BATHYMETRY OF GRUM PIT LAKE, 2009

For

Yukon

Deborah Pitt
Assessment & Abandoned Mines

Submitted by

Laberge
ENVIRONMENTAL SERVICES

November 2009

1.0 PROJECT OBJECTIVE

On September 10, 2009 while at the Faro Mine Complex Site completing other assignments Laberge Environmental Services (LES) was asked by Leslie Gomm to conduct a bathymetric survey of the Grum Pit Lake. After an exchange of emails, LES proceeded to re-launch a boat and conducted the survey on the basis of an email sent to Leslie Gomm and Deborah Pitt on September 11th, 2009. The survey was conducted on September 13th. On September 14th belated instructions were received from Luciano Pohl of Golder and Associates along with objectives for the work. The objective was to establish the underwater profile of the slumping till slope. Even without the benefit of these instructions, we were still able to generate enough transects to allow for cross sections to be plotted in the till slope area.

2.0 SCOPE OF WORK AND METHODOLOGY

Due to the extreme short notice of this assignment, LES could only use the basic instruments at hand for this work; a handheld Garmin GPS and a flat bottom boat equipped with an old Lowrance depth sounder. To create x, y and z coordinates, 421 waypoints were marked complete with depth measurements. Using the instrumentation raft anchor ropes as linear guides, about 18 transects were made with denser concentration on the northern portion. One circumnavigation of the pit lake near shore was made. All data was supplied to Fred van Delft van Delft of Quest Engineering for the creation of the bathymetric map. The following steps were then to develop the bathymetric map and cross sections herein:

- First all data was digitized and a set of coordinates were sent to Fred van Delft van Delft who then formatted the data into a coordinated elevations file, based on the surveyed elevation of the Grum Pit Lake around the time of the bathymetric survey;
- Next an attempt was made to model the data in Terramodel Software;
- LES then reviewed snapshots of this first product and recommended changes;
- A CAD base map was obtained through Deborah Pitt which was in turn based on 2003 surveys of the above water contours of Grum Pit;
- Fred van Delft then shifted the CAD Base datum to match the NAD 83 GPS data datum as recommended by LES;
- Next attempts were made to model the data in Civil 3D software. LES reviewed the snapshots and recommended further edits which were again reviewed;
- Fred van Delft then changed the contour interval to reduce "noise" and sent the resulting snapshots for review. LES recommended smoothing the data and found a few minor errors in transcription;
- Fred van Delft then made further edits to model and changed the contour interval;
- Fred van Delft then attempted smoothing in Terramodel software with mixed results;
- Fred van Delft then tried smoothing in Civil 3D software with mixed results;
- Finally, Fred van Delft was able to smooth the contours using 3D studio Max software which was successful;
- Final adjustments to contouring in were done in Civil 3D;
- Cross sections were plotted using the actual transects (as opposed to artificially generated transects perpendicular to the slope);
- LES review the plan and cross sections and found a few minor errors;
- Minor edits to the model and sections based on review;
- The model was exported to 3D studio Max software for final smoothing;
- The final model was imported to Civil 3D to make the last adjustments to the contour lines;
- The final bathymetric map and cross sections were delivered to LES and forwarded to Deborah Pitt.

