
TURNAGAIN NICKEL - ~~COBALT~~ -
~~COPPER~~ - ~~PGM~~ PROJECT
REPORT

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EXECUTIVE SUMMARY

Since 1996, Canadian Metals Exploration Limited of Vancouver ("CME") has carried out exploration programs on their Turnagain Nickel - Cobalt - Copper- PGM Project, located approximately 68 km. east of Dease Lake, or 1350 km north of Vancouver, British Columbia. This property was optioned by CME (formerly Bren-Mar Resources Limited) in 1996 and is now 100% owned. Exploration programs have consisted of a fixed wing aeromagnetic survey, drill hole pulse electro-magnetic geophysical survey in four diamond drill holes, an induced polarization survey covering approximately 50% of the property and diamond drilling totaling. Diamond drilling during the 1996, 1997, 1998 and 2002 programs have resulted in 26 holes drilled totaling 5,598 metres (16,790 feet). These drill holes were designed to test widely separated areas for nickel, copper, cobalt and platinum - palladium mineralization.

Exploration programs dating as far back as the early 1960s had identified anomalous nickel values from prospecting and diamond drilling. This area was the focus of exploration by Falconbridge Nickel Mines from 1969 to 1973 resulting in 53 holes drilled totaling approximately 2886 metres (9,524 feet). Several mineralized areas were discovered and prospected by trenching and diamond drilling. Sulphide mineralization was encountered in most of the holes. The exploration model at that time was a massive nickel-cobalt-copper sulphide target.

Geologically, the Turnagain Property is an ^{Alaskan} alpine ultramafic complex of late Triassic age approximately 8 km in length and up to 3 km in width. It intrudes and is in fault contact with upper Palaeozoic and Triassic meta-volcanic and meta-sedimentary rocks of the Cache Creek Group. Mineralization as defined at present is best associated with the olivine pyroxenite and pyroxenite rock phases of the complex. A recent (1997) study by Dr.G.T.Nixon from the British Columbia Geological Survey reports "the Turnagain ultramafic complex hosts one of the few magmatic nickel occurrences of economic potential in British Columbia".

The conceptual geological model for exploration of the Turnagain ultramafic is a bulk tonnage, low grade nickel sulphide deposit. There are nickel, cobalt, copper and PGM (platinum and palladium) values over long intersections in most drill holes. Gold and silver values also occur throughout but are not consistent. Disseminated, net textured, semi-massive and massive sulphides have been intersected in drilling. Nickel grades up to 1.4% over one metre interval have been achieved from drilling and surface sampling over widely spaced areas. The results of drilling, particularly holes 96-2, 97-8, 97-9 and 02-7 confirm the potential to meet the criteria for the geological model of a bulk tonnage- low grade nickel deposit. Drill hole 96-2 provided the initial indication that a bulk tonnage grade nickel deposit might be present returning 142 metres averaging 0.28% Ni and 0.014% Co. This included 10.7 metres of 0.53% Ni and 8 metres of 0.38% Ni. Sulphides have been intersected in drilling up to 300 metres in depth, and together with several sulphide showings indicate the exploration mineralization potential may occur over a strike length of 3.7 kilometers and width of 2 kilometres.

↑ No! Reward

Significant structures (i.e. layering, folding, faulting) have not yet been recognized along which massive sulphide mineralization may be associated. If such structures exist, based on mineralized ultramafic complexes elsewhere, there is the potential to discover massive sulphides. There appears to be an overall high sulphide content in this ultramafic.

Geophysical surveys conducted over the property include airborne helicopter magnetic and electromagnetic and fixed wing magnetic. Ground surveys (induced polarization and magnetometer) and borehole pulse electromagnetic have been carried over approximately 65% of the property. Results to date indicate that potential sulphide mineralization extends over a large part of the property, most of which has not been drill tested.

Preliminary "exploration" metallurgical testing has been conducted at Process Research Associates (Vancouver) and Lakefield Research (Lakefield, Ontario). This test work included flotation and leaching studies. Preliminary flotation results from four separate composites indicate recoveries up to 83% nickel. Further work is ongoing to achieve better recoveries and investigate other mineral processing methods.

The potential for developing a major mine from the Turnagain Property is made even more attractive based upon an infrastructure already in place in close proximity to the project. The property itself is located in a non-mountainous terrain with access possible by either helicopter from Dease Lake or by 4WD truck via a dirt road stretching about 78 kilometres to Dease Lake. An abandoned airstrip is situated adjacent to the Turnagain River on the property and can be recommissioned. Dease Lake, located on a major highway, is a major northern community of approximately 600 residents with daily airplane service. *3x weekly.*

The conceptual geological model and exploration target for the Turnagain Project is the discovery and delineation of a bulk tonnage – low grade (in excess of 250 million tons) grading 0.30% nickel with associated cobalt, copper, platinum and palladium values. The ongoing exploration and pre-feasibility work programmes are designed to determine whether the complex is capable of hosting such a deposit. These programmes are at an early stage and no such determination can be presently made. If such a deposit were found, it would allow for low cost, open pit bulk mining techniques at a mining rate more analogous to the large copper operations than to Canada's traditional underground nickel resources. While there is a lower flotation recovery than most of the copper producers, the historical metal value is worth three to four times more for nickel over copper, thereby making Turnagain an attractive exploration target. New technologies are becoming available that would certainly enhance this project. The objective is to develop the project to become a low cost nickel producer, even in times of over supply and/or low metal prices. It should be noted that this conceptual nickel sulphide model has really no known comparisons in the world, except(?) for the Mt. Keith deposit in Australia. The Turnagain Project is still at the exploration stage and will require a lot more work in order to prove up a resource.

Check

*CL 05
Kendrick
2003*

The Turnagain Nickel Property:

- is essentially under-explored,
- has good access,
- has the potential to be a new type of nickel sulphide discovery in a new mineral district,
- occurs in sulphide enriched rocks with two possible mineralizing events,
- contains platinum and palladium throughout the system
- achieved excellent preliminary metallurgy test work
- has indications from drilling, geological mapping and geophysical surveys, that mineralization potential extends for a distance in excess of 3 kms in strike length and
- has the areal extent for a potential bulk tonnage deposit.

A considerable amount of exploration and development work is required to determine whether the Turnagain Property meets the criteria of the conceptual model.

Further work is recommended that would include additional geophysical (induced polarization, magnetometer), geological mapping and additional diamond drilling and metallurgical test work. Recent developments have shown that the Turnagain Property warrants further exploration and a two phase program with Phase I work program of diamond drilling to establish mineralization extents and Phase II to complete the induced polarization survey, geological mapping and metallurgical work. Upon positive results obtained from Phases I and II, a third phase (Phase III) is recommended for a major diamond drill program to delineate a resource and provide enough information for a resource calculation. This program also would also include further metallurgical test work and environmental studies. A budget for Phases I and II would be approximately CDN\$750,00. The extent of these phases will be dependent upon the ability of the company to raise sufficient funding.

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1.0 INTRODUCTION AND TERMS OF REFERENCE

In July, 2002, Dr. Stewart Jackson, President of Canadian Metals Exploration Limited, requested that the author arrange for an induced polarization survey and subsequent diamond drill program to be conducted on the Turnagain Property. Upon completion of the exploration program, the author was also requested to compile and write a report with appropriate recommendations if warranted.

The company (formerly (Bren-Mar Resources Limited) has been exploring the Turnagain Property since 1996 for a bulk tonnage low grade nickel-cobalt-copper-platinum-palladium-silver-gold metal sulphide deposit. Exploration programmes consisting of prospecting, aeromagnetic, ground magnetometer, borehole pulse EM and induced polarization geophysical surveys and drilling have been carried out on the Cub claim group (Turnagain Project) in 1996, 1997, 1998 and 2002. The work was supervised in 1996 by Egil Livgard, P.Eng (Livgard Consultants) and in 1997 and 1998 by Bruce Downing, P.Geo. The work program in 2002 was supervised by Dr. Stewart Jackson with input from B. Downing. The geophysical work conducted in 1998 and 2002 were supervised by Dr. Dennis Woods, P.Eng, Woods Geophysical Consulting Inc, South Surrey, B.C. The drill hole section data was compiled and plotted by Mr. George Sookochoff, GeoComp Graphic Designs Inc, Vancouver.

Preliminary metallurgical test work has been conducted in 1997 and 1998 at Process Research Associates (Vancouver) Lakefield Research (Lakefield, Ontario) and Cominco Engineering Services Limited (CESL), Vancouver. This work was supervised by Frank Wright, PEng (North Vancouver, B.C.) consulting metallurgist to CME. The metallurgical study is under a separate report by Mr. Wright.

This review and recent developments have shown that the Turnagain Property warrants further exploration and a three phase program.

2.0 PROPERTY DESCRIPTION AND LOCATION

The Turnagain property occurs approximately 1350 km north of Vancouver. It is located in the Liard Mining Division, approximately 78 kilometres east of the town of Dease Lake, British Columbia, at latitude 58°20' north and longitude 128°58' west on map sheet 104I/7W, Figure 1. The Minfile numbers covering the property are 104I/014, 038, 051, 117, 118, 119 and 120. The property area is covered by airphoto BC5429 no. 098. The regional and property areas are shown in a satellite derived thematic mapper landsat 4, path 54 row 19, July 17, 1986) scene, Figure 3. The data has been rectified from 1:50,000 topographic map using NAD 83. The data has been corrected for atmospheric haze and an edge enhancement filter applied in order to sharpen the pixel edges for better definition. Data acquisition, enhancement and plotting were carried out by Dr. G.Tomlins, Pacific Geomatics, Surrey.

