


DIAVIK MINE – DIKE A418

NORTHWEST TERRITORIES, CANADA



Owner:	Diavik Diamond Mines, Inc. - DDMI
General Contractor:	Lac De Gras (Kiewit)
Engineer:	N.K.S.L.
Specialty Contractor:	TREVI Foundations Canada

TREVI Foundations Canada, Inc.



INTRODUCTION

Diavik Diamond Mine is located in the North West Territories of Canada, approximately 1,300 miles south of the North Pole. The A-418 Dike was built as part of the planned mine expansion. The water tightness of the dike was affected by the installation of a cutoff composed of plastic concrete cutoff wall, jet grouting and pressure grouting. The Jet Grouting, performed by Trevi Foundations Canada, was installed to seal the base of the cutoff wall to the pressure grouted rock, making the dike watertight for the open pit excavation.

MAIN FEATURES

The Jet Grouting contract value was \$14 million Canadian Dollars and the work consisted in the installation of a single line cutoff wall for a total of 1,169 columns with depth exceeding 135 ft. Prior to carrying out any work, a series of tests were conducted to determine the characteristics and parameters to be used for jetting. The first phase of the work was performed during the winter months with temperatures reaching the -50 degrees Celsius (-58 Fahrenheit). Work was conducted inside heated domes for both the drilling and mixing operations. The second phase of the work was carried out during the summer months, after the installation of the plastic concrete diaphragm wall and grout curtain by others. The work was completed on schedule in approximately 7 months. The equipment used, manufactured by SOILMEC, was customized for use in the demanding conditions imposed by the site.



JET GROUTING OPERATIONS



WINTER WORK IN TENT



JET GROUTING DETAIL

Jet Grout Statistics

No. of columns	1,169
Total drill length	24,100 m
Total jetted area	4,970 m ²

Equipment Used

- 2 – R-312-MP drill rigs
- 1 – SM-405 drill rig
- 1 – PSM-980G drill rig
- 6 – 7T-450 high pressure pumps
- 2 – GM-25 grout mixing units
- 1 – GM-14 grout mixing unit

(SOILMEC equipment)



CORING RIG

All work performed met the most rigorous safety and quality standards imposed by the unique project. To ensure the required quality, each column installed was checked for verticality using the Boretrak Deviation System. The verticality of each column was plotted and, if required, the nominal diameter of the closure column was increased to provide a fully overlapping wall, based on software developed by TREVI. In addition, core samples were obtained every 50 meters for verification purposes.

The final dewatering was carried out by LDG at lower rates than anticipated, proving the successful completion of the Jet Grouting cutoff.