APPENDIX 5

GEOPHYSICS REPORT

GROS CACOUNA LNG TERMINAL

Seismic refraction Survey 2005

Presented to

Journeaux Bedard inc.
1623 cr. Newman
Dorval, QC H9P 2R6

November 2005 **C05890**

FINAL REPORT

SIGMA GEOPHYSICS INC.

1400 Marie-Victorin, suite 200
ST-BRUNO QC J3V 6B9
Téléphone : (450) 441-4600
Fax : (450) 441-3703
email: cp1@geosigma.com

TABLE OF CONTENTS

APPENDIX

1 INTRODUCTION

In October 2005, as requested by **JORNEAUX BÉDARD INC., SIGMA GEOPHYSICS INC.** carried out a seismic refraction survey on the site of a proposed Liquefied Natural Gas (LNG) plant to be located at the Gros Cacouna site, in Gros Cacouna, Quebec

The main objective of the survey was to measure the thickness of the unconsolidated materials overlying the bedrock, in order to determine its topography and geophysical parameters of both bedrock and unconsolidated materials; this was accomplished using the seismic refraction method.

During the investigations, a total of **345 m** of seismic line was surveyed.

The present report deals mainly with the results obtained as well as their analysis. Other topics such as field and interpretation methods, site characteristics, equipment and personnel are also briefly discussed herein.

2 GENERAL REMARKS

2.1 Work schedule

Following a request from Journeaux Bedard inc. received in October 2005, the seismic refraction survey was carried out October 21st 2005.

2.2 Survey location

The work has been done at the Gros Cacouna port. The positions of the lines are shown on the location map in appendix A.

Surveying

The implantation seismic lines have been done by Sigma Geophysics, and positioned with a Garmin hand GPS, using UTM coordinates provided by the client.

2.3 Crew and equipment

Table 1 and table 2 describe the crew and equipment from Sigma Geophysics inc. associated with the data acquisition and interpretation and the report.

TABLE 1 - LIST OF PERSONNEL

NAME	TITLE	DUTY
Claude Provost, eng.	Sr Geophysicist	Interpretation, report
Jonathan Simard	Sr. technician	Operator, party chief
Patrick Lavoie	Sr. Technician	Blaster
Pierre-Luc Larouche	Technician	Helper

TABLE 2 - LIST OF EQUIPMENT

QTY	DESCRIPTION	MODEL	MAKER
1	Seismograph 24 channels	StrataView R24	Geometrics
2	Geophones cables 12 channels		Mark Products
26	Geophones verticals - 14 Hz	L-28	Mark Products
1	High voltage blaster	Sigma	Géophysique Sigma
1	Firing cable – 400 m		Mark Products
1	Communication system		Motorola

2.4 Field Conditions

Generally, the seismic survey has been executed without any particular problems, and the quality of the seismic records was generally good to excellent.

3 METHODOLOGY

The seismic survey has been done using spreads of 24 geophones spaced at 5 meters. For each spread, 7 high velocity explosive charges were detonated at a depth ranging from 0.25 meter to 0.5 meter. During blasting, all the traffic was blocked near the site. The response was excellent and the explosives charges were not larger than 150 g, without any projections.

A vibration monitoring seismograph (Instantel Mini mate Plus) has been installed near the closest building, to monitor the vibrations produced by the seismic activity.

4 RESULTS

This section provides an overview of the results computed from the geophysical data gathered during the seismic refraction survey. The cross-section of the lines, presented on a single drawing (DWG nº 05890-01), will be found in Appendix A of this report. This drawing also includes a location map showing the actual position of the survey line.

4.1 Presentation format

Seismic sections

The actual seismic results are presented in the form of a cross-section drawn at a horizontal scale of 1:1,000 and a vertical scale of 1:500.

On a seismic refraction cross-section, the computed elevations of the various refracting horizons, including the natural surface and the bedrock, are plotted against the horizontal position of the measurements. For each of the layers delimited by these refracting horizons, the velocity of propagation of the compressional waves travelling in the layer is also indicated.

Normally, the deepest refractor represents the top of the bedrock and the velocities plotted just below this line represent the velocities measured at the boundary between the overburden and the bedrock. To reflect this situation, the bottom refractor on the drawing is hatched with a typical rock symbol.

4.2 Accuracy of the results

The typical accuracy of the computed depth for a refraction survey is generally of 1.5 m for depths less than 15 meters and 15 % for depths greater than 15 meters.

However, some geological conditions may decrease the expected theoretical accuracy of the seismic refraction method. The error could be greater in the following cases:

- occurrence of faults or deep valleys
- abrupt change in the topography of one layer
- velocity inversion created by a frozen layer
- hidden layer

4.3 Results analysis

Along all the seismic lines, the bedrock is very close from the surface and depth to the bedrock is typically below 2 metres (with a precision of plus or minus 1.5 m). The overburden in mainly made of sand and gravel, or by blasting debris and/or very fractured and broken bedrock resulting from the previous blasting operations.

