EXPLORATION AND RESOURCE DEVELOPMENT PTY LTD

ROPER RIVER PROJECT
BUKA SOUTH RESOURCE ESTIMATION

PROJECT NO: 1170.304.ERD

JULY 2004

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EXECUTIVE SUMMARY

A Resource estimate for the Buka South heavy minerals resource was produced by TIP for internal comparison purposes for Exploration and Resource Development Pty Ltd (ERD).

Conclusions

Based on results of statistics and variography, an ordinary kriged grade estimate was applied to the pisolite and non-pisolite resource areas within a block model.

Material losses as well as some material gains have occurred in many of the 89 mm auger holes. Volume recovery was calculated as a percentage based on measured sample weights against theoretical volume of each sample interval. The results show that 61% of 100 m x 100 m drill hole sample intervals and 29% of 25 m x 25 m drill hole sample intervals are potentially outside acceptable parameters for proper sampling. This signals that a large proportion of holes could potentially have significant sampling errors. This may affect the resource estimate significantly by upgrading or downgrading grade results and/or affecting bulk density estimates. When the volume recovery is averaged down each hole, 22.9% of all averaged drill holes are still potentially outside acceptable parameters.

The base of the resource is at the top of weathered dolerite which is gradational with and beneath the largely *insitu* regolith soil. The 100 m spaced holes terminated upon encountering this degraded dolerite or fresh dolerite.

Interpretation by ERD suggests that the grade figures may be approximately 20% lower than the raw prediction in this Resource, as determination of heavy mineral percentage (HM%) results are affected by significant volume recovery issues. This Indicated Mineral Resource therefore applies to the tonnage figure and adjusted HM% figure in the attached table. A list of recommendations is detailed and should be thoroughly addressed prior to any mine scoping study or alteration of parts of the Resource to Measured category and preparation of an Ore Reserve.

The following table showing the **Indicated Mineral Resource** could be reported as a JORC-compliant Indicated Mineral Resource for tonnage and adjusted HM percent figures.

Prior to upgrading to a Measured Resource or Ore Reserve the following recommendations are made:

(1) ERD carries out further pit testwork and / or drilling and thoroughly reconciles the results to ensure that the grade estimate is reasonable.

(2) Duplicate samples are incorporated and are further reviewed in this work.

(3) Further investigation of the drill hole volume recovery percent and its effect on grade and bulk density is required before proceeding to a JORC-consistent Reserve estimate or a mine scoping study. This should involve analysis of current trench reconciliation data as well as a program of alternate sampling techniques comprising possibly a more robust drilling method such as RC and/or pit testing using suitable excavation equipment in selected areas that represent a range of geology horizons, volume recovery percent and heavy mineral results. Duplicate sample (including check analysis by an independent laboratory) should be part of any such program. Pit testing is the preferred method but appropriate in-pit support must be provided where the depth of pit exceeds 1.5 m for the safety of those involved.

(4) Further recommended validation should also be carried out, including:

- Review of statistics and, if considered appropriate, incorporation of duplicate "paired" holes into variography and resource estimations.
- Comparison of statistics and histograms of raw data, clipped composite data (after poor data points removed) and block estimates.
- Validation of the variogram used for each data point. Having fitted a curve using variogram modelling, the variogram can be validated for each data point, where a kriged grade is calculated and compared with the measured grade. In order to be considered appropriate the following conditions should be satisfied:

  i. The average error should be close to zero.

  ii. The variance of the errors should be close to the average predicted kriging variation.

  iii. The histogram of errors looks normally distributed and approximately 95% of the errors are within +/- 2 x kriging variance.

  iv. In addition, consideration of the application of only the strike variogram model should be reviewed.

(5) More rigorous validation of block estimates versus drill hole database assay values. It may be determined that the search parameters need to be adjusted and Resource estimates re-run, depending on the proportion of smearing and other estimation factors.

(6) More consideration applied to the calculated parameters within each block of number of samples used in the estimate, average distance to sample, distance to nearest sample and kriging variance.

(7) Consideration of all factors to decide the most appropriate Resource categories, which may be different within different parts of the Resource model.

(8) Review of assigned bulk density values and their distribution within the model, particularly once Vol_Recov_Perc and HM_Perc reconciliation and drill hole issues are better understood.

(9) TIP strongly recommends that ERD carry out further detailed drill hole checking and reconciliation to determine which, if any, of these holes should be discarded from future Resource estimates and to assist in identifying the reliability of drilling and subsequent Resource estimates.

BUKA SOUTH MINERAL SANDS DEPOSIT

INDICATED MINERAL RESOURCE JULY 2004

In-situ geological resource, containing:

0.0 HM% cutoff	Block Flag	Geology	Volume	Bulk Density	Tonnes	Mt	Raw HM%	Adjusted HM%
0.0-999.0	1	Pisolite Area	5,650,505	1.80	10,170,909	10.2	5.8	4.7
	2	Black Soil Area	2,880,704	1.75	5,041,233	5.0	3.3	2.6
	10	Non-pisolite, non-black soil	14,047,036	1.67	23,458,550	23.5	3.5	2.8
		Sub Total	**22,578,246**		**38,670,692**	**38.7**	4.1	**3.3**
2.5 HM% cutoff	**Block Flag**		**Volume**	**Bulk Density**	**Tonnes**		**Raw HM%**	
2.5-999.0	1	Pisolite Area	5,476,263	1.80	9,857,274	9.9	6.0	4.8
	2	Black Soil Area	1,743,510	1.75	3,051,142	3.1	4.3	3.4
	10	Non-pisolite, non-black soil	8,969,568	1.67	14,979,178	15.0	4.6	3.7
		Sub Total	**16,189,341**		**27,887,594**	**27.9**	**5.1**	**4.0**
4.0 HM% cutoff	**Block Flag**		**Volume**	**Bulk Density**	**Tonnes**		**Raw HM%**	
4.0-999.0	1	Pisolite Area	4,599,990	1.80	8,279,982	8.3	6.5	5.2
	2	Black Soil Area	721,991	1.75	1,263,484	1.3	5.7	4.6
	10	Non-pisolite, non-black soil	5,415,049	1.67	9,043,131	9.0	5.5	4.4
		Sub Total	**10,737,030**		**18,586,598**	**18.6**	**6.0**	**4.8**
5.0 HM% cutoff	**Bloc k Flag**		**Volume**	**Bulk Density**	**Tonnes**		**Raw HM%**	
5.0-999.0	1	Pisolite Area	3,589,919	1.80	6,461,855	6.5	7.0	5.6
	2	Black Soil Area	435,520	1.75	762,160	0.8	6.6	5.3
	10	Non-pisolite, non-black soil	3,191,600	1.67	5,329,972	5.3	6.3	5.0
		Sub Total	**7,217,040**		**12,553,987**	**12.6**	**6.7**	**5.3**

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Considerable input and discussion was provided by John Roiko, Director Exploration, Exploration and Resources Development Pty Ltd.

TABLE OF CONTENTS

LIST OF TABLES

Table No	Title	Page No
TABLE 3-I	DRILL HOLE GEOLOGY	3.2
TABLE 3-II	AVERAGE VOLUME RECOVERY PERCENT IN DRILL HOLES	3.4
TABLE 3-III	PISOLITE WHOLE-INTERVAL COMPOSITES AND NON-PISOLITE 1 METRE COMPOSITES	3.7
TABLE 3-IV	SEARCH PARAMETERS	3.27
TABLE 3-V	VARIOGRAM MODELS	3.28
TABLE 4-I	BLOCK MODEL PARAMETERS	4.1
TABLE 4-II	BUKA SOUTH INDICATED MINERAL RESOURCE JULY 2004	4.4

LIST OF FIGURES

Fig No	Title	
FIGURE 2.1	GEOLOGY SUMMARY MAP PROVIDED BY CLIENT	2.2
FIGURE 3.1	SNAPSHOT OF AVERAGE VOLUME RECOVERY IN SURPAC	3.5
FIGURE 3.2	HISTOGRAM DISTRIBUTION OF ASSAY RESULTS WITHIN PISOLITE INTERVALS	3.9
FIGURE 3.3	HISTOGRAM DISTRIBUTION OF ASSAY RESULTS WITHIN NON-PISOLITE INTERVALS	3.11
FIGURE 3.4	PISOLITE DOWN HOLE VARIOGRAMS FOR HM_PERC AND COMPOSITE_THICKNESS	3.15
FIGURE 3.5	NON-PISOLITE DOWN HOLE VARIOGRAMS FOR HM_PERC AND COMPOSITE_THICKNESS	3.15
FIGURE 3.6	PISOLITE HORIZONTAL VARIOGRAM FAN FOR HM-PERC FIELD	3.16
FIGURE 3.7	PISOLITE HORIZONTAL VARIOGRAM GRAPHS FOR HM_PERC FIELD	3.16
FIGURE 3.8	PISOLITE HORIZONTAL VARIOGRAM FAN FOR HM_PERC FIELD	3.17
FIGURE 3.9	PISOLITE HORIZONTAL VARIOGRAM GRAPHS FOR HM_PERC FIELD	3.17
FIGURE 3.10	NON-PISOLITE HORIZONTAL VARIOGRAM FAN FOR HM_PERC FIELD	3.18
FIGURE 3.11	NON-PISOLITE HORIZONTAL VARIOGRAM GRAPHS FOR HM_PERC FIELD	3.19
FIGURE 3.12	HORIZONTAL VARIOGRAM FAM – ACROSS-STRIKE DIRECTION IN PISOLITE AREA	3.20
FIGURE 3.13	HORIZONTAL VARIOGRAM GRAPHS – ACROSS STRIKE DIRECTION IN PISOLITE AREA	3.20
FIGURE 3.14	HORIZONTAL VARIOGRAM FAN – ACROSS-STRIKE DIRECTION IN NON-PISOLITE AREA	3.21
FIGURE 3.15	HORIZONTAL VARIOGRAM GRAPHS – ACROSS-STRIKE DIRECTION IN NON-PISOLITE AREA	3.21
FIGURE 3.16	VARIOGRAM MODEL OF PISOLITES IN STRIKE DIRECTION OF 010°	3.23
FIGURE 3.17	VARIOGRAM MODEL OF PISOLITES IN ACROSS-STRIKE DIRECTION OF 100°	3.23

LIST OF APPENDICES

LIST OF ABBREVIATIONS

Companies/Organisations

ERD	Exploration Resource & Development
JORC	Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, The Australian Institute of Geoscientists and Mineral Councils of Australia (Australian Code for Reporting of Mineral Resources and Ore Reserves)
SURPAC	SURPAC Minex Group
The AusIMM	The Australasian Institute of Mining and Metallurgy
TIP	Tennent, Isokangas Pty Ltd

Other

(Note: Abbreviations for standard metric (SI) units are not listed)

Avg.	Average
Avg_Vol_Recov_Perc	Actual volume (mass / density) recovered in sample interval as a percentage of theoretical volume recovery for that sample interval (for 89 mm diameter hole), averaged over entire hole length
Bcm	Bank cubic metre
Blk	Black
Composite_Length	Length of composite sample
EOH	End of Hole
Geol	Geology, geological
HM	Heavy mineral
HM_Perc	Heavy Mineral percent assay (as proportion of total sample)
ID	Identification
ILM	Ilmenite
ILM_Perc	Ilmenite percent assay (as proportion of total sample)
Lith	Lithology
MGA_E	Mercaton Grid Australia – Eastern Project
MGA_N	Mercaton Grid Australia – Northern Project
Min	Mineral
Mt	Estimated tonnes in block, expressed to nearest 0.1 Mt
NM	Non-magnetics
NM_Perc	Non-magnetics percent assay (as proportion of total sample)
Num	Number
Perc	Percent, percentage
Plus_1mm_Perc	Plus 1 mm size fraction (as proportion of total sample)
PSL	Pisolite, pisolitie
Recov	Recovered
Reg	Regolith
RL	Reduced level
Sed	Sediment, sedimentary
Slime_Perc	Fine slime fraction (decanted muds - size not specified by client)
SURPAC	Modelling software marketed by SURPAC
TC	Tabled concentrate
TC_Perc	Tabled concentrate (of -1mm fraction without slime)
Vol	Volume
Vol_Recov_Perc	Actual volume recovered in sample interval as a percentage of theoretical volume recovery for that sample interval (for 89 mm diameter hole)
Vs	Versus

1. INTRODUCTION

Exploration Resource & Development Pty Ltd, (ERD) requested that Tennent, Isokangas Pty Ltd, (TIP) carry out a resource estimate for the Buka South project area, located north of Roper River in the Macarthur Basin, east of Katherine in the Northern Territory. Exploration tenements held by ERD cover an area in excess of 10 000 square kilometres.

Data is provided and produced in projection MGA Zone 53 (GDA94). ERD stated that they believe that the density of drilling and other exploration works in the Buka South area should allow a Measured Resource estimate to be provided within the 25 m x 25 m infill drilling area.

1.1 Scope of Works

The scope of works was provided by John Roiko of ERD. John initially requested that TIP carry out a check of ERD's internal polygonal resource estimates. The initial time frame was approximately two days. After discussion, the schedule provided in Section 1.2 was proposed by TIP as a means of producing a preliminary resource estimate that ERD could use for comparison purposes. This provided a strictly compressed time frame to analyse the drill hole data quality and produce a preliminary resource estimate using an appropriate grade estimation technique, with some time to consider data quality issues and to make recommendations.

A block model was to be prepared using SURPAC mining software. A resource was to be estimated and then reported at the client-specified cut off grades. The resource estimation search parameters and methodology were to be determined based on initial statistics and variography of the data. The work was reviewed in consultation with John Siemon.

ERD requested the reported resource area to be calculated from surface to 4 metres below surface, and separately reported for:

- All areas, unconstrained (includes potentially mineable but unprocessable black soil area)
- The potentially mineable, but unprocessable, black soil area
- Within pisolite area only

ERD further requested the resource be calculated and reported for:

- no grade cutoff
- 2.5% HM cutoff
- 4% HM cutoff
- 5% HM cutoff.

During initial discussions, TIP stated that the preliminary resource estimate provided will not constitute a JORC-compliant estimate (JORC, 1999), for a number of reasons:

1. The author of the work, Alison Keogh, does not meet JORC experience requirements for heavy mineral resource reporting.
2. The strictly compressed time frame provided does not allow sufficient time for full validation and consideration of the data or resulting resource estimate.

2. METHODOLOGY

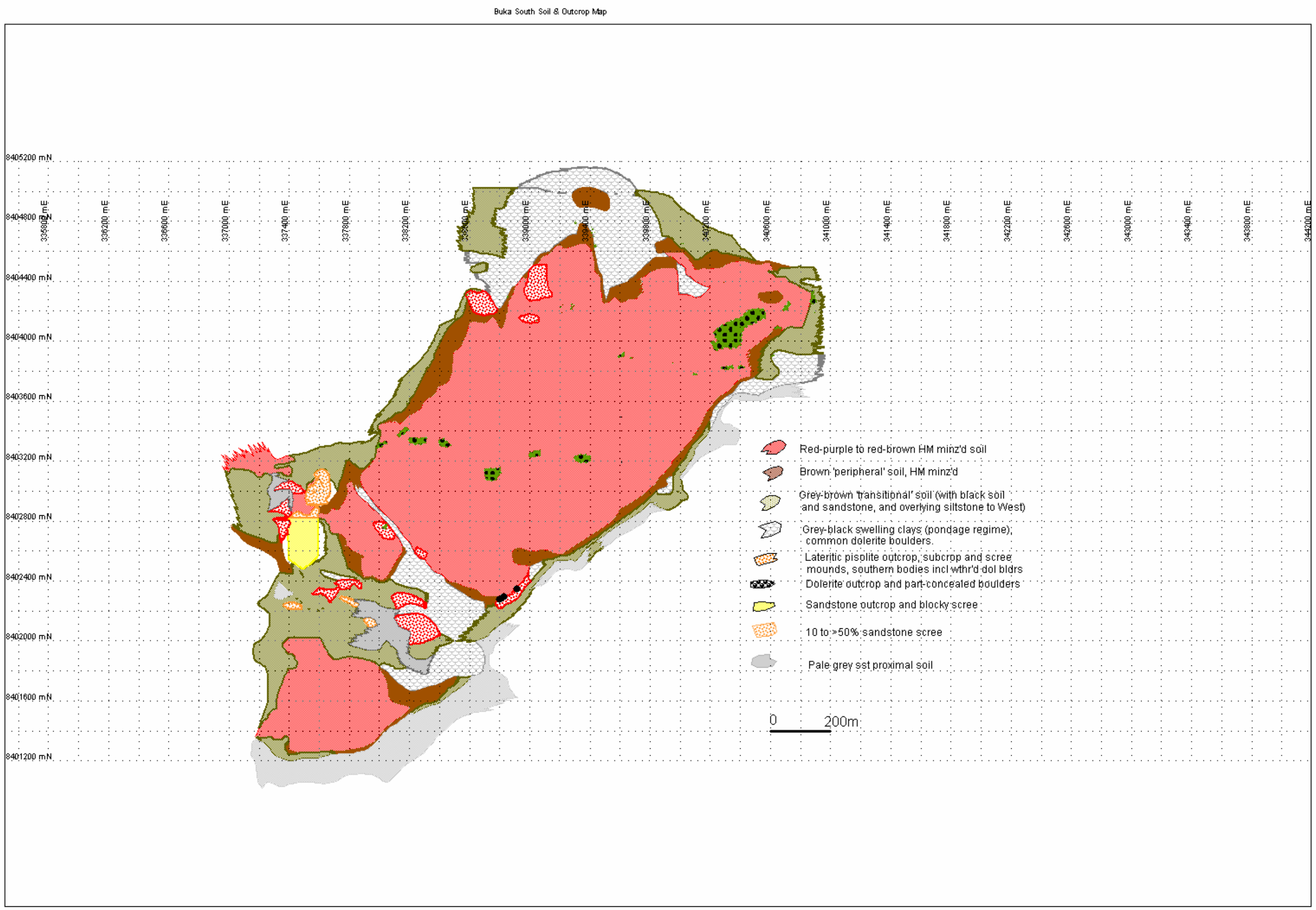
The process used and times for each step were estimated at the start of the project (APPENDIX 2-A). The work took longer than anticipated for a number of reasons, and therefore the chargeable hours are at the upper estimate of time applied, although well less than the total time taken.

Additional data provided by J Roiko includes:

- PSL contours to create limiting pisolite solid triangulation
- Polygons for black soil
- Polygons of HM_Perc cutoff grade areas to be separately reported
- Topography
- Confirmation of density – A global average density of 1.78 was used in the previous polygonal resource estimate by ERD – in this case, ERD provided three bulk densities: pisolite ore 1.8 t/bcm, black soil ore 1.75 t/bcm and all other ore types 1.67 t/bcm). See Nnote 1 below
- Letter dated 12 July 2004 detailing results of interpretation of test pit / trench bulk sampling vs drill hole sampling (APPENDIX 2-B).
- File listing details of drill holes paired with holes in existing database (APPENDIX 2-C).

Note 1: The bulk density t/m^3 (bank) is shown in this report as t/bcm

FIGURE 2.1
GEOLOGY SUMMARY MAP PROVIDED BY CLIENT



3. DATA ANALYSIS AND PROCESSING

3.1 Drill Hole Data Base

It was proposed that a clean database be provided to TIP by ERD, and that the database be checked for accuracy and modified to the format required to conduct drill hole database import, compositing and grade estimation within SURPAC mining software. This took considerable time as there were errors in the database supplied. The errors were identified and partly rectified by Alison Keogh of TIP and then rectified by John Roiko of ERD. Formatting was then carried out by Alison Keogh of TIP.

3.1.1 Data Format and Validation

A drill hole data base was provided by ERD and contained two phases of auger drilling: a 100 m x 100 m program drilled in 2002 and a 25 m x 25 m program drilled in 2003 that focused on infill of a large proportion of a higher grade pisolite area within the larger area of 100 m x 100 m spaced drilling.

The data initially provided by ERD contained three tables to be used in the study:

- “2002 BUKA Levels” with collar information for the 100 m x 100 m drilling.
- “2002 John corrected and level corrected” with combined assay and geology results for the 100 m x 100 m drilling.
- “2003 Infill drilling” with all collar, assay and geology results for the 25 m x 25 m drilling.

Review by Alison Keogh and John Siemon identified a number of data errors and formatting requirements. The following changes were made:

- Identification and correction of missing and incorrect EOH data within the “2003 Infill drilling” table.
- Identification and marking of incorrect sample interval from and to values (overlapping or gaps existing) within the “2003 Infill drilling” table.
- Calculation of theoretical volume and weight for each sample interval within the “2002 John corrected and level corrected” and “2003 Infill drilling” tables, based on an 89 mm hole diameter.
- Calculation of Vol_Recov_Perc field for each sample interval within the “2002 John corrected and level corrected” and “2003 Infill drilling” tables, by comparing the actual mass with the theoretical mass.

The database was then handed back to ERD after some discussion about data validation and formatting requirements. ERD prepared the database to meet the following data format requirements:

1. Separate database tables structured as follows:
    - COLLAR: Hole_ID, MGA_E, MGA_N, RL, EOH_Depth
    - ASSAY: Hole_ID, Sample_No, Depth_from, Depth_To, All Individual Assay Fields, Sample_Interval, Vol_Recov_Perc

- SURVEY: Hole_ID, Depth_from, Depth_To (Default 0), Dip (vertical -90), MGA_Azimuth

- GEOLOGY: Hole_ID, From, To, Geol_Code, Lith1, Lith2, Min1, Min2, Texture_Code.

2. Errors to be checked and fixed by ERD:

   - Missing EOH values and incorrect data entry of EOH values (already largely corrected by TIP)
   - Overlapping in and gaps in from and to sample interval data (Yet to be completed)
   - Errors in surveyed location, assay values and similar.
   - Any below detection results should be set to negative half the detection limit so that they can be correctly dealt with in statistics.

3. Initially, no geology field was available for the drilling. ERD produced a geology dataset to be used for the purposes of separating the pisolite, black soil and other geology in the estimate and resource.

Alison Keogh of TIP produced a Microsoft Access drill hole database from this data. The data was formatted further to meet SURPAC requirements (for example; null values or zero values to be replaced with appropriate negative default values (e.g. - 50). The ERD geology was summarised according to ERD's directions then used to flag intervals within the final database. The drill hole data was imported into SURPAC and displayed and graphically checked.

The drill hole GEOLOGY table contains the following proportion of summarised geology codes (TABLE 3-I).

TABLE 3-I
DRILL HOLE GEOLOGY

ID	Geol_Code1	Geol_Code1Num	Number_Samples	Total_Samples	Proportion
1	PSL	1	4 895	6 978	70.1%
2	CLAY_PSL	2	455	6 978	6.5%
3	CLAY	3	537	6 978	7.7%
4	SED	4	64	6 978	0.9%
5	GRAVEL	5	156	6 978	2.2%
6	DOLERITE	6	588	6 978	8.4%
7	BOULDERS	7	2	6 978	0.0%
8	CLAY_REG	8	199	6 978	2.9%
9	BLK_SOIL	9	82	6 978	1.2%

Data from the ERD reconciliation of test pit / trench vs drill hole sampling and paired holes was not used in the statistical analysis.

3.1.2 Drill Hole Volume Recovery Issues

Lee (2001) states that in mineral sands resource evaluation, recovered samples falling within +/- 20% of the calculated theoretical volume is an indication that proper sampling is likely to have been achieved, subject to correct sampling and laboratory techniques.

The field Vol_Recov_Perc calculated within the uncomposited ERD Buka South drill hole data shows the following characteristics:

In the 100 m x 100 m drill hole data:

Range of Vol_Recov_Perc	Proportion of Vol_Recov_Perc in Sample Intervals
<70%	32%
<80%	52%
>120%	9%

That is: **61%** of 100 m x 100 m drill holes are outside Lee's guide for proper sampling.

In the 25 m x 25 m drill hole data:

Range of Vol_Recov_Perc	Proportion of Vol_Recov_Perc in Sample Intervals
<70%	6%
<80%	17%
>120%	12%

That is: **29%** of 25 m x 25 m drill holes are outside Lee's guide for proper sampling.

This signals that a large proportion of holes could potentially have significant sampling errors. Overall, volume recovery is lower than expected theoretically. This overall trend could also indicate that bulk density estimates may need to be reduced.

When averaged over all sample intervals within each hole (TABLE 3-II), the proportion of holes outside the potentially acceptable range of between 80% and 120% decreases, but is still high. This reflects the trend of loss of material from the top of an auger hole and gain at the base, as some of this collapsed material is collected. This process will have a strong effect on grade reliability of samples within the drill holes. In addition, contamination and dilution and unequal sample recovery from the walls of each hole will have an unknown but significant effect on sample reliability.

By this averaged measure, **22.9%** of all drill holes are outside Lee's guide for proper sampling.

