

REPORT ON THE MAY 2008 RC DRILLING PROGRAM
TUNERQ Ni-Cu-Co SHOWING
PELLY BAY REGION, EASTERN NUNAVUT

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Summary

A short RC drilling program consisting of seven holes was completed at the Tunerq Ni-Cu-Co showing in May of 2008. The purpose of the drilling was to test the depth extent and work out the geometry of a sulphidized mafic/ultramafic body sampled at surface the previous year. The program was successful in defining a 35 metre wide north-south striking body dipping to the east at 35-45 degrees. The mafic/ultramafic body contains within it a sulphide (pyrrhotite-chalcopyrite and various Ni-sulphides) horizon on the order of 10 metres thick with an approximate average of 10-15% pyrrhotite over this interval. Sulphides are most abundant in a pyroxenitic ultramafic unit as net textured pyrrhotite while mineralization within the bordering gabbro is lower grade and disseminated in nature.

The host rocks to the sulphide mineralization differ significantly in mineralogy and geochemistry. The dark coloured pyroxenite is composed of pyroxene, amphibole, olivine, sulphides, magnetite and minor phlogopite and exhibit elevations in Ni-Co-S and depletions in Ti relative to the gabbro. The gabbro is composed of variable amounts of amphibole, phlogopite, plagioclase and sulphides and exhibit elevated Ti-V-Al-Cr-Zn relative to the pyroxenite. Based on their alternating nature and geochemical trends the two units appear to be genetically related to each other via fractional crystallization.

Various lines of evidence suggest that the mafic body is a block of old stratigraphy floating within a younger tonalite intrusive. Such evidence includes contact metamorphosed (phlogopite + white diopside) gabbro and tonalite injected gabbro along the upper and lower contacts of the mafic body. The very strong but highly localized magnetic response corroborates this hypothesis.

Future work should include additional (core) drilling and an expanded ground magnetic survey to the north and northeast. The core drilling should attempt to carry the defined mineralization to greater depth, test the southern extension of the body and investigate the magnetic anomaly 250 metres to the north of the main showing. Stratigraphy in the Tunerq area is trending approximately northeast, and so an expanded ground magnetic survey would aid in finding targets similar to those already located.

1.0 2008 RC Drilling Program

A total of seven RC drillholes were completed at the Tunerq Ni showing in May of 2008 ([Figure 1](#), [Figure 2](#), [Figure 3](#)). Drillhole geological logs and drillhole statistics can be found in Appendix A and B respectively. Five of the holes (08TUR001-005; [Figure 4](#), [Figure 5](#), [Figure 6](#), [Figure 7](#), [Figure 8](#)) were drilled directly on the gossanous outcrop in order to test the previously identified Ni-Cu-Co surface mineralization at depth and to gain a better understanding of the bodies geometry. Four of the five holes were successful in identifying significant sulphide mineralization over variable widths. These promising results prompted the drilling of two additional holes to the north to extend the mineralized zone by approximately 70 m while at the same time obtaining a true-width intersection of the zone. While both holes were successful in intersecting a wide interval of the host rock to the mineralization, no significant sulphide zones were encountered.

All procedure involving material collection, sample preparation, logging and sample shipment were completed by the author of this report, Ronnie Therriault. All cuttings from the Northspan owned-and-operated RC rig were collected in 5 gallon pales lined with a plastic sample bag. Each 5 foot run was sampled separately with the exception of a few 10 foot samples taken from unmineralized tonalite. The buckets were subsequently sealed and transported back to Tunerq camp for sampling and logging. One sample was taken from each five foot run from all mafic & ultramafic material as well as at least 10 feet (2 samples) into the tonalitic shoulder. Approximately 1/4 of the cuttings from each 5 foot interval were sampled for assay. An approximately continuous sample was taken from the top of the bag to the bottom in an attempt to obtain a sample representative of the entire 5 foot run. A representative chip sample from each of the 5 foot intervals was also gathered and placed into labeled chip trays for logging purposes. Samples for assay (Appendix C) were placed into labeled plastic bags, sealed, placed into 5 gallon pales and sent to Amaruk camp to be transported to ALS Chemex in Vancouver. Unsampled material was returned to their appropriate pale and is currently in storage at Tunerq. Logging was completed via a binocular microscope and RC cuttings which ranged in size from 2-10 mm. Noteworthy mineralogy, textures sulphide contents and lithological units were all described and documented from each of the drillholes and are available in Excel format in Appendix A.

