John - FYI

Stratigraphic and Lithogeochemical Characteristics of Archean Volcanic Rocks from Reid Township, Timmins Region, Ontario

-- Part II --

for:
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on behalf of:
The Reid Syndicate

-- Dec. 10, 1994 --

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Introduction

The Reid Syndicate claim groups (Figures 1 and 2) are located in the northeastern part of Reid Township, just west of the Matagami River, within Archean volcanic rocks of the Stoughton-Roquemore Kidd-Munro Group of the southern Abitibi greenstone belt. The claim groups lie about 10-15 km northwest of the Kidd Creek mine, which has past production and reserves, as of the end of 1991, totalling 130 million tonnes at 2.86% Cu, 6.14% Zn and 85 g/t Ag (cited in Shandl and Wicks, 1993).

Almost no outcrop is exposed in the northern and southern Reid Syndicate claim groups, as bedrock is covered by up to 50 metres of glacial overburden. Claim drilling to date is limited, although the areas surrounding the claims on all sides have had a moderate degree of drill coverage. Little is presently known about the geology of the northern claim group, other than that it probably contains, by extrapolation, a prospective belt of rhyolites and flanking mafic volcanic rocks that runs between holes drilled to the southeast of the claims mainly by Gulf Minerals, and holes drilled to the northwest of the claims mainly by Falconbridge Ltd. The presence of rhyolites and basalts within the northern Reid claim group is confirmed by two holes in the eastern part of the group (RM-79-1 and Chance R-2). In addition, a series of reverse circulation holes (UR-81-01 to UR-81-15), located along an east-west transect near the northern boundary of the claim group, encountered mainly felsic volcanic rocks in the several metres intersected immediately below overburden. Two holes in the western part of the claim group (HC-R-1-67 and R-2-67) intersected mainly mafic volcanic and intercalated graphitic sedimentary rocks.

The volcanic rocks immediately east of the Reid claims have been divided into Central Rhyolite, Southern Basalt, and Upper Rhyolite units. These are described in a petrographic and lithogeochemical survey by Pyke (1989) that focused on drill holes located mainly in the Comstate option claim block (Fig. 1), which flanked the Matagami River, but did not extend west into the area presently covered by the northern Reid claim block. The Central Rhyolite is thought to be folded about an anticlinal axis that trends to the west-northwest (Pyke, 1989); it is interpreted to be overlain stratigraphically to the south by first the Southern Basalt, then the Upper Rhyolite. A U-Pb zircon date of 2706±2 m.y. was obtained by Barrie and Davis (1990) for a rhyolite tuff apparently located near the southern contact of the Upper Rhyolite. This is the same age as the Kamiskotia gabbro complex and Kamiskotia rhyolite located ≈30 km to the south, but younger than the age of 2717 ± 2 m.y. for the Kidd Creek rhyolite (Barrie and Davis, 1990).

Reid and surrounding townships, Porcupine Mining Division, Ontario

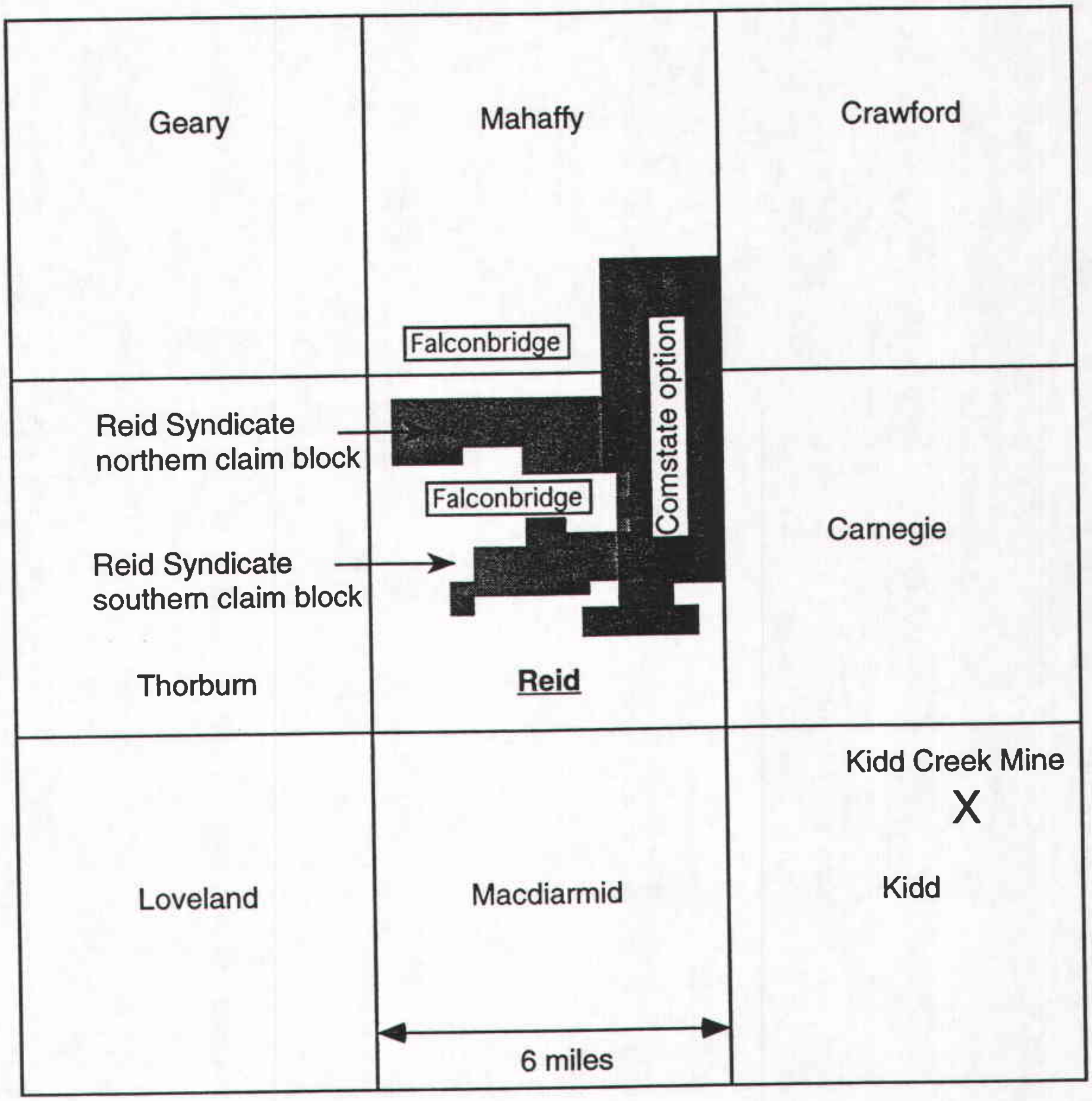

Figure 1. Location of northern and southern Reid Syndicate claim blocks, Comstate option, and site of Kidd Creek Mine.

REID SYNDICATE: NORTHERN AND SOUTHERN CLAIM BLOCKS AND DRILL HOLES IN VICINITY

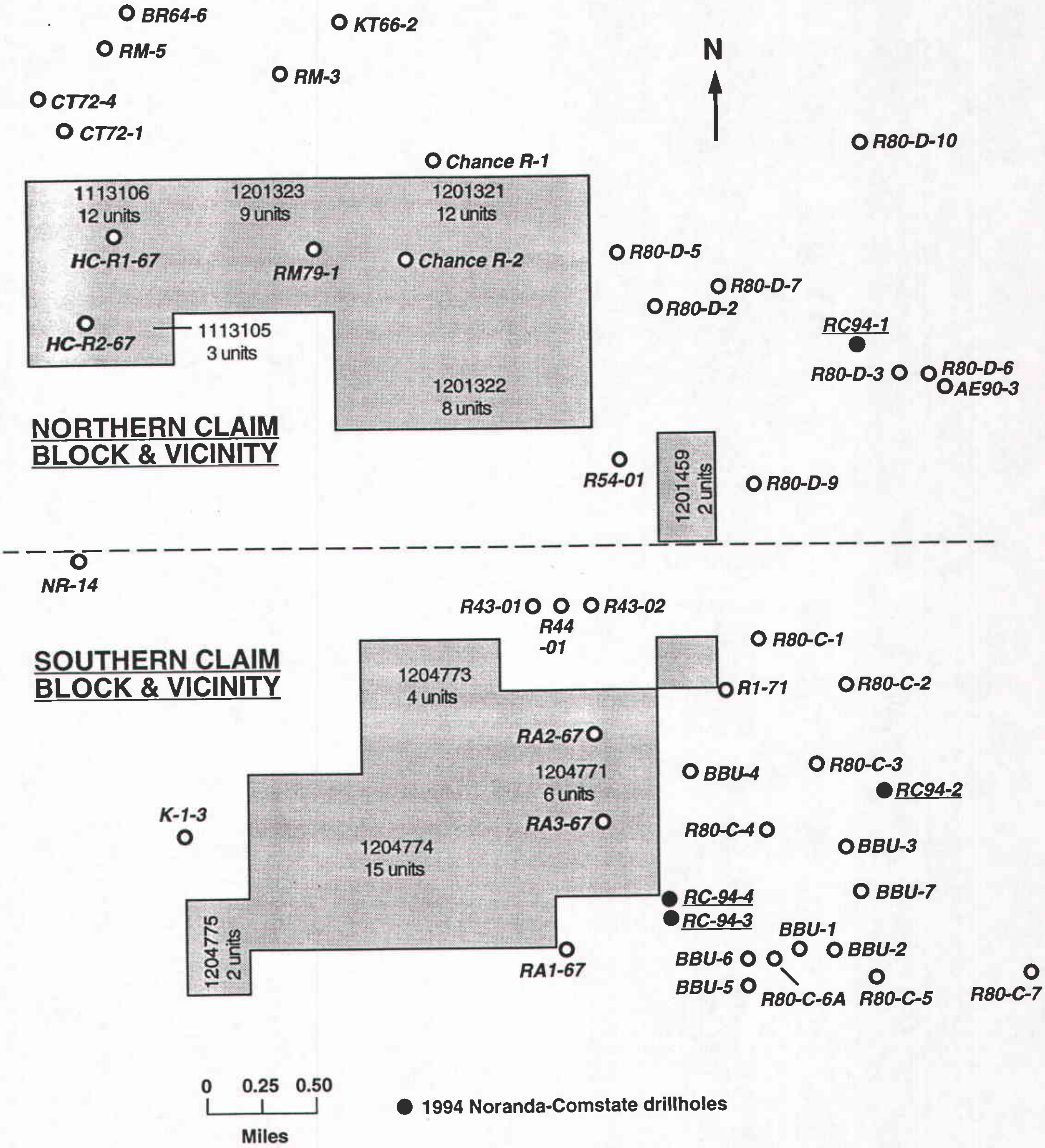

Fig. 2

An initial lithogeochemical study by Barrett and MacLean (1994) on the northern claim area established lithological units, volcanic stratigraphy and alteration. The present report on the northern and southern claim groups and vicinity emphasizes primary and alteration lithogeochemistry and inferred stratigraphic relations as applied to evaluation of the property's potential for mineralization. Numerous drill logs and data in eastern Reid township are also utilized, including four holes drilled in 1994 by Noranda Exploration.