Change X
Min file Ref. Map
M 104I046

23 me's
6 4-post (102 units)
17 2-post claims.

119 me units
2975 ha.

The property consists of 23 contiguous claims totaling 119 units. The claims are 100% owned by CME, subject to an option agreement with J. Schussler (Surrey, BC) and E. Hatzl (Watson Lake, Yukon). The claims are listed in Table 1 and shown in Figure 2. Property data is shown on Map 1 (see map pocket).

There are no known environmental liabilities arising from previous exploration. During the 2002 programs, there was minimal disturbance to the immediate surroundings as access to drill holes was either by helicopter or existing roads. Reclamation work included drill site cleanup, filling the drill sumps and seeding over drill sites. All reclamation work to date has been accepted by the district manager in Smithers. No environmental base sampling was conducted. There were no encounters with wildlife during the drilling programs. There are no known shafts or adits on the property.

To date, exploration permits have been obtained and are in good standing.

3.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE and PHYSIOGRAPHY

Access to the property is obtained by either helicopter from Dease Lake (15 minute flight) or by 4WD truck via a dirt road stretching about 78 kilometres to Dease Lake. Dease Lake is accessible by road (highway 37) and regular scheduled air service from Vancouver. The "dirt" road is accessible under Special Use Permit #23740. An abandoned 2000 foot airstrip (built by Falconbridge Nickel Mines, 1967) is situated adjacent to the Turnagain River and could provide access to the south portion of the property with minor upgrading. This airstrip is located on a large glacial outwash situated approximately 500 metres north of and 100 metres above the Turnagain River. Logistics are available at Boulder City, a gold placer camp, approximately 15 km east of the property located on the Turnagain River and accessible by road. The travel time from Boulder to the property is approximately 1 ½ hours. A forest fire access road constructed in the 1970's passes through the southern part of the property, along the Turnagain River. Access on the lower parts of the property is by drill roads, while the upper sections and the southeast corner is accessed by helicopter due to absence of drill roads. Two proposed access routes (Northern route and Southern route) were mapped and outlined by Graeme & Murray Consultants Ltd, Victoria as part of the Kutcho Creek Access Road Study (1984). These access routes both begin from highway 37 near Dease Lake and pass to within one kilometer of the western claim boundary of the Turnagain Property.

The area is characterized by a relatively dry climate, with snow averaging one metre and moderate rain precipitation during the year. The topography is not rugged as the elevation ranges from 1,020 m to 1,759 m ASL. Approximately 30% of the property occurs above tree line in alpine-type vegetation of grass and scrub brush. Outcrop in the project area is very limited and scattered, as approximately 80% of the area is covered by glacial material and soil. Most of the property occurs on a south facing slope.

X There is no known apparent land use conflict with the property by parks, wilderness study area or other perceived land use designation by local, provincial or federal governments. The property is outside the western boundary of the Muskwa-Kechika wilderness park. The status of land claims by the First Nations is not known at the time of writing this report. According to the latest boundaries, the Turnagain Property area is within the land claim of the Kaska-Dena First Nations, Lower Post, British Columbia. This area may also be claimed by the Tahltan First Nations, Telegraph Creek, British Columbia, who have had previous positive experience in dealing with mining companies. Tahltan natives are currently employed by Wheaton River Minerals Ltd. at their Golden Bear gold mine near Telegraph Creek. Letters were sent in August, 1998, to Chief Louis Louie, (Iskut band office) and Chief Yvonne Tashoots (Telegraph Creek band office) introducing the company and the Turnagain Project. The present chief of the Tahltan is Mr. Gerry Asp, who lives in Dease Lake. The Tahltan have formed a resource committee who review mining projects within their territory. The Tahltan have also formed the Tahltan Nation Development Corporation which can supply contractors and equipment to interested parties. No such committees or development corporation have been formed by the Kaska-Dena. CME intends to use local personnel as often as practicable in the exploration and development programs.

*Stikine Range - Canadian Alps
naturally dissected into
wide swift-pulled valleys.*

4.0 HISTORY

Prospecting in the 1960's located sulphides on the Turnagain River (Discovery Showing). Claims were staked and work was carried out by Falconbridge Nickel Mines Ltd. which included a helicopter EM (HEM) and magnetic survey conducted by Scintrex for Falconbridge in 1969 (assessment report #2056), ground based magnetometer, VLF and horizontal loop geophysical surveys, soil geochemical sampling, geological mapping (assessment reports #3735 & 4097) and diamond drilling. Drill programmes were conducted in 1966 (ddh TG1 totaling 9.1 metres), 1967 (ddh 1 to 13 totaling 1306.7 metres) and 1970 (ddh 14 to 28 totaling 1456.9 metres & pack sack holes 1 to 11 totaling 122.4 metres). The diamond drilling was not filed as assessment work. According to the personnel who carried out this exploration, all drill holes encountered some sulphide mineralization. These holes were widely scattered over the property. Some of the remaining core is stored at the Boulder City campsite. Samples were analyzed at the Coast Eldridge Laboratories, Vancouver. The drill logs and reports were kindly sent to the author from the Falconbridge exploration office (Winnipeg, Manitoba) in November 1998.

Exploration was conducted in 1986 on behalf of Equinox Resources Ltd. assessing the platinum and palladium potential of the Turnagain complex (assessment report #15994). No further work was done until 1996 when Bren-Mar conducted a drilling program and fixed wing magnetic survey carried out by Questor.

A geographical positioning survey (GPS) was conducted in May 1998 in order to locate and map drill holes, claim posts and other geographical positions using NAD 83. Several old drill holes (1967 and 1970) were also located. This survey was carried out by Mr. George Millen, Watson Lake, Yukon, using a Trimble Geoplore 2 instrument. Data was collected at each

station using a minimum of 180 points and corrected using the Trimble Pathfinder Office software incorporating the base station data obtained from the BC government station at Dease Lake.

5.0 GEOLOGICAL SETTING

5.1 Regional Setting

Geologically, the Turnagain Property is an ultramafic complex of late Triassic age approximately 8 km in length and up to 3 km in width. It intrudes and is in fault contact with upper Palaeozoic and Triassic meta-volcanic and meta-sedimentary rocks of the Cache Creek Group. These rocks are west-ward facing, folded and faulted. The eastern margin of the Turnagain complex is marked by a reverse fault with shear-bands in footwall slates indicating an eastward direction of motion (Nixon, 1998). The wallrocks of the Turnagain complex are black carbonaceous slates and grey graphitic phyllites. The Turnagain Complex has been termed an "alpine" intrusion in past literature which has essentially limited exploration since this interpretation implied very limited (sulphide) mineralization.

The Turnagain is situated between the Kutcho Creek massive sulphide copper-zinc deposit (17 mt @ 1.62% Cu, 2.32% Zn, 29.2 g/t Ag and 0.4 g/t Au) located approximately 55 kms to the southeast and the Eaglehead porphyry copper deposit (inferred 30 mt @ 0.41% Cu, 2.71 g/t Ag, 0.20 g/t Au and 0.010% Mo) located approximately 10 kms to the northwest. Numerous other sulphide prospects occur in the region. The Letain Creek asbestos deposit occurs approximately 15 kms south of the Turnagain Property. This areal association implies a northwesterly linear trend with associated sulphide mineralization and with ultramafics. This may represent a new mineralized district.

5.2 Property Geology

There was no regional or detailed property mapping carried out in the 1996, 1997, 1998 and 2002 exploration programs. Brief reconnaissance mapping and sampling were carried out by Dr. Graham Nixon, B.C. Geological Survey in 1997. A generalized property geology map is shown in Figure 4 and in the attached map.

This area was the focus of a PhD thesis carried out in 1975 by Tam Clark of Queens University, Kingston, Ontario. His thesis included detail mapping, petrographic studies and lithogeochemistry. The Turnagain intrusive is a differentiated complex including dunite, peridotite, olivine pyroxenite, pyroxenite, hornblendite and intruded in places by felsic dykes. A granite plug occupies the central part of the complex. One non-mineralized felsic dyke has been traced from DDH 02-03 to 06 and 07. Sulphide poor dunite occurs topographically at the top of the complex. Primary layering is evident in outcrop with moderate to steep dips. Lithologic layering is difficult to recognize in core, however, plots of magnesium values (ICP analyses) indicate possible micro and macro- accumulations indicative of layering. There is an apparent overall northwest - southeast trend and dipping to the southwest of the intrusive as

indicated from airmagnetics and ground induced polarization surveys. No NW-SE structures have been mapped, however faulting is quite evident from the trend of the Turnagain River. This is essentially northeast-southwest trending and accounts for the offset of the complex south of the river. Minor folding is evident from sulphide layers observed in core. The relative spatial distribution of rock types is not yet clear and layering with its implication for metal concentration/zoning needs further investigation. A unique breccia pipe (?) containing fragments of "reaction rimmed" and foreign granitic rocks was intersected over 53 metres in hole 67-2. It would appear that this breccia is similar to that intersected in 97-9 over two metres. This breccia has not yet been observed in outcrop and its presence has not yet been fully interpreted. A mineralogical examination of one sample by R. Buchan in 1979 identified it as a hornblende-clinopyroxene porphyry and is likely a basic intrusive breccia but with no kimberlitic affinity.