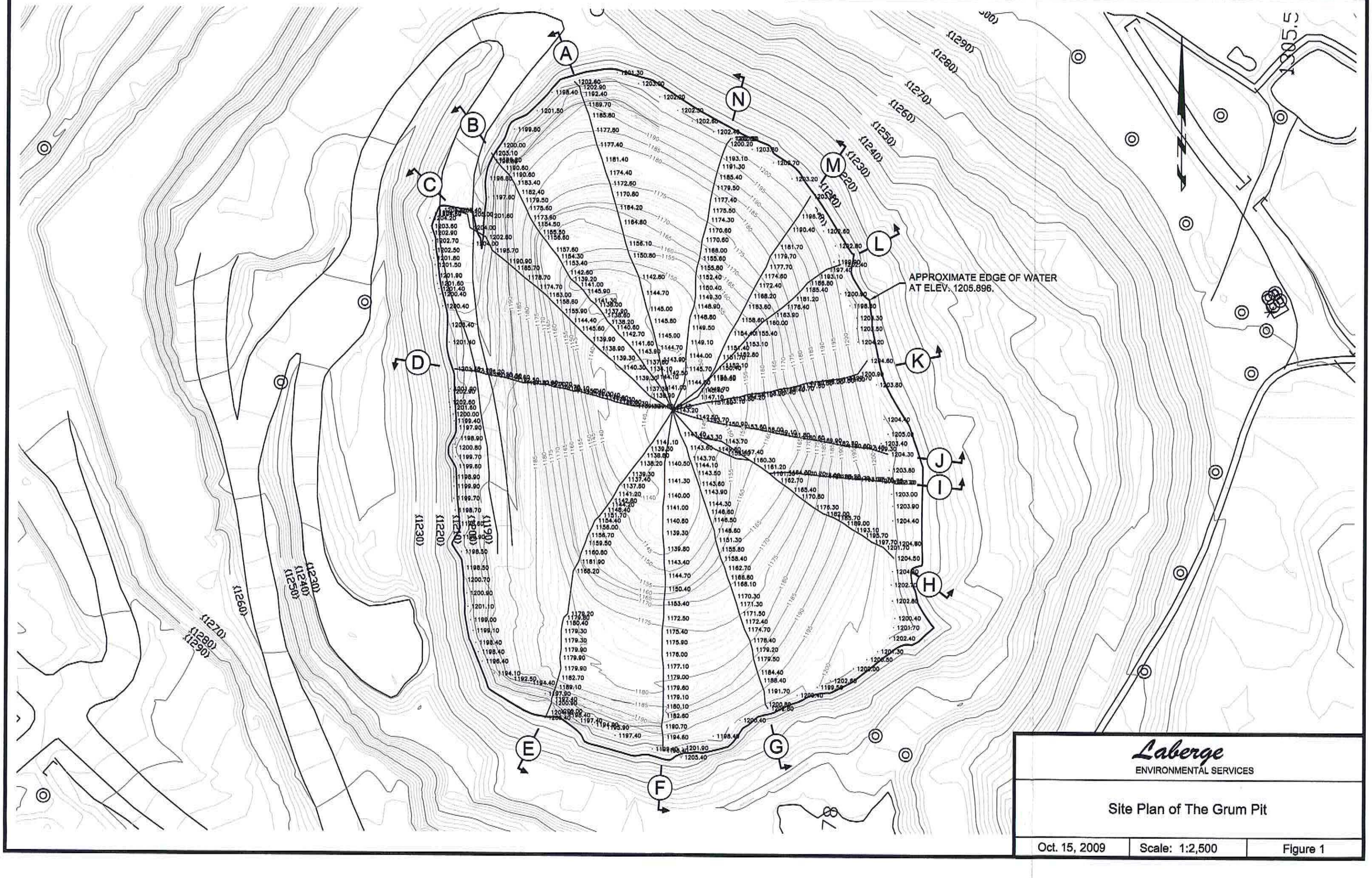
3.0 LIMITATIONS AND RECOMMENDED FURTHER WORK

The data and products contained herein should be considered preliminary at best. Without the aid of accurate positioning and side-scan sonar it was not possible to achieve a high level of precision and accuracy in this exercise.

It is recommended that a detailed bathymetric survey be conducted in the Grum Pit Lake using appropriate equipment and software. While the till slope is of interest in modeling the behavior of the Grum Pit Lake, it would also be beneficial to characterize the whole pit lake bottom with respect to density and type of material. Such a survey should coincide with sediment sampling and detailed profiling including Dissolved Oxygen and ORP as well as the usual Conductivity, Density and Temperature profile. The objective of such an exercise would be not only to look into the fate of the till slope underwater but to find out whether or not reducing conditions are developing in the pit lake bottom waters.