Purpose and Scope of Study

The purposes of this study are: 1) to establish the stratigraphy and geochemistry of the main volcanic rock types in the northern and southern Reid claim blocks and nearby areas; 2) to compare the volcanic rocks with those hosting massive sulfide deposits in the Timmins area and elsewhere in the Abitibi greenstone belt; and 3) to suggest drill holes to test for extensions of the Central and Southern Rhyolite volcanic stratigraphy.

Any future drilling project on the Reid claims should attempt to determine if the Central Rhyolite and associated mafic volcanic rocks in the vicinity of the Matagami River continue northwestwards across the northern Reid claim group. Similarly, it is important to ascertain if the Southern Rhyolite strikes northwestwards onto the southern Reid claim group. As shown below, both of these rhyolites have lithogeochemical features that mark them as potentially favorable units in terms of hosting VMS mineralization.

Lithogeochemistry and Volcanic Stratigraphy

Data and Methods

The new sample set consists of 58 drill-core samples that were analyzed for major elements and the trace elements Zr, Y, Nb, Ba, Rb and Sr; 34 samples were from the northern claim block and nearby areas (Table 1), and 24 from the southern claim block and vicinity (Table 2). All samples were analyzed by X-ray fluorescence at the XRAL lab in Toronto using glass beads for major elements and pressed pellets for trace elements to ensure accuracy and low detection limits. In addition, 22 samples from the northern claim block were analuzed for rare-earth elements (REE) by neutron activation analysis (Table 3).

In the lithogeochemistry section below, a series of diagrams are presented with data from the vicinity of the northern claim area (NCA), as well as results from a previous report on this area (Barrett and MacLean, 1994). This is followed by an analysis of rare-earth element data from the NCA. Lithogeochemical data from the vicinity of the southern claim area (SCA) are then examined using the same series of plots.

Finally, a set of lithogeochemical data (courtesy of Noranda Exploration Inc.) are treated for 81 samples from five holes drilled by as part of Noranda's 1994 exploration program in Reid Township (Table 4). As shown in Figure 2, one hole (CR94-1) is located about 2 km east of the eastern boundary of the Reid Syndicate's northern claim block; a second hole (CR94-2) lies a about 1.5 km east of the eastern boundary of the southern claim block; and two holes (R94-3, R94-4) are immediately outside of the southeastern corner of the latter block. We also briefly discuss lithogeochemical data from four holes (R43-1, R43- 2, R44-1, and R54-1) drilled by Falconbridge Ltd. in the region between the Reid Syndicate's two claim blocks.

Lithogeochemistry -- Northern Claim Area

Plots of Al_2O_3 versus TiO_2 (Fig. 3a), TiO_2 versus Zr (Fig. 3b) and SiO_2 versus Zr (Fig. 4a) show that samples from the northern claim area (hereafter NCA) mainly comprise a group of ferrobasalts and basalts on the one hand, and rhyolites of limited compositional variation on the other. The latter group is termed rhyolite A, which refers to fractionated rhyolite with low TiO_2 contents (0.1-0.2%). A few dacitic-andesitic compositions were also noted in the NCA in our earlier Reid report. In Figures 3 and 4, two silicifed mafic rocks have been omitted in order to examine primary geochemical trends.

The magmatic affinity of the NCA rocks is shown in plot of Y versus Zr (Fig. 4b), where rocks with $Zr/Y<4.5$ are of tholeiitic affinity, those between 4.5-6 are of transitional affinity, and those with $Zr/Y>6$ are of mildly calc-alkaline affinity. Assessments of affinity are not, however, made solely on the basis of the Zr/Y ratio, but also using other discriminants such as rare-earth element pattterns (and, in the mafic part of the spectrum, the nature of Ti-Fe-P enrichment trends).

The degree of K and Fe alteration is shown qualitatively by a plots of K_2O-TiO_2 (Fig. 5a) and FeO-TiO_2 (Fig. 5b). Sericitization is moderate to strong in the felsic rocks. Although alkali exchange has clearly occurred during alteration of the felsic rocks, the fact that Al_2O_3 contents mainly remain below ≈15% (Fig. 3) indicates that strong net mass loss has not occurred in the sampled felsic rocks (this usually leads to Al_2O_3 enrichment). Two mafic rocks have been sericitized (Fig. 5a). Three rhyolites show addition of Fe relative to unaltered rhyolites, which typically contain not more than 1-2% FeO (Fig. 5b).