Some of the known issues with regard to sampling are briefly discussed below. The primary issue involves the dilution of the mineralized zones by thin granitic dykes. As these dykes tend to be quite small, it would be very difficult to break them out into separate samples. A related issue involves the recovery of the granite - it tends to have a better recovery than the mineralized material adding to the dilution problem. Finally, the strongly mineralized material (ultramafic) is often thinly interbedded with the less mineralized gabbro. Its nearly impossible to do anything about this problem with RC drilling, but the issue should be easily resolved once diamond drilling begins.

2.0 Geology

This section describes some of the geological features noted at and below surface in the area of the Tunerq Ni showing. The descriptions and interpretations rely in part on the petrographic and geochemical work completed to date on the showing. The section describes the geology at and below surface separately for convenience and scale purposes only.

2.1 *Surface Geology*

Approximately one day was spent ground truthing magnetic anomalies and completing reconnaissance-scale geological mapping in the Tunerq area (Appendix D). Snow was a major issue, and the resultant map ([Figure 9](#)) is considering a rough sketch at best. At least 5 units were noted during mapping and can be roughly separated based on their magnetic signatures and patterns.

The very strong magnetic highs (deep purple) are related to the mafic- ultramafic body that contains the Ni-sulphide mineralization at the Discovery outcrop. The body consists of alternating mafic (gabbro, Unit C) and ultramafic (pyroxenite, Unit B) layers with an approximate north-south strike and a dip of 35-45 degrees to the east ([Figure 10](#)). These units are discussed in greater detail under Section 2.2. A second anomaly with a similar response strength is located approximately 250 m to the north (554728/7548405). There are currently three small exposed outcrops of gabbro (Unit C; [Figure 11](#); [Figure 12](#)) containing 1-2% po+cpy mineralization which have been sampled by the author (08RTP001-003). Based on the magnetic data, it looks to be trending approximately northeast for about 60 m and may or may not be correlative with the Discovery outcrop. The response strength of this unit is largely due to its magnetite content which is thought to be an alteration product of olivine (thin grey crack-filling material in photo 0806 of petrographic report).

The strong magnetic signature (medium purple-red) is related to biotite +/- amphibole and magnetite bearing tonalite (Unit D). Magnetite was seen to form coarse crystals up to 5 mm. This unit forms a steep ridge approximately 400 m to the northeast of the drill site trending to the northeast and to the southwest on the far side of a small lake south of the drill site ([Figure 9](#)). It seems quite likely that there is an E-W fault in the south which dextrally offsets this unit by about 1 km.

The mixed magnetic signature (best observed using magnetic airborne data) is a hybrid unit (Unit E) between the tonalite and a younger granite/syenogranite that intrudes it. It occurs on the flanks of the tonalite ridges throughout the area. The younger granite forms foliation parallel sometimes foliated and recrystallized bands and pods within the tonalite and also seems responsible for forming coarse (plagioclase?) blasts/augen structures within the tonalite proper. The unit as a whole contains

fewer mafics resulting in a weaker magnetic signature. The area immediately to the west of the drill site falls into this group from a regional perspective. Previous mapping in the area interpreted this unit as an orthogneiss of monzogranitic to granodioritic composition. Indeed, the unit does commonly show a gneissic *texture*, but the author believes that the “leucosome” fraction is exotic rather than a result of in-situ metamorphic-initiated felsic-mafic segregation. This is based on the gradation seen between the tonalite proper and the near-homogenous tonalite-free monzo/syenogranite regions (i.e. southwest of the drill site; Figure 9). However, in all likelihood the granite is probably a result of metamorphism initiated partial melting of the tonalite later in the metamorphism-deformation phase, and so it is really a matter of scale.

The magnetic lows (blue) correspond to the younger granite phase (Unit F) with little or no tonalite present. The granite contains very little mafics resulting in the weakest of magnetic responses. Contacts between the tonalite and younger granite are subjective due to the hybridized unit, but when present they exhibit very low angle foliations in the tonalite (20 degrees) with low angle (low fold plane angle) folds. A couple of possible explanations are that the contacts are thrusts or that they represent unroofing structures above the younger granite intrusives. The two are not unrelated and both may have been involved.