6.0 DEPOSIT TYPE

It should be noted that this is a new conceptual nickel sulphide model with really no world-wide comparisons. Exploration to date which includes widely spaced drill holes, prospecting, geological mapping and ground and airborne geophysics suggest the exploration potential for sulphide mineralization may exist for a distance in excess of five (5) kilometers in strike length, up to two (2) km in width and to date in excess of 600 metres in depth. The conceptual geological model and exploration target for the Turnagain Project is the discovery and delineation of a bulk tonnage – low grade (in excess of 250 million tons) grading 0.30% nickel with associated cobalt, copper, platinum and palladium values. This would allow for low cost, open pit bulk mining techniques at a mining rate more analogous to the large copper operations than to Canada's traditional underground nickel resources.

A considerable amount of exploration work is required in order to determine whether the Turnagain Property meets the criteria of the conceptual model, and until such time as that work has been completed, quantitative comparisons cannot be made.

A possible analogy (deposit model) to the Turnagain complex is the Mt. Keith nickel deposit approximately 400 kms NNW of Kalgoorlie, Western Australia. This is a low grade (270 Mt of 0.6% Ni), characteristically layered disseminated nickel sulphide deposit occurring in a olivine mesocumulate ultramafic complex (Dowling et al). To date no other low grade (less than 0.40% Ni) nickel sulphide deposit is being mined (to the author's knowledge) in the world.

7.0 MINERALIZATION

Numerous sulphide gossan showings have been identified, prospected, sampled (chip and grab samples) and drilled by both Falconbridge and CME. The showings identified and reported as such (by Falconbridge personel) are the Cliff, Discovery, Fishing Rock, Horsetrail, Northwest and Davis 1 and Davis 2 (see Figure 7 for locations). These showings range up to 30 x 30

metres in aerial extents and have not been traced for any distance due to overburden cover. They have not been channel sampled (to the author's knowledge). With subsequent drilling, these showings may prove to be part of one major sulphide zone.

A recent (1997) study by Dr.G.T.Nixon from the British Columbia Geological Survey reports "the Turnagain ultramafic complex hosts one of the few magmatic nickel occurrences of economic potential in British Columbia".

Mineralogical studies have identified pyrrhotite, pentlandite, chalcopyrite, bornite, chromite, ilmenite and magnetite as major sulphides and oxides. Minor sulphides include violarite, vallerite, machinawite, pyrite, marcasite and molybdenite. Troilite was identified by SEM at the Canmet Lab, Ottawa in three samples from hole 97-4 submitted by Dr.G.Nixon. (pers. comm., 1998). No platinum-palladium minerals have been identified, to date. The Turnagain ultramafic is anomalous in nickel as every drill hole (assayed to date) intersected sulphide mineralization with nickel values. Mineralization as defined at present is best associated with the olivine pyroxenite and pyroxenite rock phases of the complex and appears to be of two types:

1. Primary disseminated sulphides as discrete grains, cumulates and net textured, and
2. Secondary remobilized and/or sulphide phase associated with some major structure(s). Sulphides (pn and po with scattered cpy) has been observed to occur on fracture and slip planes as a smeared texture. Semi-massive sulphides occur in this category as anastomizing texture, splashes to clots and wisps. Thin massive sulphide bands up to one centimeter in width appear to be layers as observed from their sharp contacts parallel to other cumulate bedding. Other massive sulphide forms are veins up to two centimeters across. Stringer style mineralization was intersected over 20 metres in hole 98-1 (Horsetrail Zone).

Other observations relating to mineralization are as follows:.

- Graphite is associated with sulphides in places, such as that intersected in holes 97-6 and 7. These graphite intersections can occur up to ten centimeters in length. Graphite also occurs in shears and on slip planes.
- The sulphide content (pyrrhotite and pyrite) in sediments is quite noticeable, ranging from trace to three percent. Several samples were analyzed for gold and returned a few values up to 0.1 gram/ton over one metre (DDH 97-1), however the majority are generally less than detection level.
- Alteration of the ultramafic, consisting of silicification, epidote, K-feldspar and bleaching, is quite evident in drill holes 97-6,7,8 and 9. Most of the felsic dykes noted in drill core are weakly to strongly altered. In places, an apple green mineral (mariposite/fuchsite) and chalcopyrite as disseminated to coatings on fracture surfaces are evident in alteration rims to some of the dykes.

- Serpentinization varies widely from weak to strong, the latter associated with the pyroxenite and peridotite. Magnetite veins may occur as stockwork to scattered. Talc and serpentine coated fractures occur infrequently. In the strongly serpentinized rock, the matrix may be weak to strongly talcose. Fine grained sulphides may occur in the magnetite veins.
- An 18 inch molybenite section in a quartz vein has been reported from previous drilling by Falconbridge in the Northwest Zone (pers. communication. John Schussler). Scattered specks of molybenite are observed in narrow quartz veins in the sediments from ddh 97-1. The ICP analyses confirm the Mo values, as well as indicate anomalous values in other drill holes which do not contain quartz veins but are moderately to strongly hydrothermally altered.
- Alteration, serpentinization and quartz-moly veins indicate that hydrothermal activity took place and may be responsible for the redistribution and enrichment of copper and platinum group elements. This same activity may also be responsible for, or in conjunction with, a secondary sulphide phase that resulted in semi-massive to massive sulphide mineralization.
- Plots of chrome (ICP) values along drill holes indicate possible zonation/layering. No chromium-bearing mineral has been identified to date.
- Several gossanous sulphide showings have been prospected and sampled. Results from surface prospecting and sampling are shown in Table 2. Some of these showings have been subsequently drilled.
- No evidence of a laterite cap has been located and given the present climate conditions and past glacial history, probably does not occur.
- Significant structures (i.e. layering, folding, faulting) have not yet been recognized along which primary, secondary sulphide mineralization and hydrothermal activity are associated. If such structures exist, based on mineralized ultramafic complexes elsewhere, there is the potential to discover massive sulphides. There appears to be an overall high sulphide content in this ultramafic.

7.1 Nickel

Results from the drill programs indicate that there appear to be several mineralized "horizons or zones" ranging in width from a few meters to several tens of meters with nickel grades ranging from 0.20% up to 1.5%. However, the majority of nickel grades range from 0.20 to 0.50%. There are scattered one-half to one metre intervals of 0.75 to 1.5% nickel within the lower grade sections. Nickel vs depth plots of drill holes indicate zones of nickel mineralization may occur within a single drill hole. The exact orientation and structure of these zones are not known at present, however there appears to be an overall southwesterly dip to the mineralization.

Drill hole cross sections, Figure 8, of nickel and platinum+palladium histograms show the distribution of values (see Appendix F for the section plots).

7.2 Copper

Chalcopyrite occurs as occasional discrete grain in most places, however chalcopyrite enrichment has been intersected in DDH 02-07 and observed at the Discovery Zone (1.6% Cu). Copper values range from 90 to 3700 ppm in drill core, with the majority being less than 500 ppm. There also appears to be some chalcopyrite enrichment at and near the sediment contact and associated with the more hornblende rich rocks.

Specks of native copper were observed as grains and in fractures in DDH 02-01 over five metres. There is no apparent alteration zone associated with this native copper.

7.3 Cobalt

Cobalt values are generally low with the majority being less than 250 ppm. There appears to be no Ni – Co relationship, as indicated from Ni vs Co plots. Cobalt vs depth plots also shows some indication of zoning but not necessarily coinciding with the nickel-rich zones. No cobalt bearing minerals have been identified and it probably occurs in both pentlandite and pyrrhotite.

7.4 Platinum and Palladium

Platinum and palladium exploration was the focus of two previous programs, one by Equinox Resources, Vancouver, in 1986 and the other by Dr.G.Nixon, GSBC, in 1989. Both platinum and palladium values occur throughout the area, however both studies indicate that the higher values of Pt and Pd occur at the Cliff Zone (this is also indicated from the recent PGM analyses). These elements were not analyzed in past drill programs, however in the 2002 drill program they were analyzed. With very encouraging results, pulps were retrieved for the 1997 and 98 drill programs and analyzed for Au, Pt and Pd. Most of the 1996 pulps have not been found.

Platinum and palladium values (reported as parts per billion – ppb) occur throughout all the drill holes analyzed and that they are generally equal in value in most places though in some areas, Pd values are higher than Pt. There appears to be no Ni – Pt+Pd relationship as indicated from Ni vs Pt+Pd plots. Pt+Pd vs depth plots also show some indication of zoning but not necessarily coinciding with the nickel-rich zones. This implies that there are PGM enriched areas with low nickel values which may result from secondary enrichment of sulphides and/or influence of platinum minerals. The relationship of chrome and PGM is not clear at present, however from plots of values along drill holes there is no apparent correlation. Platinum+palladium values plotted along drill holes are presented in Appendix F.