Rock quality

The velocities measured at the overburden-bedrock boundary ranges from 4700 m/sec to 5400 m/s and no low velocity zones have been observed, thus indicating that no major faults and/or shear zones intercept the bedrock surface in the area covered by the seismic survey and that the rock quality at the surface of the rock varies from very good to excellent.

However, we have to keep in mind that the depth of investigation of seismic refraction is limited to the interface between the bedrock and the overburden. If there is some fracturing at depth, it will be detected only if it reflects at the surface of the bedrock.

5 CONCLUSION

The seismic refraction survey carried out in October 2005 on the site of the proposed Liquefied Natural Gas Plant in Gros Cacouna, Quebec, has allowed for the determination of the thickness of the sediment layer, rock topography and the quality of the rock mass.

The following points can be highlighted:

- No major fault and/or shear zone intercepts the bedrock surface in the area covered by the seismic survey. The quality of the rock at the surface varies from very good to excellent.

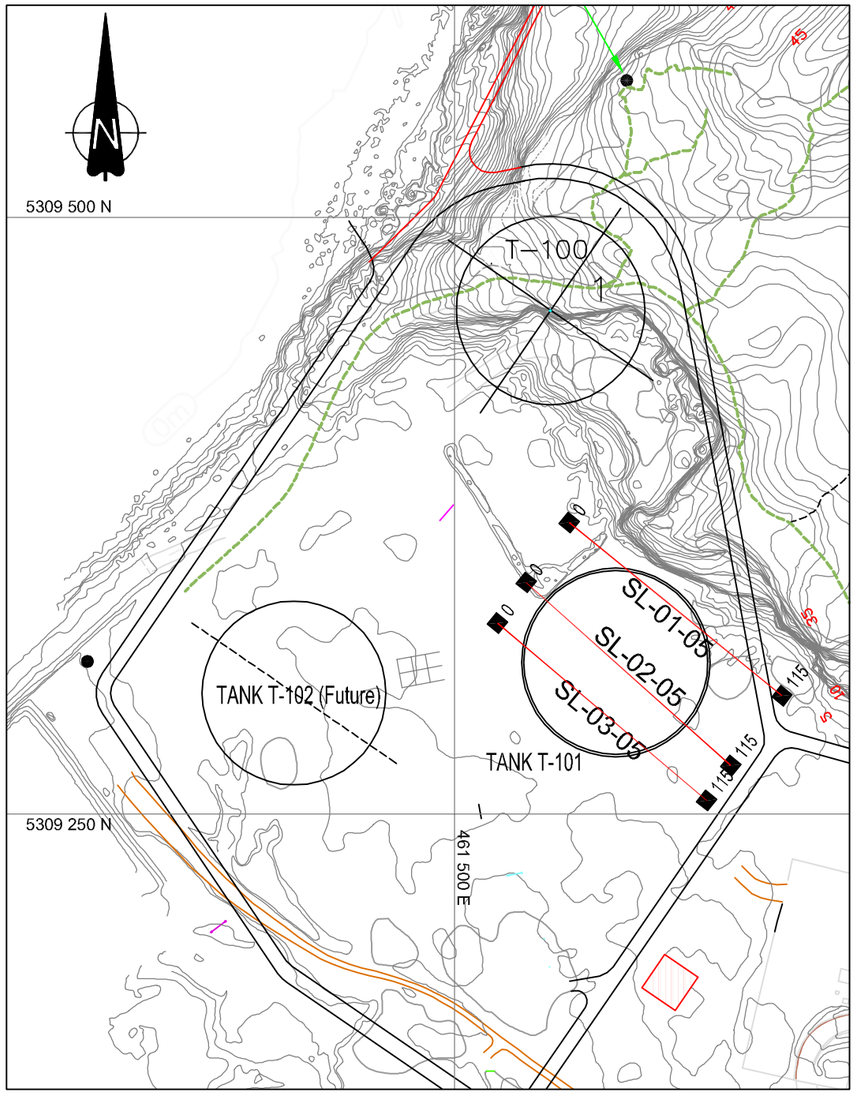
- The overburden is thin (2 meter or less) everywhere.

This report was written by Claude Provost, Eng.