Respectfully submitted by;

Ken Nordin ACsT, CCEP
Laberge Environmental Services
November, 2009



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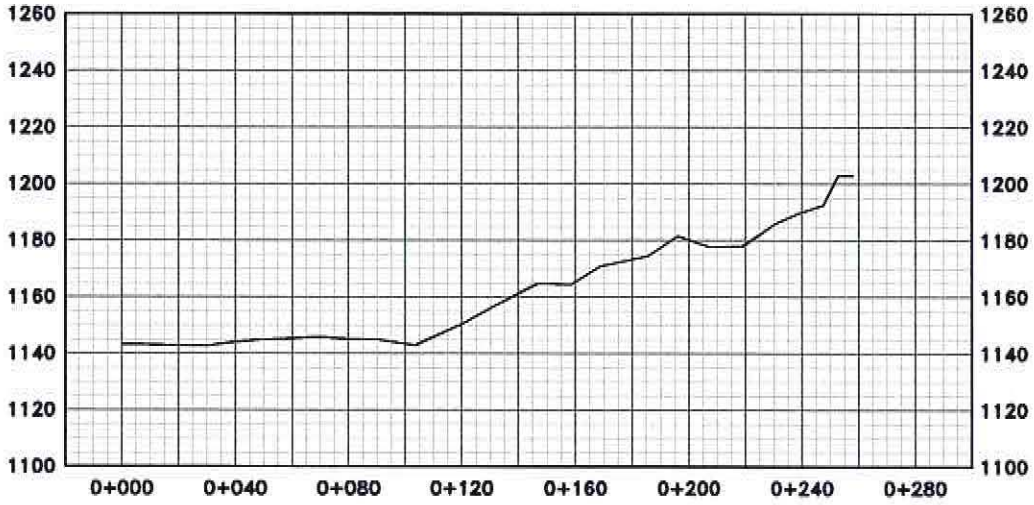
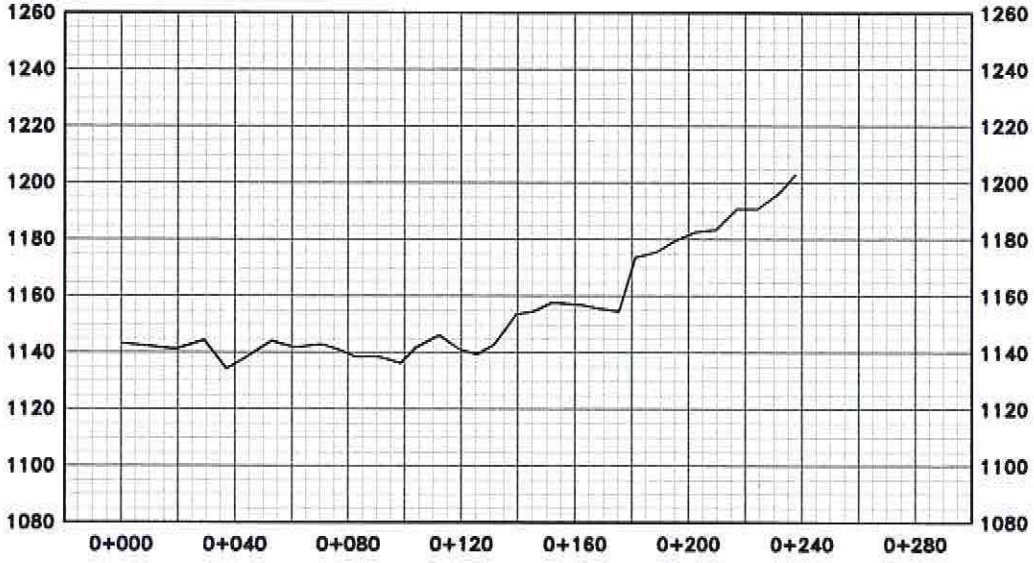
Site Plan of The Grum Pit

