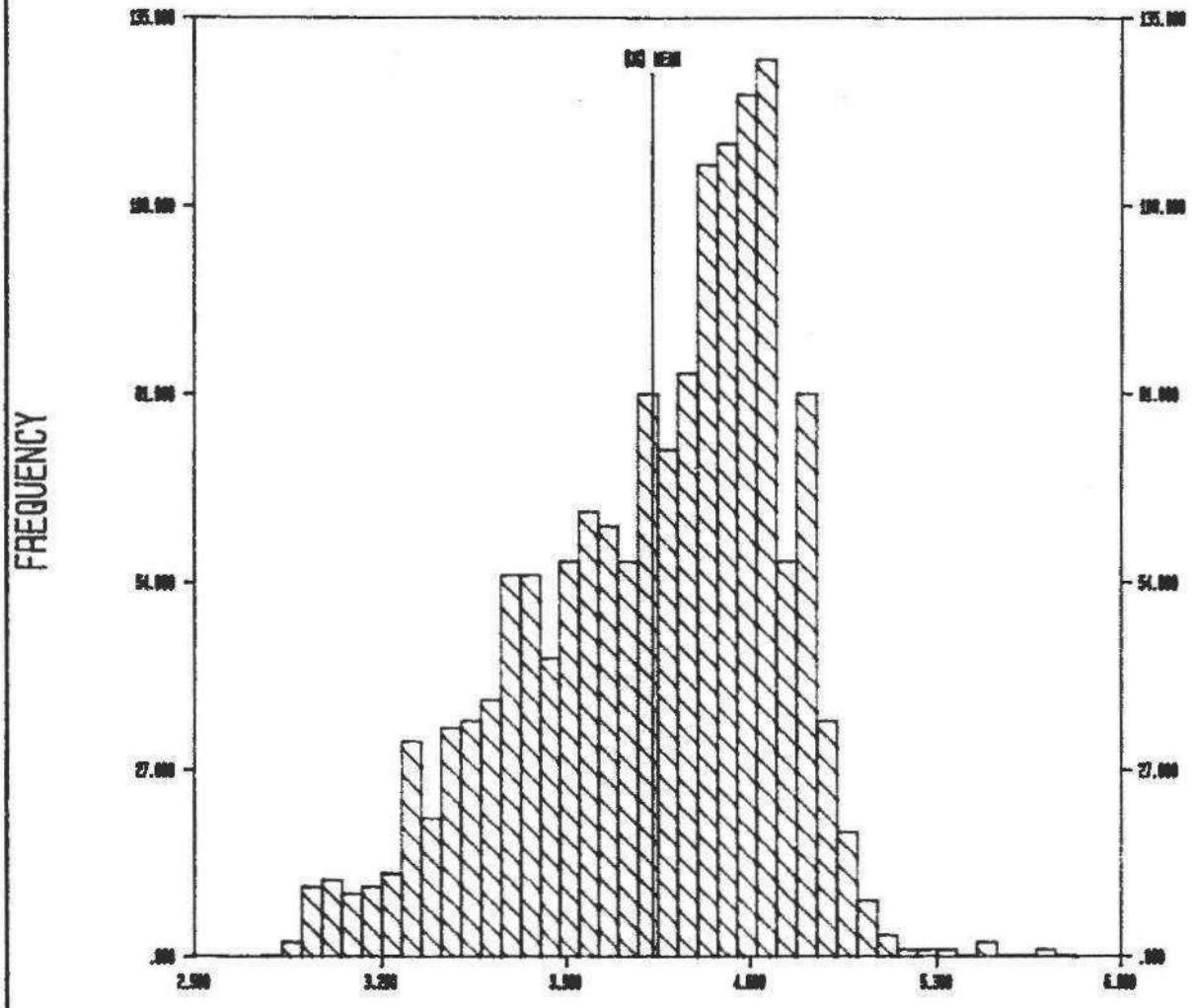
EXTRACTION FILENAME : E:\GRUM\SGDATA30
DATA DESCRIPTION : ALL SG-PULP DATA FOR ROCK CODE 30
DATA DESCRIPTION : SG-PULP PLOT FOR ROCK CODE 30