2.2 *Subsurface Geology*

This section discusses the geological observations of the subsurface at Tunerq with emphasis of the mafic-ultramafic units and sulphide mineralization. The tonalite and the young granite which is common throughout the mafic/ultramafic sequence was discussed above and is not revisited below.

Unit A (pyroxenitic gabbro): Unit A is characterized by a medium grained texture composed of white to light green euhedral pyroxene (likely diopside), brownish phlogopite books, minor quartz-plagioclase and possibly olivine. The unit is not mineralized and is non magnetic. It occurs most commonly at or toward the tonalite contact. Feathery radiating fans of fine grained white pyroxene are common and are suggestive of a contact metamorphosed rock.

Unit B (pyroxenite): Unit B is a pyroxenite characterized by a medium-coarse grained texture defined by dark green to black coloured pyroxene, woody amphibole, olivine (not observed), sulphides (pyrrhotite and chalcopyrite), magnetite and minor phlogopite. The unit occurs interlayered with Unit C in beds ranging from 30 cm (?) to a few metres. Serpentine alteration is present in some cases, but does not appear to be very strong overall. The unit is typically well mineralized and moderate to strongly magnetic. The dominant sulphide is pyrrhotite which can form up to 75% of the rock, but more commonly forms between 15-25%. It occurs as weakly to strongly

net textured material interstitial to the silicates and to a much lesser extent as disseminations throughout the rock. Accessory chalcopyrite (trace to 8%, average 4% in well mineralized zones) occurs on its own or as poorly formed rims on pyrrhotite. Interestingly, amphibole crystals core pyroxene grains, indicating a somewhat strange crystallization sequence. The magnetism of this unit is largely attributed to magnetite which is probably an alteration product of olivine.

Unit C (gabbro): Unit C is a medium-coarse grained melanocratic to weakly leucocratic gabbro composed of deep green amphibole, brownish phlogopite, milky green plagioclase, sulphides (pyrrhotite and chalcopyrite) and minor quartz. The unit ranges in composition from phlogopite dominant to amphibole dominant to plagioclase rich. Globular to banded plagioclase, sometimes with quartz cores, are common toward the footwall of the body. They are thought to represent felsic segregations from the mafic magma. Sulphide contents are consistently lower than in the pyroxenite unit forming between 5-15% po and trace-8% cpy. As in the pyroxenite unit, sulphide contents can vary wildly over short distances making estimations over five foot intervals a difficult task.

3.0 Geochemistry

The following discussion relies upon ICP results from a very small dataset and the reader is cautioned against taking this interpretation as either complete or static. The effects of contact metamorphism/metasomatism do play a role in the geochemical evolution of the mafic/ultramafic body, but are ignored here for simplicity and due to lack of data. A small number (15-20) of judiciously chosen samples for whole rock analyses (major and trace element) would prove useful and is recommended provided that the diamond drilling program suggests a body sizable enough to be potentially economic. The ultimate goal for exploration purposes is to find consistent geochemical signatures that can be used in conjunction with petrology in order to correlate lithostratigraphic units. Fractionation patterns and sequences may also prove useful, but are admittedly a bit esoteric at this stage.

The mafic/ultramafic units are divided into three distinct groups based on their geochemical signature. For the most part these groupings correspond well with the lithological units described above and so the same notation is used in the discussion below:

Unit "A" (?) (Unknown unit - might correlate with pyroxenitic gabbro)

- Exhibits the lowest Ni, Co, Cu, Mg, Mn, S and Zn values relative to all other samples.
- Shows low Al values relative to Unit C.
- Contains a weak Au enrichment trend which may or may not be real.

Unit B (pyroxenite):

- Exhibits elevated Ni, Co and S values relative to all samples.
- Has the lowest Ti values relative to all samples.
- Contains Mg-Mn values similar to Unit C.
- Zn values are greater than Unit “A” but less than Unit C.

Unit C (gabbro):

- Exhibits elevated Ti, V, Al, Cr, Zn, K and Na relative to all other samples.
- Contains intermediate Co (greater than Unit “A” and less than Unit B).
- Has low Fe values relative to all samples.
- Contains fairly consistent Ni values at approximately 0.5%.