Oct. 15, 2009	Scale: 1:2,500	Figure 1

Section A



Section B



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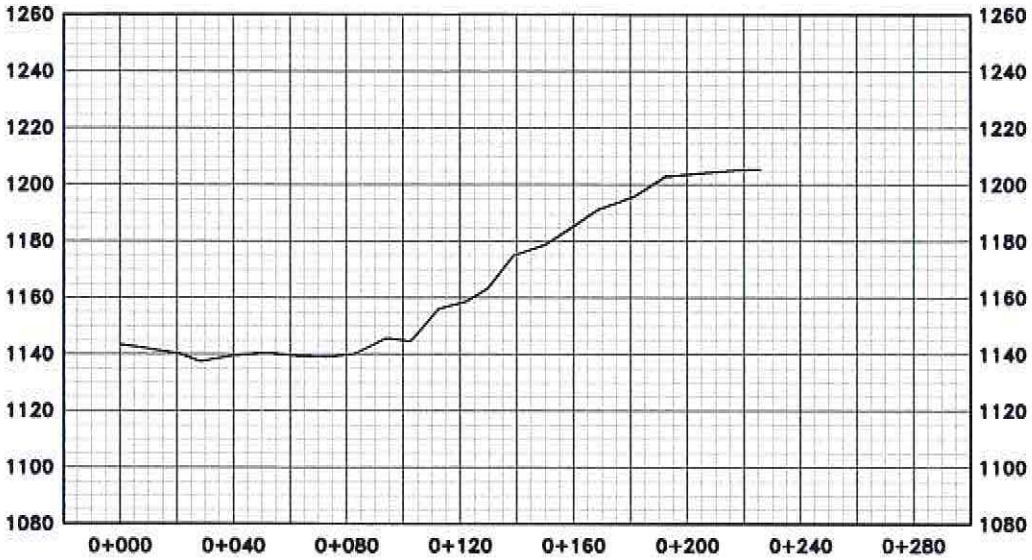
Grum Pit - Sections A & B

Oct. 15, 2009	Scale: H,V 1:2,500	Figure 2

Section C



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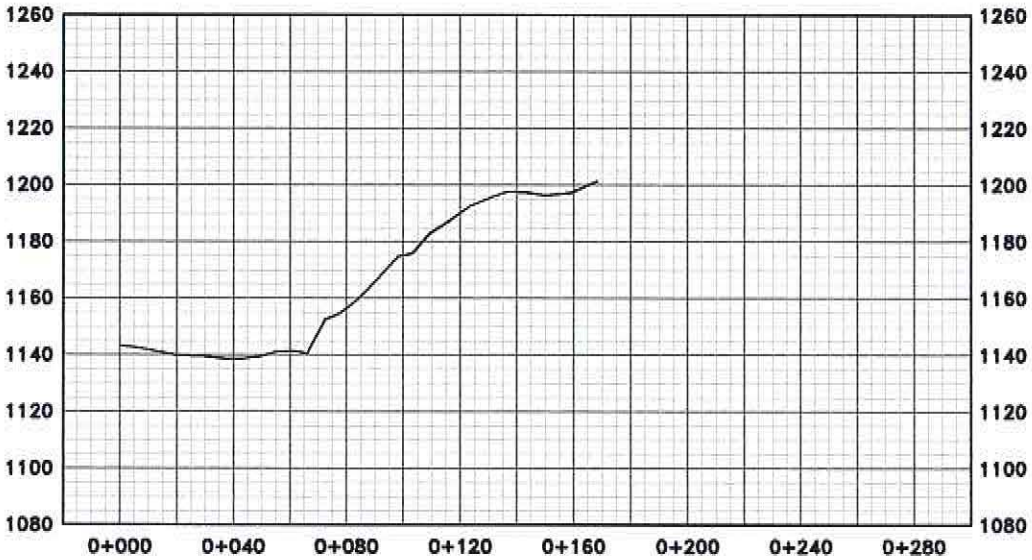