DATA VALUES ENTERED

MINIMUM CUTOFF VALUE	:	2.350
MAXIMUM CUTOFF VALUE	:	5.125
TOTAL NUMBER OF SAMPLES USED	:	1392
MINIMUM HISTOGRAM VALUE	:	2.350
MAXIMUM HISTOGRAM VALUE	:	5.125
CLASS INTERVAL	:	.075
MINIMUM POPULATION DATA POINT	:	-1.000
MAXIMUM POPULATION DATA POINT	:	5.000
TOTAL POPULATION	:	1933

	UNGROUPED DATA	GROUPED DATA
TOTAL NO OF SAMPLES	1392	
ARITHMETIC MEAN	3.4200	3.4221
MEDIAN		3.4361
GEOMETRIC MEAN	3.3920	3.3941
NATURAL LOG MEAN	1.2214	1.2220
STANDARD DEVIATION	.4405	.4408
VARIANCE	.1940	.1943
COEFFICIENT OF VARIATION	.1288	.1288
MOMENT 1 ABOUT ARITHMETIC MEAN	.0000	.0000
MOMENT 2 ABOUT ARITHMETIC MEAN	.1940	.1943
MOMENT 3 ABOUT ARITHMETIC MEAN	.0263	.0270
MOMENT 4 ABOUT ARITHMETIC MEAN	.0992	.0994
MOMENT COEFFICIENT OF SKEWNESS	.3080	.3156
MOMENT COEFFICIENT OF KURTOSIS	2.6358	2.6329

NB. LOG MEANS CALCULATED ON SAMPLES ABOVE ZERO



SG-PLUP PLOT FOR ROCK CODE 50

QUICK-PLOT SEMCON Services Inc.	DATE = 10-02-90 TIME = 10:54:22	SEMCON Services Inc. Vancouver Office	
HORIZONTAL SCALE = 1 : 40		VERTICAL SCALE = 1 : 40	

CLASSICAL STATISTICS AND HISTOGRAMS

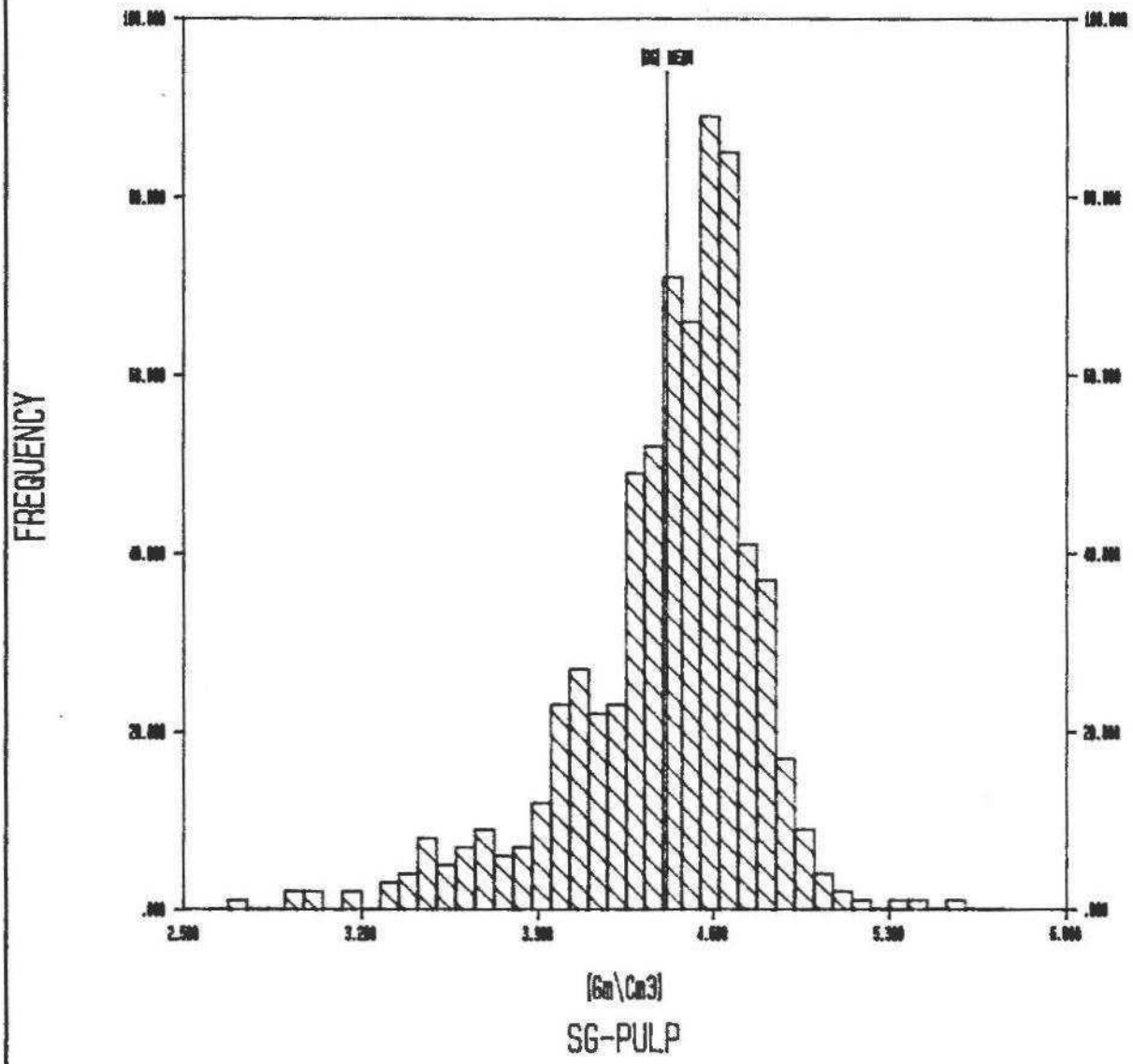
EXTRACTION FILENAME : E:\GRUM\SGDATA50
DATA DESCRIPTION : ALL SG-PULP DATA FOR ROCK CODE 50
DATA DESCRIPTION : SG-PULP PLOT FOR ROCK CODE 50