Reid Township

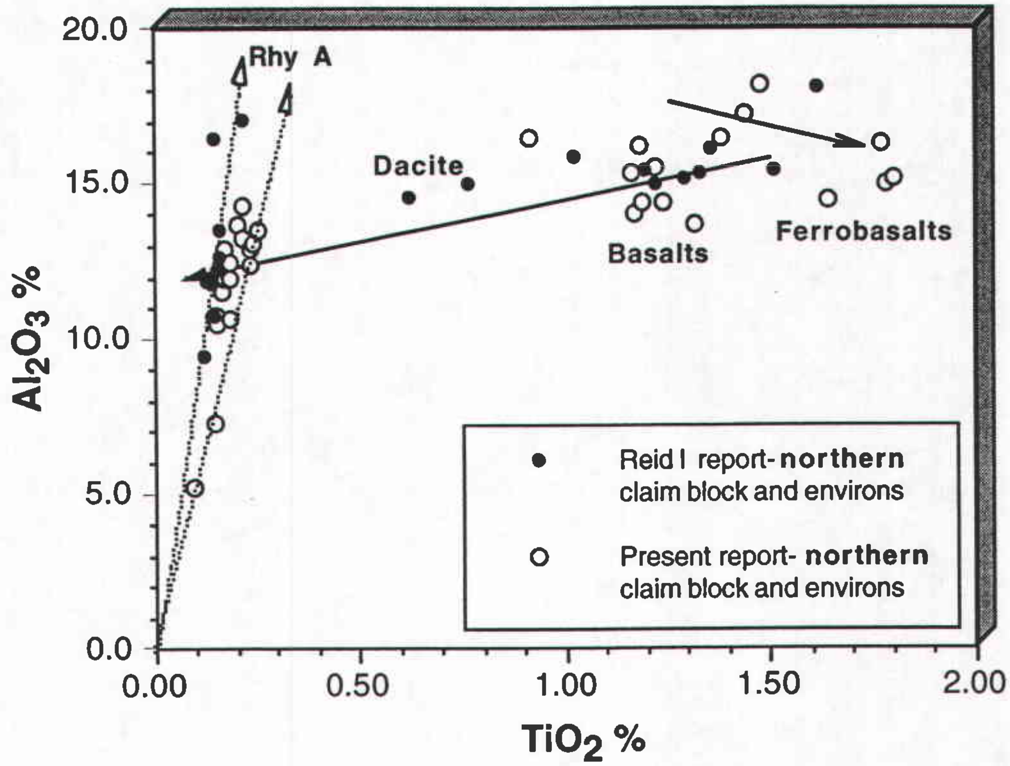

Fig. 3a

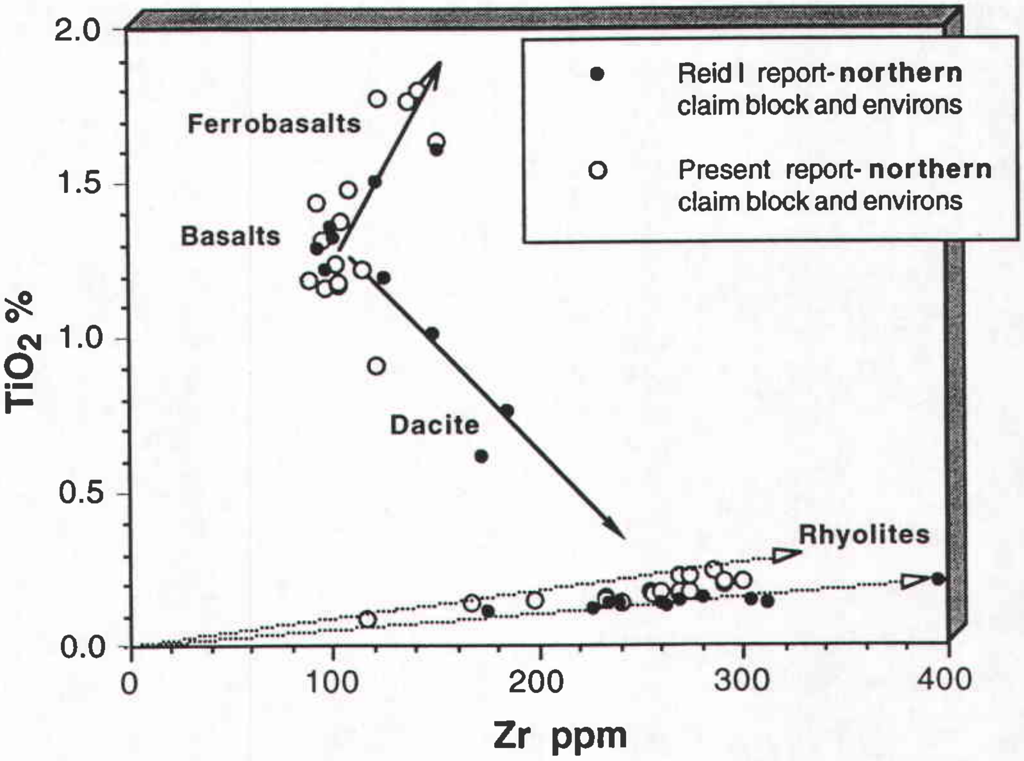

Fig. 3b

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Fig. 4a

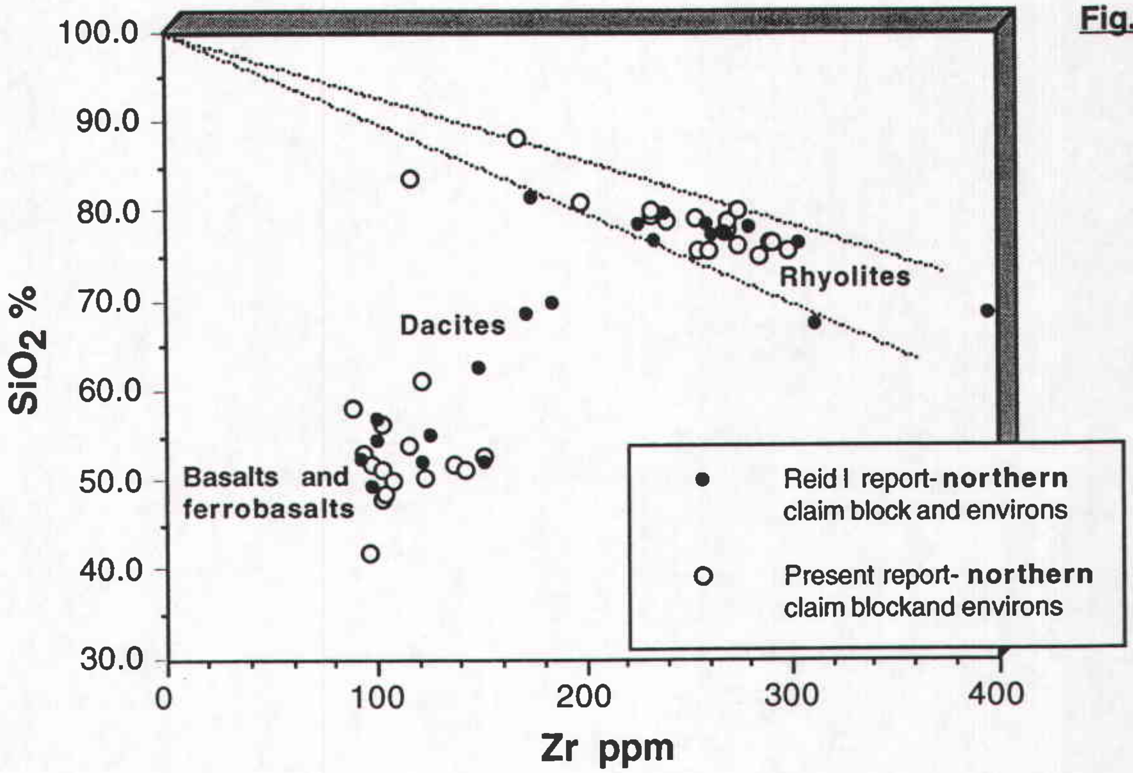

Fig. 4b

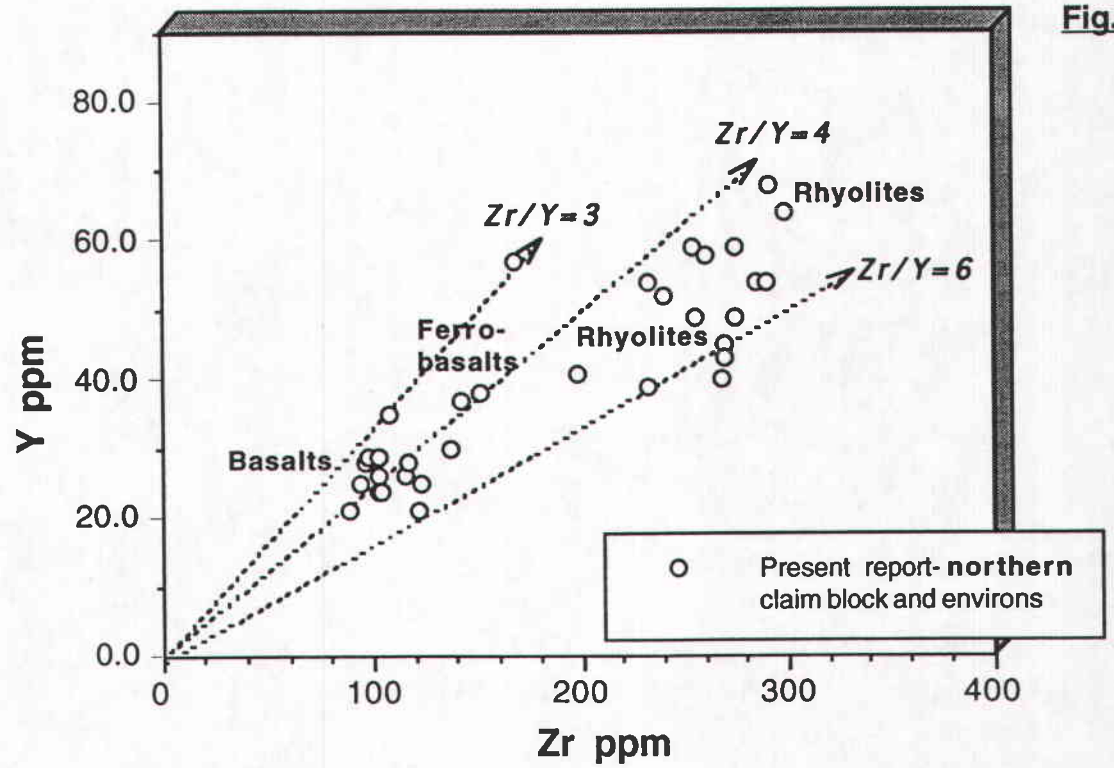

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Fig. 5a

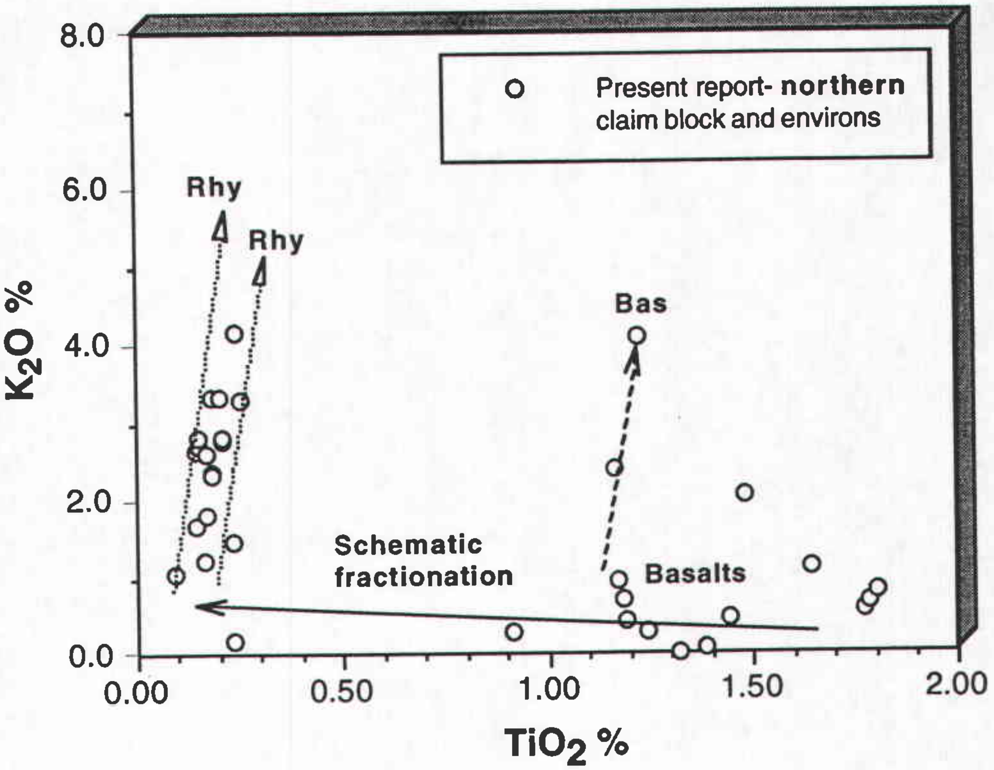
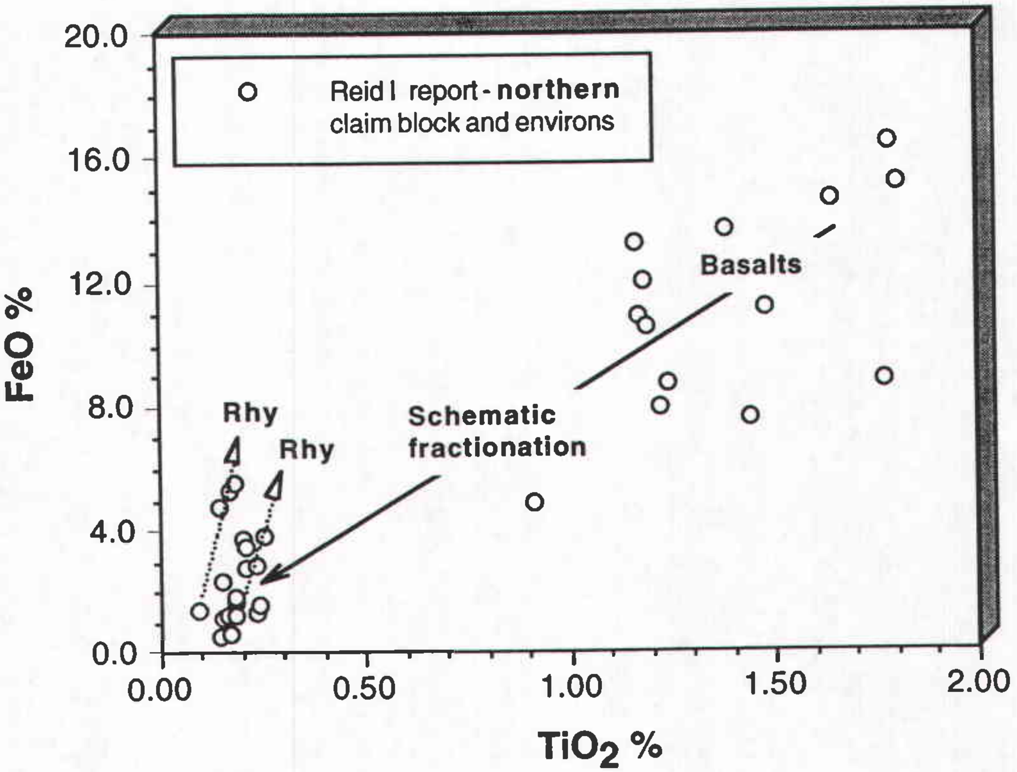


Fig. 5b



Holes drilled to the north of the northwest corner of the NCA include BR64-6, RM-5, CT72-1 and CT72-4. In BR64-6, two rhyolite samples are notably sericitized and Na-depleted. Two samples from RM-5 are basalts (65', 77'). Hole CT72-1 includes three sericitized and Na-depleted rhyolites in its upper part (samples in 76'-227' range), and three unevolved ferrobasalts in its lower part (samples in 346'-475' range). The unevolved ferrobasalts are characterized by low TiO_2, Zr, SiO_2 and P_2O_5 relative to more evolved ferrobasalts (as at 276'). Hole CT72-4 includes two sericitized, chloritized and Na-depleted rhyolites (347', 461').