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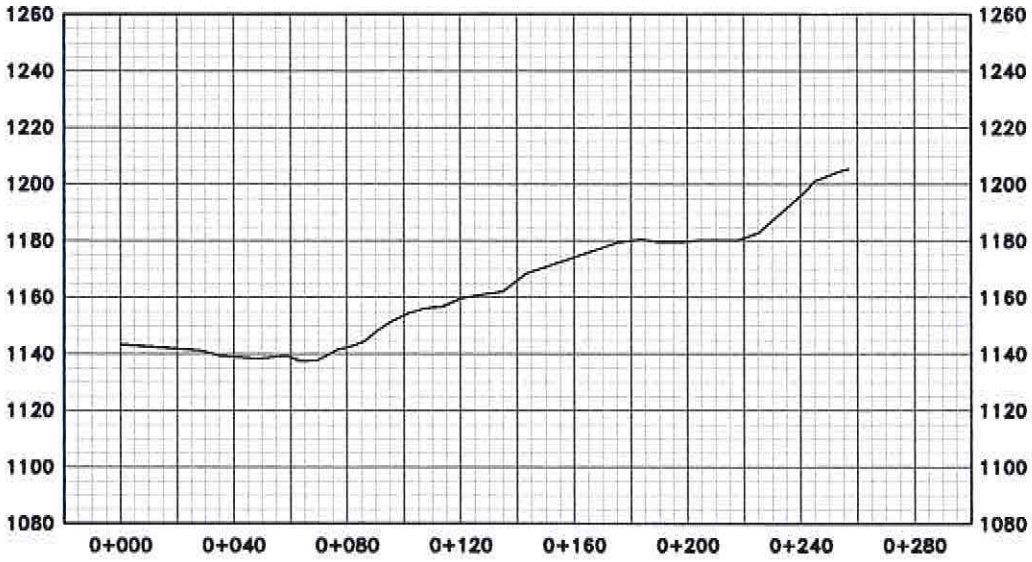
Grum Pit - Sections C & D

Oct. 15, 2009	Scale: H,V 1:2,500	Figure 3

Section E



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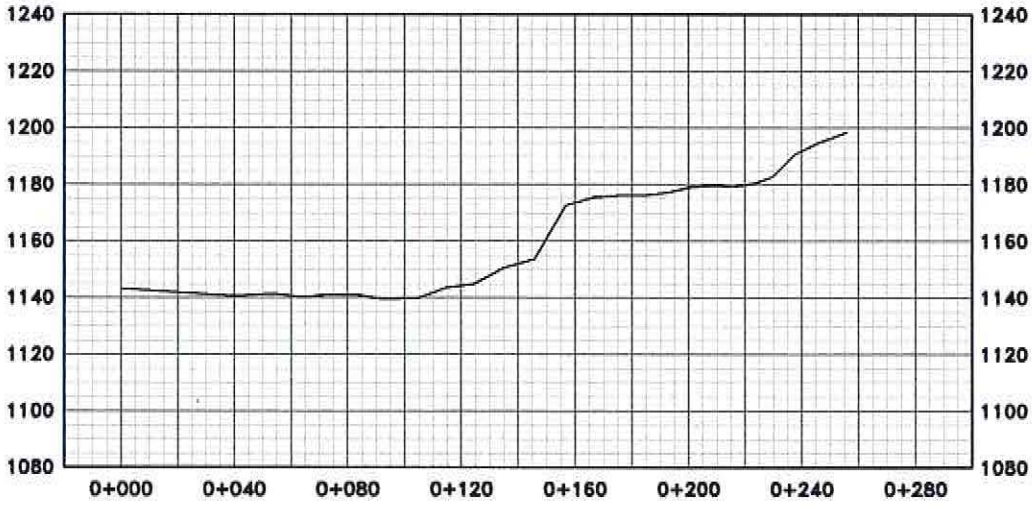