It is important to note that both platinum and palladium (as well as silver and gold) report to the sulphide concentrate (Frank Wright, 2001).

7.5 Silver

Silver content ranges from detection level (0.3 ppm) up to 4 grams, with the majority being less than 2 ppm. Silver appears to be associated with some hydrothermal activity and/or secondary sulphide mineralization phase and not the primary sulphides.

7.6 Gold

Gold values are generally very low (less than 20 ppb) with the occasional high value (320 ppb). There is no evidence yet to indicate that gold and silver values may increase with increasing copper content.

7.7 Trace Element Association

Selected samples (15) were analyzed for PGM associated trace elements (gallium, osmium, ruthenium and rhodium). The values are shown in Table 3. There is, however, some encouragement from these results but more analyses need to be done in order to ascertain the potential of these elements in the overall mineralization economics.

7.8 Petrography

Petrographic work constituted a large part of Clark's PhD thesis. Several samples were also collected and examined by Dr. Graham Nixon, BCGS. Samples of various lithologies were collected during the drill programs were sent to Vancouver Petrographics for thin section and polished section preparation. Sixteen core samples were collected and petrographic studies performed by Jeff Harris and Dr. C. Leitch. In addition to mineralogy, part of this study was to examine grain size, grain size distribution and grain boundaries. A modal summary and modal mineralogic plot of the petrographic studies are shown in Table A-1 and Figure A-1, respectively (see Appendix A). The petrographic study indicates that the degree of serpentinization imparts colour to the rock ranging from light grey to dark grey to grey-black to "coal" black. The higher the degree of serpentinization, the darker the rock. Mineralogical studies indicate that the primary sulphide minerals are pyrrhotite, pentlandite and chalcopyrite, with the gangue being olivine and pyroxenite. Pentlandite generally occurs as discrete grains with very little pentlandite-pyrrhotite intergrowths. Analytical studies indicate that pyrrhotite contains very little nickel. In places, pentlandite is surrounded by or associated with magnetite grains. This observation led to magnetic separation study of the concentrate which could have an impact on concentration cleaning and producing a magnetite concentrate (F. Wright, 2001).

8.0 GEOCHEMISTRY

8.1 Lithogeochemistry

A lithogeochemical study was initiated as part of the acid base accounting procedure in conjunction with the metallurgical program. This study had the following general objectives:

- 1) to determine the bulk chemistry of the ore and non-ore material and tailings which is a direct indication of mineralogy, including alteration,

- 2) to correlate chemistry with petrographic studies,
- 3) to determine weathering indexes,
- 4) to determine whether and to what extent an alternative method(s) could be developed for the conventional acid base accounting analytical procedures.

Data was also taken from Clark's thesis. For the purpose of this study, all data has been converted to molar values in order to relate directly to mineral formulae and to chemical reactions. Data is presented in several plots shown in Appendix B.

8.1.1 Lithologic Variation

The first step in this analysis is to determine whether the rocks used in the analysis are related or not as measured by conserved elements such as TiO_2 and Zr. However, since Zr was not analyzed by Clark and the samples that have been analyzed show background values, this approach was abandoned. Another method to differentiate lithological variation is by the plot of MgO vs Fe_2O_3 , Figure B-1. This plot indicates two lithological units. A plot of SiO_2 vs MgO also shows two lithological units, Figure B-2. A plot of MgO vs Fe_2O_3 with CaO as third variable indicates the impact of Ca on the rocks, Figure B-3. Plots of Mg (ICP analyses) show variation within a drill hole.

Samples taken for acid base accounting analysis were also analyzed for oxides and Zr. The 12 samples are plotted on an olivine fraction – crystal model plot, as shown in Figure B-4. This plot indicates that there are distinct units originating from the same parental source.

8.1.2 Weathering Potential Index

Grant (1969) examined the roles K, Na, Ca, and Mg cations and clay minerals play in the weathering of granitic rocks. He also demonstrated a direct relationship between Abrasion pH (Stevens and Carron, 1948) and the Weathering Potential Index (Reiche, 1943, 1950), and concluded that abrasion pH, being a function of a rock's modal mineralogy, could serve as a direct indicator of its weathering potential. The Weathering Potential Index (WPI) was calculated using oxide data (except for H_2O) as in Grant (1969). Weathering data is important in any assessment of the manner and rate of deterioration of the rock matrix in the field. Abrasion pH is determined by grinding a sample in water and measuring the pH of the paste with an electronic meter or indicator paper. Although it appears to be a very primitive technique, abrasion pH method is sensitive enough to distinguish calcite from dolomite from magnesite, all of which are ARD buffering minerals. The Initial pH test is part of the ABA procedure in the BCR method, while the paste pH determination is an estimate of initial reaction kinetics in a slurry. The initial pH test of a sample is a measurement of the initial reaction kinetics at room temperature (at ambient conditions) in solution and is, in effect, the weighted sum of the abrasion pH of each of the modal minerals which make up a sample. The weathering potential index (WPI) vs. initial pH scatterplot (Figure B-5) shows the weathering potential of the samples and their initial reaction with distilled water. This index does not take into account any rock quality measurements such as particle size, friability, porosity, or permeability.

The Weathering Potential Index (as modified from Reiche, 1943, 1950) is calculated as follows:

$$\text{WPI} = \frac{100 * \text{mols}(\text{CaO} + \text{Na}_2\text{O} + \text{K}_2\text{O} + \text{MgO})}{\text{mols}(\text{SiO}_2 + \text{Al}_2\text{O}_3 + \text{Fe}_2\text{O}_3 + \text{CaO} + \text{Na}_2\text{O} + \text{K}_2\text{O} + \text{MgO})}$$

The weathering potential index for the Turnagain rocks are quite high, as observed from outcrops in the field. The WPI vs. Mg/Fe ratio indicates two major lithologic units with different WPI, Figure B-6.

8.2 Trace Element Geochemistry

The purposes of the 30 element analysis are:

- To provide a check on the nickel assays,
- To provide the cobalt, copper and silver values, and
- To map trace elements over the drill hole length and deposit as a whole.

The aqua regia digestion is essentially a partial leach for silicates, but sufficient to detect Ca (carbonate), Fe (sulphides) and available Mg (olivine). Plots of Ni, Co, Cu, Cr, Mo, Ca, Mg and Fe versus depth can be used to show the distribution of trace elements that occur both with varying lithologies, ore and non-ore grade material and spatially within a deposit. It should be noted that it is not sufficient to calculate an average or median value for each trace element due to the potential variability within a deposit as shown in plots along drill holes.

Trace element plots can be used to show accuracy of sample analysis. This type of plot should be used for quality assurance / quality control purposes since the sample is analyzed using two different methods (standard assay analysis vs nickel trace element analysis).

The incorporation of trace elements into minerals occurs at the time of formation but can be altered over geologic time with changes in temperature, pressure and alteration resulting from hydrothermal fluids (Raiswell & Plant, 1980 and Madeisky, 1995). A plot of Mo versus depth from a drill hole which intersected disseminated nickel-bearing sulphides in dunite shows the influence of hydrothermal activity as indicated by the elevated Mo values. Metal mineralization may occur as disseminations in host rock, in veins, as massive sulphides and fracture fillings. A deposit may contain one or several of these types of metal mineralization. Each type may either have different metals and trace elements or varying concentrations of the same. This variation will certainly have an impact upon waste material characterization and disposal.

In general, various geochemical plots can be used as follows:

Ni % vs Ni ppm

- Plot shows accuracy of sample analysis. This type of plot should be used for quality assurance / quality control purposes since the sample is analyzed using two different methods (standard nickel assay analysis vs trace element nickel analysis).

Mo vs Depth

- Plot shows distribution of molybdenum values. This plot indicates the section of different sulphide mineralization due to hydrothermal influence on the host rock.

Cr vs Depth

- Plot shows distribution of chromium values. This plot indicates the level of chromium in potential ore and waste rock. The background level for chromium would be in excess of 500 ppm, and thus would be apparent in water geochemistry.

Mn vs Depth

- Plot shows distribution of manganese values. This plot indicates the level of manganese in potential ore and waste rock. The background level for manganese would be in excess of 800 ppm, and thus would be apparent in water geochemistry.

Ca vs Depth

- Plot shows distribution of calcium values. This plot indicates the carbonate neutralization potential both in ore and waste rock. Note that the higher values are associated with the stringer mineralization (influence of hydrothermal activity).

Mg vs Depth

- Plot shows distribution of magnesium values. This plot also indicates the varying rock types, if one assumes that Mg is largely due to the presence of olivine. This plot indicates the magnesium neutralization potential both in ore and waste rock.

8.3 Acid Rock Drainage

There are scattered occurrences of natural acid rock generation and drainage. This is a result of disseminated sulphides in the rocks comprising outcrops and which generally occur near a water source. Due to the dry climate and negligible pyrite, there is very little gossan development though the rocks generally contain sulphides (pyrrhotite, pentlandite) at surface. The most noticeable natural ARD source is the Discovery Zone which form the banks as outcrop on either side of the Turnagain River. This exposure which is approximately 25 metres in length and 10 metres in height on the north side of the river does not show signs of penetrative weathering nor oxidation. This outcrop led to the discovery of the Turnagain nickel-cobalt property. No oxidation of core was noticed, even at depth due to lack of extensive penetrating fractures. Examination of core from the 1971 drilling program indicated minor oxidation. There was no disturbance of outcrop for drilling that would lead to acid rock generation. There are no known ARD liabilities arising from previous exploration.