TABLE 3-II
AVERAGE VOLUME RECOVERY PERCENT IN DRILL HOLES

Range	Avg_Vol_Recov_Perc	Total Number of Holes	Proportion
<80%	867	4009	21.6%
>80% and <100%	2157	4009	53.8%
>100% and <120%	933	4009	23.3%
>120%	52	4009	1.3%

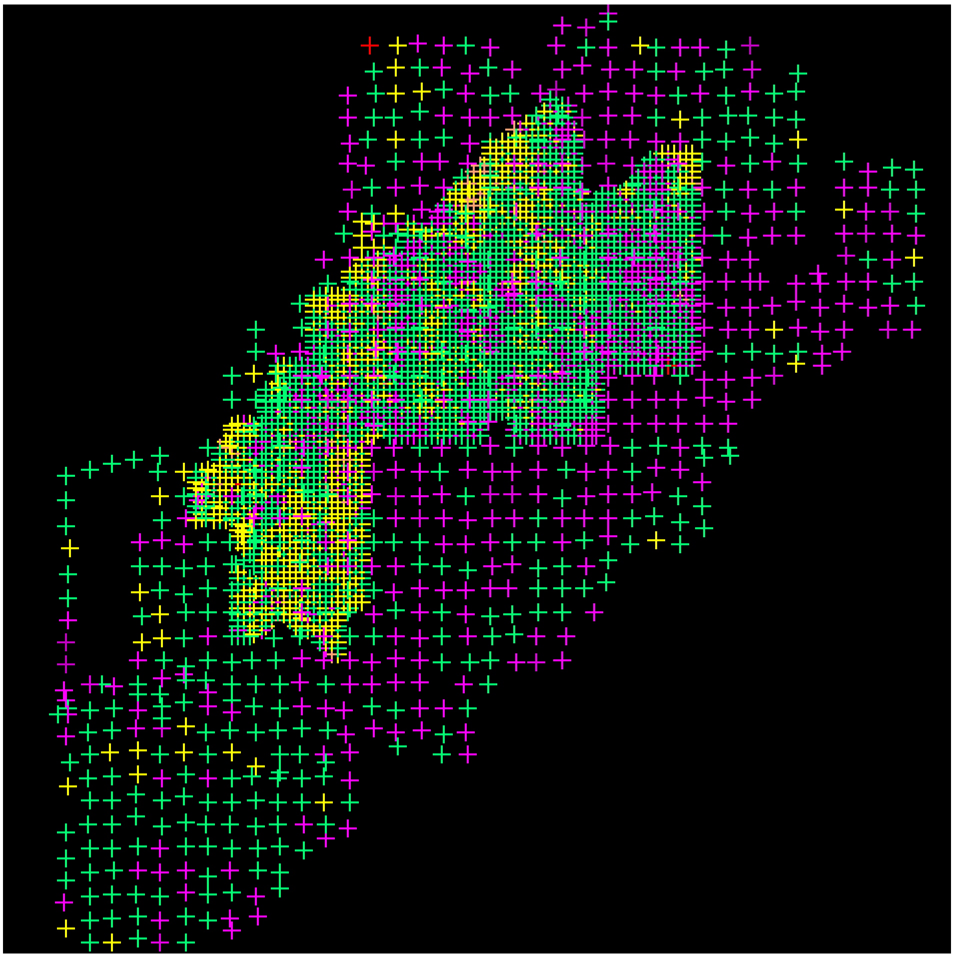
This will have a significant impact on the quality and reliability of any resource estimation and subsequent reserve and design.

FIGURE 3.1 shows a plan view of the average Volume Recovery over each whole hole, displayed by COLLAR Avg_Vol_Recov_Perc field.

Purple and pink colours indicate volume recovery intervals < 80%.

- Red and orange colours indicate volume recovery intervals > 120%.
- Green and yellow indicate volume recovery percents between 80 and 120%.
- (Green 80-100%, Yellow 100-120%).

FIGURE 3.1
SNAPSHOT OF AVERAGE VOLUME RECOVERY IN SURPAC



Drilling in representative areas (eg; alongside existing trenches, within different parts of the geology and within areas known to have poor Vol_Recov_Perc) with an appropriate drill rig and/or pit testwork using an appropriate excavator should be carried out. A drill rig which is able to case the hole as the hammer or bit proceeds would be ideal, as it would largely eliminate side cave-in and loss of material. Alternatively an appropriate RC drill rig may suffice: for example, one used for drilling sand with a shoe fitted on the drill bit to minimise contamination from the sides of the hole. A well designed program would provide feedback on the reliability of the existing drilling, bulk density reliability, and whether existing drilling is overestimating or underestimating grade. The program should involve a number of lines perpendicular to the ore strike, positioned alongside trenches and in other areas, to represent mineralisation styles and test a range of Vol_Recov_Perc and heavy mineral results.

If a large proportion of holes must be discarded from existing drilling, drilling with a different technique in areas of poor Vol_Recov_Perc may be required prior to producing a JORC compliant resource estimate upon which a mining reserve can be based.

3.2 Drill Hole Compositing

The uncomposited drill hole database showed the following characteristics:

- 100 m x 100 m data: total of 804 drill holes (802 with assays), averaging 3.12 m EOH depth, averaging 0.93sample interval (majority sampled at 1.0 m intervals)
- 25 m x 25 m data: total of 3207 drill holes, averaging 1.3 m EOH depth, averaging 0.8 m sample interval

The composite length was chosen based on these parameters, also taking into account that ERD plan to mine the area by free digging techniques across the entire vertical profile from surface to the irregular basement (clay) horizon.

It was noted that the 100 m x 100 m Vol_Recov_Perc data shows a general trend of loss of volume near the top of drill holes and gain of volume near the base of drill holes. Compositing across the length of each drill hole may assist with decreasing the effect of this on overall assays, but will also have the effect of reducing the overall variance.

For the purposes of this initial resource estimate, it was decided that a smaller composite length would be used to honour the subcelling required to the basement geology, and to assess the variation of the data.

Compositing of the drill hole data within the central pisolitic area was carried out from top of hole to base of pisolites, which averaged approximately 1.2 m in length.

Compositing of the remaining non-pisolite area was carried out from start of hole, on 1 m composites to 4 m below surface collar. Composites of less than 0.8 m length were discarded to ensure the data would be handled correctly from a geostatistical perspective (equal support of equal sample length). The 4 m cutoff was specified by ERD. The change of support (non-equal length) within the pisolite area is considered to be negligible, as the vast majority of samples are of similarly equal length.

The following data was removed from the composite files prior to carrying out the resource estimate:

1. For the pisolite composite file (dhcomp_pismid1.str)
    - Vol_Recov_Perc values of > 1.4 (>140%) and < 0.5 (<50%)
    - Composites with a length < 0.5 metre and > 1.9 metres
2. For the non-pisolite composite file (dhcomp_mid2.str)
    - Vol_Recov_Perc values of > 1.4 (>140%) and < 0.5 (<50%)
    - Composites with a length < 0.75 metre and > 1 metre

3.3 Drill Hole Composite Statistics

Overleaf is a summary of the tabulated basic statistics of the pisolite intervals within ERD's specified polygon and of the non-pisolite intervals across the entire drill hole dataset.

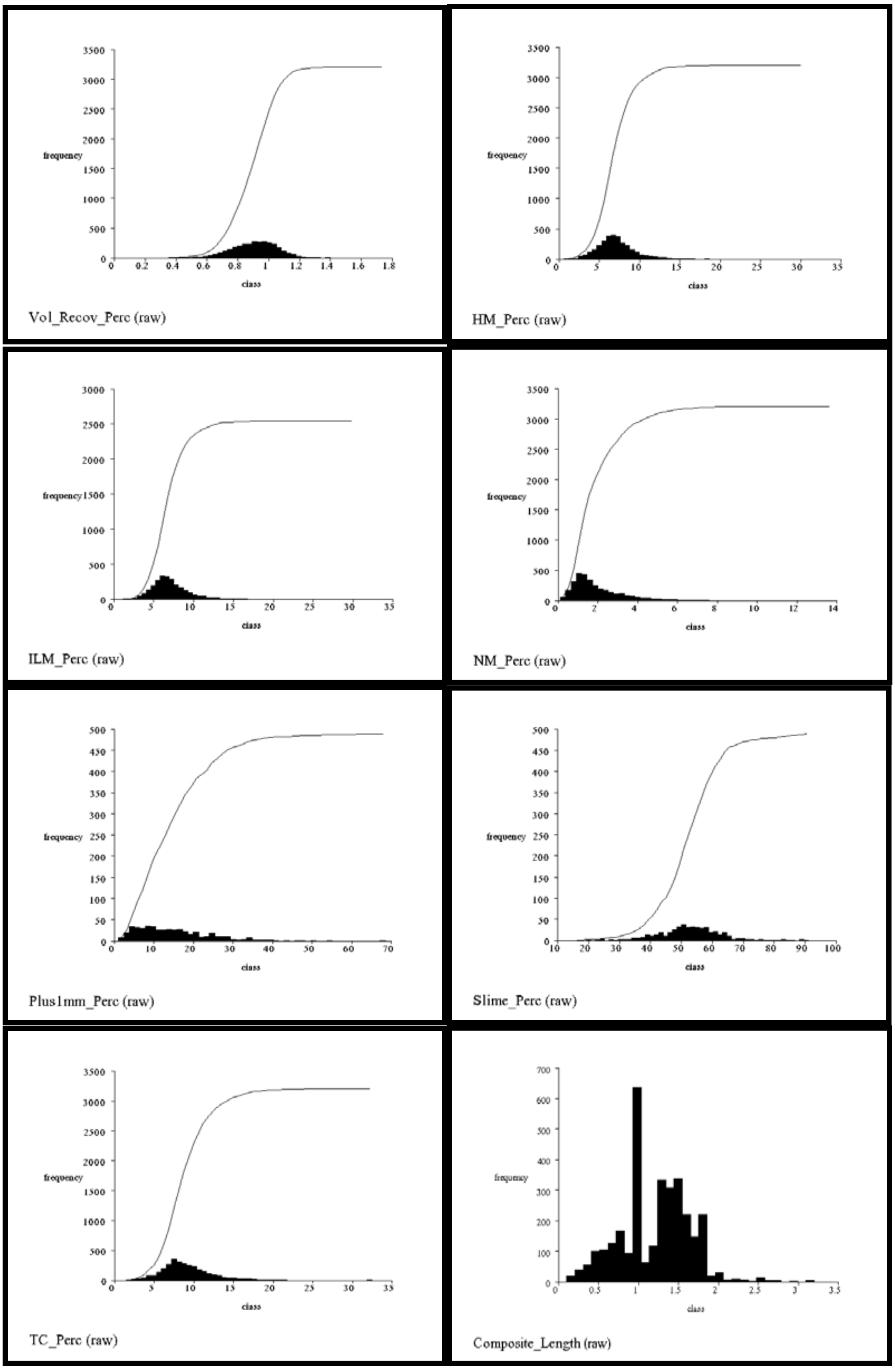
TABLE 3-III
PISOLITE WHOLE-INTERVAL COMPOSITES AND NON-PISOLITE 1 METRE COMPOSITES

Statistics of Pisolite Whole-Interval Composites								
Variable	HM_Perc	ILM_Perc	NM_Perc	Plus1mm_Perc	Slime_Perc	TC_Perc	Vol_Recov_Perc	Composite_Length
Number of Samples	**3205**	2545	3205	488	488	3205	3205	3205
Minimum	**0.602**	0.583	0.104	1.03	16.33	0.841	**0.131**	**0.1**
Maximum	**29.662**	29.486	13.483	68.49	89.61	32.443	**1.714**	**3.2**
Mean	**7.066**	7.022	1.999	14.992	52.714	9.063	**0.905**	**1.222**
Variance	6.133	5.637	1.826	90.177	106.191	10.638	0.022	0.182
Standard Deviation	2.476	2.374	1.351	9.496	10.304	3.261	0.15	0.427
Coefficient of variation	0.35	0.338	0.675	0.633	0.195	0.359	0.165	0.349
Skewness:	1.41	1.701	1.699	1.246	0.161	1.225	-0.207	0.148
Kurtosis:	9.729	11.52	7.257	5.548	4.491	6.924	3.814	3.499
Median	**6.779**	6.666	1.569	13.33	52.62	8.564	**0.914**	**1.3**
Trimean	6.846	6.755	1.703	13.717	52.732	8.672	0.911	1.275
Biweight:	6.788	6.695	1.684	13.725	52.609	8.628	0.91	1.245
Statistics of all non-Pisolite 1 metre Composites								
Variable	HM_Perc	ILM_Perc	NM_Perc	Plus1mm_Perc	Slime_Perc	TC_Perc	Vol_Recov_Perc	Composite_Length
Number of Samples	**1536**	364	1536	1145	1145	1536	1536	1536
Minimum	**0.02**	1.172	0.026	0.38	9.89	0.08	**0.088**	**0.8**
Maximum	**12.455**	11.998	8.87	75.69	96.72	16.958	**10.245**	**1**
Mean	**4.138**	6.576	1.018	16.573	54.518	5.157	**0.846**	**0.977**
Variance	5.637	1.999	0.796	162.922	232.238	7.988	0.095	0.003
Standard Deviation	2.374	1.414	0.892	12.764	15.239	2.826	0.308	0.058
Coefficient of variation	0.573	0.215	0.876	0.77	0.279	0.548	0.364	0.059
Skewness:	0.385	-0.37	2.89	1.115	-0.227	0.647	18.431	-2.453
Kurtosis:	2.395	4.323	15.457	4.192	2.672	3.099	562.337	7.424
Median	**3.824**	6.727	0.785	13.534	55.17	4.615	**0.848**	**1**
Trimean	3.957	6.68	0.826	14.457	55.093	4.873	0.84	1
Biweight:	4.011	6.688	0.805	14.71	55.026	4.896	0.841	1

3.3.1 Histogram Distribution of Assay Results within Pisolite Intervals

The following histograms show the distribution of assay results of pisolite intervals within ERD's specified polygon. The majority of date distributions are close to normal (eg. HM percent) with few outlying assay values, which indicates that an ordinary kriging grade estimation approach is reasonable for this preliminary resource estimate.

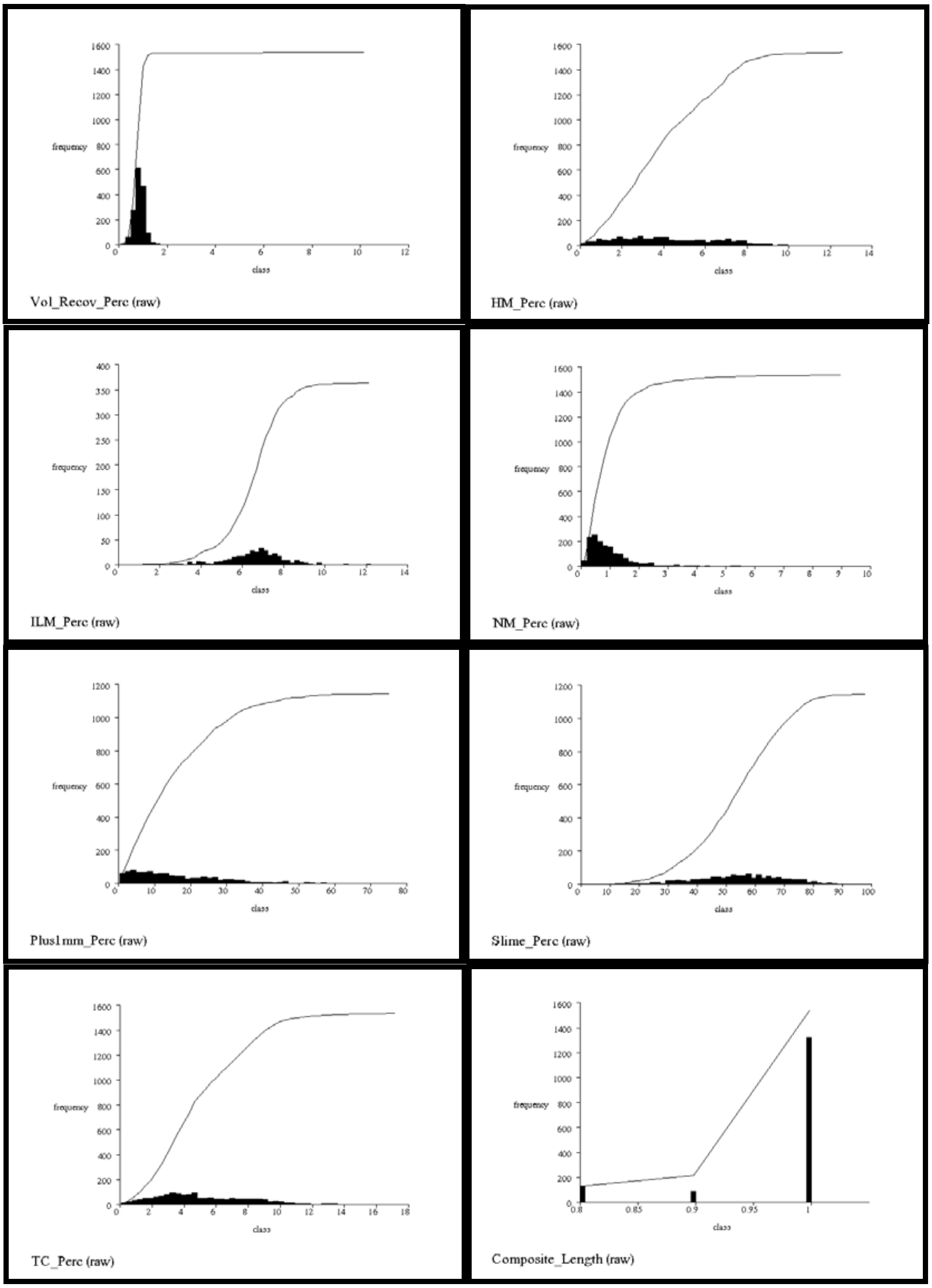
FIGURE 3.2
HISTOGRAM DISTRIBUTION OF ASSAY RESULTS WITHIN PISOLITE INTERVALS



3.3.2 Histogram Distribution of Assay Results within non-Pisolite Intervals

The following histograms show the distribution of assay results of non-pisolite intervals across the entire drill hole dataset. Although many of these assays indicate a wider data distribution than the geologically constrained pisolite area, once again the majority of data distributions are close to normal (eg; HM percent) with few outlying assay values, which indicates that an ordinary kriging grade estimation approach is reasonable for this preliminary resource estimate.

FIGURE 3.3
HISTOGRAM DISTRIBUTION OF ASSAY RESULTS WITHIN NON-PISOLITE INTERVALS



3.3.3 Probability Plot Distribution of Assay Results within Pisolite Intervals

Probability plots (refer APPENDIX 3-A) show the distribution of assay results of the pisolite intervals within ERD's specified polygon. Inflection points reflect distinct changes in the proportion of results at specific values within the dataset. In some cases (eg; Vol_Recov_Perc) this indicates that outliers may need to be discarded, or dealt with using a top-cut, so that outlying assay values do not have a disproportional affect on the resulting grade estimation.

3.3.4 Probability Plot Distribution of Assay Results within non-Pisolite Intervals

Probability plots (refer APPENDIX 3-B) show the distribution of assay results of the non-pisolite intervals across the entire drill hole dataset. Once again, inflection points reflect distinct changes in the proportion of results at specific values within the dataset. In some cases (eg; Vol_Recov_Perc) this indicates that outliers may need to be discarded, or dealt with using a top-cut, so that outlying assay values do not have a disproportional affect on the resulting grade estimation.

3.3.5 Scatter Plot Distribution of Assay Results within Pisolite Intervals

Probability plots (refer APPENDIX 3-C) indicate the relationship between two variables (bivariate statistics) of the pisolite intervals within ERD's specified polygon. This can be used to determine if the data appears sensible, and also to determine if there are correlations between two variables or more than population.

3.3.6 Scatter Plot Distribution of Assay Results within non-Pisolite Intervals

Probability plots (APPENDIX 3-D) indicate the relationship between two variables (bivariate statistics) of the non-pisolite intervals across the entire drill hole dataset. Once again, this can be used to determine if the data appears sensible, and also to determine if there are correlations between two variables or more than population.

3.4 Wireframing

Within the scope of works, it was intended that the following wireframes (also known as triangulations) would be produced in SURPAC:

- Topography at surface, using surveyed collar RLs of 100 m x 100 m drill holes.
- Topography minus 4 m (specified by client as defining the base of the resource model).
- Pisolite solid (using top and base drill hole pisolite intercepts with the codes of Psl1, Psl2 and Psl3 specified by the client), and limited by a polygon provided by the client.
- Black soil solid (using black soil outline provided by client as dxf file format), limited by surface and minus 4 m topography surfaces.

However, it was found that due to the extremely thin nature of the geology and topography, and the complexity of the mapped pisolite and black soil boundaries, that the wireframing would be very complex if not impossible to carry out in SURPAC mining software. SURPAC staff suggested an alternative approach be used to separate composites by geology and flag blocks within the block model. As a result, the following were produced:

- An open wireframe dtm of topography at surface, using surveyed collar RLs of 100 m x 100 m drill holes.
- An open wireframe dtm of topography minus 4 m (specified by client as defining the base of the resource model).
- An open wireframe dtm of the top of pisolite drill hole intercepts
- An open wireframe dtm of the base of pisolite drill hole intercepts
- An open wireframe dtm of the base of 100m x 100 m hole traces
- Open wireframes of the edges of the mapped pisolite boundaries
- Open wireframes of the edges of the mapped black soil boundaries

These files were used as constraints in SURPAC mining software to assign block flags in three dimensions for the separate areas of:

- BLOCK FLAG 1: pisolite (from top of logged pisolite to base of logged pisolite, then limited to those holes within the ERD provided mapped pisolite polygons)
- BLOCK FLAG 2: black soil (from surface to -4m below surface, then limited to those holes within the ERD provided mapped black soil polygons)
- BLOCK FLAG 10: All other blocks.
- BLOCK FLAG 9. Blocks not estimated or not reportable in Mineral Resource.

Composite files were produced and flagged using the geology summary table and reference codes in the drill hole database.

The pisolite and black soil solids were used to separate resource reports within those areas, as requested by the client. The topography surfaces were used to limit the extent of the block model, as requested by the client.

3.5 Drill Hole Composite Variography

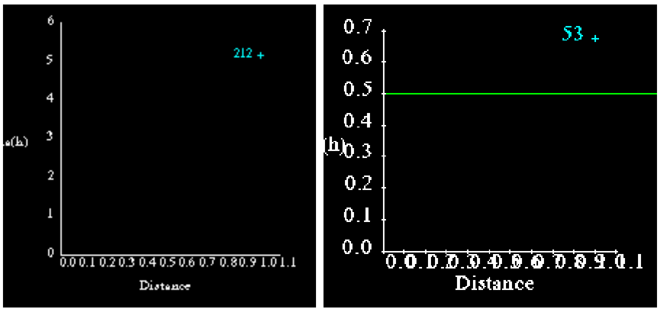
Only very limited time was available to conduct variography. A brief variogram analysis was carried out for HM_Percent for the pisolite and non-pisolite composited drill hole files to help determine search parameters (distance and direction) to be used in the preliminary resource estimate. No time was available within the budgeted scope to carry out any further variographic analysis on other assays or ore thickness.

3.5.1 Down Hole Semi-Variogram

Semi-variograms (also known as variograms) are a graph representing the variability of the specified assay data (gamma h on the Y-axis) against the increased spacing between selected sample pairs (distance on the on the X-axis). Variograms are produced from the dataset in question and can then be modelled to produce a type of mathematical map of the data set that predicts variability at certain distances at specified directions in space. Parameters from the data set itself can then be used in the subsequent grade estimate, by weighting according to the distance and direction from the various drill holes when calculating the grade estimate at a point in space.

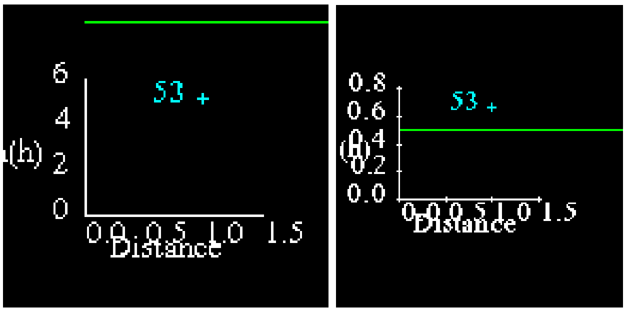
A down hole variogram was produced for each of the pisolite and non-pisolite composite files. This is usually performed to provide a sound basis to determine the nugget value for semi-variograms in other orientations.

FIGURE 3.4
PISOLITE DOWN HOLE VARIOGRAMS FOR HM_PERC AND COMPOSITE_THICKNESS



HM_Perc: 212 samples, mean 6.546, variance 8.481, SD 2.92, nugget <5
Comp_Length: 106 samples, mean 1.161, variance 0.502, SD 0.708, nugget <0.68

FIGURE 3.5
NON-PISOLITE DOWN HOLE VARIOGRAMS FOR HM_PERC AND COMPOSITE_THICKNESS



HM_Perc: nugget <5 and Comp_Length: nugget <0.68

Unfortunately, in both these cases, due to the very thin sheeted nature of the mineralised drill hole intercepts, there are not enough sample pairs down hole to establish a sound nugget value or variogram model.