The rhyolites in BR64-6, CT72-1 and CT72-4 have a magmatic affinity near the tholeiitic-transitional boundary (Zr/Y = 4.3-5.4). The affinity of the rhyolites is confirmed by REE data (discussed later) which yield chondrite-normalized La_n/Yb_n values of 4.2 to 5.2 (4 samples from BR64-6 and CT72-1). These rhyolites are thus FIIIa rhyolites in the classification of Lesher et al. (1986). As such, they are comparable to the Central Rhyolite that lies to the east of the NCA (Pyke, 1989; Barrett and MacLean, 1994). The ferrobasalts and basalts in holes RM-5 and CT72-1 are of tholeiitic affinity, with Zr/Y = 3.3-4.2. The tholeiitic affinity of ferrobasalt in CT72-1 is confirmed by its La_n/Yb_n value of 1.6.

Holes drilled to the north of the central part of the NCA include RM-3 and KT66-2. Five samples from RM-3 are weakly to moderately altered rhyolites (in the 206' to 518' range). All four samples from KT66-2 are rhyolites; from shallowest to deepest they are, respectively, unaltered (335'), slightly altered (280'), silicified and Na-depleted (375'), and sericitized and Na-depleted (550'?). In both holes, the rhyolites are of weakly tholeiitic to transitional affinity, with Zr/Y = 4.2-6.6 (six samples), and La_n/Yb_n values of 5.6 to 8.2 (five samples), which identifies them as FIIIa through to FII rhyolites.

Holes drilled in the western part of the NCA include HC R-1-67 and HC R-2-67. Three samples from the former hole are basalts (in the 275'-700' range), as are three samples in the latter hole (in the 225'-550' range). Specifically, two of the samples from HC R-1-67 are unevolved ferrobasalts with low TiO_2, Zr, SiO_2 and P_2O_5 (500', 550'), whereas two from HC R-2-67 are more evolved ferrobasalts (375', 700'). The ferrobasalts and basalts in these holes are of mainly tholeiitic affinity, with Zr/Y = 3.7 to 4.5 (five samples; also one value of 5.0). The tholeiitic affinity of two ferrobasalts in these holes is confirmed by La_n/Yb_n values of 2.3 and 2.4. Compositionally, the unevolved ferrobasalts compare closely with those in hole CT72-1 about 1.5 kilometres to the north.

Rare Earth Elements -- Northern Claim Area

All new REE data are from holes in the vicinity of the northern claim block. Chondrite-normalized REE plots are shown in Figure 6a for Central Rhyolites in holes R-80-D5 and Chance R-2. All patterns are typical of FIIIa rhyolites, that is, they are somewhat depleted in the heavy relative to the light REE. By contrast, FIIIb rhyolites, which are commonly associated with VMS mineralization in greenstone belts of the Superior Province, have relatively flat REE patterns, together with lower Zr/Y ratios and higher Y contents (Lesher et al., 1986). A previous REE analysis from R-80-D5 (233') by Pyke (1989) is also an FIIIa rhyolite; therefore this rhyolite type extends at least 95' within R-80-D5, which lies immediately east of the northern claim block. Central-type rhyolites also occur in R-80-D8, R-80-D7, R-80-D10 and Chance R-1, as indicated by their FIIIa-type REE patterns (Barrett and MacLean, 1994). These rhyolites typically have Zr/Y ratios of 4.5-6.5, that is, they are of transitional magmatic affinity; Y contents are ≈40-80 ppm.

By contrast to typical Central-type rhyolites, four rhyolites from holes AE-R-90-3 and one from RD-80-6 have REE patterns characteristic of FIIIb-type rhyolites (Barrett and MacLean, 1994). These holes (Fig. 2) lie east of the northern claim block, and immediately north of an inferred mafic belt (see compilation of K.A. Jensen, 1993). Their FIIIb-type affinity is confirmed by strongly tholeiitic Zr/Y ratios of 1.2 to 2.5, and high Y contents of ≈90-120 ppm. These FIIIb rhyolites may form an important unit striking west-northwest into the northern claim block, as discussed later in the report.

Hole RM79-1 within the NCA intersected a series of basaltic-andesitic-dacitic rocks (Fig. 6b). REE patterns show a progressive steepening from mafic to felsic compositions, as the light REE increase and heavy REE decrease. These changes suggest that these rocks could be related by fractionation. However, the high La_n/Yb_n values for the dacites (6.6, 6.9) together with their high Zr/Y values (8.8, 9.5) clearly indicate that they are of calc-alkaline affinity; by contrast, the basalt and andesite are of weakly tholeiitic affinity.

North of the NCA, central-type rhyolites were intersected in holes BR64, CT72-1 and RM-3 (Fig. 7a). These rhyolites have REE patterns and Zr/Y ratios (4.3-5.5) indicative of a weakly tholeiitic affinity, that is, they are FIIIa-type rhyolites. FIII rhyolites of transitional affinity (Zr/Y = 5.3-6.0) were intersected in holes KT66-2 and RM-3 (Fig. 7b).

The basalts and ferrobasalts in the NCA are of tholeiitic affinity, as indicated by their near-flat REE patterns (Figs. 8a, b) and Zr/Y ratios of 3.1-4.5; they resemble non-evolved (normal) Kamiskotia basalt, apart from lacking a strong positive Eu anomaly.

Reid Township volcanics

Fig. 6a

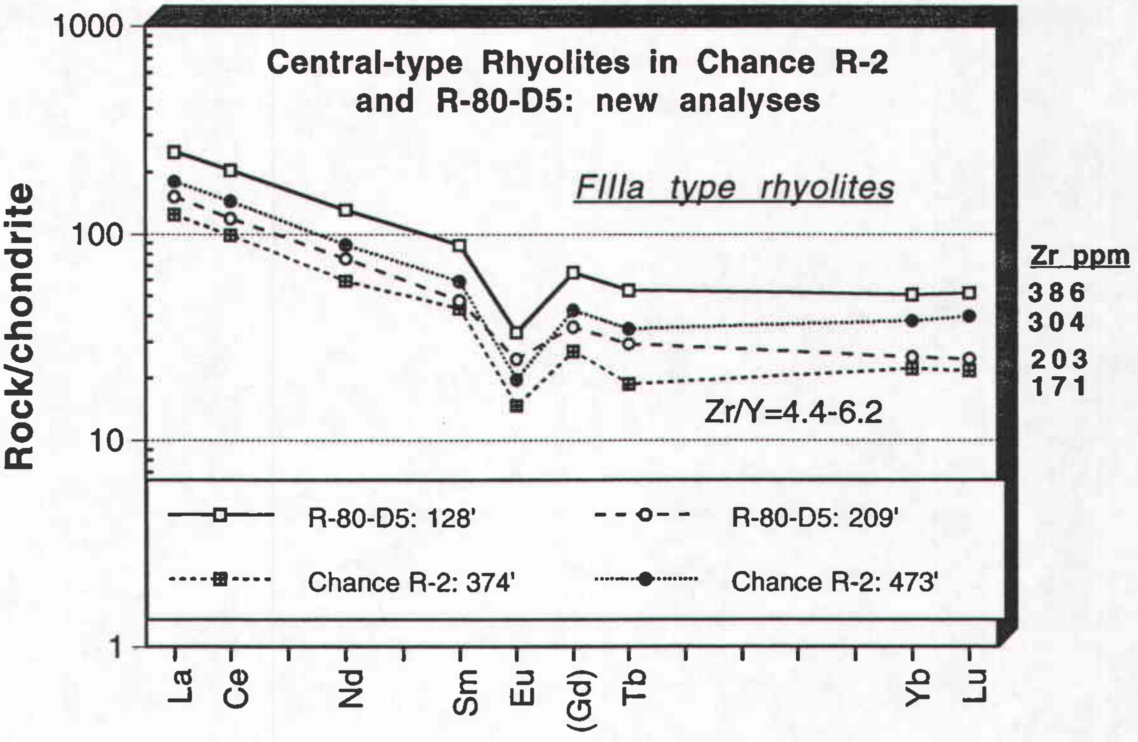
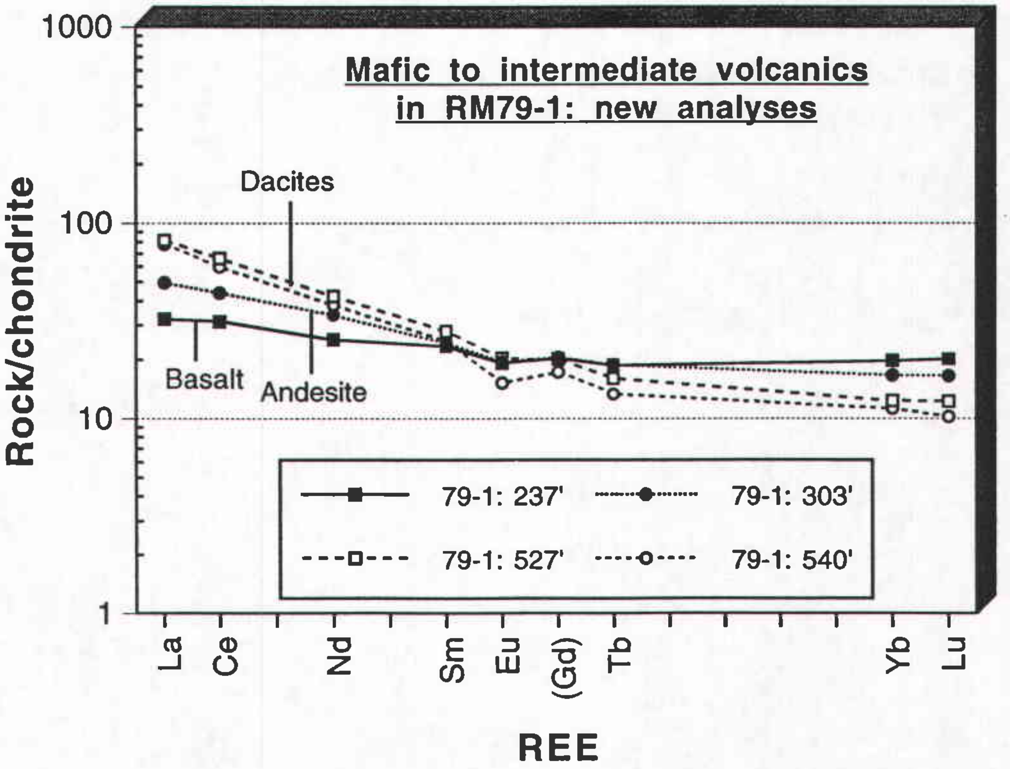