8.3.1 Acid Base Accounting Results

Acid base accounting analysis of six samples was conducted at BC Research for the purpose of metallurgical test work. Composites of assay reject samples were made according to various nickel grades, the procedures of which are documented in Appendix D. The results are tabulated in Appendix F. No sulphate bearing minerals have been observed to date. The results indicate that the rocks are potentially acid consuming. This is in agreement with the petrographic studies which show that the gangue is predominantly Mg bearing silicates such as olivine and pyroxenes. Carbonate is present as calcite though in minor amounts. Neutralization potential (NP) vs. Time plot indicates that acid is being consumed over several days which indicate that the acid consuming potential is very good. A plot of MgO versus NP, Figure C-1 indicates that the NP is due to magnesium (Mg). The major acid consuming Mg mineral is olivine with minor amounts of pyroxene (diopside). The acid consuming aspects is also borne out by metallurgical testing which indicates that the samples are acid consuming. These appear to be low sulphur-bearing rocks as shown by the sulphur analyses.

Not enough samples have been collected and analyzed in order to characterize into the acid generating, potential acid generating, non acid generating and potential acid consuming classifications.

9.0 GEOPHYSICAL SURVEYS

Airborne (helicopter and fixed wing), ground (VLF, magnetometer, HEM and induced polarization) and drill hole (pulse EM) geophysical surveys have been conducted on the Turnagain Property. The recent geophysical surveys are discussed in this report.

A separate report by Dr. Dennis Woods discusses the Falconbridge and drill hole geophysical surveys in more detail, but is presented in brevity for this report.

9.1 Airborne Survey

A regional magnetic composite map is shown in Figure 5. This map was downloaded from the BCGS website. The Turnagain intrusive is indicated on this map.

A high resolution aeromagnetic survey covering 400 linear kilometres was flown over the property in August, 1996. The objective of the survey was to identify geophysical response(s) which may be related to the nickel mineralization. The survey clearly outlined the extent of the ultramafic and generated several areas of increased magnetic susceptibility located within the ultramafic, Figure 6.

9.1.1 Results From Airborne Magnetics

Two different data sets were examined: a helicopter EM (HEM) and magnetic survey carried out by Scintrex for Falconbridge in July 1969 (680 line-kms), and a fixed wing "high resolution" magnetic survey carried out by Questor for Bren-Mar in August 1996. The HEM survey actually has higher resolution than the Questor survey because the terrain clearance is

much less: 30 to 60 m versus more than 200 m. (The upper limit of the Questor terrain clearance is unknown since they flew "a mean 200 metres where possible and constant barometric elsewhere"; i.e. over valleys such as the Turnagain River).

Although the HEM survey used a proton magnetometer with greater noise levels and reading intervals than the Questor cesium magnetometer (i.e. ± 5 nT @ 1.1 sec versus ± 0.1 nT @ 0.1 sec) the data are actually quite comparable. The extremely high-amplitude magnetic anomalies are far above either noise level, and when the air-frame speed is factored in, the reading intervals are about the same: 20 to 40 m for the HEM system versus 24 m for the Questor system.

In fact, the only really "high resolution" aspect to the Questor survey was the tighter flight line spacing of 100 m versus 200 m for the HEM survey. Normally the flight line spacing should be set at one to two times the terrain clearance for optimal resolution of magnetic anomalies, but it depends on required resolution of lateral structure (e.g. one to one for diatremes; four times the terrain clearance for long, linear structures), the size of the targets, the area to be covered, and the available budget.

The third most significant difference between the HEM magnetics and the Questor survey is the tie line spacing: 3 to 5 kms for the HEM (i.e. two tie lines only, with one through the centre of the lines instead of at their northern end), versus 500 m for the Questor survey. This results in the Questor magnetics being much better leveled and error free, whereas the HEM magnetics have obvious herring-bone leveling error - particularly at the northern ends of the lines.

The net effect of all this is that the Questor magnetic data are extremely accurate but very smooth (i.e. low resolution), whereas the HEM magnetics are much higher resolution but somewhat erroneous due to the leveling problems. Hence, magnetic features can be seen in the HEM data that are not apparent in the Questor data - although some of them may be suspect. For the present analysis, the better method would be more towards utilizing the HEM magnetics to better define the location and extent of the ultramafics at surface. The Questor magnetics better reflect the general dimensions of the intrusive complex at depth.

It is possible to make considerable improvements to the aeromagnetic data. The Questor data can be downward continued to a pseudo-drape terrain clearance of 50 m, comparable to the HEM data (this can be done quite accurately given the 100 m line spacing). And the HEM data can be re-leveled utilizing the HEM data for control. The two data sets can then be merged, which would take advantage of the two different flight line orientations: northeast-southwest for the Questor survey versus north-south for the HEM survey. The net effect would be a considerable improvement in the resolution of the magnetics to the point where it could be used to extend ground survey coverage for structural interpretation purposes.

9.1.2 Results From Airborne Electromagnetics

The Scintrex/Falconbridge helicopter EM survey was carried out using an HEM system which was a precursor to the presently utilized systems employed by Aerodat (now High Sense Geophysics) and Dighem. The only significant difference is that this early system had only one set of coaxial coils (versus 5 pairs of coaxial and coplanar coils in present systems) and operated at only one frequency: 1600 Hz (versus the current standards of three frequencies of about 900 Hz, 5000-7000 Hz, and 40-50 kHz). The coaxial coils are not as well suited to accurately resolving flat-lying and gently dipping conductors, but the data are very workable and can greatly help in planning ground follow-up.

The interpreted results were copied onto the 1:20,000 scale geologic compilation map and reproduced in Figure 1 as a hand-coloured, 1:25,000 scale map. The interpreted conductor locations in three classifications based on in-phase to quadrature ratio: <2.0 - open circles, >2.0 & <3.0 - half-filled circles, and >3.0 - solid circles were also copied onto the map. This classification reflects increasing conductance (i.e. quality or strength) of the conductors. The approximate limits of anomalous EM response, as defined by Scintrex as the half-widths of the response, are denoted which in a general way displays the limits of possible flat-lying conductors.

There appears to be line to line variation in the extent of anomalous EM response, inversely related to the leveling errors in the magnetic data. This could be caused by differences in terrain clearance with different flight directions (inexperienced drape-flight pilots tend to fly closer to the ground when going uphill). Regardless, a general pattern of anomalous response is observed; conductive formations surround the magnetic ultramafic intrusive complex and are mostly confined to sedimentary rocks. There are five notable exceptions: 1) the south central area of the intrusive, south and west of the Horsetrail zone, 2) the eastern end of the intrusive (east of the Turnagain River), particularly along the north and south margins and in a major belt between magnetic highs (possible zone of sedimentary rocks), 3) the northwest part of the intrusive in the general vicinity of the Davis 1 and 2 showings and extending to the west off the property, 4) a small conductive zone along the southwest margin of the intrusive and extending to the south (possibly within the sedimentary formations), and 5) a single isolated conductor in the central region of the intrusive complex.

9.2 Ground Magnetometer Survey

The ground magnetic survey was performed in order to map the complex and delineate the magnetic anomalies as generated from the airborne magnetic survey flown in 1996. The results indicate that the magnetic field over the intrusive is highly irregular with areas of anomalous magnetic intensity (peridotite) to other areas of non-anomalous, background magnetic intensity (granodiorite). The boundaries of the complex are very well defined by the ground magnetic survey results. The northern and north-eastern boundary is very abrupt, probably as a result of thrusting, and the southern and south-western boundaries appear more gradual caused by the sedimentary rocks (Harper Ranch Group) overlying the intrusive.

The areas of high magnetics do not necessarily coincide with sulphide-rich rocks as there appears to be little correlation between trends and known mineralized showings. Some

prospects are on magnetic highs (i.e. Northwest Zone), some on magnetic lows (i.e. Discovery Zone) and others in areas of mixed magnetic response (i.e. Horsetrail and Fishing Rock Zones).

9.3 Borehole Pulse Electromagnetic Survey

A borehole pulse electromagnetic (EM) survey was conducted (May – June, 1998) by Dr. D. Woods, P.Eng., geophysical consultant from White Rock, BC. Four drill holes (97-9, 98-1, 4 & 5) were surveyed, the deepest being 97-9 to a depth of 493 metres (1616 feet). The purpose of this survey was to locate and map electrical conductors associated with sulphide mineralization. The whole of the area surveyed (an area of approximately one km by one km by 200 metres in depth) indicated the presence of large conductive zones with some of the highest readings recorded in the experience of consultant Dr. D. Woods. Exceedingly strong in-hole anomalies were observed at various levels in the holes, as well as other multiple secondary in-hole and off-hole type responses. The preliminary interpretation of the data is that the major in-hole anomalies are due to two distinct, sheet-like, sub-horizontal (approximately 20 degrees to the south) conductive horizons. The upper horizon extends over a distance of more than 300 metres, from shallow intersections in drill holes 98-1 and 98-4 to near drill hole 98-5. This horizon has associated nickel values in 98-1 ranging from 0.25% up to 1.3%, averaging 0.30% nickel over 66.8 metres. Indications from the multiple transmitter loop surveys is that the centre of this zone has not yet been intersected. The second horizon apparently lies parallel to and about 150 metres below the upper horizon and can be traced from drill hole 97-9 to 98-4, over a distance of 150 metres. This horizon is also coincident with nickel value of 0.32% over 14.5 metres.