DATA VALUES ENTERED

MINIMUM CUTOFF VALUE	:	2.750
MAXIMUM CUTOFF VALUE	:	5.825
TOTAL NUMBER OF SAMPLES USED	:	1531
MINIMUM HISTOGRAM VALUE	:	2.750
MAXIMUM HISTOGRAM VALUE	:	5.825
CLASS INTERVAL	:	.075
MINIMUM POPULATION DATA POINT	:	-1.000
MAXIMUM POPULATION DATA POINT	:	5.710
TOTAL POPULATION	:	2035

	UNGROUPED DATA	GROUPED DATA
TOTAL NO OF SAMPLES	1531	
ARITHMETIC MEAN	4.2288	4.2287
MEDIAN		4.3335
GEOMETRIC MEAN	4.2005	4.2002
NATURAL LOG MEAN	1.4352	1.4351
STANDARD DEVIATION	.4749	.4761
VARIANCE	.2255	.2267
COEFFICIENT OF VARIATION	.1123	.1126
MOMENT 1 ABOUT ARITHMETIC MEAN	.0000	.0000
MOMENT 2 ABOUT ARITHMETIC MEAN	.2255	.2267
MOMENT 3 ABOUT ARITHMETIC MEAN	-.0622	-.0629
MOMENT 4 ABOUT ARITHMETIC MEAN	.1390	.1405
MOMENT COEFFICIENT OF SKEWNESS	-.5805	-.5833
MOMENT COEFFICIENT OF KURTOSIS	2.7335	2.7354

NB. LOG MEANS CALCULATED ON SAMPLES ABOVE ZERO



SG-PULP PLOT FOR ROCK CODE 60

QUICK-PLOT GEMCOM Services Inc.	DATE = 08-02-90 TIME = 21:17:43	GEMCOM Services Inc. Vancouver Office	
HORIZONTAL SCALE = 1 : 40		VERTICAL SCALE = 1 : 40	

PC-XPLOR VERSION 1.22 *** GRUM DRILLHOLE DATABASE ***
Exploration Data Manager ***
By GEMCOM SERVICES INC.

CLASSICAL STATISTICS AND HISTOGRAMS

EXTRACTION FILENAME : E:\GRUM\SGDATA60
DATA DESCRIPTION : ALL SG-PULP DATA FOR ROCK CODE 60
DATA DESCRIPTION : SG-PULP PLOT FOR ROCK CODE 60

DATA VALUES ENTERED

MINIMUM CUTOFF VALUE	:	2.600
MAXIMUM CUTOFF VALUE	:	5.750
TOTAL NUMBER OF SAMPLES USED	:	689
MINIMUM HISTOGRAM VALUE	:	2.600
MAXIMUM HISTOGRAM VALUE	:	5.750
CLASS INTERVAL	:	.075
MINIMUM POPULATION DATA POINT	:	-1.000
MAXIMUM POPULATION DATA POINT	:	5.560
TOTAL POPULATION	:	854