Fig. 6b



Reid Township volcanics

Fig. 7a

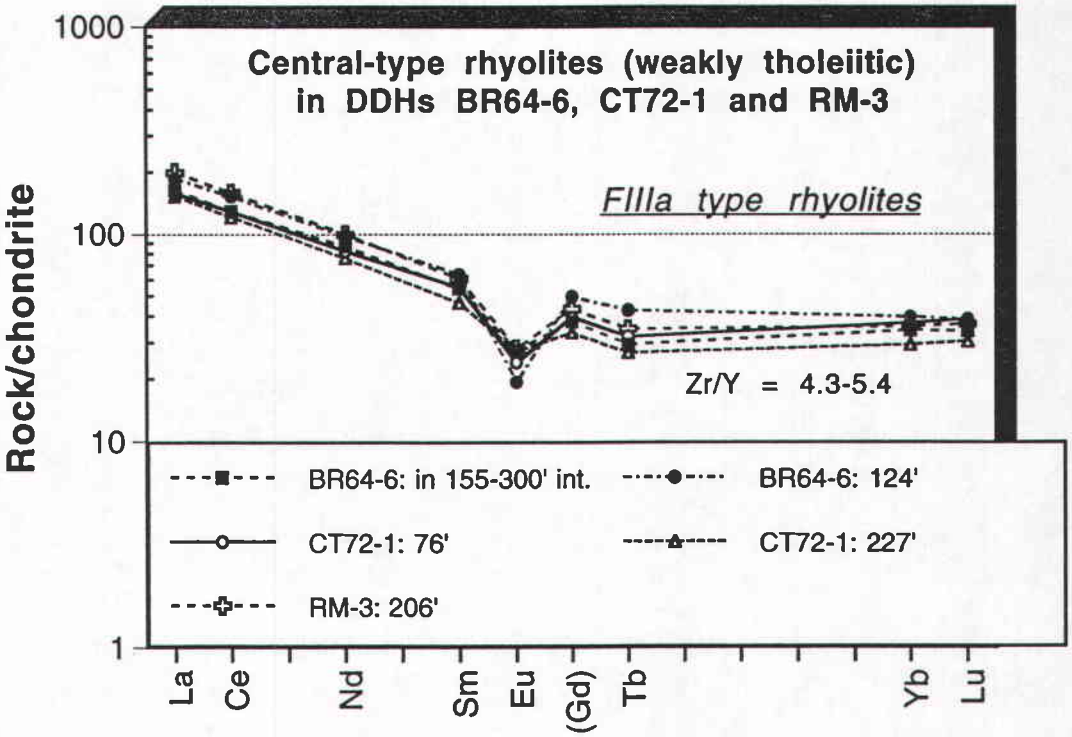
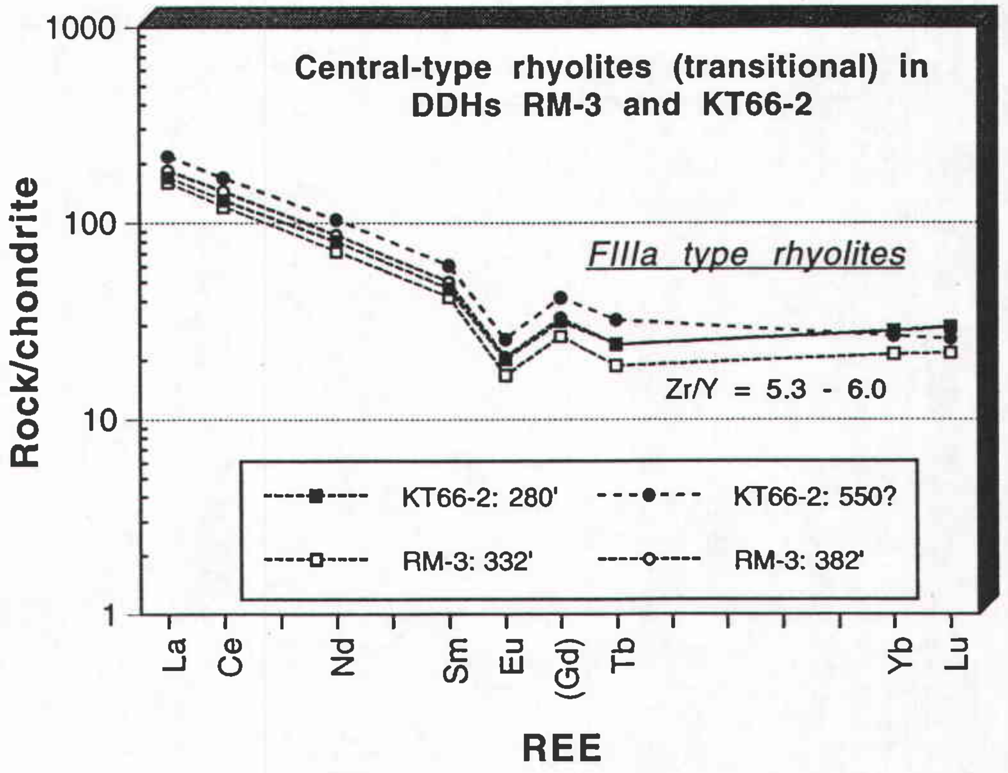


Fig. 7b



Reid Township volcanics

Fig. 8a

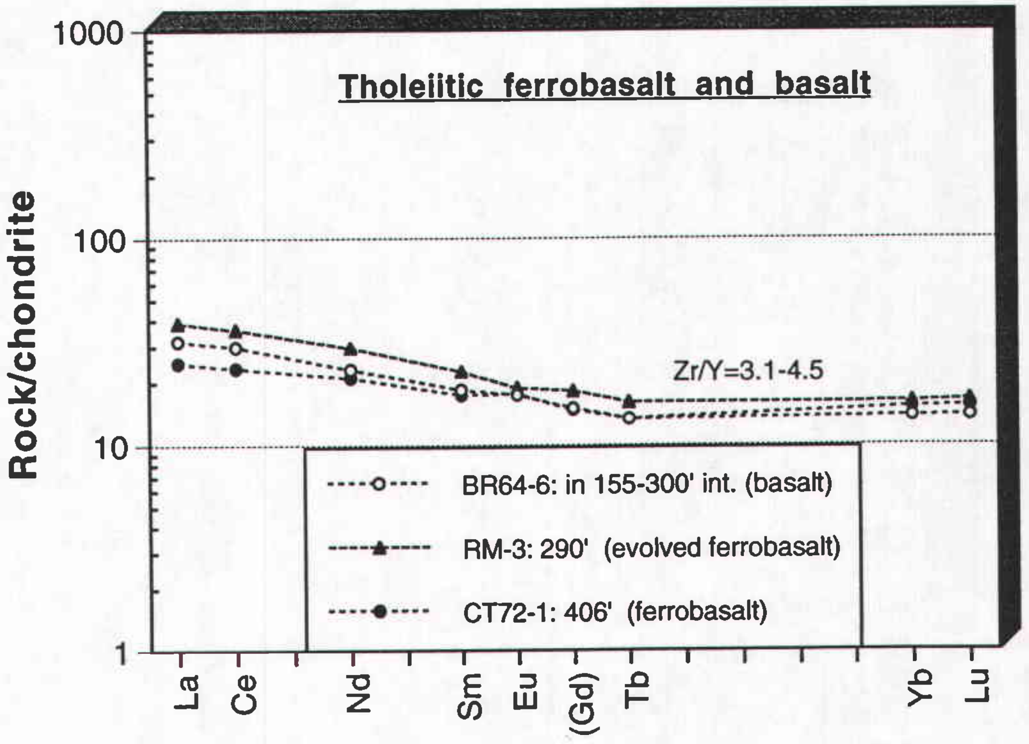
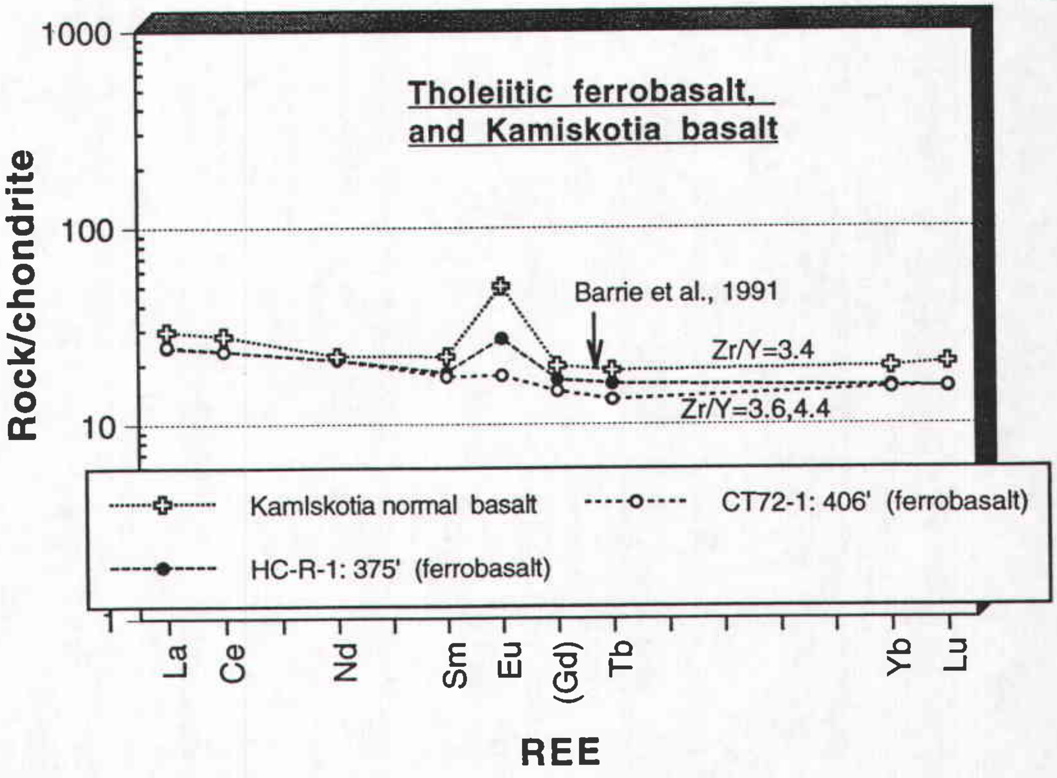


Fig. 8b



Lithogeochemistry -- Southern Claim Area

Samples for analysis came from a restricted area, mainly from holes R1-71, BBU-4 and RA3-67 near the eastern margin of the southern claim area (Fig. 2). As such, they are not representative of the SCA, particularly when rhyolites reported by Pyke (1989) from holes to the east of the SCA are taken into consideration. Plots of Al_2O_3-TiO_2 (Fig. 9a), TiO_2-Zr (Fig. 9b) and SiO_2-Zr (Fig. 10a) show that the new samples mainly comprise basalts and basaltic andesites, with lesser rhyolite and andesite-dacite. The mafic rocks fall into main two groups, one with lower contents of both TiO_2 (0.7-1.0%) and Al_2O_3 (13.2-14.8%). These mafic rocks occur mainly in hole BBU-4 (8 samples from 271' to 496'); 2 samples occur in nearby hole R1-71, and one in hole NR-14 (250') about 2 km northwest of the southern claim group. This group of mafic rocks is mostly of transitional affinity, as indicated by Zr/Y ratios of 5.3-6.4 (7 samples; 2 others are 4.0 and 7.6) (Fig. 10b).