3.5.2 Horizontal Variogram Fans and Graphs – Strike Direction

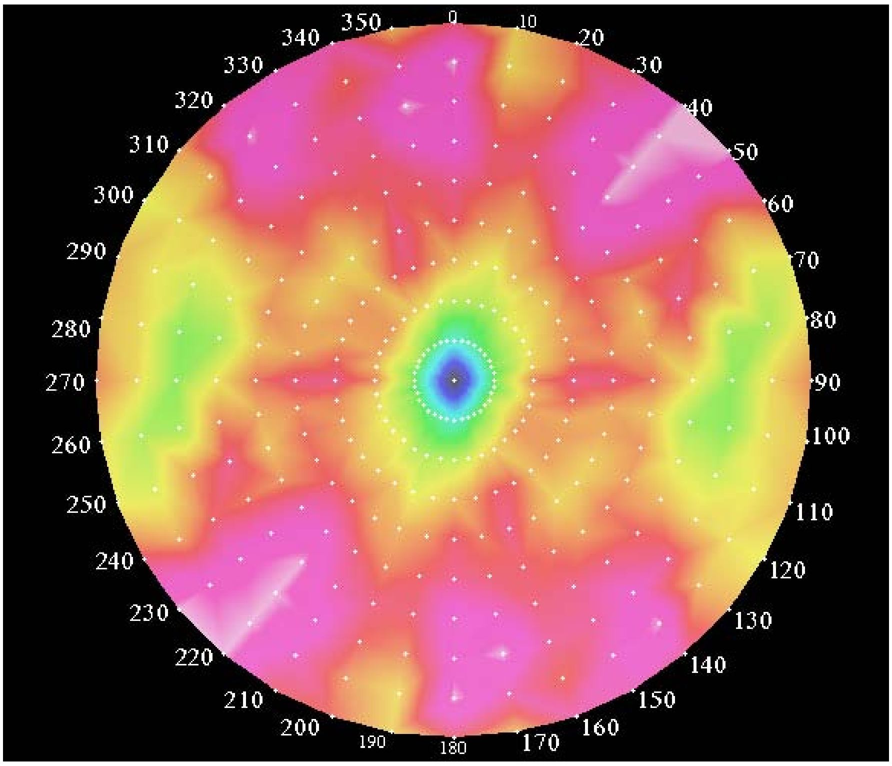
Often in geological orebodies, the ore is less variable in one direction and more variable in other directions. This can reflect underlying geological controls which control the direction of ore shoots and variability within them. Variograms were produced in a horizontal fan to determine if there are any particularly strong directions of continuity (predictable data behaviour between sample pairs on different drill holes) reflected in the variogram in specific directions.

Pisolite Horizontal Variogram Fan and Graphs for HM_Perc Field
The graph below plots the HM_Perc data, at a lag distance of 100 m.

Parameters:

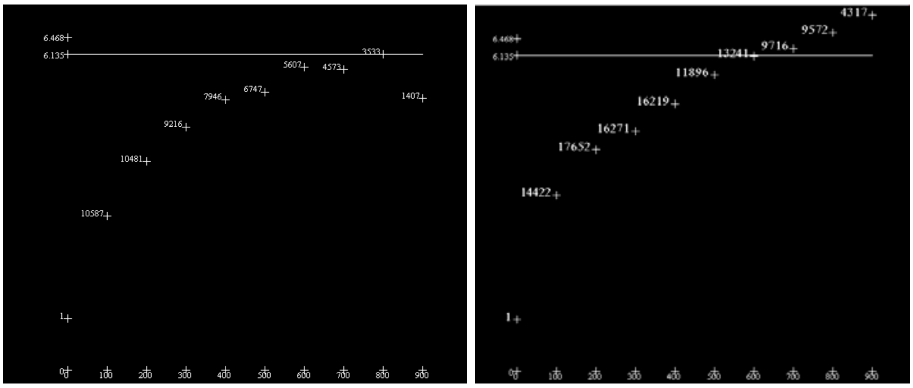
- **HM_Perc**, Nugget 1, 6.135 Variance
- 10 degree increments, 10 degree spread, spread limit 25, lag distance **100** m, max distance viewed 900 m.

FIGURE 3.6
PISOLITE HORIZONTAL VARIOGRAM FAN FOR HM-PERC FIELD



Direction 000 Variogram (long range), and 040 Variogram (short range)

FIGURE 3.7
PISOLITE HORIZONTAL VARIOGRAM GRAPHS FOR HM_PERC FIELD

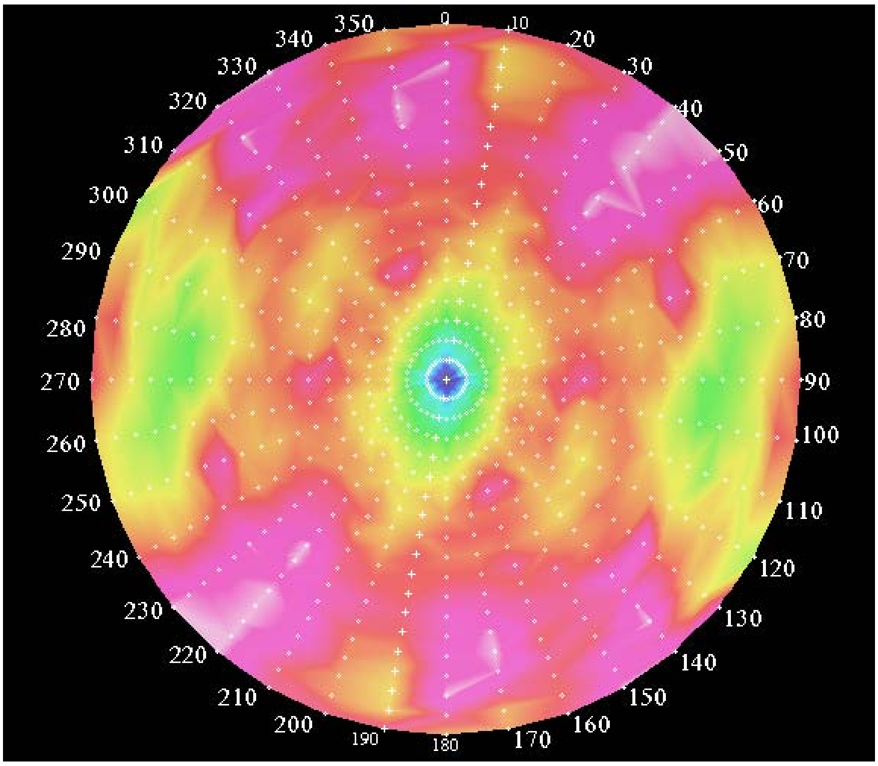


The graph below uses the same HM_Perc data, but at a lag distance of 50 metres, and therefore better reflects the behaviour of the closer range infill drilling area (versus the 100m x 100m drilling data).

Parameters:

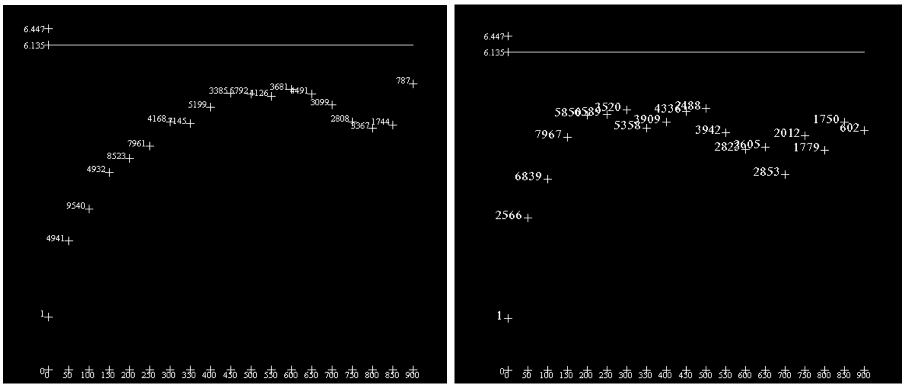
- **HM_Perc**, Nugget 1, 6.135 Variance
- 10 degree increments, 10 degree spread, spread limit 20, lag distance **50** m, max distance viewed 900 m.

FIGURE 3.8
PISOLITE HORIZONTAL VARIOGRAM FAN FOR HM_PERC FIELD



Direction 010 Variogram (longest range), and 110 Variogram (shortest range)

FIGURE 3.9
PISOLITE HORIZONTAL VARIOGRAM GRAPHS FOR HM_PERC FIELD



In both sets of variograms, there is a clear, strong direction of continuity in the direction of 010^o to 020^o. The shortest range in the horizontal plane is seen in the perpendicular direction of 100^o to 110^o. This means that data is most predictable to the longest distance in the primary direction (known as variogram strike direction) of 010^o to 020^o.

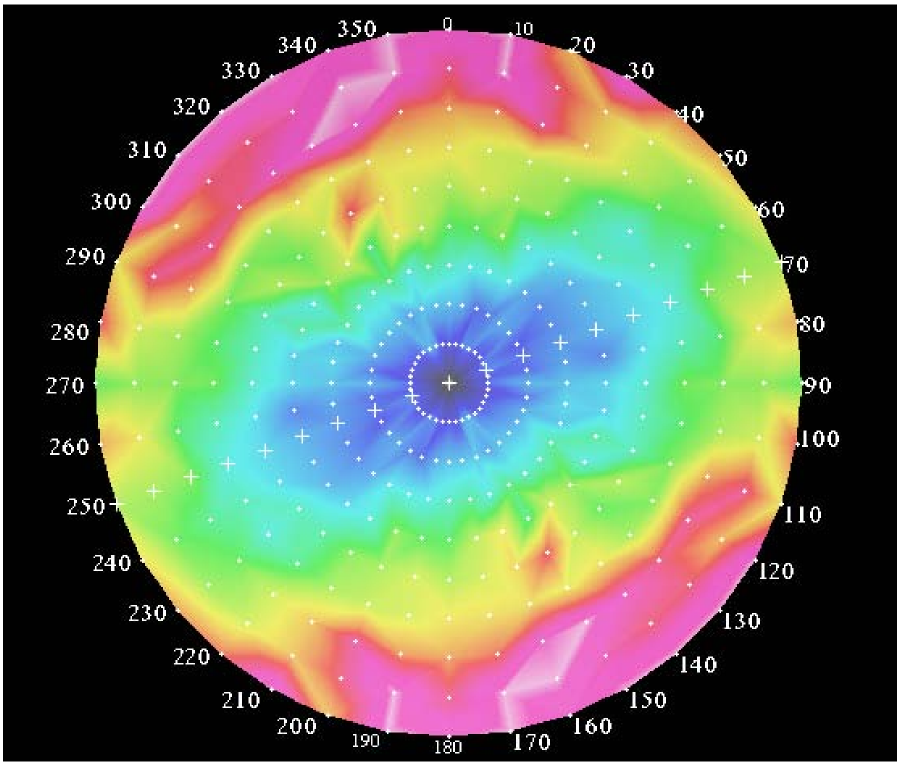
The point at which data becomes random is known as the "range". For the direction of 010 to 020^o, the range is approximately **550** to 700 metres. For the direction of 110 to 120^o, the range is approximately **250** to 300 m. These parameters can now be used to limit the distance of samples used to estimate a point in space. If modelled, the mathematical variogram equation can be used to map how the samples are weighted according to their distance away from each estimated sample point.

Non-Pisolite Horizontal Variogram Fan and Graphs for HM_Perc Field
The graph below plots the HM_Perc data, at a lag distance of 100 metres.

Parameters:

- **HM_Perc**, Nugget 1, 5.641 Variance
- 10 degree increments, 10 degree spread, spread limit 25, lag distance **100** m, max distance viewed 900 m.

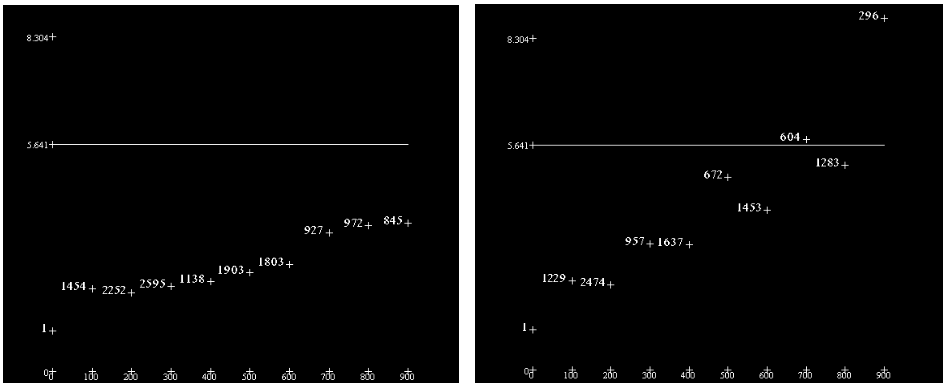
FIGURE 3.10
NON-PISOLITE HORIZONTAL VARIOGRAM FAN FOR HM_PERC FIELD



Direction 070 Variogram (long range), and 330 Variogram (short range)

Blue – low variance: Pink – high variance.

FIGURE 3.11
NON-PISOLITE HORIZONTAL VARIOGRAM GRAPHS FOR HM_PERC FIELD



By running these fans and variogram graphs using a number of different parameters (particularly lag distance and spread), it was determined that 070 direction appears to have the longest range of ore continuity (500 m to 550 m) and that the perpendicular direction of 160 has a much shorter range of ore continuity (250 m to 300 m). These variograms are less well defined than the pisolite area, probably due to there being mixed populations of differently geologically controlled ore types (black soil, gravely soil, sandy soil, dolerite, and similar).

3.5.3 Horizontal Variogram Fans and Graphs – Across-Strike Direction

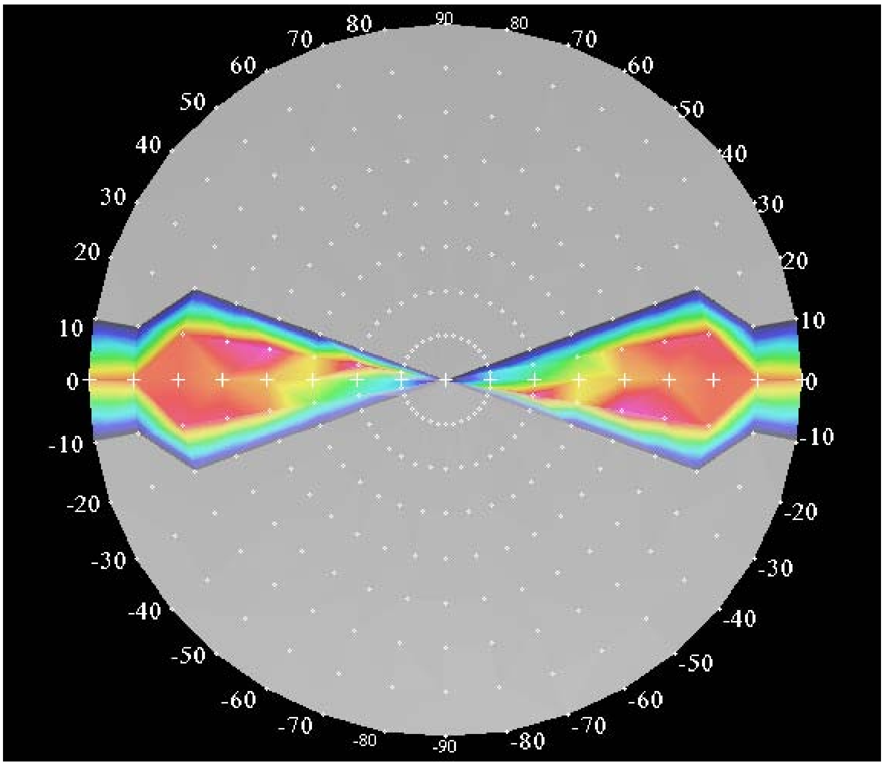
Normally variograms are calculated in three dimensions, to determine the three dimensional nature of geological ore controls. In this case, we know that the data is extremely horizontally controlled, in sheet-like, layered bodies. Therefore, the direction of strongest continuity is likely to be close to horizontal. There is so little deeper drilling information that an assessment of vertical continuity cannot be carried out with any certainty. Given these factors, it is reasonable to assume that the data is most predictable in a plane of 0 to 10 degrees from the horizontal. The variogram fan and graphs for the 100^{o} direction, in a vertical plan are displayed below (FIGURE 3.12).

3.5.4 Pisolite Area

Parameters:

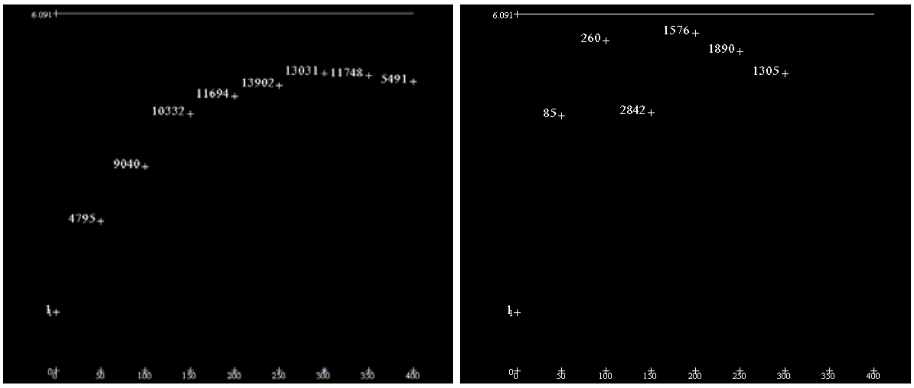
- **HM_Perc**, Nugget 1, 6.135 Variance
- 10 degree increments, 10 degree spread, spread limit 50, lag distance **25** m, max distance viewed 250 m.

FIGURE 3.12
HORIZONTAL VARIOGRAM FAM – ACROSS-STRIKE DIRECTION IN PISOLITE AREA



Plunge Direction 0^o and -10^o from vertical Variogram Graphs

FIGURE 3.13
HORIZONTAL VARIOGRAM GRAPHS – ACROSS STRIKE DIRECTION IN PISOLITE AREA



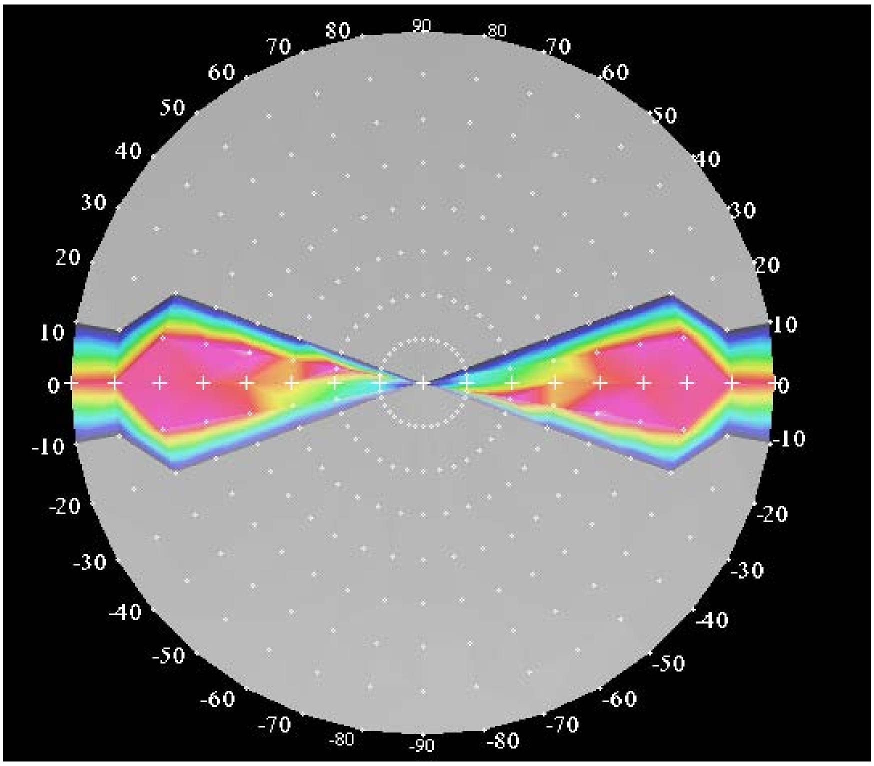
The range in these directions is about 275 m to 300 m. This distance is much less and reflects that this is not the primary ore controlling direction, therefore less weight should be applied in the grade estimate to samples from this direction.

Non-Pisolite Area
The graph below FIGURE 3.14 plots the HM_Perc data, at a lag distance of 50 m.

Parameters:

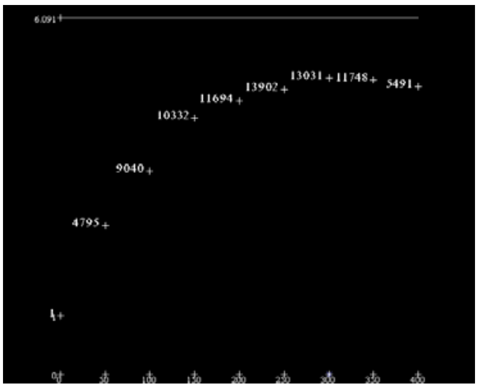
- **HM_Perc**, Nugget 1, 5.641 Variance
- 10 degree increments, 10 degree spread, spread limit 25, lag distance **50** m, max distance viewed 900 m.

FIGURE 3.14
HORIZONTAL VARIOGRAM FAN – ACROSS-STRIKE DIRECTION IN NON-PISOLITE AREA



Plunge Direction 0o from vertical Variogram Graph

FIGURE 3.15
HORIZONTAL VARIOGRAM GRAPHS – ACROSS-STRIKE DIRECTION IN NON-PISOLITE AREA



The range in these directions is about 275 to 300 m.

3.5.5 Horizontal Variogram Fans and Graphs – Dip Direction

The third direction calculated to determine the three dimensional direction of ore continuity is the dip direction.

Because a dip of zero degrees was chosen, the variogram will be the same as the across-strike variogram shown in Section 3.4.2. Hence, the variograms are not shown again.

3.5.6 Summary of Variography

For both the pisolite and non-pisolite data sets, data is extremely limited in the vertical plane because of the short drill holes. As the orebody is known to be tabular in nature, it is reasonable to assume the strongest direction of continuity has zero dip.

Pisolites

The variography indicates a strong direction of ore continuity at zero dip towards a strike of **010** degrees. The across-strike direction (medium range of continuity) is determined to be at zero dip towards a strike of **100** degrees. The dip direction (shortest possible range of continuity) is determined to be at 90 degrees dip to 100 degrees.

Non-pisolites

The variography indicates a direction of ore continuity at zero dip towards a strike of **070** degrees. The across-strike direction (medium range of continuity) is determined to be at zero dip towards a strike of **160** degrees. The dip direction (shortest possible range of continuity) is determined to be at 90 degrees dip to 160 degrees.

3.5.7 Variogram Modelling

Simple variogram models were fit to the determined directions of major and semi-major ore continuity. Insufficient samples were available to produce a down hole variogram model.

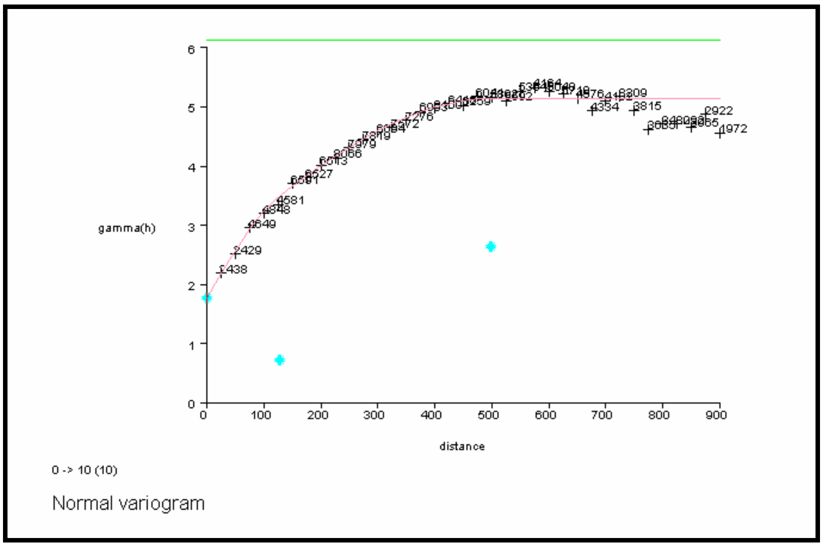
The mathematical models will be used to weight the samples used within the resource estimates according to sample distance. That is, samples at a greater distance will have less weighting applied than samples closer together, according to the variogram model.

Pisolites – Strike Direction

FIGURE 3.16 shows the modelled variogram at zero dip in 010 strike direction (direction of strongest ore continuity). The parameters are: nugget **1.78**, two spherical structures with sill1 at **0.72** and range1 of **127**, and sill2 at **2.64** and range2 of **497**.

Number of samples: 3205
Mean: 7.066
Variance: 6.135
Standard deviation: 2.477

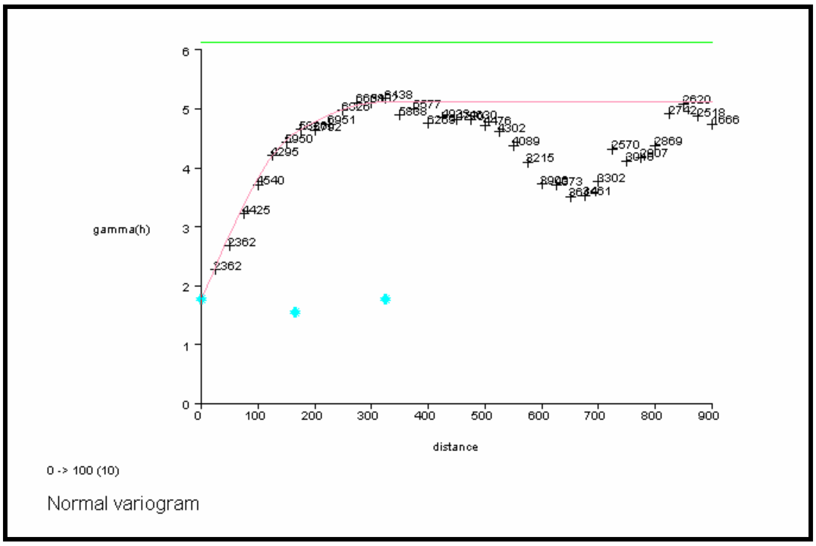
FIGURE 3.16
VARIOGRAM MODEL OF PISOLITES IN STRIKE DIRECTION OF 010°



Pisolites – Across-Strike Direction

FIGURE 3.17 shows the modelled variogram at zero dip in 100 across-strike direction (direction of medium ore continuity). The parameters are: nugget **1.78**, and two spherical structures with sill1 at **1.56** and range1 of **164**, and sill2 at **1.78** and range of **324**.