	UNGROUPED DATA	GROUPED DATA
TOTAL NO OF SAMPLES	689	
ARITHMETIC MEAN	4.4108	4.4127
MEDIAN		4.4858
GEOMETRIC MEAN	4.3943	4.3961
NATURAL LOG MEAN	1.4803	1.4807
STANDARD DEVIATION	.3660	.3675
VARIANCE	.1340	.1350
COEFFICIENT OF VARIATION	.0830	.0833
MOMENT 1 ABOUT ARITHMETIC MEAN	.0000	.0000
MOMENT 2 ABOUT ARITHMETIC MEAN	.1340	.1350
MOMENT 3 ABOUT ARITHMETIC MEAN	-.0572	-.0581
MOMENT 4 ABOUT ARITHMETIC MEAN	.0942	.0964
MOMENT COEFFICIENT OF SKEWNESS	-1.1674	-1.1710
MOMENT COEFFICIENT OF KURTOSIS	5.2497	5.2839

NB. LOG MEANS CALCULATED ON SAMPLES ABOVE ZERO

v) Rock Code 70

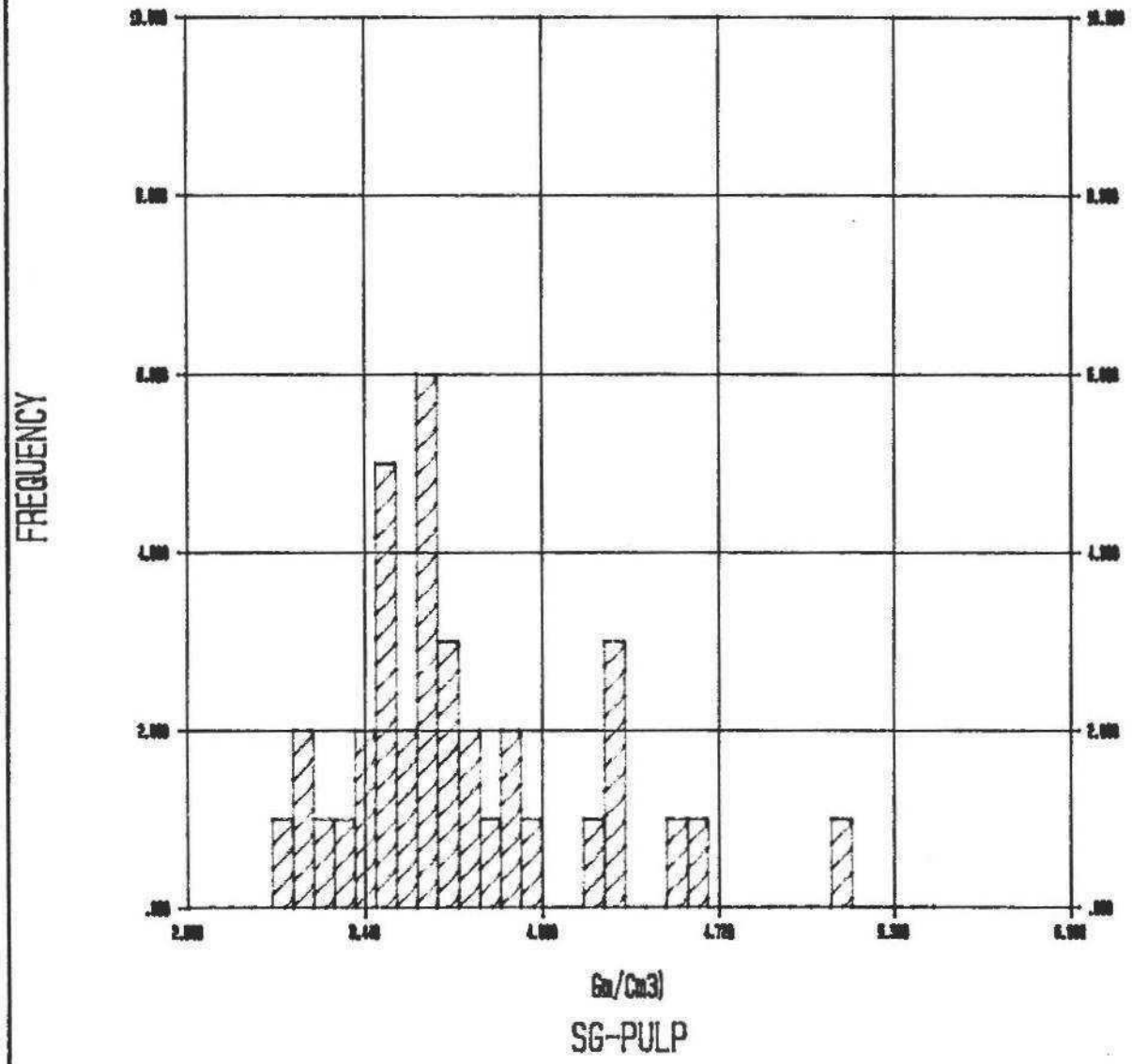
Fourty-nine sg-pulp values were extracted from Grum Deposit Database B and thirty-six of these were statistically analysed. The arithmetic mean is 3.78 gm/cm^3, variance is 0.19, and the coefficent of variation is 0.12. Results are displayed on figure 5 and table 5.

