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GEOCON

Applied Soil Mechanics
Foundations
Offshore Geotechnics
Geotechnical Processes
Earthworks

APR 9 1981

April 1st, 1981

Falconbridge Nickel Mines Limited
P.O. Box 40
Commerce Court West
Toronto, Ontario
M5L 1B4

Attention: Mr. P.J. Raleigh, P.Eng.
Chief Engineer

Re: Mine Backfill Sampling Programme
Giant Yellowknife Mines Limited
Yellowknife, N.W.T.

Dear Sirs:

Further to the meeting between the writer and Mr. P.J. Raleigh, P.Eng. on February 3rd, 1981 and to the letter of February 17th, 1981 from our Mr. M.A.J. Matich, P.Eng. to yourselves, we are pleased to enclose herewith our proposal for provision of requisite drilling, sampling and engineering supervisory services for the above referenced work. It is understood that arsenic bearing dust is currently stored as backfill in stopes located at the 100 foot and 250 foot levels of the Giant Yellowknife Mine. Further, that this waste material has an estimated mean grade of in the region of 0.5 ounces gold per ton in many areas. In view of the relatively high grade of gold, it is understood that Giant Yellowknife Mines is contemplating conducting a drilling and sampling programme into selected stopes for purposes of obtaining representative samples for the full depth of stored material to determine whether recovery and re-milling of the tails would prove to be economical. Further, that Giant Yellowknife Mines wishes to mine the crown pillar in certain areas requiring the removal of the above arsenic bearing dust from a number of the stopes.

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It is understood that the stope storage areas were prepared by construction of concrete bulkheads at draw points into haulage drifts or at the entrances of specially constructed caverns for dust storage. The dust was pumped through pipelines and blown into the stopes, which are located within the continuous permafrost zone, in a dry condition. Information on the condition and state of the material in storage is not available at this time. While groundwater and ice may be present in the material, it is anticipated that the dust is still, at least, partly dry. It is anticipated that Giant Yellowknife Mines is currently considering drilling 12 boreholes from surface through overburden and the crown pillar into the stored dust in Stopes B2-30ST, 33, 34, 35, B2-08, 2-12, 2-13 and 2-14 and that confined samples and, if possible, bulk samples are to be recovered for assay and strength determination purposes respectively from these holes. It is understood from discussions with Mr. Raleigh that a number of holes would be collared on exposed bedrock and that up to 60 feet of overburden may be anticipated at several locations. Further, that a typical crown pillar thickness of 120 feet would be anticipated and that a stope height of from 120 to 140 feet would be encountered. Access to boreholes intersecting all storage stopes would be made in the immediate vicinity of the Mine Yard area.

The writer met with Mr. A. Wallendorf of S.D.S. Drilling Ltd. in Calgary on February 13th, 1981 to discuss the requirements of the programme in terms of drilling through the crown pillar into the stope itself as well as for the recovery of bulk samples. S.D.S. propose to provide a truck-mounted Seismic 1700 rotary drill complete with all equipment necessary for drilling through overburden and rock and for sampling within the stored arsenic bearing dust. Where overburden is encountered, drilling would commence with the use of an 8-5/8 inch diameter tricone bit and mud for borehole support to advance a hole to allow for setting of 7 inch diameter casing into bedrock. Following setting of casing, a 6 inch diameter hole would be drilled through the crown pillar with the use of a Mission 4015

downhole hammer bit using air extraction for clearing of cuttings. It is understood that cuttings recovered during drilling through the crown pillar would be retained for assay purposes by the Mine. The backfill dust would be sampled using 5-1/2 inch O.D. CSR duo-tube reverse circulation pipe for the recovery of bulk samples. A number of different CSR bit configurations would be provided to allow for optimum recovery of the material as encountered in-situ.

Soil mechanics tests are to be carried out on a number of samples recovered from within the storage stopes. In each of the boreholes, 3 or 4 samples would be recovered utilizing thin-walled steel tube samplers or split spoon samplers which can pass through the CSR pipe inner tube I.D. of 3-1/4 inches. We would propose that the following tests be carried out for determination of in-place condition and strength:

- moisture content
- in-place density
- in-place temperature
- Atterberg Limits (liquid and plastic)
- grain size analysis
- specific gravity
- unconfined compression

The samplers provided would be deployed from AW rod specially provided for the work. All other sampled material would be turned over to the Mine.

We would propose that the bulk samples would be collected with the use of a "super sucker" vacuum truck available through the Mine on site. The outflow line from the CSR pipe would be fed to the input point on the vacuum truck which we understand is equipped with a special filter to contain the arsenic dust avoiding the possibility of contamination by free flying dust.

The proposed programme is tentatively to consist of drilling 12 boreholes into the storage stopes. We have assumed, for purposes of this proposal, that 6 boreholes would be drilled through overburden of up to 60 feet in thickness and that all holes would be taken down through

a 120 foot thick crown pillar. Further, that approximately 100 feet of stored arsenic bearing dust would be sampled in each hole. We would estimate that the drilling of overburden and setting of casing would take of the order of 1 day per hole, that 1 day each would be required to drill bedrock and sample backfill and that 1/2 day would be required to move between each borehole location for a total programme duration of approximately 36 days.

The following rates were quoted by S.D.S. Drilling for provision of drilling and sampling services:

Mobilization	\$4.00 per mile
Productive drilling rate	160.00 per hour
Standby drilling rate	140.00 per hour
Fuel consumption (estimated)	75.00 per day
Consumables in overburden and bedrock	3.00 per foot
Site transport	50.00 per hour
Living expenses	54.00 per day plus room
Provision of field supervision and laboratory services by Geocon would be as per the attached Schedule of Rates for Engineering Services to the extent necessary for completion of work in the field.	

Our estimate for completion of drilling and sampling work and for provision of a report outlining progress in the field and laboratory testing work is as follows:

Drilling Services

Mobilization/demobilization of drill rig and crew	\$9,600.00
Drilling Services 36 12-hour days @ \$160/hr.	69,120.00
Living expenses and travel (if not provided by Giant Yellowknife Mines Limited)	9,000.00
Consumables 1800 ft. @ \$3.00/ft.	<u>5,400.00</u>
Subtotal	\$93,120.00

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Engineering Supervision and Testing

Mobilization/demobilization of personnel	\$2,000.00
On site supervision	11,750.00
Living expenses (where not provided by Giant Yellowknife Mines Limited)	4,000.00
Laboratory testing (estimated at \$500/hole)	6,000.00
Consumables (Shelby tubes etc.)	1,000.00
Provision of engineering report	<u>3,000.00</u>
Subtotal	\$27,750.00
Estimated Total	<u>\$120,000.00</u>

As discussed, preparations would be made to commence work after April 15th, 1981. S.D.S. has indicated that access to the site from Calgary may be complicated by road bans but the effect of this on the programme cannot be fully determined at this time. Work in the field would be carried out under the overall supervision of the writer who would be present on site for the drilling work at the first location. On site supervision for the duration of the work would be provided by an experienced Geotechnical or Geological Engineer who would be present on the site at all times.

We trust that the enclosed is suitable for your current purposes and look forward to the possibility of being of service to you on this interesting programme. Should you have any questions regarding the above, please do not hesitate to contact us at any time.

Yours very truly,

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R. B. German/Bg.

R.B. German, P.Eng.,
Manager Field Services Division

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Encl:

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