FIGURE 3.17
VARIOGRAM MODEL OF PISOLITES IN ACROSS-STRIKE DIRECTION OF 100°

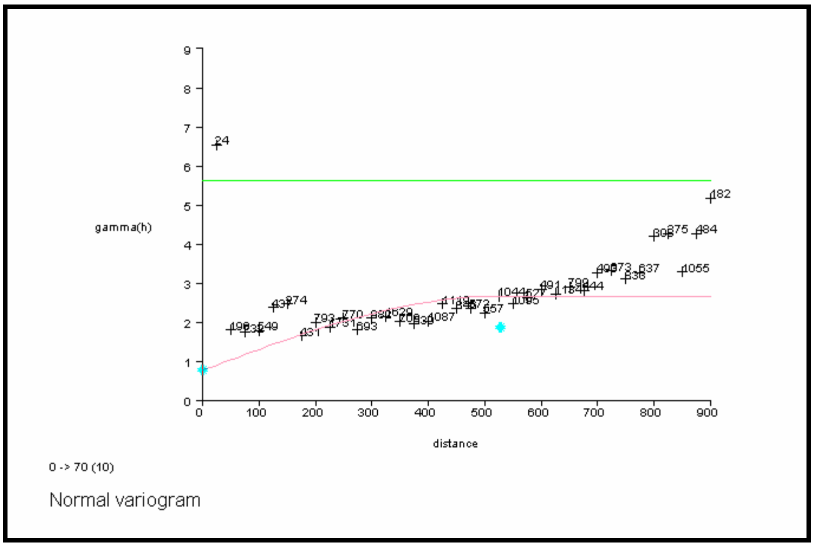


Non-Pisolites – Strike Direction

Number of samples: 1536
Mean: 4.139
Variance: 5.641
Standard deviation: 2.375

FIGURE 3.18 shows the modelled variogram at zero dip in 070 strike direction (direction of strongest ore continuity). The parameters are: nugget **1.00**, single spherical structure with sill at **1.65** and range of **563**.

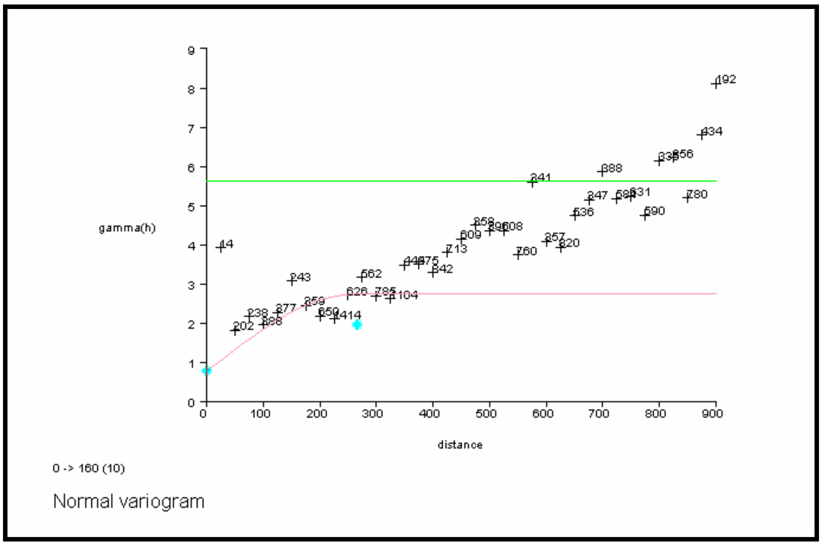
FIGURE 3.18
VARIOGRAM MODEL OF NON-PISOLITES IN STRIKE DIRECTION OF 070°



Non-Pisolites – Across-Strike Direction

FIGURE 3.19 shows the modelled variogram at zero dip in 160 across-strike direction (direction of medium ore continuity). The parameters are: nugget **1.00**, single spherical structure with sill at **1.68** and range of **276**.

FIGURE 3.19
VARIOGRAM MODEL OF NON-PISOLITES IN ACROSS-STRIKE DIRECTION OF 160°



3.5.8 Geological explanation of variogram directions of ore continuity

It is prudent practice to ensure that the variogram directions of ore continuity make sense geologically before applying these directions to search parameters in a resource estimate.

Other than a soil map (gif), no further information was supplied by the client to give insight into the regional structural and geological setting.

Triangulation of the top pisolite intercepts (see Section 3.4) showed some clear structural patterns which are shown in FIGURE 3.20 (plan view). These patterns do appear to show some structures or lineaments in similar orientations to the directions of major ore continuity determined from both pisolite and non-pisolite composite files. North-south lineaments may largely or partly be an artefact of the drilling pattern and drilling order.

These lineaments have been highlighted by producing a rough structural lineament interpretation (pale green lines). The blue polygon outlines the area of potential pisolite resource whilst the white polygon outlines delineate an area of black soil.

An oblique view is shown in FIGURE 3.21.

FIGURE 3.20
PLAN VIEW OF TOP PISOLITE TRIANGULATION, WITH ROUGH LINEAMENT INTERPRETATION (BOTTOM)

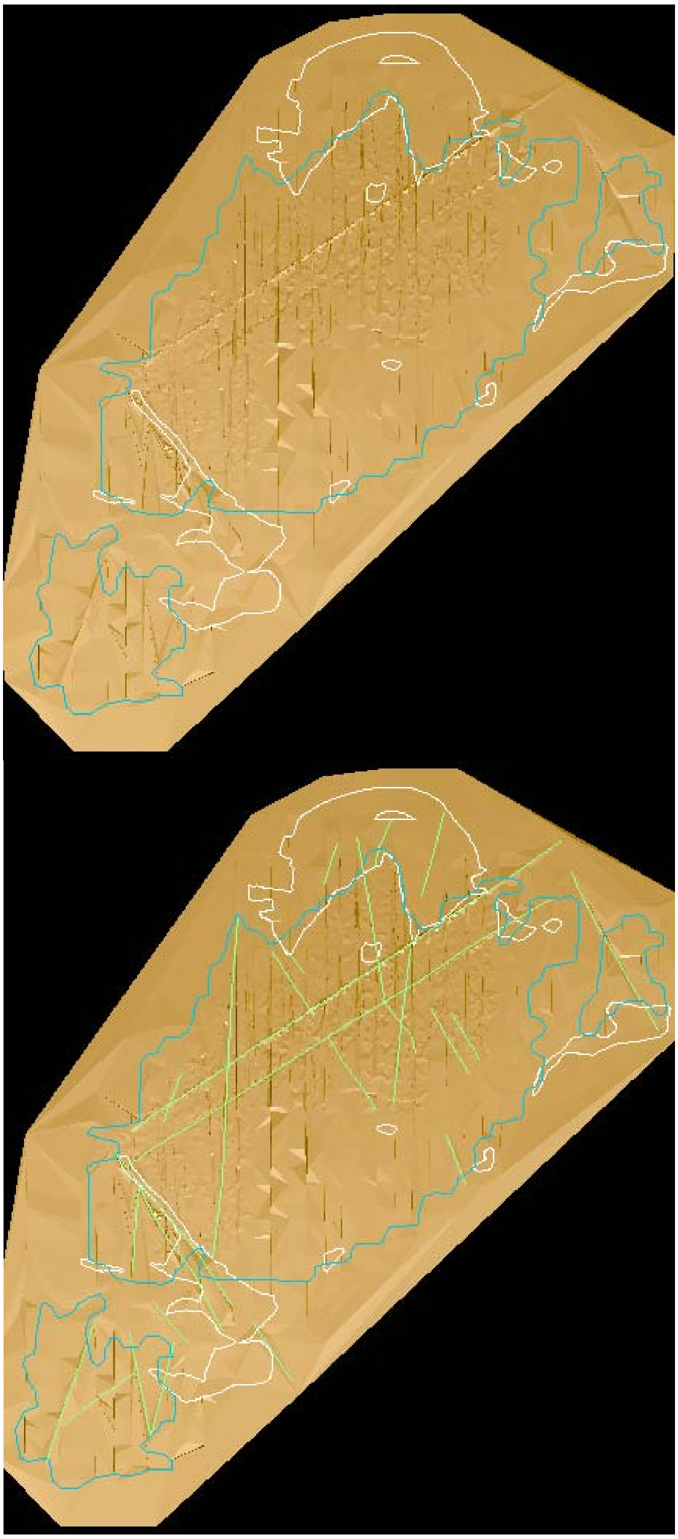
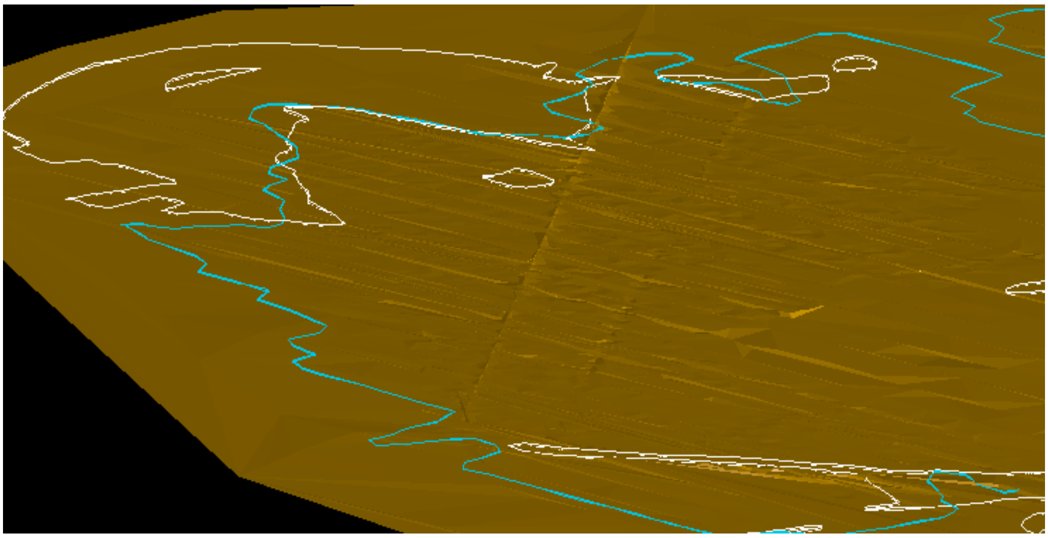


FIGURE 3.21
OBLIQUE VIEW OF TOP PISOLITE TRIANGULATION, LOOKING TOWARDS APPROXIMATELY 050° NORTH-EAST. LINEAMENT STRUCTURES MEASURE 056° AND 057° FROM NORTH



These lineaments occur on the top as well as the base of the pisolites. Although they are not apparent on the surface topography triangulation (which was produced from the surveyed 100 m x 100 m drill hole collars), it is possible that cadastral influences may have occurred. The client should therefore ensure these structures are not caused by man-made surface changes (eg; roads, pipelines). Alternatively, the structure could reflect disturbance by a recent fault, if it does affect both the top and the base of the pisolite surfaces.

3.5.9 Summary of Search Parameters and Variogram Models

The search parameters used in the preliminary resource estimate will apply:

- the longest search distance in the area of strongest ore continuity (using less than or equal to the determined range distance)
- a medium search distance in the area of medium ore continuity perpendicular to this (using less than or equal to the determined range)
- the shortest search distance and least weighting in the direction of least ore continuity (vertical, using a reasonable distance of approximately or less than the average composite length to ensure no significant smearing of grades across tabular horizons).

TABLE 3-IV
SEARCH PARAMETERS

	Direction	Search Distance
Pisolites	010	300
Non-pisolites	070	280

Anisotropy ratios of 1:2:10 were applied in the pisolites estimate, which is effectively a maximum search distance of 300 m in the major direction, 150 m in the semi-major direction and 30 m in the minor direction. The search was also limited by a minimum number of samples of 3 and a maximum number of samples of 30, within the constraining thin pisolite geology envelope.

Anisotropy ratios of 1:2:56 were applied in the non-pisolites estimate, which is effectively a maximum search distance of 280 m in the major direction, 140 m in the semi-major direction and 5 m in the minor direction. The search was limited by a minimum number of samples of 10 and a maximum number of samples of 30, within blocks flagged as not representing pisolite, and limited to those blocks above the base of 100 m x 100 m drill holes wireframe.

Only the strike variogram parameters were applied to the kriged grade estimate (TABLE 3-V variogram models), as it was not possible to establish a variogram in the dip direction. This is considered an appropriate compromise considering the deposit is strongly horizontally layered.

TABLE 3-V
VARIOGRAM MODELS

		Direction	Nugget	Sill1	Range1	Sill2	Range2
Pisolites	Strike	010	**1.78**	**0.72**	**127**	**2.64**	**497**
	Across strike	100	**1.78**	**1.56**	**164**	**1.78**	**324**
	Dip	Vertical					
Non-pisolites	Strike	070	**1.00**	**1.65**	**563**		
	Across strike	100	**1.00**	**1.68**	**276**		
	Dip	vertical	No data				

4. RESOURCE ESTIMATE

4.1 Block Model Parameters

The block model parameters used are detailed in Appendix 4-A.

SURPAC requires that sub cell size must be an even division of the parent cell size. The parent cell size was chosen to be half the larger grid of 100 m by 100 m drill hole spacing. Ideally, sub cells should be reported using proportional volume calculations in SURPAC to account for percentages of estimated grades and tonnes within and outside cells near geological boundaries. However, it was not possible to apply the complex geological constraints without first producing a closed solid wireframe. This could introduce some small errors in the volume and tonnage estimate. Due to the extensive sub celling, this is likely to be insignificant.

TABLE 4-I
BLOCK MODEL PARAMETERS

Block Model Parameter	Definition
Block model origin	336 500 mE : 8 400 500 mN : 80 m RL
Block parent cell size	50 m E x 50 m W x 1 m RL (vertical)
Block sub cell size	3.125 m E x 3.125 m W x 0.125 m RL

The following figure (FIGURE 4.1) summarises the view of block model extents and empty block model with respect to polygonal geology:

FIGURE 4.1
BLOCK MODEL EXTENTS

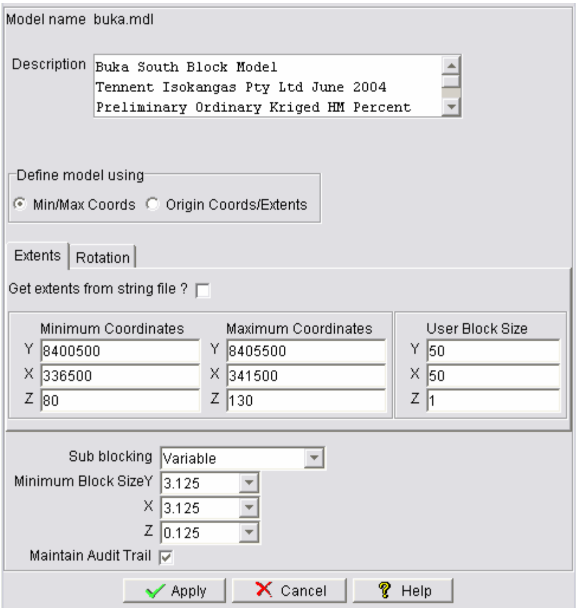
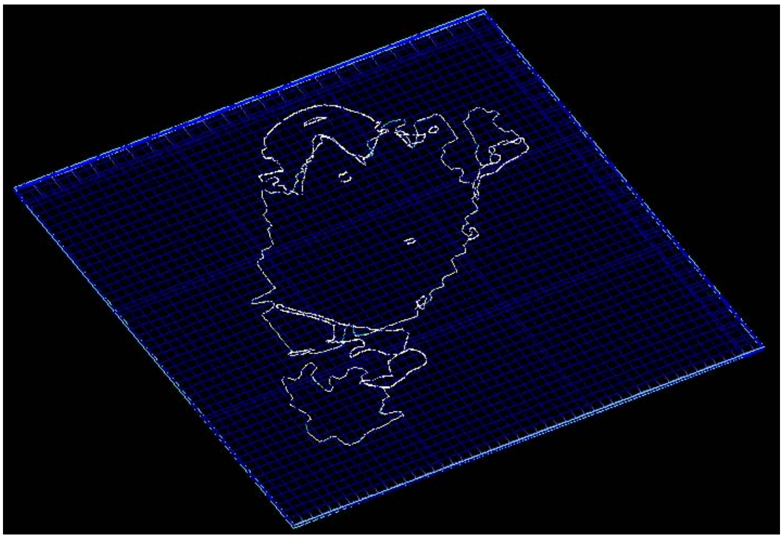


FIGURE 4.2
OBLIQUE VIEW OF EMPTY BLOCK MODEL WITH POLYGONAL GEOLOGY, LOOKING NORTH EAST



A number of spare fields were inserted and calculated to enable ease of use at a later stage. The results applied in the Vol_Recov_Perc, No_Samples and Avg_Distance fields may be used at a later stage to define the JORC Resource category of different areas within the block model.

The block model when sub celled according to geology constraints was large (600 MB). To enable the resource estimation to be conducted in a timely manner, this size was reduced by limiting the block model extents in the vertical plane to between the topography and topography minus 4 m surfaces, and by a clipping boundary polygon (of approximately 500 m distance from nearest drill holes).

4.2 Resource Estimation

4.2.1 Requirements for reporting of these figures and applicability of JORC guidelines

This resource estimation work was initially carried out on the understanding that it would not constitute a JORC-compliant resource estimate (JORC, 1999). It was stated to the client that Alison Keogh does not have sufficient heavy minerals experience to meet the required JORC reporting criteria. As such, John Siemon, who has sufficient experience for resource reporting of heavy mineral deposits, has acted as reviewer of this work and has determined the status of resource category and JORC-compliance of this resource (Appendix 4-B). John Siemon has determined that an Indicated Mineral Resource is present, based on a number of factors, including the drill hole spacing. However, because of concerns about the reliability of the drill hole sampling method in representing grades in this deposit, John Siemon has determined that despite the close drill hole spacing, the Resource category is not Measured, and that significant further testwork, checking and reconciliation must be carried out prior to proceeding to a mining scoping study or estimation of an Ore Reserve.

If the Resource Estimations quoted in this document are to be reported or published externally in any form, permission must be obtained from TIP. TIP may require specific wording to accompany any such report. Further detailed validation of the drill hole data and the resource estimate is also recommended prior to using this information for further mining scoping studies or financial estimations.

4.2.2 Resource Report

ERD requested the reported resource area be calculated from surface to 4 metres below surface, and separately reported for:

- All areas, unconstrained (includes potentially mineable but unprocessable black soil area)
- The potentially mineable, but unprocessable, black soil area
- Within pisolite area only

ERD further requested the resource be calculated and reported for:

- no grade cutoff
- 2.5% HM cutoff
- 4% HM cutoff
- 5% HM cutoff.

The possibility of separating the resource at 1 m depths was discussed. However, it is felt that until further reconciliation work is carried out, reporting the resource on this basis may be misleading due to the known volume recovery issues and possible upgrading and/or downgrading of HM percent values in drill holes. The client also requested that the dolerite “boulders” be left in the Resource.

The estimated Resource is summarised in TABLE 4-II and individual raw SURPAC Resource reports are attached in Appendix 4-C.

TABLE 4-II
BUKA SOUTH INDICATED MINERAL RESOURCE JULY 2004

0.0 HM% cutoff	Block Flag	Geology	Volume	Bulk Density	Tonnes	Mt	Raw HM%	Adjusted HM%
0.0-999.0	1	Pisolite Area	5,650,505	1.80	10,170,909	10.2	5.8	4.7
	2	Black Soil Area	2,880,704	1.75	5,041,233	5.0	3.3	2.6
	10	Non-pisolite, non-black soil	14,047,036	1.67	23,458,550	23.5	3.5	2.8
		Sub Total	**22,578,246**		**38,670,692**	**38.7**	4.1	**3.3**
2.5 HM% cutoff	**Block Flag**		**Volume**	**Bulk Density**	**Tonnes**		**Raw HM%**	
2.5-999.0	1	Pisolite Area	5,476,263	1.80	9,857,274	9.9	6.0	4.8
	2	Black Soil Area	1,743,510	1.75	3,051,142	3.1	4.3	3.4
	10	Non-pisolite, non-black soil	8,969,568	1.67	14,979,178	15.0	4.6	3.7
		Sub Total	**16,189,341**		**27,887,594**	**27.9**	**5.1**	**4.0**
4.0 HM% cutoff	**Block Flag**		**Volume**	**Bulk Density**	**Tonnes**		**Raw HM%**	
4.0-999.0	1	Pisolite Area	4,599,990	1.80	8,279,982	8.3	6.5	5.2
	2	Black Soil Area	721,991	1.75	1,263,484	1.3	5.7	4.6
	10	Non-pisolite, non-black soil	5,415,049	1.67	9,043,131	9.0	5.5	4.4
		Sub Total	**10,737,030**		**18,586,598**	**18.6**	**6.0**	**4.8**
5.0 HM% cutoff	**Block Flag**		**Volume**	**Bulk Density**	**Tonnes**		**Raw HM%**	
5.0-999.0	1	Pisolite Area	3,589,919	1.80	6,461,855	6.5	7.0	5.6
	2	Black Soil Area	435,520	1.75	762,160	0.8	6.6	5.3
	10	Non-pisolite, non-black soil	3,191,600	1.67	5,329,972	5.3	6.3	5.0
		Sub Total	**7,217,040**		**12,553,987**	**12.6**	**6.7**	**5.3**

Interpretation by ERD (J Roiko) suggests that the grade figures may be approximately 20% lower than the raw prediction, as determination of heavy mineral percentage (HM%) results for drill holes are affected by significant volume recovery issues. This interpretation is based on the results of initial trench-v-drillhole sampling (APPENDIX 2-B). The Indicated Mineral Resource therefore applies to the tonnage figure and adjusted HM% figure (TABLE 4-II). A list of recommendations is detailed in SECTION 4.2.3 and should be thoroughly addressed prior to any mine scoping study, financial decisions or alteration of parts of the resource to measured category.

FIGURE 4.3
PLAN VIEW OF BLOCK MODEL COLOURED BY RAW HM PERCENT RESOURCE ESTIMATE

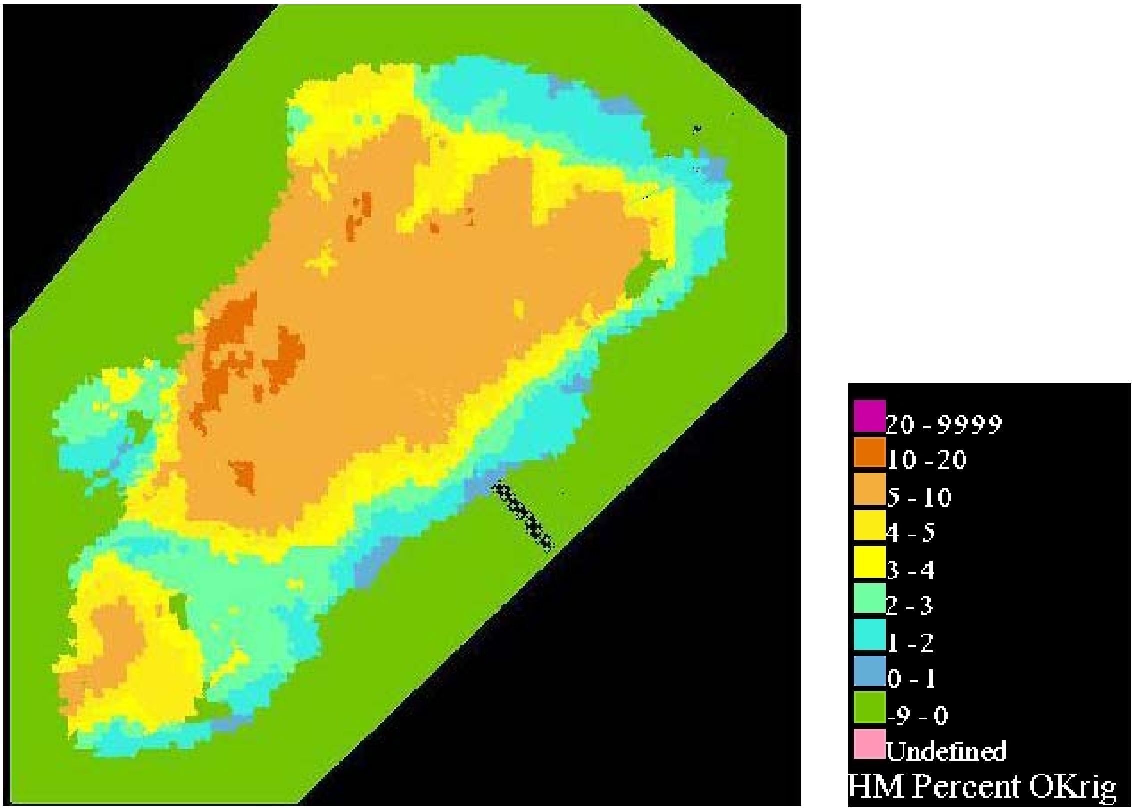
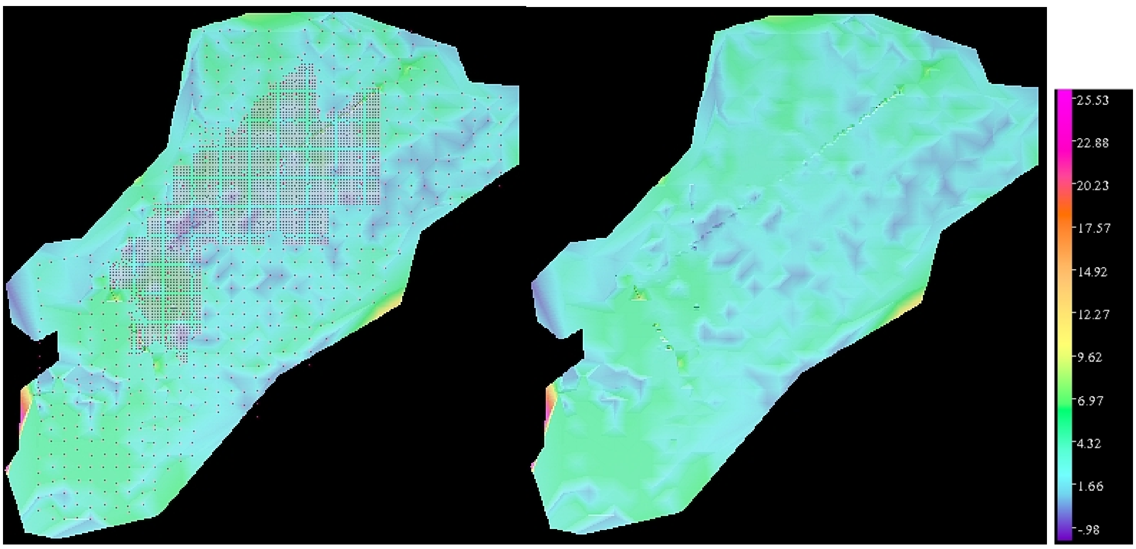


FIGURE 4.4
RESOURCE OF THICKNESS TO BASE OF 100 m X 100 m DRILL HOLES (WITH AND WITHOUT DRILL HOLE COLLARS)



As anticipated, the HM_Perc grade is highest in the pisolite resource area, with some particularly high grade isolated zones concentrated in the west of this area.