vi) Rock Code 200

A total of 277 sg-pulp values were extracted for rock code 200. Statistical evaluation utilized 226 of these values. The arithmetic mean for this rock code is 2.98 gm/cm^3. Varience for sg-pulp data is 0.08 and the coefficent of variation is 0.09. Figure 6 and table 6 present the related statistical data.

vii) Rock Code 210

The sg-pulp extration file for rock code 210 collected 812 values and 562 of these were statistically evaluated. The arithmetic mean calulated for rock code 210 is 3.08 gm/cm^3. Variance is 0.08 and the coefficent of variation is 0.09. Figure 7 contains the histogram of the results and table 7 hosts the related statistical data.



SG-PULP PLOT FOR ROCK CODE 70

QUICK-PLOT SEMCON Services Inc.	DATE = 08-OE-90 TIME = 15: 36: 41	SEMCON Services Inc. Vancouver Office	
HORIZONTAL SCALE = 1 : 40		VERTICAL SCALE = 1 : 40	

CLASSICAL STATISTICS AND HISTOGRAMS

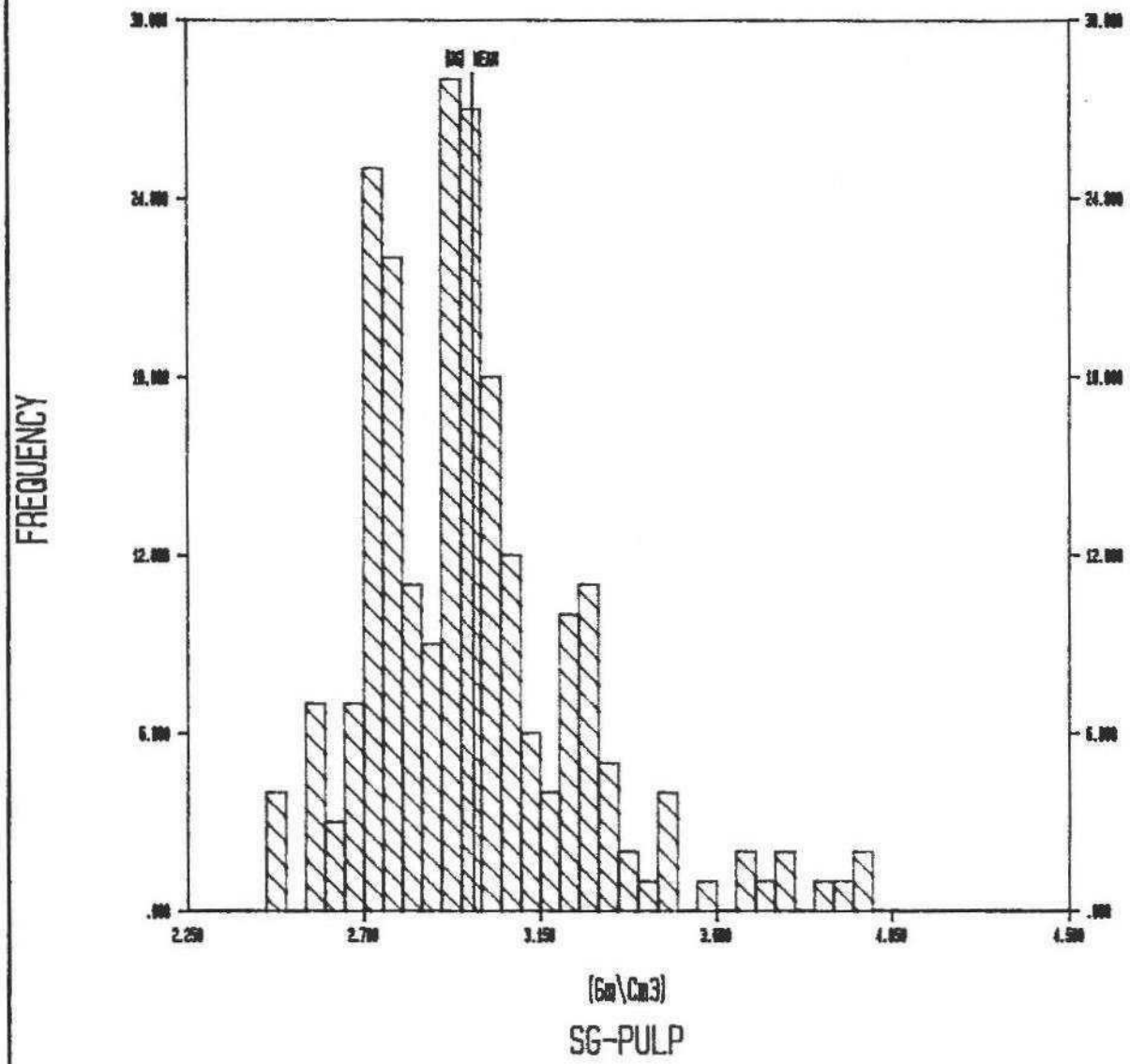
EXTRACTION FILENAME : E:\GRUM\SGDATA70
DATA DESCRIPTION : ALL SG-PULP DATA FOR ROCK CODE 70
DATA DESCRIPTION : SG-PULP PLOT FOR ROCK CODE 70