A group of higher TiO_2-Al_2O_3 mafic rocks occurs mainly in hole RA3-67. Unaltered mafic rocks in this group (193' to 421') have 1.4-2.0% TiO_2 and 16.7-17.8% Al_2O_3 (samples at 298' and 450' appear somewhat silicified). Most of the samples in this mafic group are ferrobasalts with ≥9% FeO. The group is of weakly tholeiitic to transitional affinity, as indicated by Zr/Y ratios of 4.3 to 5.5.

Two rhyolites were sampled in hole R1-71. The first sample is strongly altered rhyolite A, with significant sericitization, chloritization, Na-depletion, and net mass loss. This rhyolite is strongly tholeiitic, with Zr/Y = 1.6; this is likely an FIIIb-type rhyolite analogous to the Southern (Upper) Rhyolite. The second sample is sericitized, Na-depleted rhyolite, with a transitional Zr/Y value of 6.7; this is likely an FIIIa-type rhyolite similar to the Central Rhyolite. REE data on these rhyolites would be useful to confirm affinities. An andesite and a dacite also occur in R1-71.

It is of interest that two distinctly different rhyolite types occur in the upper part of R1-71. Two comparable rhyolite types also occur in hole R80-C-7, about 3 km to the southeast, where three samples of strongly tholeiitic rhyolite occur in the 228-403' interval, and a weakly tholeiitic rhyolite at 477'. Single samples of transitional andesite and tholeiitic basalt were analyzed from Hole K-1-3, located one claim west of the western margin of the southern claim group.

The degree of potassic and iron alteration in SCA rocks is shown qualitatively using plots of K_2O-TiO_2 (Fig. 11a) and FeO-TiO_2 (Fig. 11b). Two rhyolites and one mafic rock show significant additions of K_2O; one rhyolite is strongly Fe-enriched.