Thickness contours of drilling in the resource area (from surface topography to the end of the 100 m x 100 m drill holes) are depicted in FIGURE 4.4, and these show some interesting trends and clear structures. In particular, there appears to be some thickening of the resource area in two areas - the south-south-west and in the north-east - and an abrupt thinning south-east of a 060-070 trending structure.

4.2.3 Validation of Resource Estimation

Due to stringent time limitations allocated to the project, only cursory validation of the block model and resource estimates have been carried out. Further validation must therefore be carried out prior to producing a JORC-compliant Measured and Indicated Resource estimate.

The validation carried out has included:

1. Graphical checking of the assigned block flag and bulk density values within the block model in plan view.
2. Graphical comparison of the drill hole sample HM percent results against the block model centroid estimates, along a limited number of section slice views.

Because of the large areal extent of the orebody and the need for detailed sub celling to accurately reflect the nature of the geological boundaries, the size of the block model is very large and therefore this validation process has also been limited by very slow processing and displaying of the block model data.

On discussion of preliminary results with ERD, the volume and tonnage of the estimate appeared to be larger than expected. During validation, it was observed that block cells below the end of existing auger drill holes contained grade estimates and accounted for this larger volume of resource. Many of the 100 m x 100 m auger drill holes were stopped when penetration rates slowed (that is; at a hard rock boundary), and it is believed from discussions with ERD that any resource below this hard rock is unlikely to be mined. Although ERD initially specified the resource be calculated to 4 metres below surface, the resource between the end of the deeper (100 m x 100 m) auger drill holes and the 4 m block model extent was removed to reflect this “extent of mining boundary”.

Further investigation of the drill hole volume recovery percent and its effect on grade and bulk density is required before proceeding to a JORC-compliant Resource estimate or a mine scoping study. This should involve analysis of current trench reconciliation data as well as a program of pit testwork (using suitable excavation equipment in selected areas that represent a range of geology horizons, volume recovery percent and heavy mineral results. Duplicate samples including check analysis by an independent laboratory should be part of any such program.

Additional recommended validation should also be carried out, including:

1. Review of statistics and, if considered appropriate, incorporation of duplicate “paired” holes into variography and resource estimations.
2. Comparison of statistics and histograms of raw data, clipped composite data (after poor data points removed) and block estimates.

3. Validation of the variogram used for each data point. Having fitted a curve using variogram modelling, the variogram can be validated for each data point, where a kriged grade is calculated and compared with the measured grade. In order to be considered appropriate the following conditions should be satisfied:

   - The average error should be close to zero.
   - The variance of the errors should be close to the average predicted kriging variation.
   - The histogram of errors looks normally distributed and approximately 95% of the errors are within +/- 2 x kriging variance.
   - In addition, consideration of the application of only the strike variogram model should be reviewed.

4. More rigorous validation of block estimates versus drill hole database assay values. It may be determined that the search parameters need to be adjusted and Resource estimates re-run, depending on the proportion of smearing and other estimation factors.

5. More consideration applied to the calculated parameters within each block of number of samples used in the estimate, average distance to sample, distance to nearest sample and kriging variance.

6. TIP strongly recommends that ERD carry out further detailed drill hole checking and reconciliation to determine which, if any, of these holes should be discarded from future resource estimates and to assist in identifying the reliability of drilling and subsequent resource estimates.

7. Consideration of all factors to decide the most appropriate Resource categories, which may be different within different parts of the resource model.

8. Review of assigned bulk density values and their distribution within the model, particularly once Vol_Recov_Perc and HM_Perc reconciliation and drill hole issues are better understood.

9. The hard rock resource boundary is arbitary (based on the extend of auger penetration to weathered dolerite to 4 m maximum depth) Where holes extend below 4 m there may be areas where mining could be extended (e.g. mining “flitches”).

Alan C Robertson,
FAusIMM, MMICA, RPEQ
Director

A J Keogh
Associate, BSc(Hons) Geology
(Uni of Melbourne), MAusIMM

5. REFERENCES

Lee G., 2001. Mineral Sands – Some Aspects of Evaluation, Resource Estimation and Reporting, in *Mineral Resource and Ore Reserve Estimation – The AusIMM Guide to Good Practice* (Ed: A. C. Edwards), pp 315-322 (The Australasian Institute of Mining and Metallurgy: Melbourne).

JORC (Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, The Australian Institute of Geoscientists and Mineral Councils of Australia), 1999. Australasian Code for Reporting of Mineral Resources and Ore Reserves (The JORC Code), 1999.

APPENDIX 2-A

METHODOLOGY – ROPER RIVER RESOURCE ESTIMATE

METHODOLOGY – ROPER RIVER RESOURCE ESTIMATE

	Step	Time (hours)	Person
1	Check and format database. • Check and correct errors in EOH. • Check for errors in assay fields and mark for ERD's correction. • Add volume recovery fields for both databases and calculate against theoretical volume for a 89 mm diameter hole. All other validation carried out by client as per memo from AJK detailing required data format. Location/survey check and more detailed data validation not part of TIP scope.	15	AJK
2	SURPAC dhdb import, display and check for each of the two databases. Transform 25 m x 25 m drill hole collars to topography wireframe to correct missing RL.	4	AJK
3	SURPAC dhdb compositing and checks (if required, for each of the two databases).	1-3	AJK
4	Conduct basic statistics on SURPAC composited dhdb to determine, for each of two areas (in pisolite, outside pisolite) • Distributions of HM_Perc and thickness in normal and lognormal space, and if required identify any inflections of outliers. • Distribution of Vol_Recov_Perc. • Remove outlying Vol_Recov_Perc drill holes if required. • Populations and correlations of HM_Perc vs Vol_Recov_Perc. • Obvious data assay errors. Conduct basic statistics on SURPAC to compare two drillhole phases. • Populations and correlations of HM_Perc vs Vol_Recov_Perc.	4-5	AJK
5	Create empty SURPAC block model(s) to reasonable mining parameters setting required field names/structures (based on client requirements and liaison with mining engineer) for each drilling area.	3	AJK & PG

	Step	Time (hours)	Person
6	Create Wireframes: • Topography (using all drillhole collars only). • Base of 25 m x 25 m drill holes (specified by client as being at EOH). • Base of 100 m x 100 m drill holes area (specified by client as 4 m below collars (topography). • Black soil outlines. • 5 HM_Perc outline (specified by client as separating out 25 m x 25 m drilling area limits) • Pisolite Solid • Block model limit outline	4-6	PG & AJK
7	Use wireframes to tag and sub cell geology of blocks (dolerite, soil types, etc) if required.	1-2	AJK (PG)
8	Do basic down hole variogram for each of two areas (within pisolite and outside pisolite) to determine nugget and variance.	1	AJK
9	Do variogram fans for each of two areas (within pisolite and outside pisolite) for HM_Perc and EOH thickness (where specified) to determine strike, across-strike, dip directions of major ore continuity, and approximate range of influence.	4-6	AJK
10	Meet with John Roiko to discuss progress: • Drill hole data analysis – which drill holes to use in estimate. • Grade estimation methodology and search parameters.		
11	Conduct polygonal, ID or kriging grade estimation, based on search parameters determined through variography and discussion with client (if no variogram analysis carried out, then set parameters of search ellipse directions and range according to client's direction). (If chosen, multiple indicator kriging would require more time).	2-4	AJK (PG)
12	Check/validate grade estimates, by interrogating block cells, colouring block cells and slicing through block model in sectional and plan view, and comparing against drill hole data.	2-4	AJK & PG
13	Report in-situ resource (excluding dolerite blocks), separating out 100 m x 100 m black soil areas, 100 m x 100 m non-black soil areas, and 25 m x 25 m infill area.	1-2	AJK or PG
14	Write report and review	4-5	AJK & PG, AR
	Total	**46 hours** (- 57 hours)	Plus 3h AR

* TIP has provided John Siemon (Senior Associate) to assist in peer review of Alison Keogh's work.

APPENDIX 2-B

ERD LETTER DATED 12 JULY

Exploration & Resource Development Pty Ltd
PO Box 39447, Winnellie, NT, 0821 Australia

20 July, 2004

Tennent, Isokangas Pty Ltd
Consultant Mining Engineers
6/29 McDougall St
Milton Qld 4064

Dear Sir:

ERD undertook macro-sampling at three localities at the Buka South deposit to compare insitu heavy mineral grade with bulk sample grade and to establish a metallurgical flowsheet which will be used in a full scale production plant in the advent of mining. Additionally, three costeans capturing existing auger holes were excavated with channel samples collected immediately adjacent to 25m spaced drill holes as well as at 12.5m spacing for further grade validation.

The following data summarises the comparative results.

Pit 4 – centred on auger hole 02AH2077 in high grade pisolite ore.

Depth	Auger Volume Recovery	Auger HM%	Bulk HM%	Bulk vs Auger
0-1m	82.5%	15.6%	15%	96%
1-2m	116%	10.6%	9.2%	87%

A channel sample collected from the pit wall reported 13.09% HM from 0-1m (84% of auger hole) and 10.95% HM from 1-1.5m (base of Psl).

Pit 5 – centred on auger hole 02AH2165 in transitional pisolite – regolith ore.

Depth	Auger Volume Recovery	Auger HM%	Bulk HM%	Bulk vs Auger
0-1m	80.4%	7.8%	6.3%	89%
1-2m	62.3%	5.6%	3.2%	57%

A channel sample collected from the pit wall reported 7.7% HM from 0-1m (99% of auger hole). The significantly lower bulk sample grades in the 1-2m interval can be attributed to presence of large boulders in this basal regolith ore coupled with clay balls (with HM) reporting in oversize. The laboratory considers that this clay balling would be much reduced in a larger trommel/scrubber with subsequent improvement of grades.

Pit 6 – centred on auger hole 02AH2654 in distal pisolite ore.

Depth	Auger Volume Recovery	Auger HM%	Bulk HM%	Bulk vs Auger
0-1m	76%	6.8%	4.7%	69%
1-2m	80%	5.8%	4.1%	71%

The lower HM grade in the spiral concentrates is attributed to the presence of abundant slimes which could not be completely removed by the existing two cyclones. Further processing refinement including additional larger cyclones is considered appropriate to upgrade recovery in a full plant operation.

Summary Bulk Samples vs Auger Holes

0-1m Bulks report **84.7%** of Auger grades;

1-2m Bulks report **71.7%** of Auger grades.

Providing an all up 0-2m average of 78.2% Bulk vs Auger

Trench 1 – testing pisolite ore

Depth	**Average Auger (12) Volume Recovery**	**Average of 12 Auger holes HM%**	**Average of 24 Trench channel samples HM%**	**Bulk vs Auger**
0-1m	92.4%	10.82%	8.8%	81.5%
Depth	**Average Auger (8) Volume Recovery**	**Average of 8 Auger holes HM%**	**Average of 16 Trench channel samples HM%**	**Bulk vs Auger**
+1m	121%	6.35%	5.53%	87%

Trench 2 – testing pisolite ore with basal regolith ore

Depth	**Average Auger (11) Volume Recovery**	**Average of 11 Auger holes HM%**	**Average of 21 Trench channel samples HM%**	**Bulk vs Auger**
0-1m	84.5%	8.55%	6.26%	73.2%
Depth	**Average Auger (11) Volume Recovery**	**Average of 11 Auger holes HM%**	**Average of 20 Trench channel samples HM%**	**Bulk vs Auger**
+1m	115%	5.26%	4.07%	77.4%

Trench 3 – testing pisolite ore with increasing boulders

Depth	**Average Auger (13) Volume Recovery**	**Average of 13 Auger holes HM%**	**Average of 25 Trench channel samples HM%**	**Bulk vs Auger**
0-1m	91.4%	9.7%	7.3%	75.3%
Depth	**Average Auger (10) Volume Recovery**	**Average of 10 Auger holes HM%**	**Average of 10 Trench channel samples HM%**	**Bulk vs Auger**
+1m	104.5%	7.1%	6.4%	90.1%

In summary, the three trenches average:

Auger 0-1m 9.72% HM; channels 7.5% HM **(77.2%)**

Auger 1-2m 6.2% HM; channels 5.1% HM **(82.3%)**

Providing an all up average of 80.75% Channel vs Auger.

Combining both trench and bulk sample data sets, an average of 20% reduction in HM% grade from the raw auger grades is considered realistic

Sincerely,

HJ Roiko
Director Exploration
ERD Pty Ltd

APPENDIX 2-C

PAIRED DRILLHOLE DATA

GEOLOGY 100 X 100 DUPLICATES

Hole_ID	Geol_Code	From	To
02AH1872	Psl2, gravels	0	1.5
02AH1872	clay, gravels	1.5	4.7
02AH1890	Psl2	0	1.3
02AH1890	clay	1.3	2.2
02AH1890	dolerite	2.2	3
02AH1905	Psl2	0	1.5
02AH1905	clay	1.5	2.8
02AH1905	dolerite	2.8	3
02AH1920	Psl3	0	2.6
02AH1920	clay	2.6	4
02AH1935	Psl3, sand	0	3.2
02AH1935	dolerite	3.2	4
02AH1950	Psl2	0	2.1
02AH1950	clay	2.1	3
02AH1950	dolerite	3	4
02AH1965	Psl3	0	1.7
02AH1965	clay	1.7	2.2
02AH1965	dolerite	2.2	2.4
02AH1980	Psl3, sandy	0	1.7
02AH1980	clay, dolerite	1.7	2.3
02AH1980	dolerite	2.3	3
02AH1995	Psl1	0	0.9
02AH1995	clay	0.9	2.5
02AH1995	dolerite	2.5	3.5
02AH2010	Psl2	0	0.5
02AH2010	clay	0.5	1.9
02AH2010	dolerite	1.9	2.8
02AH2025	Psl1	0	1.7
02AH2025	clay	1.7	2.6
02AH2025	clay, dolerite	2.6	4
02AH2040	Psl2	0	1.5
02AH2040	clay	1.5	3
02AH2040	dolerite	3	4
02AH2055	Psl1	0	1.3
02AH2055	clay	1.3	1.9
02AH2055	dolerite	1.9	3
02AH2070	Psl2	0	0.9
02AH2070	clay	0.9	1.6
02AH2070	dolerite	1.6	2.9
02AH2071	Psl2	0	1.4
02AH2085	gravels	0	1.9
02AH2085	dolerite	1.9	3
02AH2100	Psl2	0	0.8
02AH2100	dolerite	0.8	1.6
02AH2115	Psl2	0	1.4
02AH2115	clay	1.4	3.4
02AH2115	clay, dolerite	3.4	4
02AH2145	Psl2	0	1.3
02AH2145	clay	1.3	2.4
02AH2145	dolerite	2.4	3
02AH2160	Psl2	0	0.7
02AH2160	clay	0.7	2.2
02AH2160	dolerite	2.2	3

02AH2175	Psl2	0	1.6
02AH2175	clay	1.6	3.7
02AH2175	dolerite	3.7	4
02AH2190	Psl2, sst, gravels	0	2.1
02AH2190	gravels, dolerite	2.1	3.8
02AH2220	Psl2	0	1.3
02AH2220	clay	1.3	2.2
02AH2220	clay, dolerite	2.2	2.5
02AH2235	Psl2	0	1.8
02AH2235	clay	1.8	2.7
02AH2235	dolerite	2.7	3
02AH2250	black soil	0	2
02AH2250	dolerite	2	2.6
02AH2265	Psl3	0	0.7
02AH2265	clay	0.7	1.3
02AH2265	dolerite	1.3	2
02AH2295	Psl2	0	1
02AH2295	clay	1	1.4
02AH2295	dolerite	1.4	2
02AH2310	Psl3, black soil	0	2
02AH2310	clay, gravels	2	4
02AH2325	Psl2	0	1.3
02AH2325	clay	1.3	2.2
02AH2325	dolerite	2.2	2.8
02AH2400	Psl4	0	0.3
02AH2400	dolerite	0.3	1.7
02AH2430	Psl3	0	0.6
02AH2430	clay	0.6	2.5
02AH2430	clay, dolerite	2.5	3
02AH2445	Psl1	0	1.5
02AH2445	siltstone	1.5	4
02AH2460	Psl2	0	0.7
02AH2460	clay	0.7	2
02AH2460	dolerite	2	2.5
02AH2475	black soil	0	1.9
02AH2475	clay, dolerite	1.9	2.9
02AH2517	sand	0	2.4
02AH2517	sand, siltstone	2.4	3
02AH2535	Psl1	0	1.8
02AH2535	clay	1.8	3
02AH2535	dolerite	3	3.3
02AH2565	Psl3, black soil	0	3.1
02AH2565	siltstone	3.1	4
02AH2611	Psl4, dol	0	0.6
02AH2611	clay, dolerite	0.6	1.8
02AH2640	Psl2	0	0.7
02AH2640	clay	0.7	2
02AH2640	dolerite	2	2.4
02AH2655	Psl2	0	0.5
02AH2655	clay	0.5	1.5
02AH2655	dolerite	1.5	2

ASSAY 100 X 100 M DUPLICATES

Hole_ID	Sample_No	Depth_Fro	Depth_To	Dry Wt	Wt plus1m	percplus1m	Wtmin1mm	percmin1m
02AH1872	16986	0	1	10150	1245	12.26	4224	41.61
02AH1872	16987	1	2	11780	504	4.27	3684	31.27
02AH1872	16988	2	3	12260	214	1.74	3556	29
02AH1872	16989	3	4	11040	273	2.47	3866	35.01
02AH1890	17076	0	1	11340	885	7.8	4554	40.15
02AH1890	17077	1	2	9940	581	5.84	3709	37.31
02AH1890	17078	2	3	11380	636	5.58	3917	34.42
02AH1905	17135	1	2	10400	1897	18.24	2985	28.7
02AH1920	17177	0	1	7840	164	2.09	4192	53.46
02AH1920	17178	1	2	8440	1094	12.96	3493	41.38
02AH1920	17179	2	3	11820	1428	12.08	3488	29.5
02AH1920	17180	3	4	13100	126	0.96	2526	19.28
02AH1935	17243	0	1	9020	1088	12.06	2000	22.17
02AH1935	17244	1	2	10460	1408	13.46	3559	34.02
02AH1935	17245	2	3	13380	2492	18.62	4304	32.16
02AH1935	17246	3	4	11700	1976	16.88	4098	35.02
02AH1950	17292	2	3	9020	1281	14.2	2247	24.91
02AH1965	17356	0	1	7180	281	3.91	2271	31.62
02AH1965	17357	1	2	9460	854	9.02	3319	35.08
02AH1980	17412	0	1	11040	714	6.46	4888	44.27
02AH1980	17413	1	2	7780	1569	20.16	2510	32.26
02AH1980	17414	2	3	10940	2955	27.01	3470	31.71
02AH1995	17460	1	2	8540	1152	13.48	2355	27.57
02AH1995	17461	2	3	9320	1060	11.37	2395	25.69
02AH2010	17504	0	1	7980	2308	28.92	2384	29.87
02AH2010	17505	1	2	8260	2601	31.48	2056	24.89
02AH2010	17506	2	2.8	12620	6230	49.36	2793	22.13
02AH2025	17561	0	1	5600	798	14.25	2188	39.07
02AH2025	17562	1	2	10120	2005	19.81	3162	31.24
02AH2040	17608	0	1	8920	1589	17.81	2936	32.91
02AH2040	17609	1	2	8560	1019	11.9	2492	29.11
02AH2040	17610	2	3	9500	115	1.21	2146	22.58
02AH2040	17611	3	4	10140	907	8.94	3858	38.04
02AH2055	17658	0	1	11000	2724	24.76	3175	28.86
02AH2055	17659	1	2	11000	1227	11.15	2614	23.76
02AH2055	17660	2	3	12140	2476	20.39	4591	37.81
02AH2070	17708	0	1	7860	1099	13.98	2270	28.88
02AH2070	17709	1	2	7660	484	6.31	2444	31.9
02AH2070	17710	2	2.9	12160	3074	25.27	4047	33.28
02AH2085	17757	0	1	12040	2313	19.21	5140	42.69
02AH2085	17758	1	2	6700	753	11.23	1943	29
02AH2085	17759	2	3	10980	4639	42.24	2406	21.91
02AH2100	17807	0	1	7340	2114	28.8	2046	27.87
02AH2115	17847	0	1	8080	850	10.51	2516	31.13
02AH2115	17848	1	2	9760	420	4.3	1828	18.72
02AH2115	17849	2	3	7330	58	0.79	1114	15.19
02AH2115	17850	3	4	6960	22	0.31	1926	27.67
02AH2145	17923	0	1	8000	435	5.43	3446	43.07
02AH2145	17924	1	2	7260	249	3.42	1614	22.23
02AH2145	17925	2	3	11720	2544	21.7	3350	28.58
02AH2160	17962	0	1	7780	399	5.12	3218	41.36
02AH2160	17963	1	2	8120	255	3.14	2054	25.29
02AH2175	17997	0	1	8160	1914	23.45	2236	27.4