DATA VALUES ENTERED

MINIMUM CUTOFF VALUE	:	2.750
MAXIMUM CUTOFF VALUE	:	5.500
TOTAL NUMBER OF SAMPLES USED	:	36
MINIMUM HISTOGRAM VALUE	:	2.750
MAXIMUM HISTOGRAM VALUE	:	5.525
CLASS INTERVAL	:	.075
MINIMUM POPULATION DATA POINT	:	-1.000
MAXIMUM POPULATION DATA POINT	:	5.190
TOTAL POPULATION	:	49

	UNGROUPED DATA	GROUPED DATA
TOTAL NO OF SAMPLES	36	
ARITHMETIC MEAN	3.7797	3.7792
MEDIAN		3.6800
GEOMETRIC MEAN	3.7562	3.7557
NATURAL LOG MEAN	1.3234	1.3233
STANDARD DEVIATION	.4367	.4370
VARIANCE	.1907	.1910
COEFFICIENT OF VARIATION	.1155	.1156
MOMENT 1 ABOUT ARITHMETIC MEAN	.0000	.0000
MOMENT 2 ABOUT ARITHMETIC MEAN	.1907	.1910
MOMENT 3 ABOUT ARITHMETIC MEAN	.0977	.1010
MOMENT 4 ABOUT ARITHMETIC MEAN	.1598	.1612
MOMENT COEFFICIENT OF SKEWNESS	1.1730	1.2102
MOMENT COEFFICIENT OF KURTOSIS	4.3939	4.4207

NB. LOG MEANS CALCULATED ON SAMPLES ABOVE ZERO



SG-PULP PLOT FOR ROCK CODE 200

QUICK-PLOT GEMCOM Services Inc.	DATE = 09-02-90 TIME = 11:00:11	GEMCOM Services Inc. Vancouver Office	
HORIZONTAL SCALE = 1 : 40		VERTICAL SCALE = 1 : 40	