Reid Township

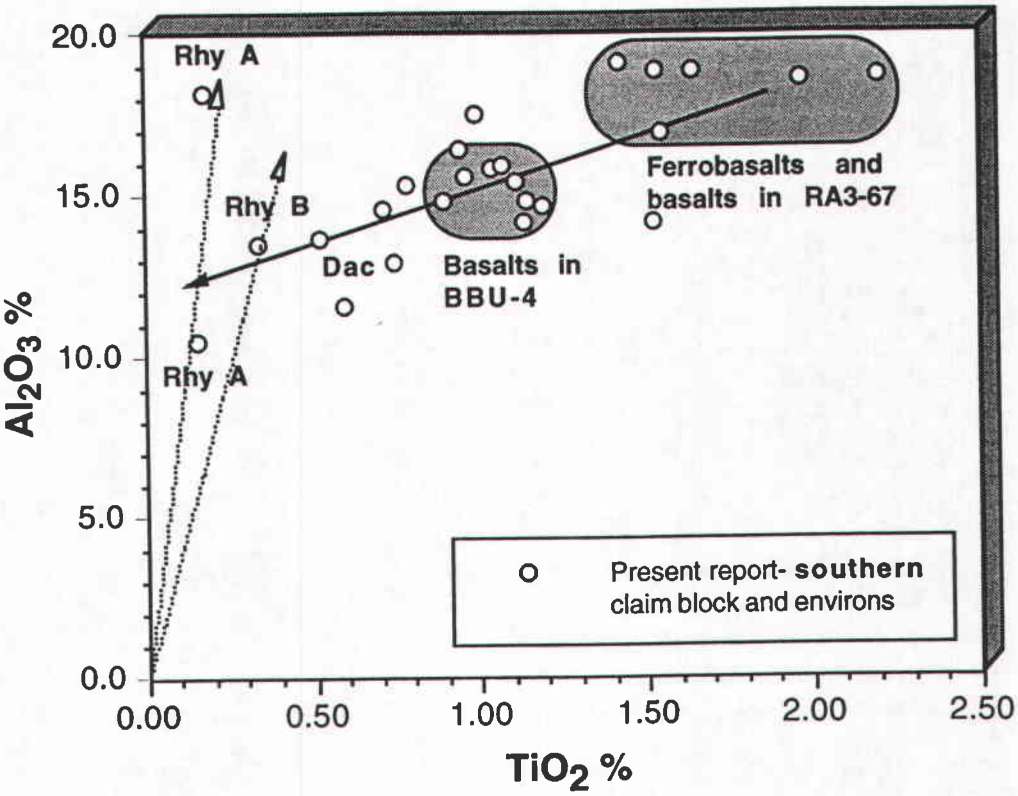


Fig. 9a

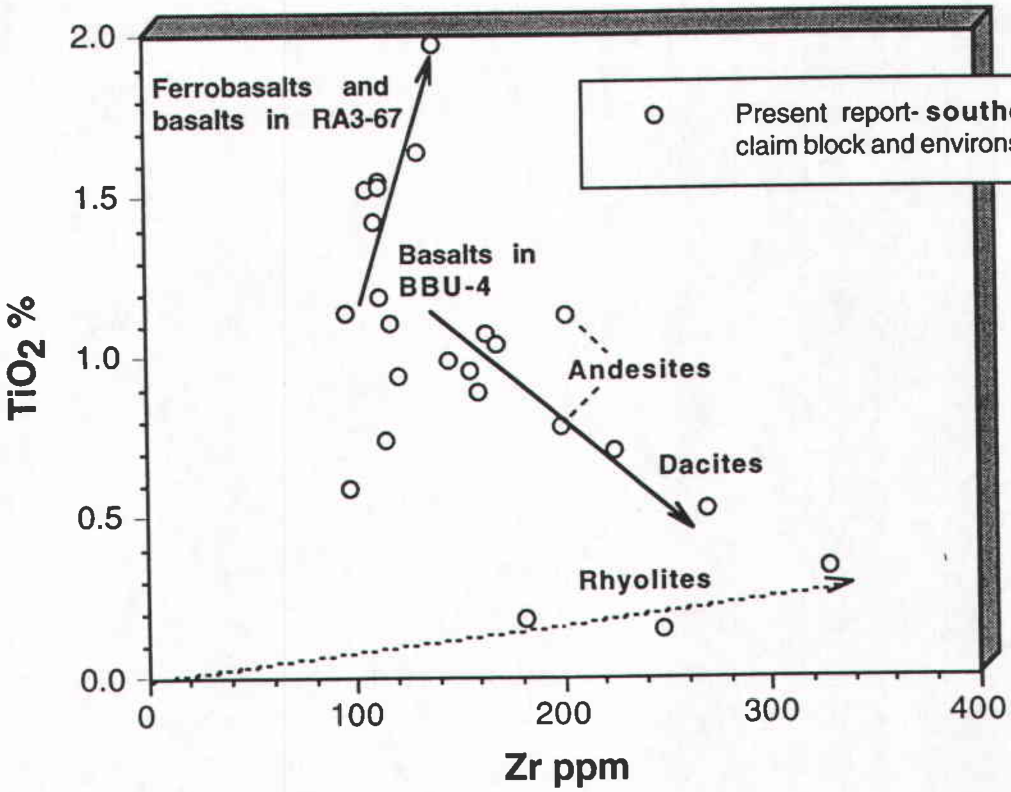


Fig. 9b

Reid Township

Fig. 10a

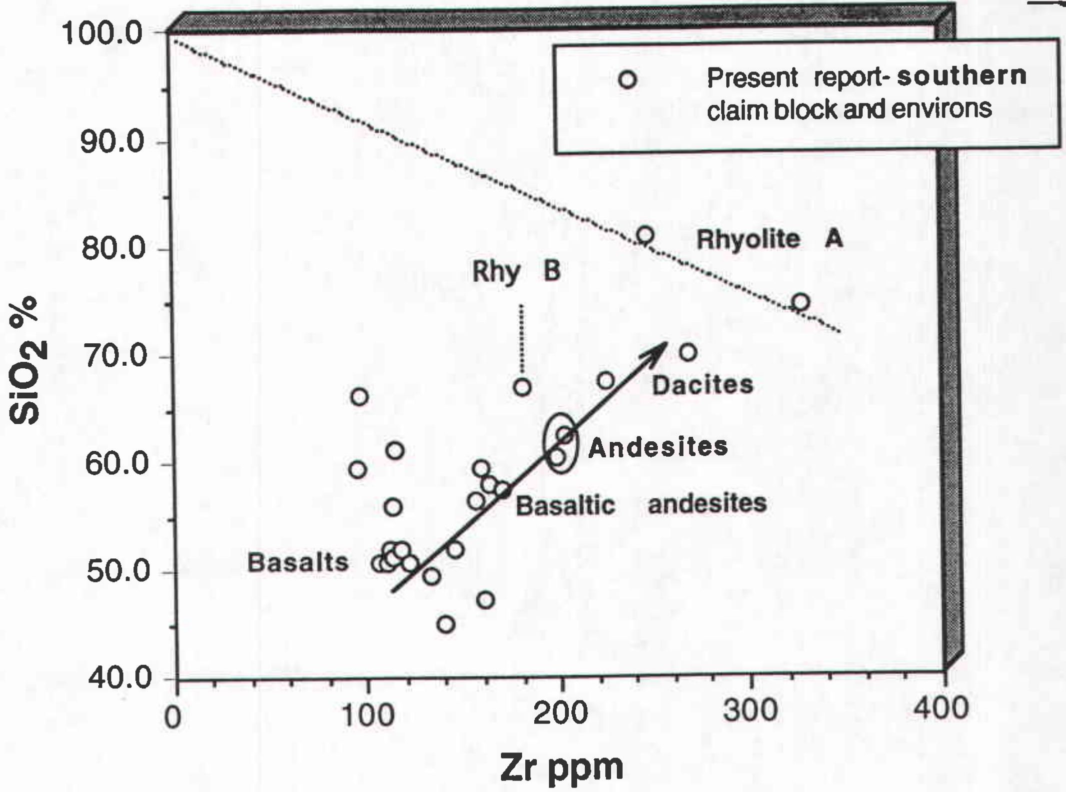
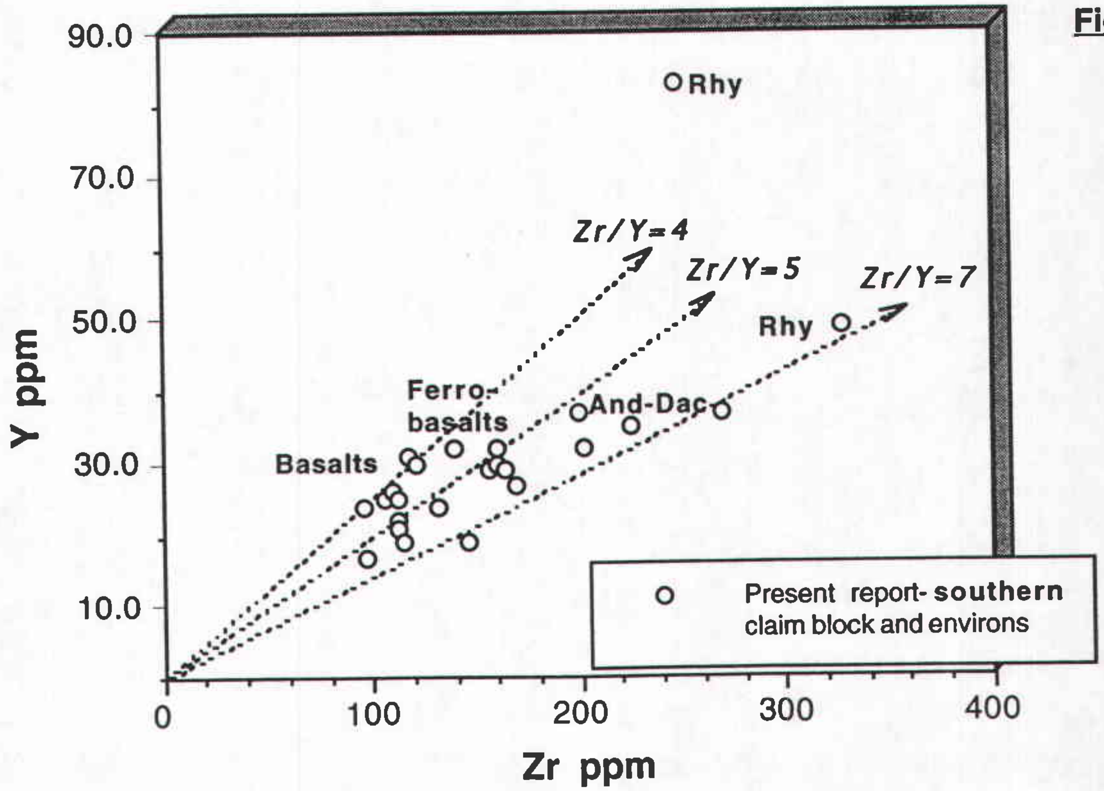


Fig. 10b



Reid Township

Fig. 11a

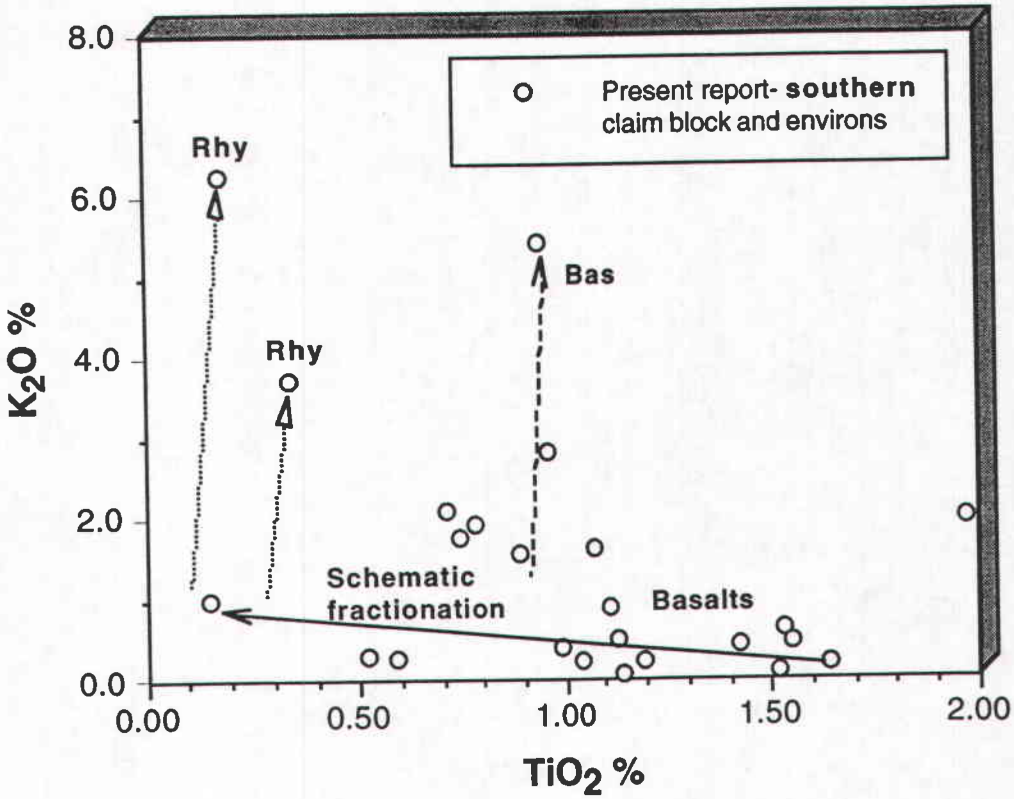
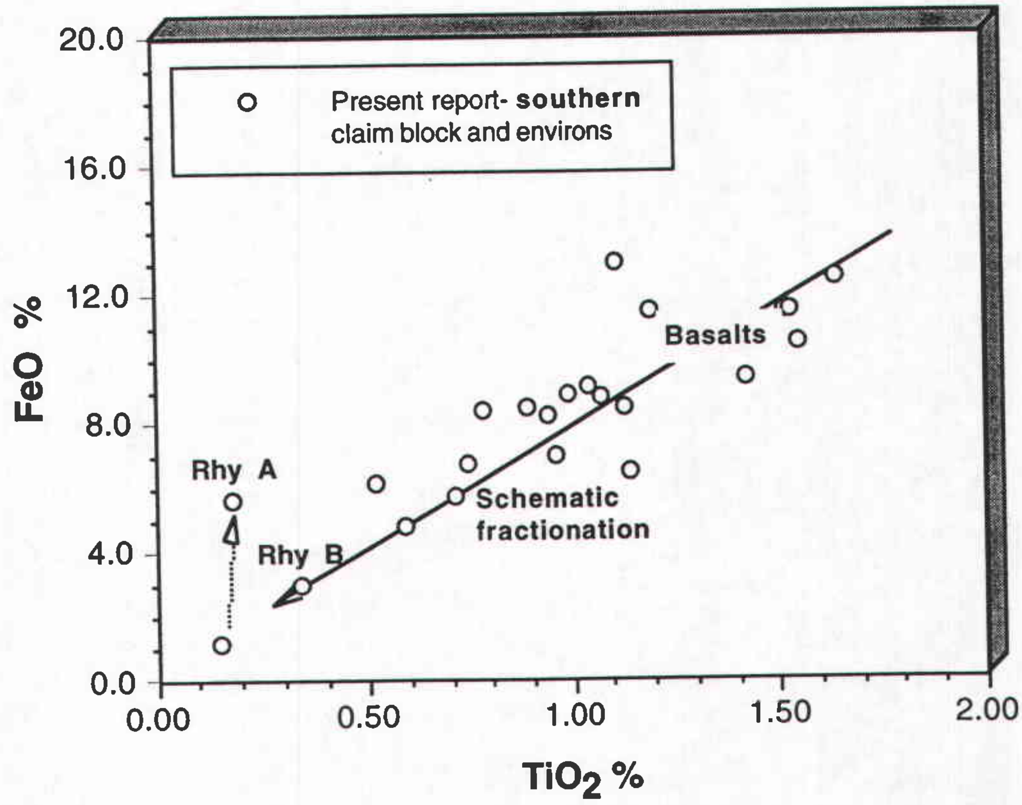


Fig. 11b



Petrography of the Southern Rhyolite

Based on Pyke's (1989) report on the Comstate claim block, and our inspection of several drill cores, the Southern Rhyolite in southeastern Reid Township is mainly a massive homogeneous quartz feldspar porphyritic rhyolite. It is pale grey to pale beige in colour, and is fine-grained (apart from the phenocrysts). Spherulitic structure was locally noted. Several greenish black zones (<1 metre thick) are interpreted as the altered glassy margins to individual flows of rhyolite. As shown in Barrett and MacLean (1994) and by data from Noranda's 1994 exploration holes (discussed below), the Southern Rhyolite is a an FIIIb-type rhyolite of tholeiitic affinity. As such, it represents a good exploration target, particularly as it is flanked by mafic volcanic rocks (Noranda's drilling indicates that mafic volcanic rocks are also intercalated within the Southern Rhyolite).