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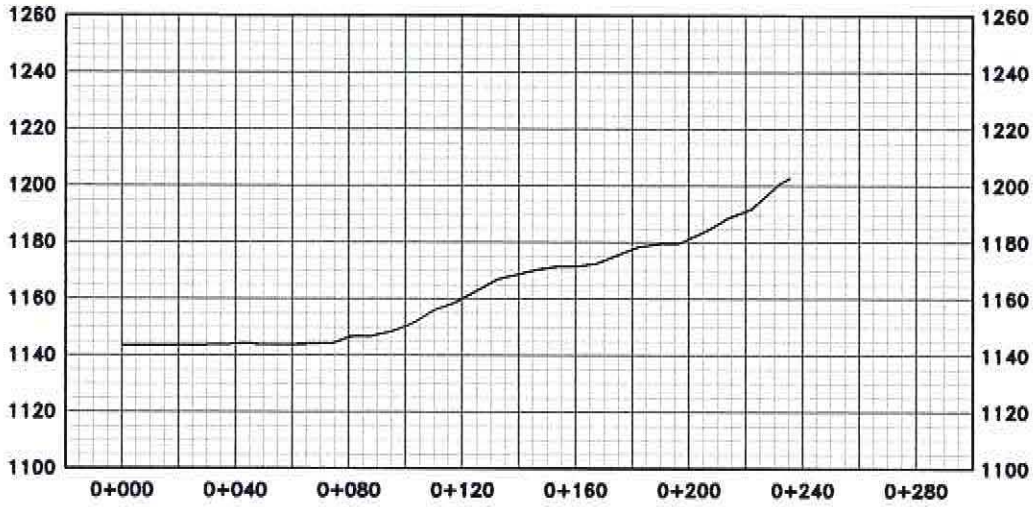
Grum Pit - Sections E & F

Oct. 15, 2009	Scale: H,V 1:2,500	Figure 4

Section G



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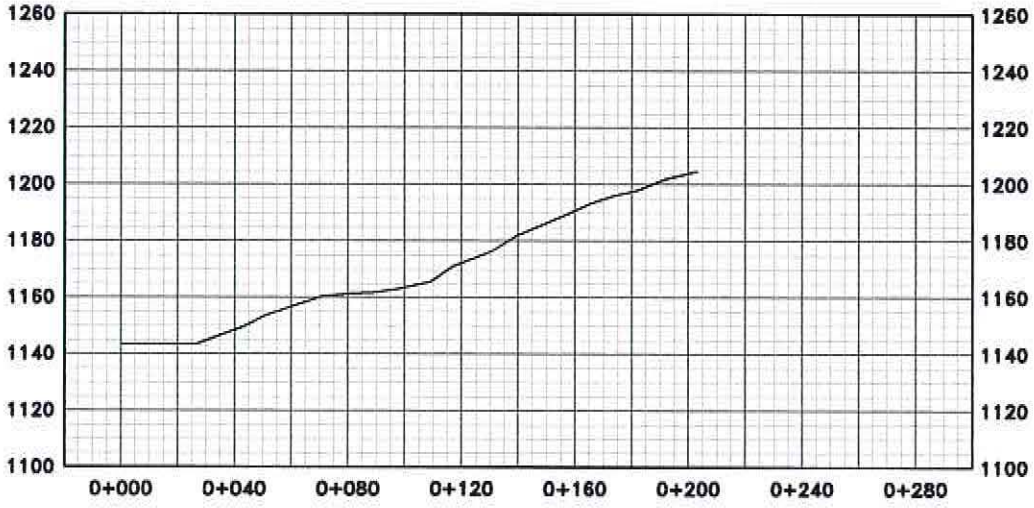