02AH2175	17998	1	2	8380	1531	18.26	1787	21.32
02AH2175	18000	3	4	10060	1004	9.98	3757	37.34
02AH2190	18052	0	1	11500	1157	10.06	3219	27.99
02AH2190	18053	1	2	10620	529	4.98	2572	24.21
02AH2190	18054	2	3	13080	5906	45.15	2291	17.51
02AH2220	18122	0	1	7860	1460	18.57	2241	28.51
02AH2235	18156	0	1	7280	587	8.06	2625	36.05
02AH2235	18157	1	2	9800	2645	26.98	1765	18.01
02AH2235	18158	2	3	7760	2074	26.72	1987	25.6
02AH2250	18200	0	1	4620	83	1.79	520	11.25
02AH2250	18201	1	2	11080	1785	16.11	787	7.1
02AH2265	18242	0	1	8220	312	3.79	655	7.96
02AH2265	18243	1	2	10360	2727	26.32	3629	35.02
02AH2295	18307	0	1	7340	671	9.14	2415	32.9
02AH2295	18308	1	2	8860	1885	21.27	2265	25.56
02AH2310	18360	0	1	6900	193	2.79	2019	29.26
02AH2310	18361	1	2	7780	301	3.86	2188	28.12
02AH2310	18362	2	3	9700	1618	16.68	1558	16.06
02AH2310	18363	3	4	9820	1787	18.19	2500	25.45
02AH2325	18423	0	1	9200	1489	16.18	3293	35.79
02AH2325	18424	1	2	6240	489	7.83	1827	29.27
02AH2325	18425	2	2.8	8980	2980	33.18	2553	28.42
02AH2400	18613	1	1.7	7300	3374	46.21	2033	27.84
02AH2430	18693	0	1	8400	491	5.84	2799	33.32
02AH2445	18731	1	2	13420	1854	13.81	3119	23.24
02AH2445	18732	2	3	7520	426	5.66	1248	16.59
02AH2445	18733	3	4	7580	303	3.99	1582	20.87
02AH2460	18764	1	2	5620	221	3.93	1397	24.85
02AH2475	18798	0	1	3640	48	1.31	835	22.93
02AH2475	18799	1	2	5340	143	2.67	943	17.65
02AH2475	18800	2	2.9	9020	3226	35.76	1890	20.95
02AH2517	18906	2	3	14120	5049	35.75	3324	23.54
02AH2535	18951	0	1	6140	424	6.9	2998	48.82
02AH2535	18952	1	2	8680	2037	23.46	2486	28.64
02AH2535	18953	2	3	9080	1068	11.76	1880	20.7
02AH2565	19043	0	1	8160	530	6.49	2758	33.79
02AH2565	19044	1	2	9280	301	3.24	2336	25.17
02AH2565	19045	2	3	12000	545	4.54	2073	17.27
02AH2611	19150	0	1	8960	1995	22.26	1933	21.57
02AH2640	19208	0	1	7500	843	11.24	3112	41.49
02AH2640	19210	2	2.4	6140	2415	39.33	1163	18.94
02AH2655	19244	0	1	8920	3391	38.01	2107	23.62
02AH2655	19245	1	2	10240	2432	23.75	2428	23.71

perc slime	WT TC	Perc TC	WT NM	%HM	Sample_Interval	%Vol_Recovered
46.11	755	7.43	199	5.47	1	0.916592175
64.44	683	5.79	151	4.51	1	1.063788751
69.24	442	3.6	106	2.74	1	1.107134982
62.5	275	2.49	46	2.07	1	0.996963311
52.03	532	4.69	99	3.81	1	1.024054706
56.84	455	4.57	65	3.92	1	0.897628199
59.99	498	4.37	50	3.93	1	1.027666892
53.05	441	4.24	93	3.34	1	0.939168337
44.43	614	7.83	137	6.08	1	0.707988439
45.65	484	5.73	101	4.53	1	0.762171227
58.4	513	4.34	116	3.35	1	1.067400937
79.75	735	5.61	212	3.99	1	1.182990886
65.76	337	3.73	101	2.61	1	0.814547923
52.51	349	3.33	98	2.39	1	0.944586616
49.2	489	3.65	153	2.51	1	1.208276187
48.08	344	2.94	101	2.07	1	1.056564379
60.88	303	3.35	83	2.43	1	0.814547923
64.45	374	5.2	137	3.3	1	0.648387371
55.88	481	5.08	301	1.9	1	0.854281968
49.25	696	6.3	431	2.4	1	0.996963311
47.57	227	2.91	38	2.42	1	0.70257016
41.27	237	2.16	71	1.51	1	0.987932847
58.93	600	7.02	112	5.71	1	0.771201692
62.92	417	4.47	59	3.84	1	0.841639317
41.2	260	3.25	36	2.8	1	0.720631089
43.61	236	2.85	16	2.66	1	0.745916391
28.5	284	2.25	19	2.09	0.8	1.424555819
46.67	441	7.87	49	7	1	0.505706028
48.94	533	5.26	93	4.34	1	0.913883035
49.27	825	9.24	82	8.32	1	0.805517458
58.98	545	6.36	40	5.89	1	0.773007785
76.2	498	5.24	31	4.91	1	0.857894154
53	408	4.02	46	3.57	1	0.915689128
46.37	1160	10.54	169	9	1	0.993351126
65.08	648	5.89	34	5.58	1	0.993351126
41.78	237	1.95	38	1.63	1	1.096298424
57.13	959	12.2	89	11.06	1	0.709794532
61.77	597	7.79	57	7.04	1	0.691733602
41.43	472	3.88	44	3.51	0.9	1.22011613
38.09	324	2.69	99	1.86	1	1.087267959
59.76	179	2.67	76	1.53	1	0.60504114
35.83	138	1.25	53	0.77	1	0.991545033
43.32	582	7.92	47	7.28	1	0.662836115
58.34	894	11.06	98	9.85	1	0.729661554
76.96	651	6.67	40	6.26	1	0.881373362
84.01	395	5.38	32	4.95	1	0.661933068
72.01	257	3.69	25	3.33	1	0.628520349
51.48	753	9.41	62	8.63	1	0.722437182
74.33	477	6.57	31	6.14	1	0.655611743
49.7	315	2.68	27	2.45	1	1.058370472
53.5	436	5.6	36	5.14	1	0.70257016
71.56	327	4.02	29	3.66	1	0.73327374
49.14	459	5.62	52	4.98	1	0.736885926

60.4	462	5.51	57	4.83	1	0.756752948
52.67	446	4.43	53	3.9	1	0.908464757
61.94	1000	8.69	279	6.26	1	1.038503449
70.8	763	7.18	276	4.58	1	0.959035359
37.33	300	2.29	92	1.59	1	1.181184793
52.91	318	4.04	56	3.33	1	0.709794532
55.87	562	7.71	44	7.11	1	0.657417836
55	395	4.03	33	3.69	1	0.884985548
47.66	227	2.92	20	2.66	1	0.700764067
86.94	187	4.04	25	3.5	1	0.417207473
76.78	376	3.39	115	2.35	1	1.000575497
88.23	397	4.82	29	4.47	1	0.742304205
38.64	283	2.73	24	2.5	1	0.935556151
57.95	735	10.01	85	8.85	1	0.662836115
53.16	396	4.46	45	3.96	1	0.800099179
67.94	498	7.21	171	4.73	1	0.62310207
68	312	4.01	47	3.4	1	0.70257016
67.25	429	4.42	92	3.47	1	0.875955083
56.34	364	3.7	79	2.9	1	0.886791641
48.02	579	6.29	33	5.93	1	0.83080276
62.88	362	5.8	34	5.25	1	0.563501002
38.38	214	2.38	21	2.14	0.8	1.013669671
25.93	150	2.05	8	1.94	0.7	0.94174847
60.83	845	10.05	81	9.09	1	0.758559041
62.94	358	2.66	168	1.41	1	1.211888373
77.73	169	2.24	73	1.27	1	0.679090951
75.13	204	2.69	72	1.74	1	0.68450923
71.21	360	6.4	74	5.08	1	0.50751212
75.74	195	5.35	51	3.95	1	0.328708918
79.66	142	2.65	24	2.2	1	0.482226819
43.28	204	2.26	45	1.76	0.9	0.905053248
40.7	125	0.88	71	0.38	1	1.275101627
44.26	115	1.87	16	1.61	1	0.554470537
47.89	227	2.61	57	1.95	1	0.783844343
67.53	332	3.65	115	2.38	1	0.819966202
59.7	213	2.61	50	1.99	1	0.736885926
71.58	198	2.13	41	1.69	1	0.838027131
78.18	171	1.42	52	0.99	1	1.083655773
56.16	797	8.89	121	7.54	1	0.809129644
47.26	282	3.76	53	3.05	1	0.677284858
41.72	173	2.81	17	2.54	0.4	1.386176343
38.36	323	3.62	41	3.16	1	0.805517458
52.53	290	2.83	214	0.74	1	0.924719593

B Dry Weig	B Wt +1mn	B % +1mm	B Wt -1mm	B % -1mm	B % slimes	B Wt table	B % table c	B Wt NM (S
9980	3827	38.3467	2848	28.5371	33.1162	774	7.75551	261
12580	786	6.24801	3293	26.1765	67.5755	688	5.469	110
10160	342	3.36614	2353	23.1594	73.4744	384	3.77953	81
12420	794	6.39291	2542	20.467	73.1401	375	3.01932	75
10380	771	7.42775	2932	28.2466	64.3256	540	5.20231	130
8040	187	2.32587	1823	22.6741	75	329	4.09204	74
9720	579	5.95679	2347	24.1461	69.8971	430	4.42387	68
9080	597	6.57489	1257	13.8436	79.5815	416	4.5815	81
7900	166	2.10127	2385	30.1899	67.7089	571	7.22785	118
7860	843	10.7252	1772	22.5445	66.7303	345	4.38931	39
10800	1976	18.2963	1741	16.1204	65.5833	470	4.35185	115
11720	266	2.26962	1609	13.7287	84.0017	411	3.50683	54
9000	1153	12.8111	2988	33.2	53.9889	444	4.93333	174
11580	2294	19.81	2843	24.5509	55.639	432	3.73057	205
12140	2080	17.1334	1913	15.7578	67.1087	289	2.38056	91
10840	0	0	2713	0	100	314	2.89668	102
6260	642	10.2556	805	12.8594	76.885	165	2.63578	40
9640	890	9.23237	2317	24.0353	66.7324	292	3.02905	44
7960	796	10	2167	27.2236	62.7764	176	2.21106	26
11240	410	3.64769	4599	40.9164	55.4359	458	4.07473	182
7920	1487	18.7753	2345	29.6086	51.6162	216	2.72727	65
13160	5205	39.5517	2504	19.0274	41.421	321	2.43921	122
8540	231	2.70492	0	0	97.2951	487	5.70258	68
7680	779	10.1432	1497	19.4922	70.3646	360	4.6875	74
8660	2434	28.1062	1391	16.0624	55.8314	327	3.77598	74
10180	3473	34.1159	1680	16.5029	49.3811	298	2.92731	31
10240	4292	41.9141	1634	15.957	42.1289	222	2.16797	16
10040	1988	19.8008	1808	18.008	62.1912	972	9.68127	307
6820	680	9.97067	910	13.3431	76.6862	318	4.66276	64
9440	0	0	998	0	100	963	10.2013	240
9360	1307	13.9637	624	6.66667	79.3697	643	6.86966	128
7640	118	1.5445	522	6.83246	91.623	453	5.92932	59
11460	280	2.44328	3209	28.0017	69.555	695	6.06457	143
10780	4369	40.5288	1448	13.4323	46.039	1225	11.3636	318
12220	1927	15.7692	1696	13.8789	70.3519	939	7.68412	169
13300	2650	19.9248	3333	25.0602	55.015	434	3.26316	70
6900	882	12.7826	802	11.6232	75.5942	990	14.3478	180
7020	1288	18.3476	1217	17.3362	64.3162	538	7.66382	92
15780	7980	50.5703	3152	19.9747	29.455	486	3.07985	147
12240	1987	16.2337	4646	37.9575	45.8088	433	3.53758	159
7540	812	10.7692	2331	30.9151	58.3156	176	2.33422	70
10920	4795	43.9103	1596	14.6154	41.4744	141	1.29121	72
7100	1094	15.4085	731	10.2958	74.2958	748	10.5352	76
8860	0	0	0	0	100	932	10.5192	105
10140	523	5.15779	640	6.31164	88.5306	644	6.35108	60
6420	53	0.825545	574	8.94081	90.2336	300	4.6729	28
12360	955	7.72654	2962	23.9644	68.3091	430	3.47896	70
8180	482	5.89242	770	9.4132	84.6944	810	9.9022	89
7760	294	3.78866	453	5.83763	90.3737	522	6.7268	55
10760	1133	10.5297	2020	18.7732	70.697	505	4.69331	90
8380	497	5.93079	1154	13.7709	80.2983	493	5.88305	91
7840	250	3.18878	516	6.58163	90.2296	299	3.81378	33
8720	1851	21.2271	515	5.90596	72.867	507	5.81422	98

9080	1924	21.1894	1026	11.2996	67.511	427	4.70264	56
10040	733	7.3008	2752	27.4104	65.2888	397	3.95418	48
10960	1311	11.9617	2410	21.9891	66.0493	830	7.57299	184
10500	652	6.20952	2487	23.6857	70.1048	576	5.48571	117
10300	4016	38.9903	1534	14.8932	46.1165	282	2.73786	119
6840	1196	17.4854	917	13.4064	69.1082	271	3.96199	41
8140	834	10.2457	1239	15.2211	74.5332	790	9.70516	168
7840	2631	33.5587	827	10.5485	55.8929	362	4.61735	66
10580	1177	11.1248	1574	14.8771	73.9981	458	4.32892	53
11320	163	1.43993	1361	12.023	86.5371	565	4.99117	95
8780	2550	29.0433	1022	11.6401	59.3166	161	1.83371	27
7420	255	3.43666	633	8.531	88.0323	520	7.00809	46
11280	3337	29.5833	2917	25.8599	44.5567	502	4.45035	152
7040	771	10.9517	696	9.88636	79.1619	680	9.65909	96
8440	616	7.29858	981	11.6232	81.0782	495	5.86493	46
7320	161	2.19945	1505	20.5601	77.2404	356	4.86339	56
6400	231	3.60938	1394	21.7813	74.6094	241	3.76563	36
8700	1440	16.5517	2156	24.7816	58.6667	309	3.55172	66
10000	2085	20.85	2325	23.25	55.9	433	4.33	86
7780	1090	14.0103	1023	13.1491	72.8406	577	7.41645	38
6620	1206	18.2175	816	12.3263	69.4562	325	4.90937	37
11640	4109	35.3007	2818	24.2096	40.4897	286	2.45704	36
7840	2147	27.3852	1126	14.3622	58.2526	900	11.4796	141
8540	406	4.7541	2457	28.7705	66.4754	180	2.10773	37
10640	1504	14.1353	2180	20.4887	65.3759	293	2.75376	133
10460	796	7.60994	1403	13.413	78.9771	158	1.51052	23
8320	718	8.62981	0	0	91.3702	96	1.15385	13
6800	309	4.54412	538	7.91176	87.5441	467	6.86765	64
6720	112	1.66667	979	14.5685	83.7649	306	4.55357	66
6440	205	3.18323	477	7.40683	89.4099	158	2.45342	32
7620	710	9.31759	1753	23.0052	67.6772	189	2.48031	49
13700	4030	29.4161	2837	20.708	49.8759	166	1.21168	105
7600	538	7.07895	1449	19.0658	73.8553	215	2.82895	83
8840	2488	28.1448	1017	11.5045	60.3507	222	2.51131	94
10060	1343	13.3499	1357	13.4891	73.161	322	3.2008	88
9740	689	7.07392	1621	16.6427	76.2834	259	2.65914	77
9620	378	3.92931	1864	19.3763	76.6944	214	2.22453	62
9460	326	3.44609	1385	14.6406	81.9133	154	1.62791	44
8620	1676	19.4432	1614	18.7239	61.8329	830	9.62877	127
7540	859	11.3926	1056	14.0053	74.6021	269	3.56764	82
9240	4462	48.29	1604	17.3593	34.3506	180	1.94805	14
10240	4460	43.5547	1345	13.1348	43.3105	304	2.96875	40
9520	2089	21.9433	1314	13.8025	64.2542	295	3.09874	33

B % HM	B Sample_Inter	B%Vol_Recovered
5.14028	1	0.901240385
4.59459	1	1.136032469
2.98228	1	0.917495221
2.41546	1	1.121583725
3.9499	1	0.937362244
3.17164	1	0.726049368
3.72428	1	0.877761176
3.68943	1	0.819966202
5.73418	1	0.713406717
3.89313	1	0.709794532
3.28704	1	0.975290196
3.04608	1	1.058370472
3	1	0.81274183
1.96028	1	1.045727821
1.63097	1	1.096298424
1.95572	1	0.978902382
1.99681	1	0.565307095
2.57261	1	0.870536805
1.88442	1	0.718824996
2.45552	1	1.015024241
1.90657	1	0.71521281
1.51216	1	1.188409165
4.90632	1	0.771201692
3.72396	1	0.693539695
2.92148	1	0.78203825
2.62279	1	0.919301314
2.01172	0.8	1.155899492
6.62351	1	0.906658664
3.72434	1	0.615877698
7.6589	1	0.852475875
5.50214	1	0.845251503
5.15707	1	0.689927509
4.81675	1	1.034891263
8.41373	1	0.973484103
6.30115	1	1.103522796
2.73684	1	1.201051815
11.7391	1	0.62310207
6.35328	1	0.633938627
2.14829	0.9	1.583341491
2.23856	1	1.105328889
1.40584	1	0.680897044
0.631868	1	0.986126754
9.46479	1	0.641162999
9.33409	1	0.800099179
5.75937	1	0.915689128
4.23676	1	0.579755839
2.91262	1	1.116165446
8.81418	1	0.738692019
6.01804	1	0.700764067
3.85688	1	0.97167801
4.79714	1	0.756752948
3.39286	1	0.707988439
4.69037	1	0.787456529

4.0859	1	0.819966202
3.4761	1	0.906658664
5.89416	1	0.98973894
4.37143	1	0.948198802
1.58252	1	0.930137872
3.36257	1	0.617683791
7.64128	1	0.735079833
3.77551	1	0.707988439
3.82798	1	0.955423173
4.15194	1	1.022248613
1.5262	1	0.792874807
6.38814	1	0.670060486
3.10284	1	1.018636427
8.29545	1	0.63574472
5.31991	1	0.762171227
4.09836	1	0.661030022
3.20313	1	0.577949746
2.7931	1	0.785650436
3.47	1	0.903046478
6.92802	1	0.70257016
4.35045	1	0.597816768
2.14777	0.8	1.313932625
9.68112	0.7	1.011412055
1.67447	1	0.771201692
1.50376	1	0.960841452
1.29063	1	0.944586616
0.997596	1	0.751334669
5.92647	1	0.614071605
3.57143	1	0.606847233
1.95652	1	0.581561932
1.83727	0.9	0.764579351
0.445255	1	1.237173675
1.73684	1	0.686315323
1.44796	1	0.798293086
2.32604	1	0.908464757
1.86858	1	0.879567269
1.58004	1	0.868730712
1.16279	1	0.854281968
8.15545	1	0.778426064
2.48011	1	0.680897044
1.79654	0.4	2.086037364
2.57813	1	0.924719593
2.7521	1	0.859700247

COLLAR 100 X 100 M DUPLICATES

Hole No	EASTING	NORTHING	LEVEL	EOH
02AH1872	337306.8	8401870.95	119.65	12.4
02AH1890	337400.62	8402190.82	116.59	3
02AH1905	337594.16	8401409.28	116.53	3
02AH1920	337703.2	8401806.81	112.97	4.8
02AH1935	337799.91	8402014.55	111.89	4
02AH1950	337902.44	8401295.26	114.69	4
02AH1965	338106.08	8401696.88	108.75	2.4
02AH1980	338298.72	8401898.83	107.19	3
02AH1995	337698.67	8402696.59	116.11	3.5
02AH2010	337299.15	8403183.25	126.43	2.8
02AH2025	337900.57	8402505.57	112.23	4
02AH2040	338003.13	8403001.33	115.53	4
02AH2055	338104.56	8402701.24	111.73	3
02AH2070	338197.39	8403398.81	117.78	2.9
02AH2085	338294.18	8402006.56	107.96	3
02AH2100	338297.52	8403503.5	117.4	1.6
02AH2115	338404.58	8402988.43	114.5	4.8
02AH2145	338502.45	8403004.78	114.57	3
02AH2160	338600.61	8402499.59	109.75	3
02AH2175	338593.78	8404010.81	113.22	4
02AH2190	338695.04	8404606.82	107.3	3.8
02AH2220	338798.46	8402399.8	109.65	2.5
02AH2235	338804.74	8403906.54	113.07	3
02AH2250	338901.63	8404713.98	105.26	2.6
02AH2265	338886.82	8403200.81	116.15	2
02AH2295	339000.22	8403795.89	114.06	2
02AH2310	339095.03	8405002.21	103.91	4.3
02AH2325	339094.37	8403802.58	113.97	2.8
02AH2400	339401.55	8403091.18	116.56	1.7
02AH2430	339498.18	8404199.94	110.54	3
02AH2445	339498.63	8402707.61	116.43	5.3
02AH2460	339598.22	8404004.34	112.59	2.5
02AH2475	339705.11	8404804.64	104.86	2.9
02AH2517	339900.19	8405000.93	105.32	3
02AH2535	339901.89	8403203.94	114.02	3.3
02AH2565	340093.67	8404597.75	109.04	4.5
02AH2611	340397.91	8403917.71	109.45	1.8
02AH2640	340800.35	8404205.71	109.52	2.4
02AH2655	340400.8	8404504.95	111.57	2

BUKA_ASSAY_CALCULATIONS

Hole No	EASTING	NORTHING	LEVEL	EOH	B'rock	SNO	From	To
02AH1872	337306.8	8401870.95	119.65	12.4		16986	0	1
02AH1872	337306.8	8401870.95	119.65	12.4		16987	1	2
02AH1872	337306.8	8401870.95	119.65	12.4		16988	2	3
02AH1872	337306.8	8401870.95	119.65	12.4		16989	3	4
02AH1890	337400.62	8402190.82	116.59	3	dol	17076	0	1
02AH1890	337400.62	8402190.82	116.59	3	dol	17077	1	2
02AH1890	337400.62	8402190.82	116.59	3	dol	17078	2	3
02AH1905	337594.16	8401409.28	116.53	3	dol	17135	1	2
02AH1920	337703.2	8401806.81	112.97	4.8	dol	17177	0	1
02AH1920	337703.2	8401806.81	112.97	4.8	dol	17178	1	2
02AH1920	337703.2	8401806.81	112.97	4.8	dol	17179	2	3
02AH1920	337703.2	8401806.81	112.97	4.8	dol	17180	3	4
02AH1935	337799.91	8402014.55	111.89	4	dol	17243	0	1
02AH1935	337799.91	8402014.55	111.89	4	dol	17244	1	2
02AH1935	337799.91	8402014.55	111.89	4	dol	17245	2	3
02AH1935	337799.91	8402014.55	111.89	4	dol	17246	3	4
02AH1950	337902.44	8401295.26	114.69	4	dol	17292	2	3
02AH1965	338106.08	8401696.88	108.75	2.4	dol	17356	0	1
02AH1965	338106.08	8401696.88	108.75	2.4	dol	17357	1	2
02AH1980	338298.72	8401898.83	107.19	3	dol	17412	0	1
02AH1980	338298.72	8401898.83	107.19	3	dol	17413	1	2
02AH1980	338298.72	8401898.83	107.19	3	dol	17414	2	3
02AH1995	337698.67	8402696.59	116.11	3.5	dol	17460	1	2
02AH1995	337698.67	8402696.59	116.11	3.5	dol	17461	2	3
02AH2010	337299.15	8403183.25	126.43	2.8	dol	17504	0	1
02AH2010	337299.15	8403183.25	126.43	2.8	dol	17505	1	2
02AH2010	337299.15	8403183.25	126.43	2.8	dol	17506	2	2.8
02AH2025	337900.57	8402505.57	112.23	4	dol	17561	0	1
02AH2025	337900.57	8402505.57	112.23	4	dol	17562	1	2
02AH2040	338003.13	8403001.33	115.53	4	dol	17608	0	1
02AH2040	338003.13	8403001.33	115.53	4	dol	17609	1	2
02AH2040	338003.13	8403001.33	115.53	4	dol	17610	2	3
02AH2040	338003.13	8403001.33	115.53	4	dol	17611	3	4
02AH2055	338104.56	8402701.24	111.73	3	dol	17658	0	1
02AH2055	338104.56	8402701.24	111.73	3	dol	17659	1	2
02AH2055	338104.56	8402701.24	111.73	3	dol	17660	2	3
02AH2070	338197.39	8403398.81	117.78	2.9	dol	17708	0	1
02AH2070	338197.39	8403398.81	117.78	2.9	dol	17709	1	2
02AH2070	338197.39	8403398.81	117.78	2.9	dol	17710	2	2.9
02AH2085	338294.18	8402006.56	107.96	3	dol	17757	0	1
02AH2085	338294.18	8402006.56	107.96	3	dol	17758	1	2
02AH2085	338294.18	8402006.56	107.96	3	dol	17759	2	3
02AH2100	338297.52	8403503.5	117.4	1.6	dol	17807	0	1
02AH2115	338404.58	8402988.43	114.5	4.8	dol	17847	0	1
02AH2115	338404.58	8402988.43	114.5	4.8	dol	17848	1	2
02AH2115	338404.58	8402988.43	114.5	4.8	dol	17849	2	3
02AH2115	338404.58	8402988.43	114.5	4.8	dol	17850	3	4
02AH2145	338502.45	8403004.78	114.57	3	dol	17923	0	1
02AH2145	338502.45	8403004.78	114.57	3	dol	17924	1	2
02AH2145	338502.45	8403004.78	114.57	3	dol	17925	2	3

02AH2160	338600.61	8402499.59	109.75	3	dol	17962	0	1
02AH2160	338600.61	8402499.59	109.75	3	dol	17963	1	2
02AH2175	338593.78	8404010.81	113.22	4	dol	17997	0	1
02AH2175	338593.78	8404010.81	113.22	4	dol	17998	1	2
02AH2175	338593.78	8404010.81	113.22	4	dol	18000	3	4
02AH2190	338695.04	8404606.82	107.3	3.8	dol	18052	0	1
02AH2190	338695.04	8404606.82	107.3	3.8	dol	18053	1	2
02AH2190	338695.04	8404606.82	107.3	3.8	dol	18054	2	3
02AH2220	338798.46	8402399.8	109.65	2.5	dol	18122	0	1
02AH2235	338804.74	8403906.54	113.07	3	dol	18156	0	1
02AH2235	338804.74	8403906.54	113.07	3	dol	18157	1	2
02AH2235	338804.74	8403906.54	113.07	3	dol	18158	2	3
02AH2250	338901.63	8404713.98	105.26	2.6	dol	18200	0	1
02AH2250	338901.63	8404713.98	105.26	2.6	dol	18201	1	2
02AH2265	338886.82	8403200.81	116.15	2	dol	18242	0	1
02AH2265	338886.82	8403200.81	116.15	2	dol	18243	1	2
02AH2295	339000.22	8403795.89	114.06	2	dol	18307	0	1
02AH2295	339000.22	8403795.89	114.06	2	dol	18308	1	2
02AH2310	339095.03	8405002.21	103.91	4.3		18360	0	1
02AH2310	339095.03	8405002.21	103.91	4.3		18361	1	2
02AH2310	339095.03	8405002.21	103.91	4.3		18362	2	3
02AH2310	339095.03	8405002.21	103.91	4.3		18363	3	4
02AH2325	339094.37	8403802.58	113.97	2.8	dol	18423	0	1
02AH2325	339094.37	8403802.58	113.97	2.8	dol	18424	1	2
02AH2325	339094.37	8403802.58	113.97	2.8	dol	18425	2	2.8
02AH2400	339401.55	8403091.18	116.56	1.7	dol	18613	1	1.7
02AH2430	339498.18	8404199.94	110.54	3	dol	18693	0	1
02AH2445	339498.63	8402707.61	116.43	5.3	slt?	18731	1	2
02AH2445	339498.63	8402707.61	116.43	5.3	slt?	18732	2	3
02AH2445	339498.63	8402707.61	116.43	5.3	slt?	18733	3	4
02AH2460	339598.22	8404004.34	112.59	2.5	dol	18764	1	2
02AH2475	339705.11	8404804.64	104.86	2.9	dol	18798	0	1
02AH2475	339705.11	8404804.64	104.86	2.9	dol	18799	1	2
02AH2475	339705.11	8404804.64	104.86	2.9	dol	18800	2	2.9
02AH2517	339900.19	8405000.93	105.32	3	slt? Clay	18906	2	3
02AH2535	339901.89	8403203.94	114.02	3.3	dol	18951	0	1
02AH2535	339901.89	8403203.94	114.02	3.3	dol	18952	1	2
02AH2535	339901.89	8403203.94	114.02	3.3	dol	18953	2	3
02AH2565	340093.67	8404597.75	109.04	4.5	SLT?	19043	0	1
02AH2565	340093.67	8404597.75	109.04	4.5	SLT?	19044	1	2
02AH2565	340093.67	8404597.75	109.04	4.5	SLT?	19045	2	3
02AH2611	340397.91	8403917.71	109.45	1.8	dol	19150	0	1
02AH2640	340800.35	8404205.71	109.52	2.4	dol	19208	0	1
02AH2640	340800.35	8404205.71	109.52	2.4	dol	19210	2	2.4
02AH2655	340400.8	8404504.95	111.57	2	dol	19244	0	1
02AH2655	340400.8	8404504.95	111.57	2	dol	19245	1	2