The following is one possible interpretation to explain the geochemical trends presented in Appendix E. Note that Unit B and Unit C are interbedded, so this crystallization sequence is thought to have been repetitive.

Phase 1 (pyroxenite crystallization): Open system fractional crystallization begins with (Mg) olivine, Fe-Ni sulphides and (Mg +/- Fe) pyroxene (i.e. orthopyroxene). This results in a trend of decreasing S, Ni, Co and Fe. The base metals Zn & Cu show slight increases indicating they are building up in the fluid phase. Cr, Al and Ti appear to be acting pretty incompatibly at this point as the values don't change as Fe-S-Ni fall out. This likely indicates that spinel (Al-bearing phase) and Cr-Ti-oxides +/- magnetite crystallization is suppressed. It is possible that magnetite *does* crystallize out at this point, but it is more likely that the high magnetite content in the ultramafic is due to olivine +/- pyroxene alteration. The post Phase 1 liquid and “final” composition of the ultramafic are shown as a red ‘x’ on the diagrams in Appendix E.

Phase 2: The second phase of crystallization is derived from the liquid remaining from the crystallization of the ultramafic and involves spinel, amphibole, plagioclase, Cu-Zn-Ni sulphides and potentially phlogopite/biotite. Note that the Ni values remain rather constant during the crystallization of the rest of the silicates. This would presumably result in a more disseminated versus massive/semi-massive style of mineralization. This is consistent with petrographic data. The

base metals sulphides are also dropped out during this stage; note that both the Ni-Cu and Ni-Zn show the same trends of initial enrichment in the ultramafic (increasing in the liquid) followed by quick depletion into the gabbro. Au appears to follow a similar trend albeit less well defined. It would not be surprising to find a weak (uneconomic?) Au-chalcopyrite association. Phlogopite(?) - amphibole crystallization is marked by dropping Al, K and Mg. Feldspar crystallization is marked by drops in Ca, Na and Al. It is not known whether the phlogopite is a primary mineral or a derivative of amphibole due to contact metamorphism. The latter explanation is preferred given the mineralogy of Unit A (high phlogopite) and its spatial position next to the tonalite contact. The liquid remaining after Phase 2 was presumably quite rich in Si and alkalis which may have given rise to the felsic segregations (qrtz-plg) in the gabbro as discussed earlier.

Phase 3 (Unit A?): There are too few points to definitively say how Group 2 rocks are involved. It is also not known if this unit corresponds to the pyroxenitic gabbro defined earlier. Based on thin section analysis, this unit is more likely a heavily oxidized and limonite altered product of either Unit B or Unit C. ICP analyses from the RC drilling should help to confirm or refute this idea.

4.0 Conclusions

- 1) The mafic/ultramafic unit at the Tunerq Ni Discovery outcrop is an approximately 35 metre wide north-south striking body dipping to the east at 35-45 degrees. The body is enclosed within biotitic tonalite and intruded by younger granite/syenogranite dykes.
- 2) The ultramafic (orthopyroxene + amphibole + olivine + Fe-Ni-Cu-Co sulphides) and gabbro (amphibole + phlogopite + plagioclase + Fe-Ni-Cu-Co sulphides) occur as interbedded units in the body. Gabbro is by far the dominant phase forming roughly 80% of the unit.
- 3) Mineralization consists dominantly of pyrrhotite-chalcopyrite together with various unidentified Ni sulphides (pentlandite, bravoite). The ultramafic unit hosts the strongest mineralization as net textured pyrrhotite averaging 15-25% and variable amounts of chalcopyrite. Disseminated pyrrhotite-chalcopyrite within the gabbroic unit averages 5-15% pyrrhotite with variable chalcopyrite contents. Minor chalcopyrite mineralization occurs within the crosscutting granite dykes, the sulphides having been accrued from the surrounding mafics.
- 4) Textures and mineralogies observed in Unit A suggest that it is the contact metamorphosed equivalent of the gabbro. If this is correct, then the mafic body is likely a foreign block of stratigraphy hosted within the tonalite intrusive.
- 5) Available geochemistry data indicates that there are at least three distinct units within the mafic body. Furthermore, two of the units (Units B and C) appear to be genetically related to each other

via fractional crystallization.