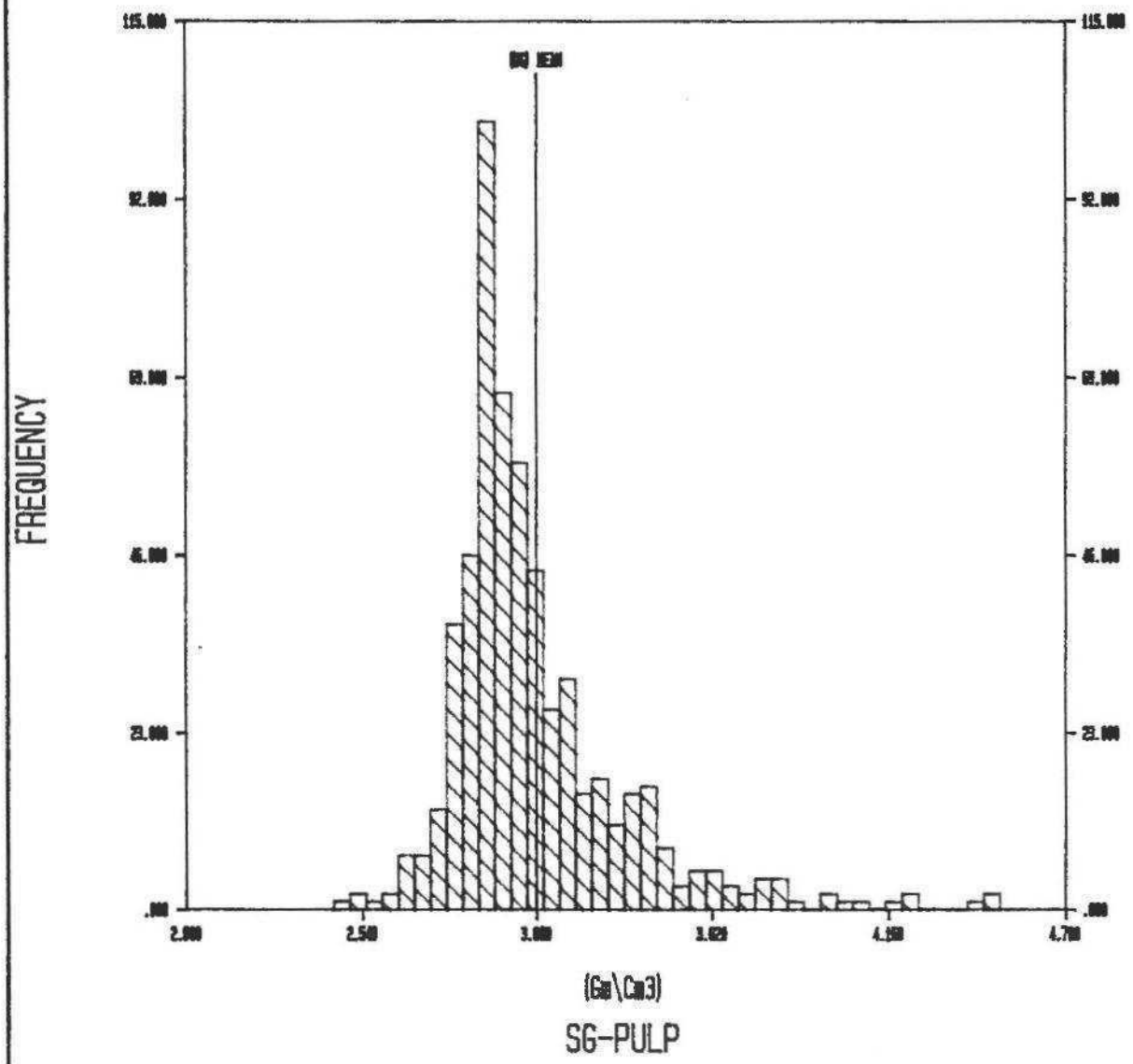
PC-XPLOR Version :1.22 CURRAGH RESOURCES 20320 9/ 2/90 GEMCOM : 34.04

Description :[SG-PULP DATA FOR ROCK CODE 200]

No. of samples	[226]	Number of values <= 0	[51]
Minimum value	[-1.000]	Minimum Histogram value	[2.250]
Maximum value	[4.000]	Maximum Histogram value	[4.500]

	UNGROUPED DATA	DATA REDUCED TO CLASS INTERVALS
Mean	[2.979]	[2.976]
Median		[2.945]
Geometric Mean	[2.967]	[2.964]
Natural log mean	[1.088]	[1.087]
Standard deviation	[.275]	[.275]
Variance	[.076]	[.076]
Coefficient of variation	[.092]	[.092]
Moment 1 about arithmetic mean	[.000]	[.000]
Moment 2 about arithmetic mean	[.076]	[.076]
Moment 3 about arithmetic mean	[.025]	[.024]
Moment 4 about arithmetic mean	[.029]	[.028]
Moment coefficient of skewness	[1.179]	[1.161]
Moment coefficient of kurtosis	[4.991]	[4.977]

PAUSE CAPS NUM LOCK



SG-PULP PLOT FOR ROCK CODE 210

QUICK-PLOT GENCON Services Inc.	DATE = 09-02-20 TIME = 10:39:21	GENCOM Services Inc. Vancouver Office	
HORIZONTAL SCALE = 1 : 40		VERTICAL SCALE = 1 : 40	