Although the pulse EM conductors are spatially coincident with nickel, cobalt, copper and silver values, it is believed that they are due to a combination of talc/serpentine and sulphides rather than sulphides alone. In addition, from geological logging and nickel assay results of these drill holes, there are other nickeliferous disseminated sulphide zones that do not form detectable pulse EM conductors.

9.4 Induced Polarization Survey

Like the magnetic results, the resistivity and chargeability results of the Turnagain complex are highly variable. Overall, the intrusive is dominantly and uniformly resistive, however anomalously low resistivities appear to correlate with peridotite or dunite. Zones of intense chargeability occur in all areas of the complex, sometimes near surface and sometimes at depth. There does not appear to be a definite correlation between high chargeabilities and mapped ultramafic rocks; the chargeability anomalies cross various lithologies. It should be noted that the various lithologies can contain various types and amounts of chargeable minerals such as sulphides, serpentine/talc-tremolite and graphite. The serpentine and talc-tremolite can be saturated to supersaturated in water associated with ultramafic rocks and groundwater interaction which can contribute to the high chargeabilities.

10.0 Drilling

Diamond drilling programs using BQ size core were carried out in 1996 (August-September), 1997 (August-September, and October), 1998 (May) and 2002 (October-November) to test geophysical and geological targets and mineralized showings. The drilling was contracted out to DJ Drilling, Surrey, B.C. Drill hole locations are shown in Figure 7. The rock is quite easy to drill as core recovery averages 95% and hole deviation is not significant. For example, hole 97-9 deviated 5 degrees over 494 metres, from an initial dip of -56 to final dip of -51 degrees. A problem that does occur with drilling is the expansion of serpentine and talc, as these minerals tend to expand during drilling and cause some problems in emptying the core barrel. Diamond drilling carried out by Falconbridge in 1966, 1967 (QXT core size) and 1970 (AQ core size) was contracted out to John Schussler, present owner/operator of DJ Drilling. The CME and some of the Falconbridge diamond drill locations are also shown in Figure 7.

Core was transported daily via helicopter from the drill site to the Wheaton Creek camp site where it was logged and sampled. All core is stored at the Wheaton Creek camp (Boulder City) in outside core racks. All drill holes were contiguously sampled over their whole length in one or two metre intervals based on visual mineralization, except where more detail sampling was warranted and the sampled interval was generally ½ metre. Holes 02-01 and 02-04 were not sampled.

Samples were analyzed for nickel, copper, cobalt, gold, platinum, palladium and trace elements. The significant intersections of the diamond drill programs are presented in Table 4. The analytical data for the Falconbridge drill holes are also shown in Table 4, however no records of analytical procedures and methods have been found to date.

11.0 Quality Assurance / Quality Control

The objectives of quality assurance/quality control (QA/QC) are to document the procedures and methods of sample collection, preparation and analysis and to provide some assurance as to reliability of analyses using cross-laboratory checks. No internal standards were submitted by the company and all replicate samples and internal standards reporting were carried out by the analytical laboratory. The sample and analytical procedures and methods are documented in Appendix A.

11.1 Sampling Method and Approach

Core and sample logging for the 1997 and 1998 drill programs were conducted and supervised by B. Downing. The core and sample logging for the 2002 drill program was carried out by Dr. S. Jackson and for the 1995 drill program it was conducted by Mr. E. Frey.

11.1.1 Field

The BQ size core was split using a manual core splitter with one half of the core put back into the box. The core splitter was cleaned after each sample. Most of the drill holes were sampled for their entire lengths with the average sample interval being two (2) metres in length. More heavily mineralized sections were generally sampled at one metre intervals. These are convenient widths and do not necessarily represent true widths of mineralization. Samples were put in polyethylene bags, sealed with twist tie, and 5 to 7 were placed in larger rice-bags weighing up to 45 kg and shipped as a unit. They were flown by helicopter from Wheaton Creek to the helicopter base in Dease Lake and then transported by commercial truck to ACME Laboratories in Vancouver. The 2002 samples were transported by private truck to ACME.

In May, 1999, split core from specific sections of drill holes 98-1, 2 and 4 was taken, composited into specified grade intervals and shipped to Billiton Metallurgical Facilities in Johannesburg, South Africa, for metallurgical test work (F.Wright, 2000).

11.1.2 Laboratory

The split core was prepared at Acme Laboratories, Vancouver (see Appendix D for procedures). The sample was crushed using a jaw crusher, then split using a riffle splitter. One split was stored, while the other half was pulverized in a ring and puck pulverizer. The 1997, 1998 and 2002 assay pulp samples are stored at Acme Laboratories, Vancouver.

11.1.3 Metallurgical

The analytical work for the metallurgical test work was carried out by the metallurgical laboratory and is described in the metallurgical report by Frank Wright (2000).

11.2 Sample Preparation, Analyses and Security

Sample preparation and analyses were performed at Acme Analytical Labs, Vancouver. Acme is a certified ISO 9002 laboratory, having obtained registration in November 1996 (registration # 378/96).

All core samples were analyzed for nickel using standard assay method and for multi-elements using the 30 element ICP-MS method following an aqua regia digestion. The aqua regia acid digestion, which will dissolve sulphides, is partial for the silicates that may contain some nickel such as olivine and pyroxenes. The ICP-MS method was chosen for the following reasons:

- As a check on the nickel assay value,
- Determination of cobalt, silver and copper values, and
- Determination of other significant elements for possible elemental zoning.

The aqua regia digestion for the Turnagain samples may cause some gel to form which is caused by magnesium. The gel inhibits the leaching efficiency on the samples if not sufficiently stirred or shaken. Constant stirring by stirring rod must be used during the ICP analysis. This situation was observed during analyses in 1998, and was implemented, but no comparative study was conducted. It was not retroactive to the 1997 and 1996 analyses.

The standard nickel assay method produces a total nickel value and does not distinguish between sulphide bearing nickel and silicate bearing nickel. In order to distinguish sulphide nickel, another assay method was tried using samples ranging from 0.23 to 1.3% nickel. This method uses a different leach process from the standard method and will detect nickel in sulphide and oxide forms and essentially consists of an ammonium citrate and hydrochloric acid digestion. The analytical procedure is documented in Appendix D. Samples were selected with low to high nickel assay values.

In regards to security, both the shipping and sample bags were received intact upon arrival at ACME Laboratories (pers. communication). There was no evidence of spillage of sample material during shipping nor evidence of any opening of the bags. All samples that were shipped from the field have been analyzed and entered into a database. There were no missing samples.

11.3 Acid Base Accounting Method

The ABA method of preference is the BC Research (BCR) method, as initiated by BC Research Institute (BCRI), Vancouver. ABA analyses of all samples were conducted by BCRI in their laboratory in Vancouver. The acid base accounting test work includes analyses of initial pH, total sulphur, sulphate sulphur, acid potential (AP), neutralization potential (NP) and calculated net neutralization potential (NNP) and neutralization potential to acid potential ratios (NP/AP or NPR). In addition to the ABA analysis, whole rock (using the inductively coupled plasma emission spectroscopy (ICPES) - lithium metaborate fusion method), and TIC (total inorganic carbon) analyses were also done. All analyses were done by Acme Analytical Labs, Vancouver. The procedures and analytical methods are documented in Appendix D. The whole rock (major oxides) data provides bulk chemistry, CO₂ indicates carbonate content, and 30 element analyses provides trace element distribution. In addition to the analytical data, various ratios were calculated, all of which are shown in Appendix B.

11.4 Nickel Analysis

An examination of nickel analyses was conducted in order to determine the sulphide nickel and silicate nickel distribution. The contribution of silicate nickel to the nickel assay is important, especially when examining the low grade nickel distribution. This was examined in the following ways:

- Sulphide Nickel Analysis (see Appendix D for procedures): Plots of total nickel versus nickel sulphide/oxide are presented in Appendix E. Results show a very good correlation, which indicate that the nickel is mainly derived from sulphides.
- The depletion of Ni in olivine in the sulphide bearing phases from the Ni in olivine in dunite is important. Analytical work by Clark (1975) indicates that nickel is depleted in olivine in sulphide-rich dunite and olivine pyroxenites versus nickel enrichment in olivine in the non-sulphide bearing dunite.
- Plots of nickel assay values versus ICP nickel values show a very good correlation. The aqua regia acid digestion used in the ICP analysis will dissolve sulphides and is a partial digestion for the silicates. Though not all the olivine may be digested, the amount that is digested does not appear to affect the correlation and thus impact the nickel concentration.
- From field observations of core and plots of estimated sulphides (from drill logs) with depth indicate that where nickel grades are 0.20 to 0.30%, sulphides are present.