6) Initial efforts at mapping have shown that the lithologies encountered in the subsurface are well represented at the surface. The previously described units can be differentiated using patterns and signal strengths from the airborne magnetic survey.

5.0 Recommendations

1) Additional drilling using a core rig is recommended. This will not only improve the geological logging but also the sampling integrity and resulting geochemical data. At least one hole should be drilled to test the depth extent of the known mineralization and another hole to test the southern extent of the body. The magnetic anomaly 250 m to the north of the Discovery outcrop should also be drilled. The first and second hole should be designed to intersect a body trending north-south and dipping 35-45 degrees to the east. The third hole should plan on intersecting a body with a more northeasterly trend and a currently unknown dip.

2) A small suite of samples (15-20) should be chosen from the drillcore for full petrography and whole rock analysis. Correlations between the whole rock and ICP data should make it possible to distinguish between lithostratigraphic units using just the ICP data. This data will prove useful during any additional surface or subsurface mapping/logging.

3) Additional ground magnetics should be conducted, particularly to the north and northeast. The airborne data is not of sufficient resolution to distinguish between the tonalite and the spatially restricted mafic/ultramafic units.

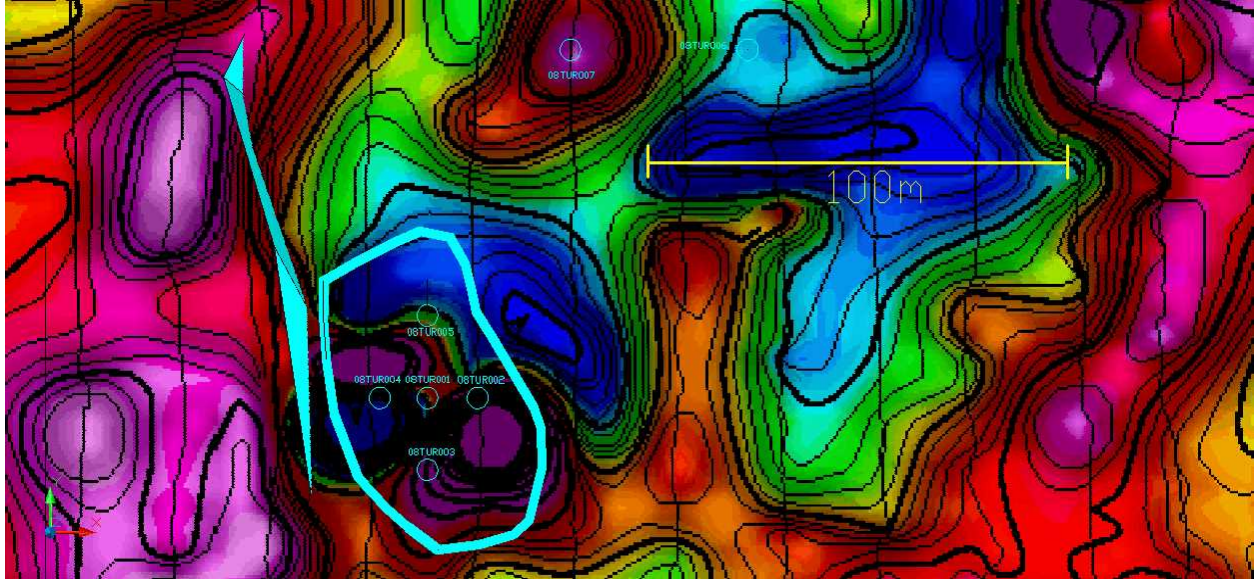


Figure 1: Plan view of the 2008 RC drillhole collars at Tunerq.