Colour	Comp
brown, pale brown	loamy topsoil on gravelly loam
pale brown	clayey & sandy loam gravels
pale brown	clayeye sandy loam and minor gravel
A/A	A/A
red	minor red clay
red	red clay (pl > 1.5)
red khaki	red/khaki clay
red	red clay
red	clay (small pl)
red	clay (small pl)
red	clay (small pl)
red	clay (pl)
grey - orange	gritty clay
orange, brown	gritty clay & light grey clay
brown	gritty clay
brown	gritty clay
red	clay (pl > 2.1)
brown, red	red clay
red	red clay (pl > 1.7)
orange	orange light grey sandy clay
orange, khaki	orange light grey sandy clay
khaki	kk clay
red	red clay (pl)
red, orange	red clay (pl)
red	clay (small pl > 0.5)
red khaki	clay (small pl > 0.5)
khaki	nil rec
red	minor clay
red	minor clay, pl > 1.8
red	red clay
red	clay (pl > 1.5)
red, orange, red	clay (pl)
orange, red, khaki	orange, red clay
brown, red	minor clay
red, khaki	clay (pl> 1.3
khaki	nil rec
red	red clay
redd, orange red	red clay
orange red, khaki	orange red clay
orange, brown	sandy - gritty clay (pl)
brown, khaki	gritty clay 9pl)
khaki	kk clay
red, orange red	red clay
red	red clay
red	min red clay (pl)
red	red clay (pl)
red-khaki	red clay
red	clay
red	clay
red	clay (pl)

red	red clay (small pl > 0.7)
red	clay (pl)
red	red clay
red	red clay (small pl> 1.6)
red/orange - khaki	red/or - kk clay
orange, brown	sandy - gritty clay (pl)
brown	clay (pl) wk gritty
brown, light brown	clay (pl) wk gritty
red	red clay
red	clay
red	minor clay , clay (pl > 1.8)
khaki	clay (pl)
olive	black clay soil (pl)
olive, khaki	black clay soil (pl)
red	clay
red	clay
red	clay
red-khaki	nil rec
grey	black clay soil(pl)
grey	black clay soil(pl)
lt brown to khaki	sandy clay and lt grey streaks
khaki to orange	sandy clay and lt grey streaks
red	minor clay
red	clay (small pl > 1.3)
red khaki	clay (pl)
khaki	nil rec
red	clay (small pl> 0.6)
brown	minor clay - clay pl> 1.5
brown, orange	clay (pl) light grey streaks
orange	clay (pl) incre light grey
red	clay
olive	black clay soil (pl)
olive, khaki	black clay soil (pl)
khaki	kk clay
red brown	sand red
red	clay
red	clay (small pl > 1.8)
red - orange red	clay (pl)
olive	black clay soil (pl)
olive	black clay soil (pl)
olive	black clay soil (pl)
red - orange/red	kk clay
red	clay
khaki	nil rec
red	clay (pl > 0.4)
red - khaki	clay (pl)

Comments	Dry Wt	Wt plus1mm	percplus1mm
soil & common psl & lat gravels	9980	3827	38.3467
soil & mod psl & lat gravels	12580	786	6.24801
soil & minor psl & lat gravels	10160	342	3.36614
A/A	12420	794	6.39291
tiny rnded dol clasts/pisos, rare go slt clasts	10380	771	7.42775
< 1.3 tiny rnded dol clasts/pisos, rare go slt clasts, > 1.3 no chips	8040	187	2.32587
leached white ferr black pisos	9720	579	5.95679
< 1.5 tiny rnded dol clasts/pisos, > 1.5 no chips	9080	597	6.57489
minor tiny rnded dol clasts/pisos	7900	166	2.10127
minor tiny rnded dol clasts/pisos	7860	843	10.7252
< 2.6 minor tiny rnded dol clasts/pisos, > 2.6 no chips - clay (pl larger)	10800	1976	18.2963
no chips	11720	266	2.26962
abun small sst balls & minor dol pisos/rnd clasts	9000	1153	12.8111
Lesser abun small sst balls & minor dol pisos/rnd clasts	11580	2294	19.81
abun small sst balls & minor dol pisos/rnd clasts	12140	2080	17.1334
kk = ferr white black dol leached strng wrd, white (calc) chips ~ 3.2 kk	10840	0	0
2.1 < tiny rnded dol clasts/pisos, > 2.1 no chips	6260	642	10.2556
minor tiny rnded dol clasts/pisos	9640	890	9.23237
< 1.7 minor tiny rnded dol clasts/pisos, 1.7> tr no chips	7960	796	10
minor tiny small sst dol balls/pisos	11240	410	3.64769
kk = kk clay & minor white calc chips, 1.6 - 1.7 gravel bed, sst gravels	7920	1487	18.7753
chips> 2.3 ferr black dol & abun white calc	13160	5205	39.5517
indurated chips (friable) minor tiny rnded dol clasts/pisos (decr dh - co	8540	231	2.70492
or = ferr/or friable dol	7680	779	10.1432
0.5 < tiny rnded dol clasts/pisos > 0.5 no chips	8660	2434	28.1062
no chips, kk = ferr greenblack dol	10180	3473	34.1159
ferr greenblakc dol some rare large cm rnded chips (weathered feature	10240	4292	41.9141
abun tiny small rnded dol clasts/pisos	10040	1988	19.8008
< 1.7 abun tiny small rnded dol clasts/pisos, > 1.7 no chips	6820	680	9.97067
tiny rnded dol clasts/pisos	9440	0	0
1.5 < tiny rnded dol clasts/pisos, > 1.5 no chips	9360	1307	13.9637
no chips, rare ferr orange dol chips at depth	7640	118	1.5445
kk = ferr green black dol	11460	280	2.44328
abun tiny dol clasts/pisos	10780	4369	40.5288
< 1.5 abun tiny dol clasts/pisos, > 1.5 rare chips (decr - none), kk = st f	12220	1927	15.7692
ferr black dol	13300	2650	19.9248
0.9 < tiny rnded dol clasts/pisos > 0.9 lesser	6900	882	12.7826
minor tiny rnded dol clasts/pisos, or/rd strng ferr black dol	7020	1288	18.3476
kk = ferr green black dol large cm chips (rnded wrd feature?)	15780	7980	50.5703
abun sst gravel - cm pebble (esp > 0.5)	12240	1987	16.2337
abun sst gravel - cm pebble - rare (decr dh), kk = white calc /kk clay	7540	812	10.7692
white (calc) dkkk = white calc & ferr black dol	10920	4795	43.9103
0.8 < tiny rnd dol clasts/pisos (incr dh) > 0.8 st ferr or dol	7100	1094	15.4085
tiny rnded dol clasts/piso's	8860	0	0
1.4< tiny rnded dol clasts/piso's, 1.4> rare chips decreasing dh	10140	523	5.15779
no chips	6420	53	0.825545
khaki = khaki clay (no chips)	12360	955	7.72654
minor tiny dol rnded clasts/pisos (incr dh)	8180	482	5.89242
< 1.3 minor tiny dol rnded clasts/pisos (incr dh), > 1.3 no chips	7760	294	3.78866
no chips, kk = ferr greenblack dol	10760	1133	10.5297

0.7 < tiny rnded dol clasts/pisos, > 0.7 minor tiny rnded dol clasts/pisos	8380	497	5.93079
no chips	7840	250	3.18878
tiny rnded dol clasts/pisos (incr dh)	8720	1851	21.2271
, 1.6 tiny rnded dol clasts/pisos (incr dh), 1.6> rare tiny rnded dol clasts	9080	1924	21.1894
chips ~> 3.7 , ferr greenblack dol	10040	733	7.3008
dh abun dk ferr sst balls/pisos decr dh	10960	1311	11.9617
dh abun dk ferr sst balls/pisos decr dh	10500	652	6.20952
dh abun dk ferr sst balls/pisos decr dh 2.1 > large chips - ferr light gree	10300	4016	38.9903
tiny rnded dol clasts/pisos incr some cm size dol clasts ~ 0.8	6840	1196	17.4854
tiny small rnded dol clasts/pisos (incr dh)	8140	834	10.2457
1.8 < abun small rnded dol clasts/pisos, > 1.8 no pisos	7840	2631	33.5587
no chips, kk = ferr greenblack dol	10580	1177	11.1248
nil rec	11320	163	1.43993
nil rec	8780	2550	29.0433
0.7< minor tiny rnded dol clasts/pisos, > 0.7 fewer pisos, more clay (pl)	7420	255	3.43666
kk=ferr greenblack dol	11280	3337	29.5833
tiny rnded dol clasts/piso (increasing dh)	7040	771	10.9517
rare tiny rnded dol clasts/piso (increasing dh), khaki = ferr green/black	8440	616	7.29858
min tiny black piso's, rare tiny ferr gravels	7320	161	2.19945
min tiny black piso's, rare tiny ferr gravels	6400	231	3.60938
rare white calc (increasing dh), hem sst gravels and min go slt gravels	8700	1440	16.5517
rare white calc (increasing dh), hem sst gravels and min go slt gravels	10000	2085	20.85
tiny rnded dol clasts/pisos	7780	1090	14.0103
< 1.3 tiny rnded dol clasts/pisos, > 1.3 lesser pisos	6620	1206	18.2175
kk= ferr greenblack dol	11640	4109	35.3007
kk = ferr greenblack dol	7840	2147	27.3852
0.6 < minor tiny rnded dol clasts/pisos, > 0.6 rare tiny rnded dol clasts	8540	406	4.7541
abun tiny rnded dol clasts/pisos - no chips > 1.5	10640	1504	14.1353
no chips	10460	796	7.60994
no chips	8320	718	8.62981
no chips	6800	309	4.54412
rare tiny black pisos	6720	112	1.66667
rare tiny black pisos, kk = kk clay	6440	205	3.18323
ferr greenblack dol (incr chips dh)	7620	710	9.31759
or = clay - brown/light grey clay (weathered SLT?)	13700	4030	29.4161
abun tiny small rnded dol clasts/pisos, (incr dh - v few at top)	7600	538	7.07895
1.8< abun tiny small rnded dol clasts/pisos, > 1.8 less pisos	8840	2488	28.1448
no chips, or/rd = st ferr orange dol (friable)	10060	1343	13.3499
minor tiny sst clasts & minor tiny small black pisos	9740	689	7.07392
less minor tiny sst clasts & minor tiny small black pisos	9620	378	3.92931
minor tiny sst clasts & minor tiny small black pisos & rare light grey chi	9460	326	3.44609
rare tiny dol clasts/pisos, or/rd = st ferr dol clasts	8620	1676	19.4432
0.7< minor tiny rnded dol clasts/pisos (incr dh), 0.7> less pisos, & minc	7540	859	11.3926
ferr green black dol	9240	4462	48.29
0.6< tiny small rnded dol clasts/pisos, 0.6> rare small rnded dol clasts/	10240	4460	43.5547
kk = ferr green black dol	9520	2089	21.9433

Wtmin1mm	percmin1mm	perc slime	WT TC	Perc TC	WT NM	%HM	**Sample_Interval**
2848	28.5371	33.1162	774	7.75551	261	5.14	1
3293	26.1765	67.5755	688	5.469	110	4.595	1
2353	23.1594	73.4744	384	3.77953	81	2.982	1
2542	20.467	73.1401	375	3.01932	75	2.415	1
2932	28.2466	64.3256	540	5.20231	130	3.95	1
1823	22.6741	75	329	4.09204	74	3.172	1
2347	24.1461	69.8971	430	4.42387	68	3.724	1
1257	13.8436	79.5815	416	4.5815	81	3.689	1
2385	30.1899	67.7089	571	7.22785	118	5.734	1
1772	22.5445	66.7303	345	4.38931	39	3.893	1
1741	16.1204	65.5833	470	4.35185	115	3.287	1
1609	13.7287	84.0017	411	3.50683	54	3.046	1
2988	33.2	53.9889	444	4.93333	174	3	1
2843	24.5509	55.639	432	3.73057	205	1.96	1
1913	15.7578	67.1087	289	2.38056	91	1.631	1
2713	0	100	314	2.89668	102	1.956	1
805	12.8594	76.885	165	2.63578	40	1.997	1
2317	24.0353	66.7324	292	3.02905	44	2.573	1
2167	27.2236	62.7764	176	2.21106	26	1.884	1
4599	40.9164	55.4359	458	4.07473	182	2.456	1
2345	29.6086	51.6162	216	2.72727	65	1.907	1
2504	19.0274	41.421	321	2.43921	122	1.512	1
0	0	97.2951	487	5.70258	68	4.906	1
1497	19.4922	70.3646	360	4.6875	74	3.724	1
1391	16.0624	55.8314	327	3.77598	74	2.921	1
1680	16.5029	49.3811	298	2.92731	31	2.623	1
1634	15.957	42.1289	222	2.16797	16	2.012	0.8
1808	18.008	62.1912	972	9.68127	307	6.624	1
910	13.3431	76.6862	318	4.66276	64	3.724	1
998	0	100	963	10.2013	240	7.659	1
624	6.66667	79.3697	643	6.86966	128	5.502	1
522	6.83246	91.623	453	5.92932	59	5.157	1
3209	28.0017	69.555	695	6.06457	143	4.817	1
1448	13.4323	46.039	1225	11.3636	318	8.414	1
1696	13.8789	70.3519	939	7.68412	169	6.301	1
3333	25.0602	55.015	434	3.26316	70	2.737	1
802	11.6232	75.5942	990	14.3478	180	11.74	1
1217	17.3362	64.3162	538	7.66382	92	6.353	1
3152	19.9747	29.455	486	3.07985	147	2.148	0.9
4646	37.9575	45.8088	433	3.53758	159	2.239	1
2331	30.9151	58.3156	176	2.33422	70	1.406	1
1596	14.6154	41.4744	141	1.29121	72	0.632	1
731	10.2958	74.2958	748	10.5352	76	9.465	1
0	0	100	932	10.5192	105	9.334	1
640	6.31164	88.5306	644	6.35108	60	5.759	1
574	8.94081	90.2336	300	4.6729	28	4.237	1
2962	23.9644	68.3091	430	3.47896	70	2.913	1
770	9.4132	84.6944	810	9.9022	89	8.814	1
453	5.83763	90.3737	522	6.7268	55	6.018	1
2020	18.7732	70.697	505	4.69331	90	3.857	1

1154	13.7709	80.2983	493	5.88305	91	4.797	1
516	6.58163	90.2296	299	3.81378	33	3.393	1
515	5.90596	72.867	507	5.81422	98	4.69	1
1026	11.2996	67.511	427	4.70264	56	4.086	1
2752	27.4104	65.2888	397	3.95418	48	3.476	1
2410	21.9891	66.0493	830	7.57299	184	5.894	1
2487	23.6857	70.1048	576	5.48571	117	4.371	1
1534	14.8932	46.1165	282	2.73786	119	1.583	1
917	13.4064	69.1082	271	3.96199	41	3.363	1
1239	15.2211	74.5332	790	9.70516	168	7.641	1
827	10.5485	55.8929	362	4.61735	66	3.776	1
1574	14.8771	73.9981	458	4.32892	53	3.828	1
1361	12.023	86.5371	565	4.99117	95	4.152	1
1022	11.6401	59.3166	161	1.83371	27	1.526	1
633	8.531	88.0323	520	7.00809	46	6.388	1
2917	25.8599	44.5567	502	4.45035	152	3.103	1
696	9.88636	79.1619	680	9.65909	96	8.295	1
981	11.6232	81.0782	495	5.86493	46	5.32	1
1505	20.5601	77.2404	356	4.86339	56	4.098	1
1394	21.7813	74.6094	241	3.76563	36	3.203	1
2156	24.7816	58.6667	309	3.55172	66	2.793	1
2325	23.25	55.9	433	4.33	86	3.47	1
1023	13.1491	72.8406	577	7.41645	38	6.928	1
816	12.3263	69.4562	325	4.90937	37	4.35	1
2818	24.2096	40.4897	286	2.45704	36	2.148	0.8
1126	14.3622	58.2526	900	11.4796	141	9.681	0.7
2457	28.7705	66.4754	180	2.10773	37	1.674	1
2180	20.4887	65.3759	293	2.75376	133	1.504	1
1403	13.413	78.9771	158	1.51052	23	1.291	1
0	0	91.3702	96	1.15385	13	0.998	1
538	7.91176	87.5441	467	6.86765	64	5.926	1
979	14.5685	83.7649	306	4.55357	66	3.571	1
477	7.40683	89.4099	158	2.45342	32	1.957	1
1753	23.0052	67.6772	189	2.48031	49	1.837	0.9
2837	20.708	49.8759	166	1.21168	105	0.445	1
1449	19.0658	73.8553	215	2.82895	83	1.737	1
1017	11.5045	60.3507	222	2.51131	94	1.448	1
1357	13.4891	73.161	322	3.2008	88	2.326	1
1621	16.6427	76.2834	259	2.65914	77	1.869	1
1864	19.3763	76.6944	214	2.22453	62	1.58	1
1385	14.6406	81.9133	154	1.62791	44	1.163	1
1614	18.7239	61.8329	830	9.62877	127	8.155	1
1056	14.0053	74.6021	269	3.56764	82	2.48	1
1604	17.3593	34.3506	180	1.94805	14	1.797	0.4
1345	13.1348	43.3105	304	2.96875	40	2.578	1
1314	13.8025	64.2542	295	3.09874	33	2.752	1

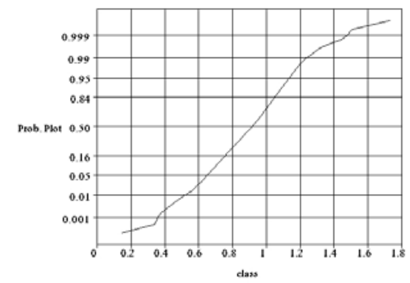
Theoretical_Volume	Theoretical_Weight	%Vol_Recovered
0.006221139	11073.62716	0.901240385
0.006221139	11073.62716	1.136032469
0.006221139	11073.62716	0.917495221
0.006221139	11073.62716	1.121583725
0.006221139	11073.62716	0.937362244
0.006221139	11073.62716	0.726049368
0.006221139	11073.62716	0.877761176
0.006221139	11073.62716	0.819966202
0.006221139	11073.62716	0.713406717
0.006221139	11073.62716	0.709794532
0.006221139	11073.62716	0.975290196
0.006221139	11073.62716	1.058370472
0.006221139	11073.62716	0.81274183
0.006221139	11073.62716	1.045727821
0.006221139	11073.62716	1.096298424
0.006221139	11073.62716	0.978902382
0.006221139	11073.62716	0.565307095
0.006221139	11073.62716	0.870536805
0.006221139	11073.62716	0.718824996
0.006221139	11073.62716	1.015024241
0.006221139	11073.62716	0.71521281
0.006221139	11073.62716	1.188409165
0.006221139	11073.62716	0.771201692
0.006221139	11073.62716	0.693539695
0.006221139	11073.62716	0.78203825
0.006221139	11073.62716	0.919301314
0.004976911	8858.901726	1.155899492
0.006221139	11073.62716	0.906658664
0.006221139	11073.62716	0.615877698
0.006221139	11073.62716	0.852475875
0.006221139	11073.62716	0.845251503
0.006221139	11073.62716	0.689927509
0.006221139	11073.62716	1.034891263
0.006221139	11073.62716	0.973484103
0.006221139	11073.62716	1.103522796
0.006221139	11073.62716	1.201051815
0.006221139	11073.62716	0.62310207
0.006221139	11073.62716	0.633938627
0.005599025	9966.264441	1.583341491
0.006221139	11073.62716	1.105328889
0.006221139	11073.62716	0.680897044
0.006221139	11073.62716	0.986126754
0.006221139	11073.62716	0.641162999
0.006221139	11073.62716	0.800099179
0.006221139	11073.62716	0.915689128
0.006221139	11073.62716	0.579755839
0.006221139	11073.62716	1.116165446
0.006221139	11073.62716	0.738692019
0.006221139	11073.62716	0.700764067
0.006221139	11073.62716	0.97167801

0.006221139	11073.62716	0.756752948
0.006221139	11073.62716	0.707988439
0.006221139	11073.62716	0.787456529
0.006221139	11073.62716	0.819966202
0.006221139	11073.62716	0.906658664
0.006221139	11073.62716	0.98973894
0.006221139	11073.62716	0.948198802
0.006221139	11073.62716	0.930137872
0.006221139	11073.62716	0.617683791
0.006221139	11073.62716	0.735079833
0.006221139	11073.62716	0.707988439
0.006221139	11073.62716	0.955423173
0.006221139	11073.62716	1.022248613
0.006221139	11073.62716	0.792874807
0.006221139	11073.62716	0.670060486
0.006221139	11073.62716	1.018636427
0.006221139	11073.62716	0.63574472
0.006221139	11073.62716	0.762171227
0.006221139	11073.62716	0.661030022
0.006221139	11073.62716	0.577949746
0.006221139	11073.62716	0.785650436
0.006221139	11073.62716	0.903046478
0.006221139	11073.62716	0.70257016
0.006221139	11073.62716	0.597816768
0.004976911	8858.901726	1.313932625
0.004354797	7751.53901	1.011412055
0.006221139	11073.62716	0.771201692
0.006221139	11073.62716	0.960841452
0.006221139	11073.62716	0.944586616
0.006221139	11073.62716	0.751334669
0.006221139	11073.62716	0.614071605
0.006221139	11073.62716	0.606847233
0.006221139	11073.62716	0.581561932
0.005599025	9966.264441	0.764579351
0.006221139	11073.62716	1.237173675
0.006221139	11073.62716	0.686315323
0.006221139	11073.62716	0.798293086
0.006221139	11073.62716	0.908464757
0.006221139	11073.62716	0.879567269
0.006221139	11073.62716	0.868730712
0.006221139	11073.62716	0.854281968
0.006221139	11073.62716	0.778426064
0.006221139	11073.62716	0.680897044
0.002488456	4429.450863	2.086037364
0.006221139	11073.62716	0.924719593
0.006221139	11073.62716	0.859700247

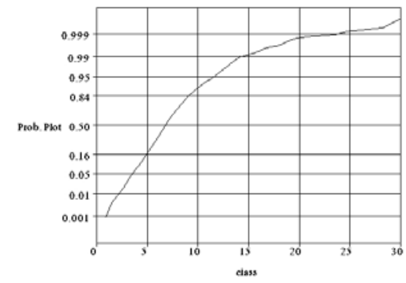
APPENDIX 3-A

PROBABILITY PLOT DISTRIBUTION OF ASSAY RESULTS WITHIN PISOLITE INTERVALS

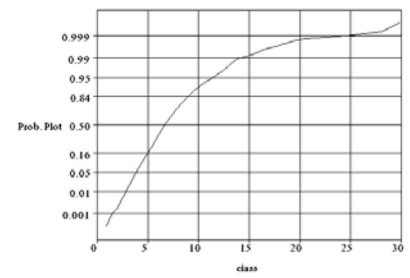
PROBABILITY PLOT DISTRIBUTION OF ASSAY RESULTS WITHIN PISOLITE INTERVALS



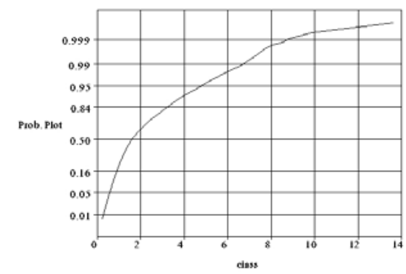
Vol_Recov_Perc (raw)



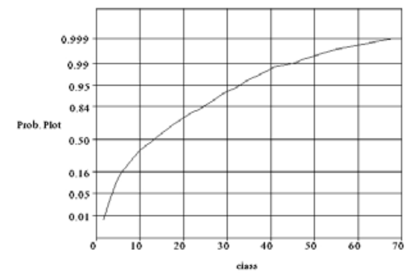
HM_Perc (raw)



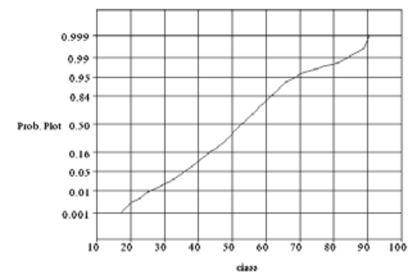
ILM_Perc (raw)



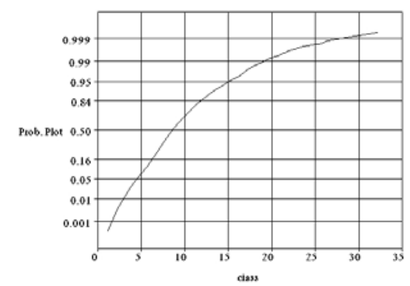
NM_Perc (raw)