11.5 Data Verification

Nickel ICP versus Ni assay values were plotted for each drill hole in order to determine if any spurious values were apparent which may be due to laboratory analyses. The values did show a good correlation, as shown in the plots, see Appendix E. This also provided a check on the database in order to verify if there were any spurious values due to incorrect entries in the database.

Eighteen samples were assayed by INCO for copper, nickel and cobalt. These values show an excellent correlation with those values as reported by Acme, Appendix E. Twenty-five samples were analyzed for nickel by Chemex Labs, Vancouver. These results correlate very well with the Acme values and are presented in Appendix E.

Re-analysis by Acme Labs of 15 samples for platinum and palladium show excellent correlation (see Appendix E).

Drill hole plots of nickel and Pt+Pd were visually examined in order to determine if any spurious values occurred that may be due to data entry and/or transcription.

12.0 Mineral Processing and Metallurgical Testing

Metallurgical test work was initiated at the very early stage in exploration in order to determine if this project was viable metallurgically, given the conceptual geological model of large tonnage with low grades averaging 0.3% to 0.5% nickel. Test work was initiated in October, 1997, under the direction of Mr. Frank Wright, P.Eng. Acid base accounting analyses were conducted in order to determine if the material would be amenable to leaching. Flotation batch studies have been conducted on four whole ore composite samples obtained from the 1996 and 1997 drill programs. Test work was conducted at Process Research Associates (Vancouver) and Lakefield Research (Lakefield, Ontario).

Initial recoveries of up to 83% nickel and 77 % cobalt were achieved with rougher flotation tests. With flotation cleaning, concentrate grades ranged from 2.8 to 13.6 % nickel and 0.16 to 0.28% cobalt. Concentrate recoveries range from 79 to 52% for nickel and 73 to 41% for cobalt. Magnetite separation was also shown to be beneficial and is anticipated to further increase metal recovery. A potential magnetite concentrate is considered as a viable product, specifically where it is used in the coal industry.

The mineralized (reject) samples which were used in the metallurgical studies were obtained from the 1998 diamond drill program. The composite test sample obtained from three drill holes: 98-1 (194m to 236m), 98-2 (6m to 112m) and 98-4 (6m to 41m / 98m to 108m), resulted in a composite sample feed grade of 0.43% Ni and 0.018% Co.

A 90 kg bulk flotation test was conducted by Process Research Associates (PRA) of Vancouver, B.C. The work was undertaken to provide a sufficient quantity of sulphide concentrate for pressure leach testing. Flotation feed was ground to particle size (K_{80}) of 70 microns. While overall flotation recoveries are dependent on future locked cycle testing, the recovery of nickel and cobalt was 77% and 71% respectively, to the rougher flotation concentrate. This was followed by two stages of cleaning to produce a final concentrate that analyzed as follows:

CONCENTRATE ANALYSES

Metal	%Ni	%Co	%Cu	Pt (g/mt)	Pd (g/mt)	Au (g/mt)	Ag (g/mt)	%Fe	%S-
Concentrate	6.65	0.243	0.29	0.52	0.61	0.27	9.3	32	21.3

The work resulted in an encouraging and improving recovery of nickel and cobalt to the sulfide concentrate. The analyses also indicates that appreciable amounts of platinum (Pt), palladium (Pd), as well as gold (Au) and silver (Ag) are present. Investigations into production of magnetite and magnesium by-products are also slated for future study.

Based on a conceptual geological model of 250,000,000 tonnes grading 0.30% nickel, the ongoing exploration and pre-feasibility analysis is to confirm a mineral reserve that would support an ore production rate of 68,000 tonne/day. This would allow for an economy of scale, which equals or exceeds the favorable operating costs of current base copper metal

producers in B.C. This and the fact that the gross contained metal values at Turnagain in the small areas that have been explored to date are higher than those of these same producers, makes the project a promising opportunity. It should be noted that this is a conceptual metallurgical model and does not take into account cut off grades nor precious metal content. A considerable amount of exploration and development work are required in order to determine if the Turnagain complex meets the criteria of the conceptual model. Until such time as the work has been completed, references to production rates and operating costs are speculative.

Based on the latest metallurgical results, using the achieved concentration ratio of 22:1, and assuming 90% plant availability, would result in the conceptual annual metal production to the sulphide concentrate as follows:

CONCEPTUAL METAL PRODUCTION

Conceptual	Ni(tonnes)	Co(tonnes)	Pt (g)	Pd (g)	Au (g)	Ag (g)
Annual Production	67,000	2,400	528,000	680,000	275,000	940,000

Preliminary pressure leaching studies on the concentrate using the CESL process were conducted by Cominco Engineering Services Ltd. of Vancouver, B.C. This or similar hydrometallurgy processes would allow for the on-site production of metallic nickel, thereby eliminating concentrate transport and contract smelting charges. The optimum CESL test results to date gave 98% Ni recovery and over 98% Co recovery to solution. Cathode metal would be produced from this solution by conventional solvent extraction and electrowinning technology. The metallurgical studies show that a technical flowsheet is available to apply to the Turnagain Project.

The results are considered very encouraging in that an acceptable concentrate could be produced for upgrading on site. Continuing optimization of the concentration procedure will be conducted both at Process Research Associates Ltd. and at Lakefield Research. Studies will be initiated on concentrate leaching, which will be followed by laboratory work on solvent extraction and electrowinning for recovering dissolved nickel and cobalt from solution. Producing a mid-grade nickel-cobalt concentrate should allow for the rejection of sufficient acid consuming gangue minerals so that a variety of newly available low cost recovery methods can be considered.

The conceptual metallurgical approach is to treat the flotation concentrate, (possibly combined with a magnetic concentrate) on site. Consequently, the traditional high cost approach of shipping the concentrate to a smelter refiner may not be required. Instead, the nickel and cobalt would be recovered by lower cost acid leaching techniques, such as pressure leaching, biological leaching or chemical leaching. This would be followed by solvent extraction and electrowinning (similar to that currently used in the copper industry) to produce a high grade metal cathode product to meet LME specifications.

The Turnagain samples reviewed to date (Frank Wright, 2000) indicate that the material would likely respond favourably to a number of newly developed nickel processes. These include Dominion Mining's "Activox Process", "CESL Process" and bioleach processes promoted by such companies as Gencor and others. The Turnagain sulphides are primarily pentlandite/pyrrhotite which are readily soluble under their stated process conditions. In addition, there do not appear to be any other metal by-products or deleterious substances present which would complicate such a treatment circuit. The Turnagain material responds to sulphide concentration by flotation, which is necessary for this type of flowsheet development. The metallurgical report by F. Wright (2000) contains more detailed information.

13.0 Interpretation and Conclusions

The Turnagain intrusive is a differentiated ultramafic complex including dunite, peridotite, olivine pyroxenite, pyroxenite and hornblendite. It is intruded in places by felsic dykes with a granitic plug occupying the central part of the complex. Layering is indicated in part from drill hole logging, magnesium drill hole plots and litho geochemistry studies.

There are consistent nickel (0.20 to 0.40%) and cobalt (0.015 to 0.03%) grades over long intersections in most drill holes. Grades of up to 1.4% nickel over one metre intervals have been intersected in drilling, and grab samples from widely spaced areas have also returned greater than 1.0% nickel. Grab samples containing up to 2% nickel have been reported by people who have worked on this property for Falconbridge. Copper, platinum and palladium values occur with the nickel bearing sulphides. Grades up to 4% copper have been reported by people who have worked on this property for Falconbridge, specifically in the Discovery Zone. The higher PGM values appear to occur in the Cliff Zone area. It should be noted that sulphide mineralization in all drill holes generally begins at the hole collar or top of casing

From drilling and field follow-up, results from the magnetometer survey indicate that the magnetic highs are generally consistent with those from the aeromagnetic survey. The highest magnetic readings are associated with serpentinized peridotites that have a stockwork of magnetite bands. Generally, these magnetite bands are sulphide poor. The sediments are coincident with the magnetic low. Some of the magnetic highs are adjacent to the sediments. It would appear that sulphides occur on the periphery of the magnetic highs, and that drilling the magnetic highs would not necessarily intersect sulphides. The pulse EM survey indicated that the area responds well but that a more discriminating survey such as induced polarization is needed in order to map and locate sulphide-rich lithologies. The pulse EM survey interpretation indicates that sulphide mineralization occurs as horizons dipping to the south. Review of the Scintrex airborne survey flown in 1969 shows numerous conductors along the edges of the Turnagain complex and that the drilled areas to date also have coincidental conductors. The overall resistivity and chargeability results to date indicate a dominant west to north-westerly trend associated with mineralization where drilled. This extends over a distance of two kilometers. Most of the conductors have not been drill tested.

Significant structures have not yet been recognized along which the secondary mineralization is associated. Sulphides to date have been intersected in progressive drilling up to 300 metres

in depth and over a conservative strike length of 800 metres. The interpreted potential strike length of mineralization for exploration based on the geophysical surveys, scattered sulphide showings and drilling is approximately 7 kilometres and width of 2 kilometres. There appears to be an overall high sulphide content in this ultramafic.