Claude Provost, Eng.
Geophysicist

DRAWING NO 05890-01

LOCATION PLAN 1:2,500



LEGEND

SOUND BEDROCK PROFILE

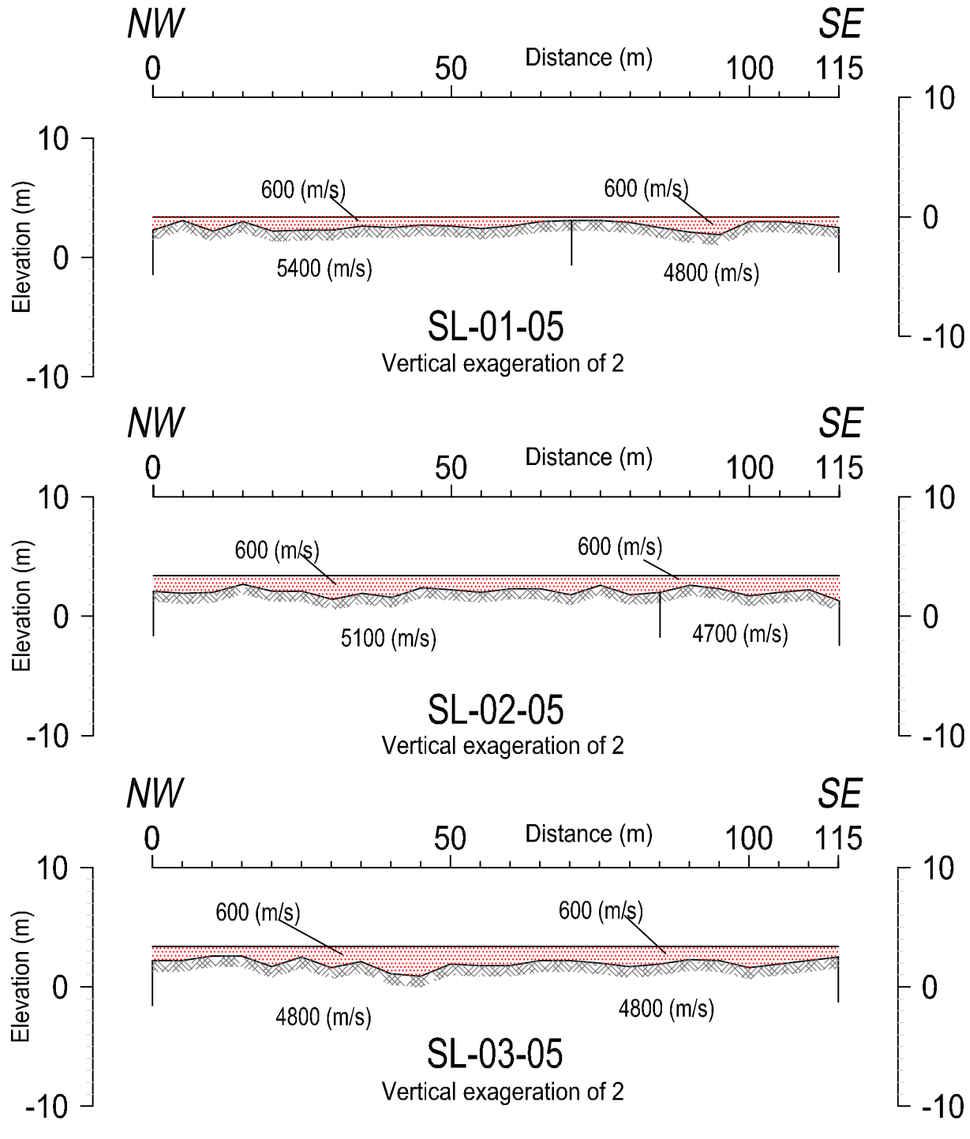
REFRACTOR PROFILE

OVERBURDEN

(Sand, gravel, crushed or very fractured rock)

P WAVE VELOCITY (m/s) 5000

ORIENTATION *SE*



1. The seismic survey has been carried out by Sigma Geophysics inc. in Oct 2005.
2. A constant elevation of 3.4 m has been assigned to the ground elevation.
3. The lines have been positionned with a hand GPS, for a precision of around 3 metres, and are referenced to the UTM grid zone 19 T, NAD 83.

INGÉNIEUR Claude Provost 35476 QUÉBEC

SCALE

Units: metres

10 0 10 20 30 40 HOR: 1:1000

5 0 5 10 15 20 VER: 1:500

SIGMA GÉOPHYSIQUE SIGMA INC.

1400, Boul. Marie-Victorin, suite 200
Saint-Bruno, QC J3V 6B9
Telephone : (450) 441-4600 Fax : (450) 441-3703

DRAWING: C.P. VERIFIED: C. Provost, eng.

DESIGNED: C. Provost, eng. APPROVED: C. Provost, eng.

ÉNERGIE cacouna ENERGY

SEISMIC REFRACTION SURVEY 2005

Seismic sections and location

DATE: Nov 22 2005 Drawing: 05890-01