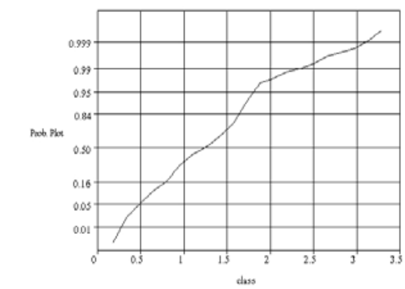
Plus1mm_Perc (raw)



Slime_Perc (raw)



TC_Perc (raw)

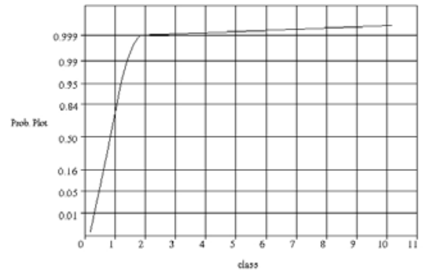


Composite_Length (raw)

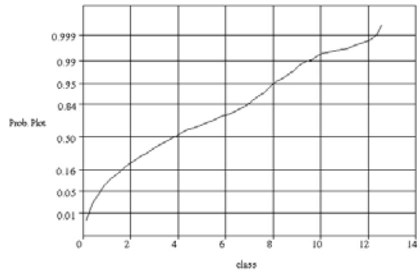
APPENDIX 3-B

PROBABILITY PLOT DISTRIBUTION OF ASSAY RESULTS WITHIN NON-PISOLITE INTERVALS

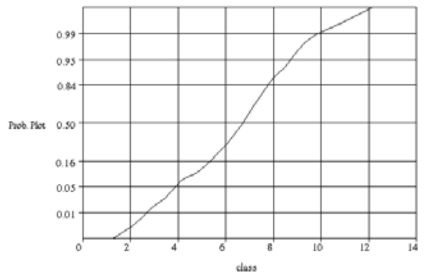
PROBABILITY PLOT DISTRIBUTION OF ASSAY RESULTS WITHIN NON-PISOLITE INTERVALS



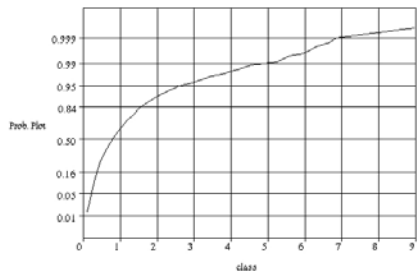
Vol_Recov_Perc (raw)



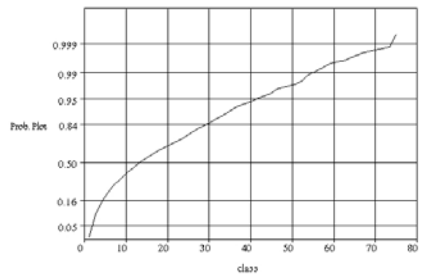
HM_Perc (raw)



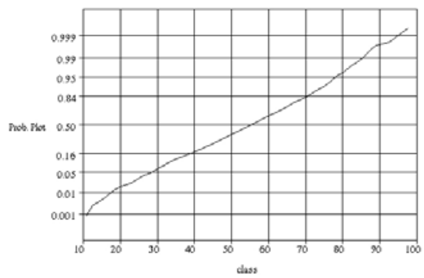
ILM_Perc (raw)



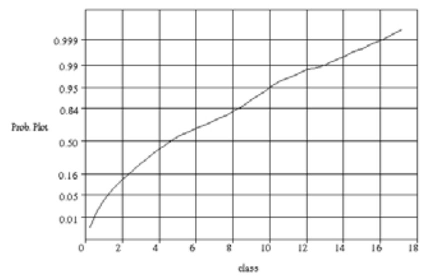
NM_Perc (raw)



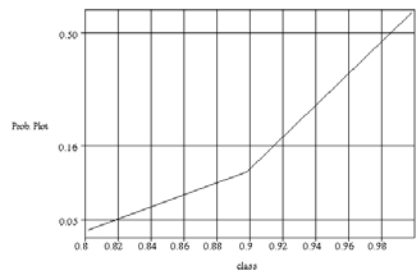
Plus1mm_Perc (raw)



Slime_Perc (raw)



TC_Perc (raw)

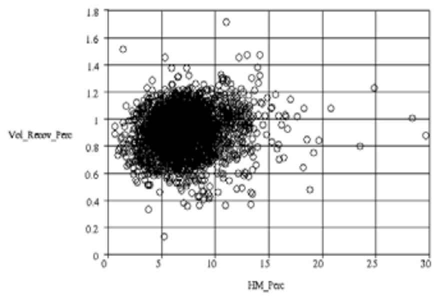


Composite_Length (raw)

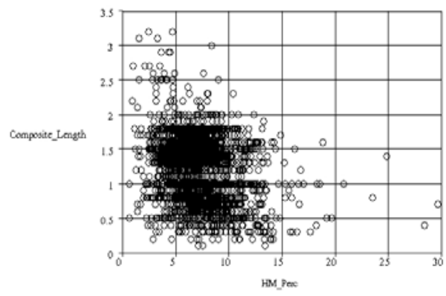
APPENDIX 3-C

SCATTER PLOTS DISTRIBUTION OF ASSAY RESULTS WITHIN PISOLITE COMPOSITES

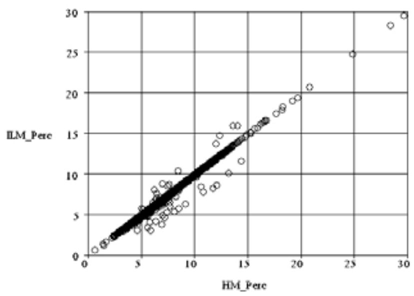
SCATTER PLOT DISTRIBUTION OF ASSAY RESULTS WITHIN PISOLITE COMPOSITES



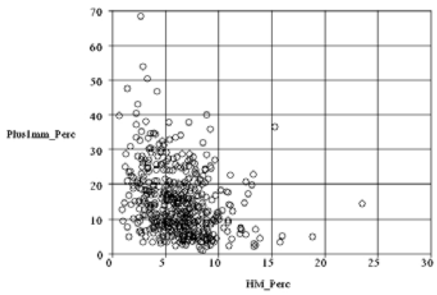
HM_Perc vs Vol_Recov_Perc



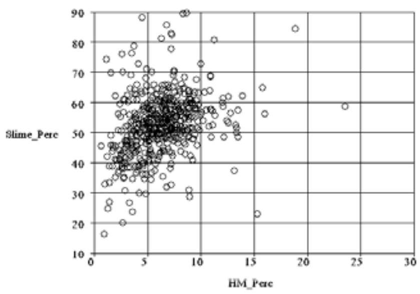
HM_Perc vs Composite_Length



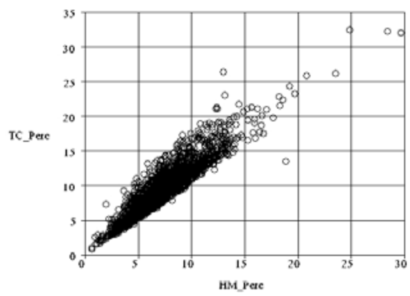
HM_Perc vs ILM_Perc



HM_Perc vs Plus1mm_Perc

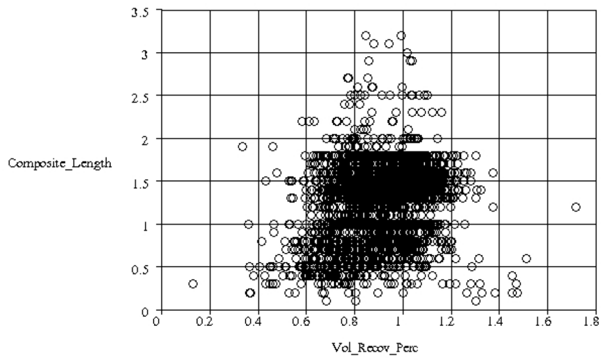


HM_Perc vs Slime_Perc

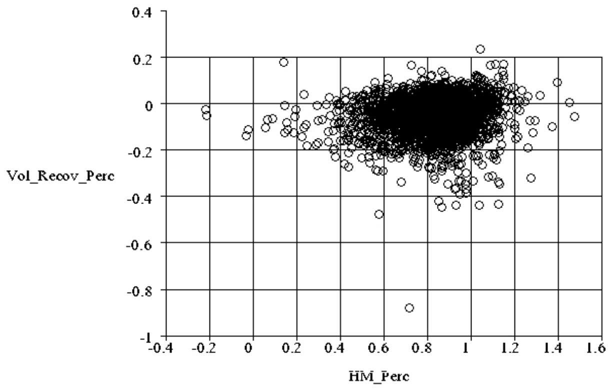


HM_Perc vs TC_Perc

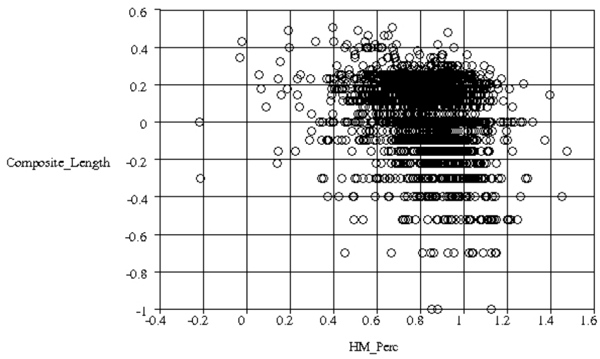
SCATTER PLOTS IN LOG-NORMAL (LOG 10) SPACE OF PISOLITES



Vol_Recov_Perc vs Composite_Length



HM_Perc vs Vol_Recov_Perc

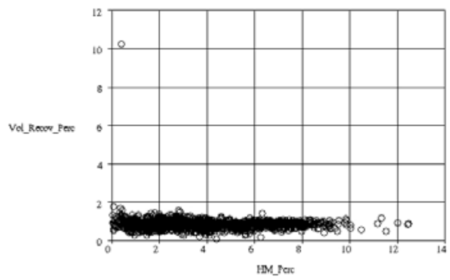


HM_Perc vs Composite_Length

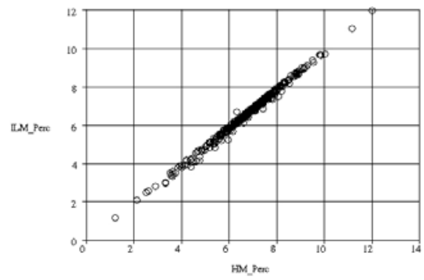
APPENDIX 3-D

SCATTER PLOT DISTRIBUTION OF ASSAY RESULTS WITHIN NON-PISOLITE INTERVALS

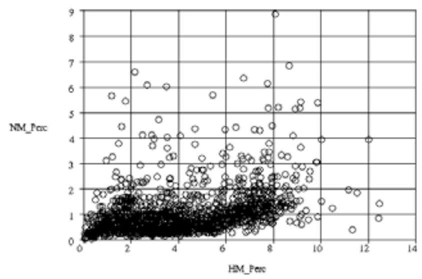
SCATTER PLOTS IN NORMAL SPACE OF NON-PISOLITES



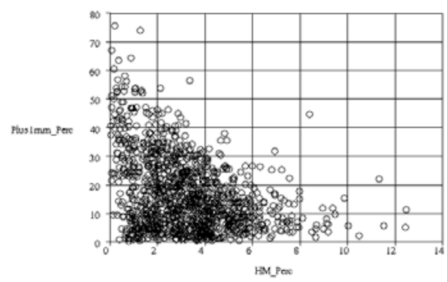
HM_Perc vs Vol_Recov_Perc



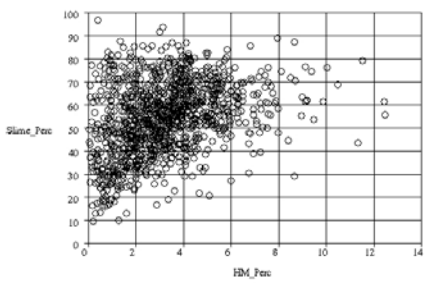
HM_Perc vs ILM_Perc



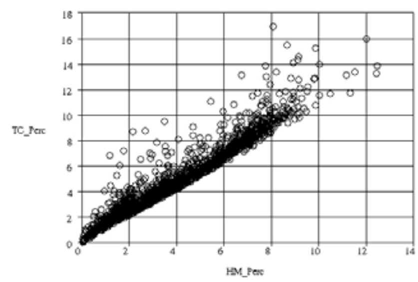
HM_Perc vs NM_Perc



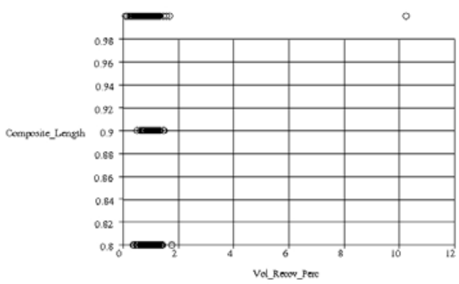
HM_Perc vs Plus1mm_Perc



HM_Perc vs Slime_Perc



HM_Perc vs TC_Perc



Vol_Recov_Perc vs Composite_Length

APPENDIX 4-A

BLOCK MODEL PARAMETERS

Block Model Summary buka.mdl

Buka South Block Model
Tennent Isokangas Pty Ltd June 2004
Preliminary Ordinary Kriged HM Percent Estimate

Type	Y	X	Z
Minimum Coordinates	8400500	336500	80
Maximum Coordinates	8405500	341500	130
User Block Size	50	50	1
Min. Block Size	3.125	3.125	.125
Rotation	0	0	0

Total Blocks	3133
Storage Efficiency %	99.99

Attribute Name	Type	Decimals	Background	Description
assay1_ok	Float	3	-9	Spare assay 1 field
assay2_ok	Float	3	-9	Spare assay2 field
avg_distance_ok	Integer	-	-9	average distance from samples used in hm_perc ok grade estimate
bulk_density	Float	3	-9	ERD assigned bulk density value
east_spare	Float	5	-9	
geology_flag	Integer	-	-9	flagged numeric geology field
geology_tag	Character	-	null	tagged character geology field
hm_perc_ok	Float	3	-9	Heavy Mineral Percent - Estimated by ordinary kriging
no_samples_ok	Integer	-	-9	number of samples used in hm_perc ok grade estimate
north_spare	Float	5	-9	
rl_spare	Float	5	-9	
spare	Float	3	-9	spare field
tonnes	Float	2	-9	Tonnes
vol_recov_perc_id	Float	4	-9	percentage between 0 and 1 of inverse distance est vol recov

APPENDIX 4-B

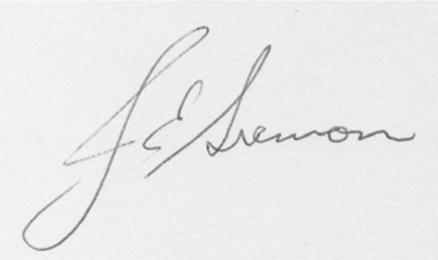
JORC COMPLIANCE STATEMENT

RESOURCE STATEMENT

The information in this report that relates to Mineral Resources or Ore Reserves is based on information compiled by Alison Keogh and reviewed by John Edward Siemon who is a Member of the Australian Institute of Geoscientists.

John Edward Siemon is employed by J.E. Siemon Pty Ltd.

*John Edward Siemon has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity for which he is undertaking to qualify as a Competent Person as defined in the 1999 edition of the **Australasian Code for Reporting of Mineral Resources and Ore Reserves**. John Edward Siemon confirms that the information contained above is appropriate to include in the TIP report in the form and context in which it appears.*



J.E. Siemon
B.Sc, M.Sc, MAIG, MGSA

APPENDIX 4-C

SURPAC RESOURCE REPORTS

SURPAC RESOURCE REPORTS

RAW_HM_NO_CUT

Hm Perc Ok	Block Flag	Volume	Tonnes	Hm Perc Ok
0.0-999.0	1	5 650 505	10 170 909	5.848
	2	2 880 704	5 041 233	3.267
	10	14 047 036	23 458 550	3.519
Sub Total		22 578 246	38 670 692	4.099

RAW_HM_2_5_CUT

Hm Perc Ok	Block Flag	Volume	Tonnes	Hm Perc Ok
2.5-999.0	1	5 476 263	9 857 274	5.962
	2	1 743 510	3 051 142	4.254
	10	8 969 568	14 979 178	4.619
Sub Total		16 189 341	27 887 594	5.054

RAW_HM_4_CUT

Hm Perc Ok	Block Flag	Volume	Tonnes	Hm Perc Ok
4.0-999.0	1	4 599 990	8 279 982	6.476
	2	721 991	1 263 484	5.747
	10	5 415 049	9 043 131	5.528
Sub Total		10 737 030	18 586 598	5.966

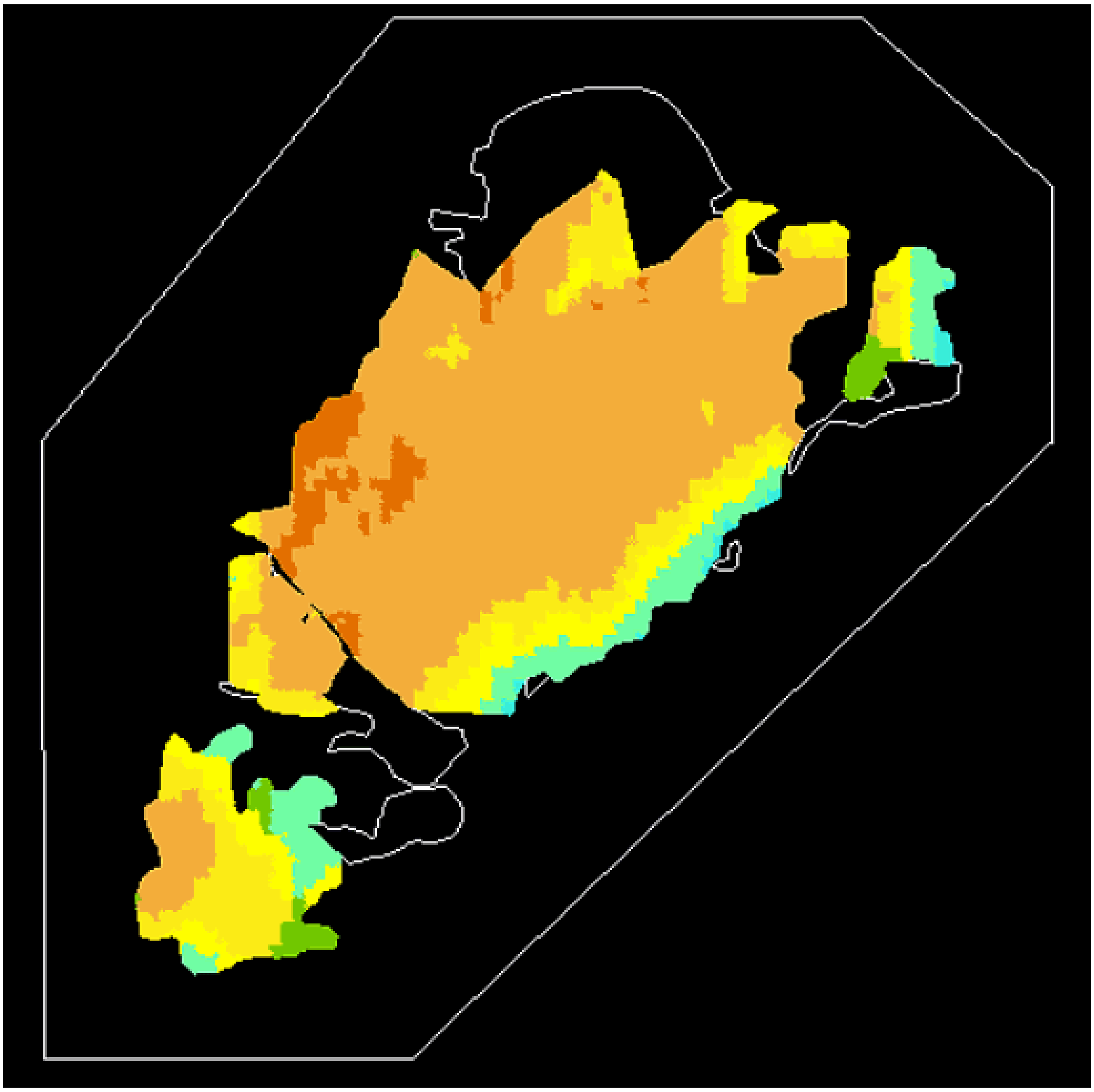
RAW_HM_5_CUT

Hm Perc Ok	Block Flag	Volume	Tonnes	Hm Perc Ok
5.0-999.0	1	3 589 919	6 461 855	7.039
	2	435 520	762 160	6.619
	10	3 191 600	5 329 972	6.261
Sub Total		7 217 040	12 553 987	6.683

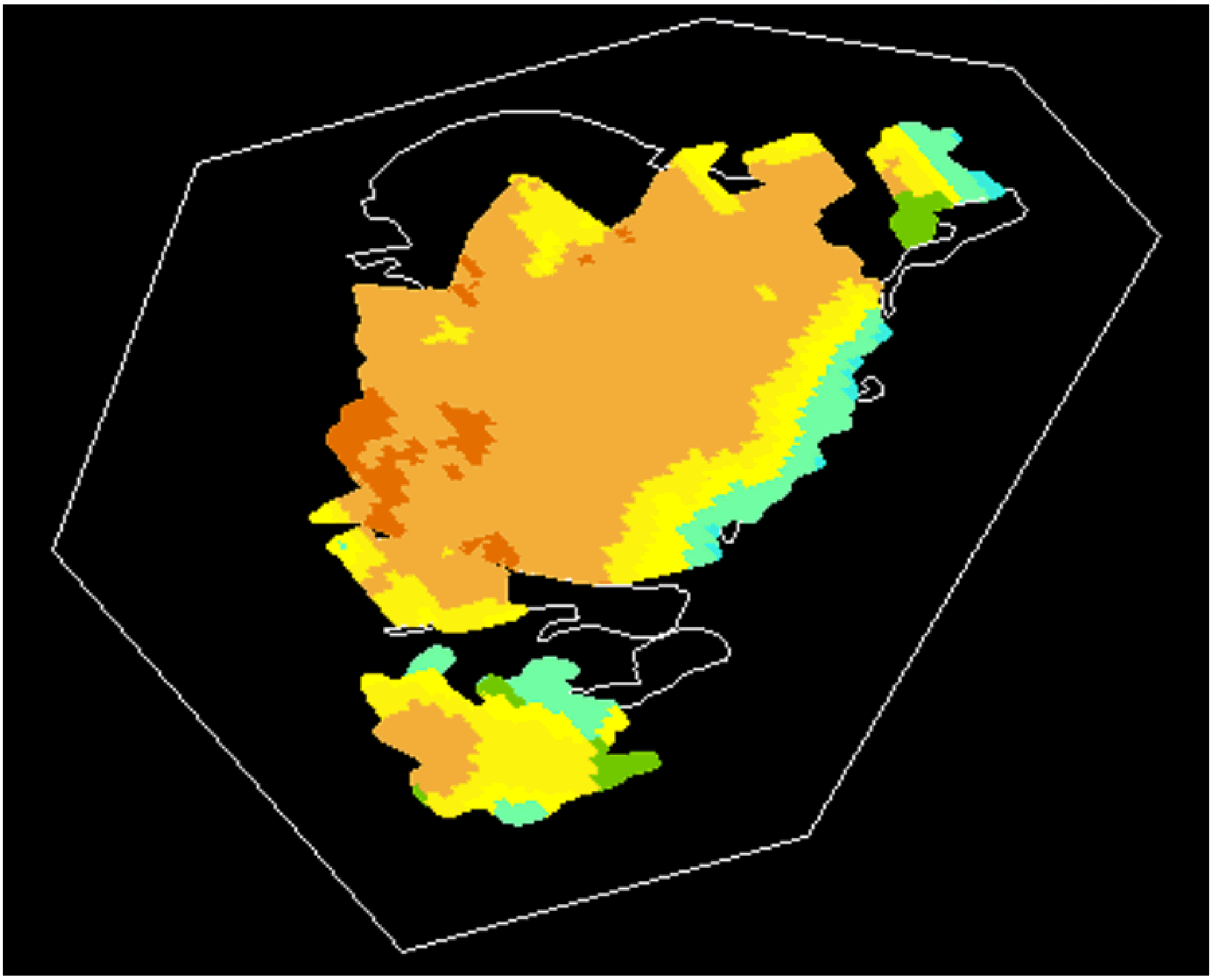
APPENDIX 4-D

HM PERCENT MODEL PICTURES

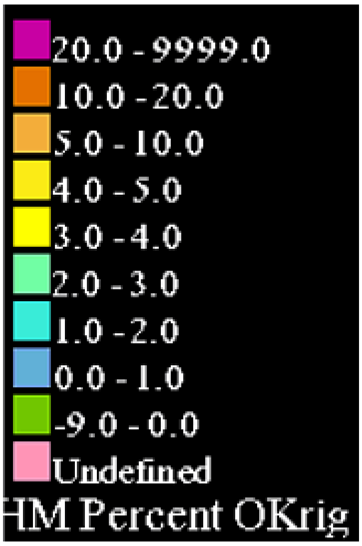
PISOLITE_RawHM_Plan1



PISOLITE_RawHM_NE_Oblique1



PISOLITE_RawHM_Plan1_Legend



Distribution of Mineral (Heavy Mineral Material, No Cutoff)