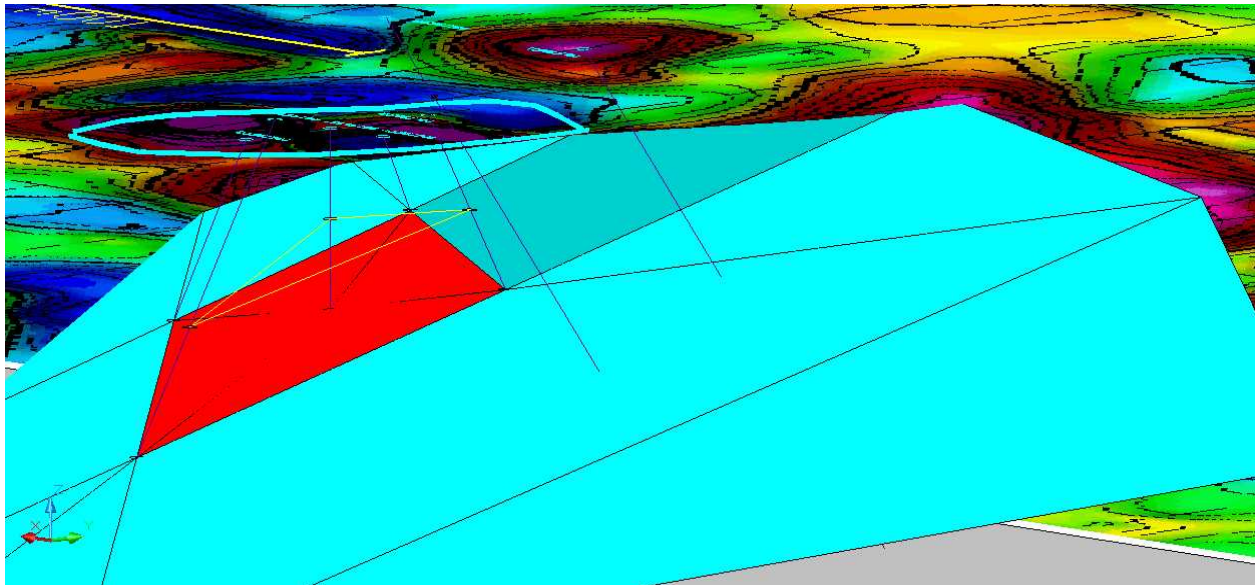


Figure 2: Looking SW from subsurface. The red plane is the defined base of the mafic body while the blue plane is extrapolated. The purple lines are drillholes and the yellow triangle is the base of known mineralization.

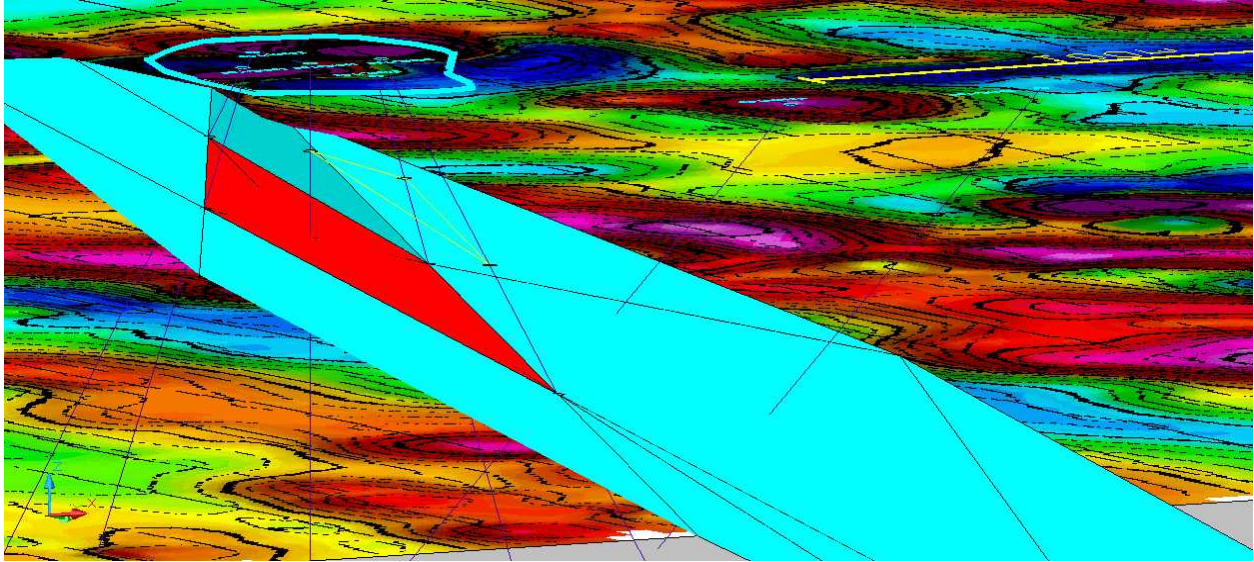


Figure 3: As above, but looking NW.