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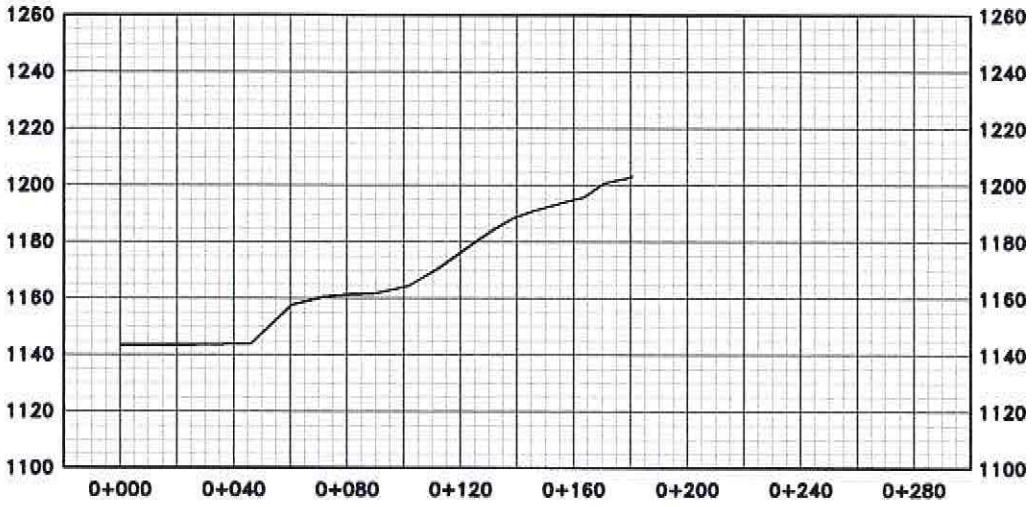
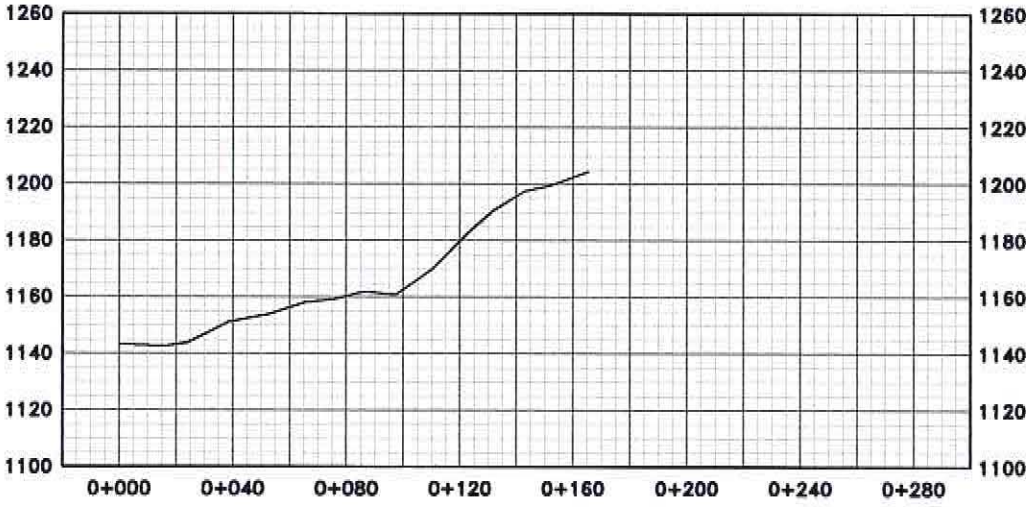
Grum Pit - Sections G & H

Oct. 15, 2009	Scale: H,V 1:2,500	Figure 5

Section I



Section J



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Grum Pit - Sections I & J

Oct. 15, 2009	Scale: H,V 1:2,500	Figure 6