Some of the significant points worth noting regarding the Turnagain complex are:

- Large ore deposits are associated with large-scale magmatic systems. The Turnagain Ultramafic is large in size extending approximately 8 km in length, up to 3 km in width and at present in excess of 493 metres (1617 feet – DDH 97-9) in depth. The ultimate size is not known at present.
- The Turnagain Ultramafic is associated with a major transcurrent fault. The complex is thrust easterly against the sediments (footwall).
- The importance of graphitic and sulphide-rich sediments in contact with the Turnagain ultramafic is significant in that these sulphides may have provided a source of sulphur for nickel sulphides to form (e.g. as sulphur contamination and enrichment of the magma).
- The periphery of the ultramafic may not be as important as the keel. Massive sulphides have probably formed in embayments or structural dilational zones. The importance of magma conduits in focussing sulphide concentrations and upgrading are very important. This will be an interpretation on which drilling and geophysics will be focused. The “plumbing” system has not yet been recognized.
- There is a significant depletion of nickel in the hydrothermal zones. There is some indication of nickel and copper sulphide enrichment in other zones.
- A unique breccia pipe (?) containing fragments of “reaction rimmed” and foreign granitic rocks was intersected over 53 metres in hole 67-2. It would appear that this breccia is similar to that intersected in 97-9 over two metres. This breccia has not yet been observed in outcrop and its presence has not yet been fully interpreted. A mineralogical examination of one sample by R.Buchan in 1979 identified it as a hornblende-clinopyroxene porphyry and is likely a basic intrusive breccia but with no kimberlitic affinity.

The conceptual model for the Turnagain Project appears amenable to large scale, open pit mining techniques. This would significantly reduce the operating cost as compared to underground mining, which is typical of most nickel sulphide deposits. Metallurgical flowsheet development will be ongoing with the geological studies in determining the most feasible process approach. A considerable amount of exploration and development work is required in order to determine whether the Turnagain Property meets the criteria of the conceptual model.

The Turnagain Nickel Property:

- **is essentially under-explored,**
- **has good access,**
- **has the potential to be a new type of nickel sulphide discovery in a new mineral district,**
- **occurs in sulphide enriched rocks with two possible mineralizing events,**
- **contains platinum and palladium throughout the system,**
- **achieved excellent preliminary metallurgy test work,**
- **has indications from drilling, geological mapping and geophysical surveys that potential mineralization extends for a distance in excess of 5 kms in strike length and**
- **has the areal extent for a potential bulk tonnage deposit.**

14.0 RECOMMENDATIONS

- 1) Initiate a detail mineralogical study that would include microprobe analyses. Identify the platinum, palladium, silver and gold mineralogy. This study would be done in conjunction with the metallurgical work.
- 2) Survey all drill hole locations and claim posts.
- 3) Finish line-cutting for mapping and geophysical surveys. This would total approximately 60 kms.
- 4) Stake additional claims to cover ground to Hard Creek. As well, the claims should be expanded to cover the entire extent of the intrusive complex to the northwest and southeast of the present land holdings.
- 5) Conduct a detailed geological and prospecting grid survey. Enter data into database program.
- 6) The Questor airmagnetic data should be retrieved (along with positional and altimeter data), and processed by pseudo-drape downward continuation. The HEM magnetic data should be digitized at the contour/flight-line cross points and then re-leveled utilizing the Questor data as control. The two data sets can then be combined, and a new, higher resolution, magnetic image can be produced. Further processing should involve vertical derivative and signal strength analysis to produce images which better depict magnetic features at surface without the distortion effects of induced or remnant dipolar magnetization.

A more precise method of obtaining the same type of final product is to perform a three-dimensional inversion of the magnetic data. This newly developed technique from UBC produces startlingly clear 3-D images of the magnetic susceptibility in the earth using standard surface or airborne magnetic data. Structural interpretation can be significantly improved with this procedure.

Magnetic images produced by these reprocessing procedures should be digitally overlain on a topographic plot, for optimal interpretation power.

- 7) Conduct a bore hole IP geophysical survey to locate and map massive sulphides in conjunction with the surface IP survey. For even greater three-dimensional resolution of anomalous chargeability and resistivity in the Horsetrail zone, it is recommended that the drill holes previously surveyed by borehole Pulse EM be re-surveyed with borehole IP using a radial directional pole-dipole array. This technique can be used to determine the precise depth of any chargeability or resistivity anomalies, as well as indicate the spatial position of the zones with respect to the drill hole. When combined with inverted pole-dipole data from surface, a clear picture of mineralization and structure will emerge - to form a more definitive model of any nickel/cobalt ore zones.

- 8) Complete the gradient IP/resistivity and magnetometer surveys that were initiated in 2002. This will aid in mapping/interpretation of the complex.
- 9) Conduct a major diamond drill program of 9,150 metres (30,000 feet) to delineate enough information for a resource calculation. This program would follow up on the present drilling program in order to extend the known limits of nickel mineralization. Rotary drilling should be considered to delineate the property on a detailed scale for infill drilling. Enter data into drill hole computer program. This drill program should use NQ core in order to get a larger sample for analysis that may have an impact on PGM analyses. This core will require sawing of the core as it will much harder to manually split. Density measurements of core should be taken for future resource calculations.
- 10) Initiate a preliminary baseline environmental survey that would include water sampling of creeks, bogs etc., continued acid base accounting analyses and a historical research of the area.
- 11) Continue with the QA/QC during the next drilling phases and include reference material (i.e. CanMet standards). Check assays should be conducted via another laboratory.
- 12) Use a magnetic susceptibility unit during core logging to identify magnetic profile along drill hole.

These recommendations would constitute two main phases:

- **Phase I:** diamond drilling (approximately 5,000 metres) to establish some sulphide mineralization extents, and
- **Phase II:** to complete the induced polarization survey, geological mapping and metallurgical work.

These phases can be conducted at the same time or at different time periods depending upon spring breakup (i.e. Phase I – 2,500 metres in April-May, Phase II in May-August followed by additional drilling from Phase I). The metallurgical work can essentially begin after the early drilling in order to obtain material for the test work.

A budget for Phases I and II would be approximately CDN\$750,00. The extent of these phases will be dependent upon the ability of the company to raise sufficient funding.

Upon positive results obtained from Phases I and II, a third phase (Phase III) is recommended for a major diamond drill program to delineate a resource and provide enough information for a resource calculation. This program also would also include further metallurgical test work and environmental studies.

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16.0 STATEMENT OF QUALIFICATIONS

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CERTIFICATE OF AUTHOR

I, Bruce W. Downing, M.Sc., P.Geol. do hereby certify that:

1. I am currently employed as a consultant by:

Canadian Metals Exploration Limited
Suite 1060, 1090 West Georgia Street
Vancouver, B.C. V6E 3V7 Canada
2. I graduated with an honours B.Sc. in geology and pedology from Queens' University in 1970. In addition, I obtained a M.Sc. in geology from the University of Toronto in 1974.
3. I am a member in good standing of the Association of Professional Engineers and Geoscientists of British Columbia, the Association of Exploration Geochemists, and the Canadian Institute of Mining. I am a fellow in good standing of the Geological Association of Canada.
4. I have worked as a geologist for a total of 30 years since my graduation from university.
5. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
6. I am responsible for the preparation of the technical report titled Turnagain Nickel-Cobalt-Copper-PGM Project Report and dated March 15, 2003 (the "Technical Report") relating to the Turnagain property. I visited the Turnagain property in 1997, 1998 and 1999 for a total of approximately 160 days.
7. I have had prior involvement with the property that is the subject of the Technical Report. The nature of my prior involvement is as consultant.

8. I am no aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report , the omission to disclose which makes the Technical Report misleading.
9. I am not independent of the issuer applying all of the tests in section 1.5 of National Instrument 43-101. I have been granted by CME the opportunity of receiving options of which I have not exercised to date.
10. I have read National Instrument 43-101 and Form 43-101F1 and the Technical Report has been prepared in compliance with that instrument and form.
11. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

DATED this 5th day of June, 2003.

"Bruce W. Downing"

Signature of Qualified Person

Bruce W. Downing, M.Sc., P.Ge

Print name of Qualified Person

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CONSENT OF AUTHOR

TO: British Columbia Securities Commission
Alberta Securities Commission
TSX Venture Exchange

I, Bruce W. Downing, do hereby consent to the filing, with the regulatory authorities referred to above, of the technical report titled Turnagain Nickel-Cobalt-Copper-PGM Project Report and dated March 15, 2003 (the "Technical Report") and to the written disclosure of the Technical Report and of extracts from or a summary of the Technical Report in the written disclosure in the Amended and Restated Annual Information Form of Canadian Metals Exploration Limited being filed.

I also certify that I have read the written disclosure being filed and I do not have any reason to believe that there are any misrepresentations in the information derived from the Technical Report or that the written disclosure in the Amended and Restated Annual Information Form of Canadian Metals Exploration Limited contains any misrepresentation of the information contained in the Technical Report.

DATED this 5th day of June, 2003.

"Bruce W. Downing"
Signature of Qualified Person

[Seal or Stamp of
Qualified Person]

Bruce W. Downing, M.Sc., P.Geol.
Print name of Qualified Person