Figure 4: RC hole 08TUR001.



Figure 5: RC hole 08TUR002.



Figure 6: RC hole 08TUR003.



Figure 7: RC hole 08TUR004.



Figure 8: RC hole 08TUR005.

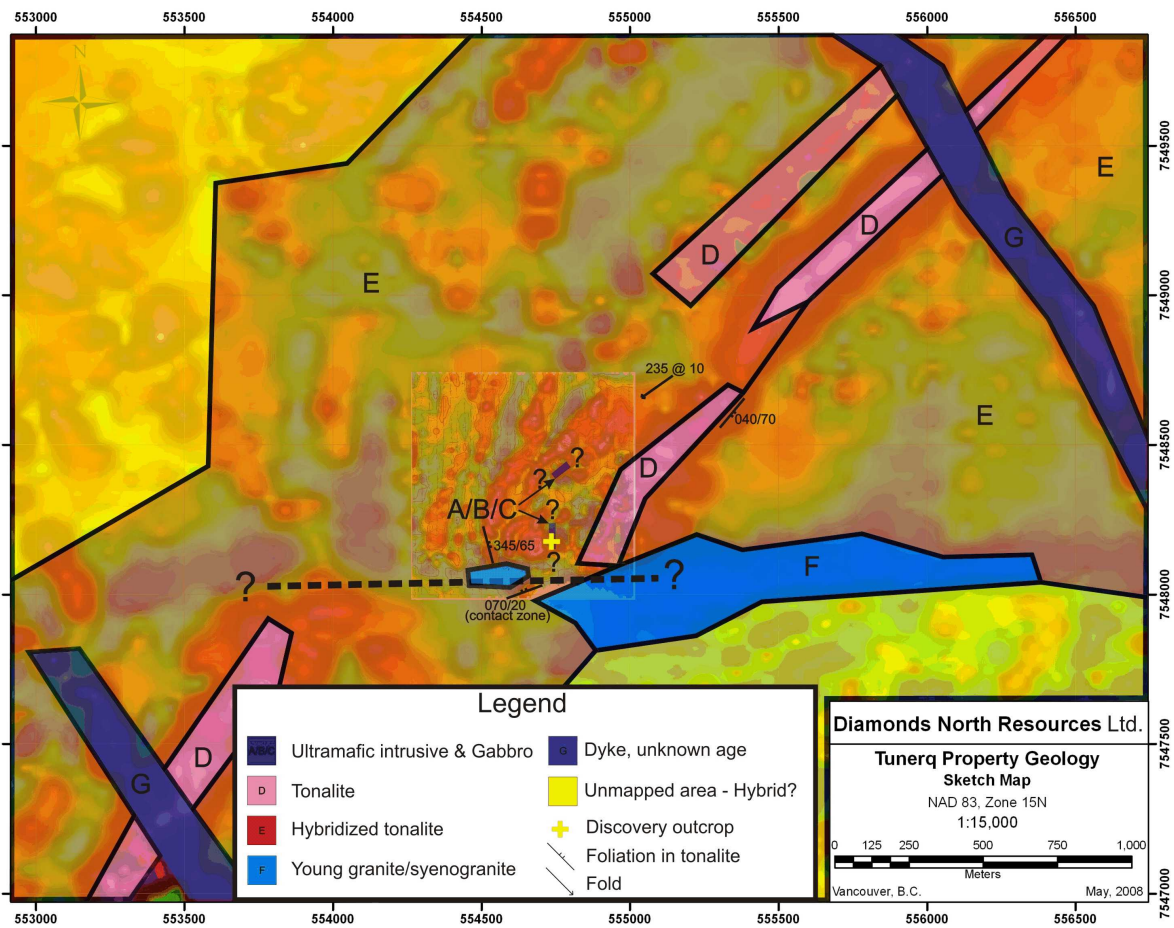


Figure 9: Geological sketch map of the Tunerq area.



Figure 10: Discovery outcrop showing dip of mafic body.



Figure 11: Tonalite injected gabbro, north of Discovery outcrop



Figure 12: Plagioclase rich gabbro, north of Discovery outcrop.