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Prepare statistics and histograms from extraction file


Number of data points                                              [812         ]
Minimum value                                                      [-1.000      ]
Maximum value                                                      [4.490       ]
Number of values less than or equal to zero                        [249         ]

Lower cutoff value                                                 [2.450       ]
Upper cutoff value                                                 [4.500       ]
Histogram minimum                                                  [2.450       ]
Histogram maximum                                                  [4.500       ]
Number of classes                                                  [41          ]
Class intervals                                                    [.050        ]
Histogram type (Normal/Log) :                                      [NORMAL      ]
Graph description :                      [SG-PULP PLOT FOR ROCK CODE 210        ]



DDDDDMIN <Small         > DDDDDMAX <4.500          > DDDDDDDDDDDDDDDDDDDDDDDDDDDDD



PC-XPLOR Version :1.22   CURRAGH RESOURCES       20320    9/ 2/90   GEMCOM : 30.00
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

Description :[SG-PULP DATA FOR ROCK CODE 210                                    ]
No. of samples      [562          ]  Number of values <= 0      [249         ]
Minimum value       [-1.000       ]  Minimum Histogram value    [2.450       ]
Maximum value       [4.490        ]  Maximum Histogram value    [4.500       ]
                                                                 DATA REDUCED TO
                                     UNGROUPED DATA              CLASS INTERVALS
Mean                                 [3.076          ]           [3.071       ]
Median                                                           [2.997       ]
Geometric Mean                       [3.065          ]           [3.060       ]
Natural log mean                     [1.120          ]           [1.119       ]
Standard deviation                   [.273           ]           [.273        ]
Variance                             [.075           ]           [.075        ]
Coefficient of variation             [.089           ]           [.089        ]
Moment 1 about arithmetic mean       [.000           ]           [.000        ]
Moment 2 about arithmetic mean       [.075           ]           [.075        ]
Moment 3 about arithmetic mean       [.038           ]           [.038        ]
Moment 4 about arithmetic mean       [.045           ]           [.045        ]
Moment coefficient of skewness       [1.862          ]           [1.855       ]
Moment coefficient of kurtosis       [8.079          ]           [8.125       ]
DDDDDPAUSE DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
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INTERPRETATION

Univariant statistical analysis for rock codes 20, 40, 50, 70, 200 and 210 for the Grum Deposit display normal distribution for sg-pulp data. The variance ranges from 0.08 for rock codes 200 and 210, up to 0.23 for rock code 50. Coefficent of variance ranges from 0.09 for rock codes 200 and 210, up to 0.13 for rock code 30.

Distribution of sg-pulp data for rock code 30 is bimodal and suggests two or more rock types with discrete sg-pulp values have been compiled into one rock code.

Sample populations statistically analysed ranged from 36 for rock code 70, to 3,430 for rock code 20. Univariant analysis for each rock code utilized no less than 69 % of the extracted sg-pulp data in the extraction file.

The smallest sample population analysed is for rock code 70. Statistical analysis for this rock code utilized thirty-six of the fourty-nine values extracted from the database. The variance of sg-pulp data is 0.19 and the coefficent of variance is 0.12.

CONCLUSIONS AND RECOMENDATIONS

Specfic gravity of pulp arithmetic mean values for rock codes 20, 30, 50, 60, 70, 200, and 210 have been calculated using univariant analysis techniques. All -1 default sg-pulp values contained in the Pcxplor Grum Database B have been replaced with the applicable arithmetic mean values.

The bimodal distribution of rock code 30 suggests more than one rock type has been clustered into this single rock code. Although a more precise model will be acheived if the unique rock types could be separated, the generally "lower" grade of this rock type does not justify the significant effort required to accomplish this task.

Although statistical variance for rock code 50 is high, 0.23, it is considered to reflect the variablity in grade and possible amount of iron within specific samples for this rock type. To reduce problems associated with the high variance of this data group, it may be required to prepare an x-y plot of SG vs Pb+Zn% x-y plot. Each samples Pb+Zn value for this rock type could then be applied to the graph and indivdual SG values determined. This technique may implemented if other high density minerals exist in this rock type (eg. barite, iron or copper).

The variance of data for rock rock code 70 is 0.19. Although this value is considered high, the limited sample population will not introduced significant error into the deposit modeling.