Figure 12a (upper photo, following page)

Reid R80-C-7 (486') **<u>Massive Quartz Feldspar Porphyritic Rhyolite</u>**

<u>Photo</u>: Quartz + albite phenocrysts in a matrix of these minerals, plus a sericite vein.
Crossed nicols, 40X (sample 30218)

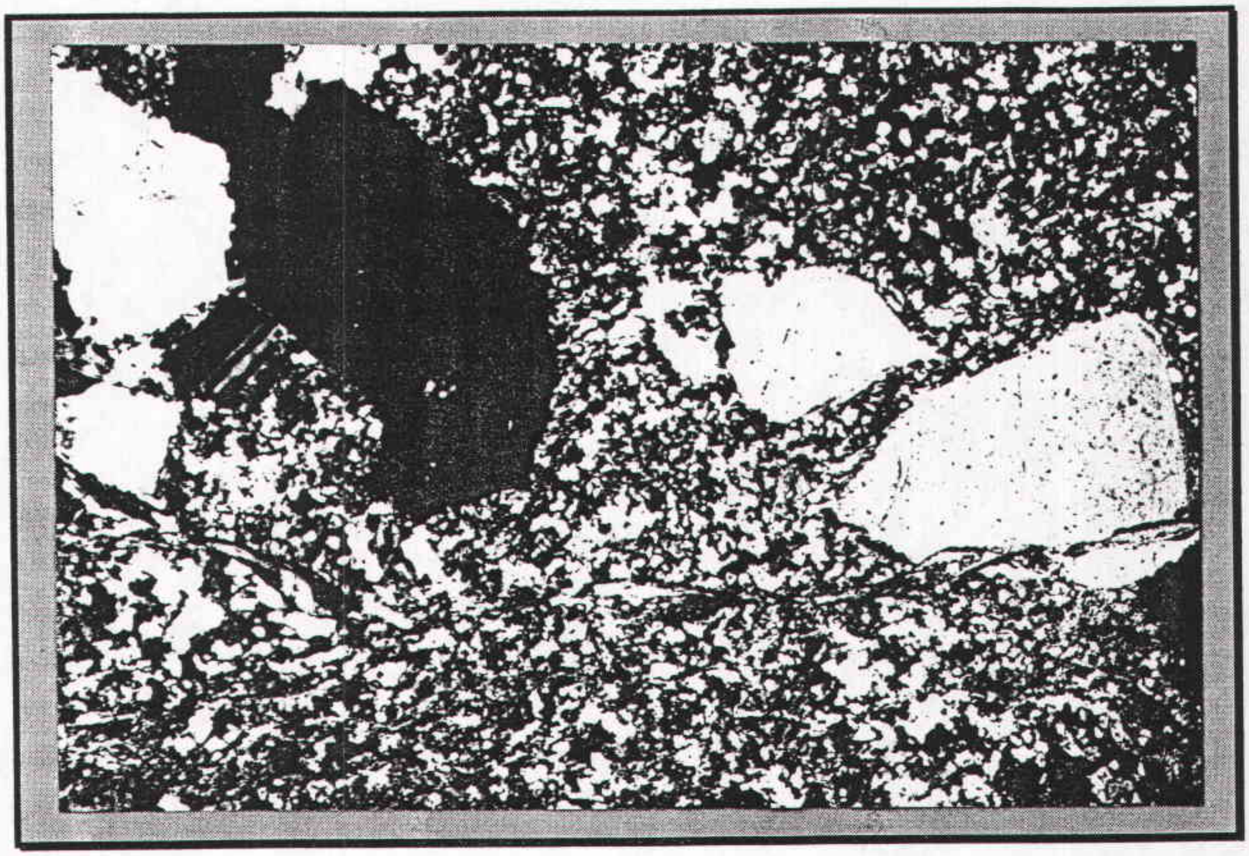
- <u>Least-altered;</u> massive with a fine-grained groundmass. Volcanic rather than intrusive.
- Quartz and partly altered albite phenocrysts (some albite replaced by carbonate).
- veins and amygdules of quartz and minor carbonate.
- Very thin sericite-chlorite veins along shear planes.

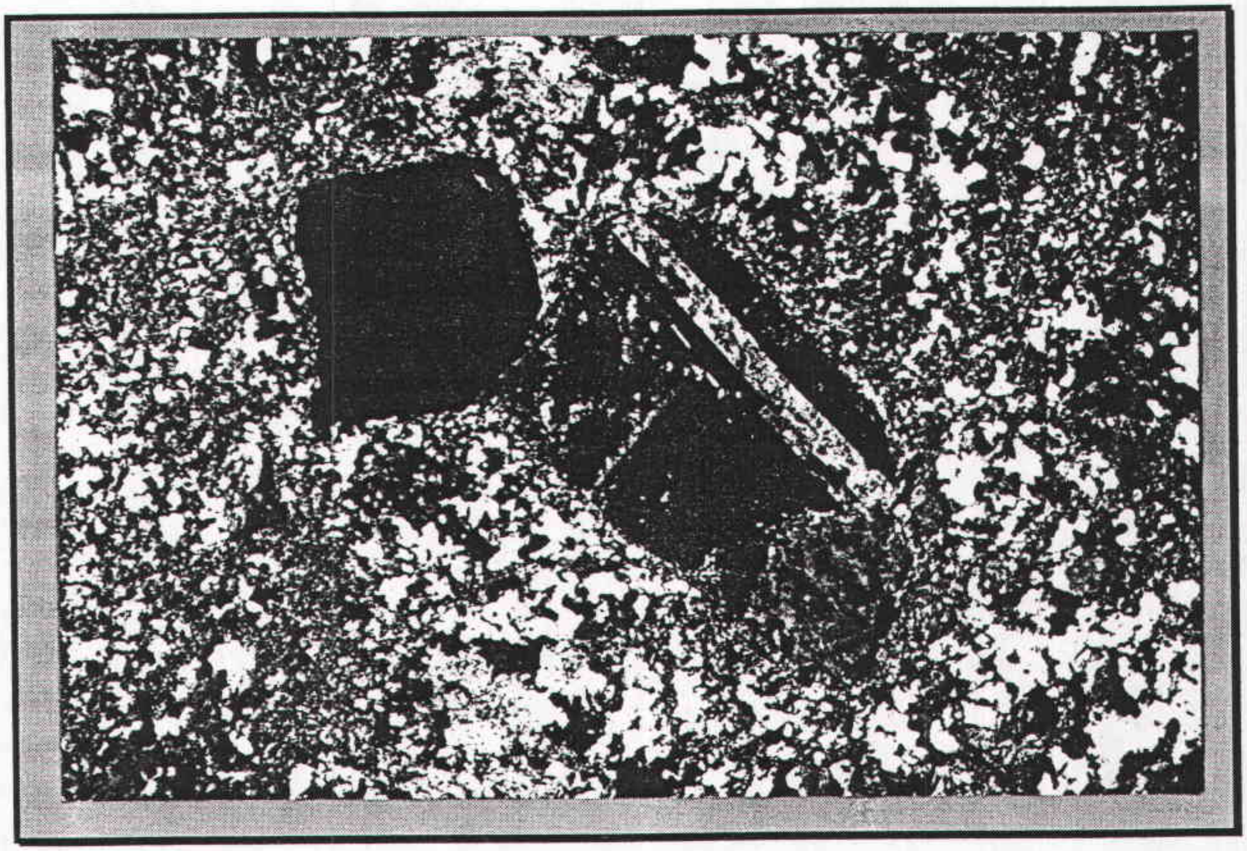
Figure 12b (lower photo, following page)

Reid R80-C-7 (304') **<u>Quartz Feldspar Porphyritic Rhyolite</u>**

<u>Photo:</u> Quartz+ albite phenocrysts in matrix of sericite + quartz+ carbonate.
Crossed nicols, 40X (sample 30219)

- Phenocrysts are mainly quartz.
- Matrix is fine grained and sericitic, with minor carbonate plus scattered biotite (chlorite is rare).
- The amount of biotite is probably limited by the original amount of chlorite, from the reaction: chlorite+ sericite = biotite.





Lithogeochemistry -- Noranda/Comstate 1994 Drilling Program

Table 4 lists lithogeochemical data for 4 holes drilled by Noranda Exploration (Fig. 2); individual holes are respectively located 2 km east of the NCA (CR94-1), 2 km east of the SCA (CR94-2), and adjacent to the southeast corner of the SCA (CR94-3, CR94-4). Most of the rocks intersected are either rhyolites, or a suite of basalts to basaltic andesites (some of the mafic rocks were logged as dacites). Most rhyolites are of tholeiitic magmatic affinity, and most of the mafic rocks are of tholeiitic or transitional affinity.

Holes CR94-1 and CR94-2

CR94-1. Al_2O_3-TiO_2-Zr plots indicates that the rocks in this hole are basalts to basaltic andesites, or strongly fractionated rhyolite (Figures 13a,b). The rhyolite, which forms an important interval extending from 43 to 117 metres downhole, has Zr/Y ratos of 1.6-2.5, indicating that is strongly tholeiitic. This rhyolite interval has high Y contents of 97-158 ppm. Rhyolites with these combined features are termed rhyolite A*; they are probably FIIIb-type rhyolites of the most favorable type, although this should be confirmed with REE data. Precursor contents of Al_2O_3 and TiO_2 are ≈11.5% and 0.13% respectively, based on the least altered rhyolite (at 56.9m). The mafic interval, which extends from 117 to 356 m, comprises as series of flows and intercalated flow breccias, with Zr/Y ratios of 3.7-4.4, indicating a slightly tholeiitic affinity. The mafic rocks show a fractionation trend with Al_2O_3 increasing from about 13 to 17% as Zr increases from about 100 to 150 ppm (i.e. fractionation over the basalt to basaltic andesite range).

Within the rhyolite interval, there is increasing alkali alteration downhole, as K_2O increases at the expense of Na_2O (Fig. 14a). Generally, however, these rhyolites have not been shifted far from their estimated precursor position in the Al_2O_3-TiO_2 plot (Fig. 13a), indicating that net mass losses are small. An exception is the most Na-depleted rhyolite, which shows notable net mass loss (this is the + symbol between the rhyolite arrowheads in Fig. 13a).The mafic volcanic rocks, in strong contrast to the felsic rocks in this hole, show almost no chemical alteration (although some greenshist mineralogy has developed).

CR94-2. The felsic rocks in this hole are almost compositionally identical to those in CR94-1. They are rhyolite A* type, with strongly tholeiitic affinity (Zr/Y = 2.1-3.0; Y = 80-108 ppm). Felsic rocks in CR94-2 form units up to 20 metres thick that alternate with mafic units of similar thickness. The mafic rocks include four basaltic andesites and two intermediate andesites; basalts are absent in contrast to CR94-1 (Figs. 13 a,b). Mafic rocks in CR94-2 are weakly tholeiitic to transitional, with Zr/Y = 3.7-5.5 (1 value of 7.0).

Reid Township: 1994
Noranda drilling

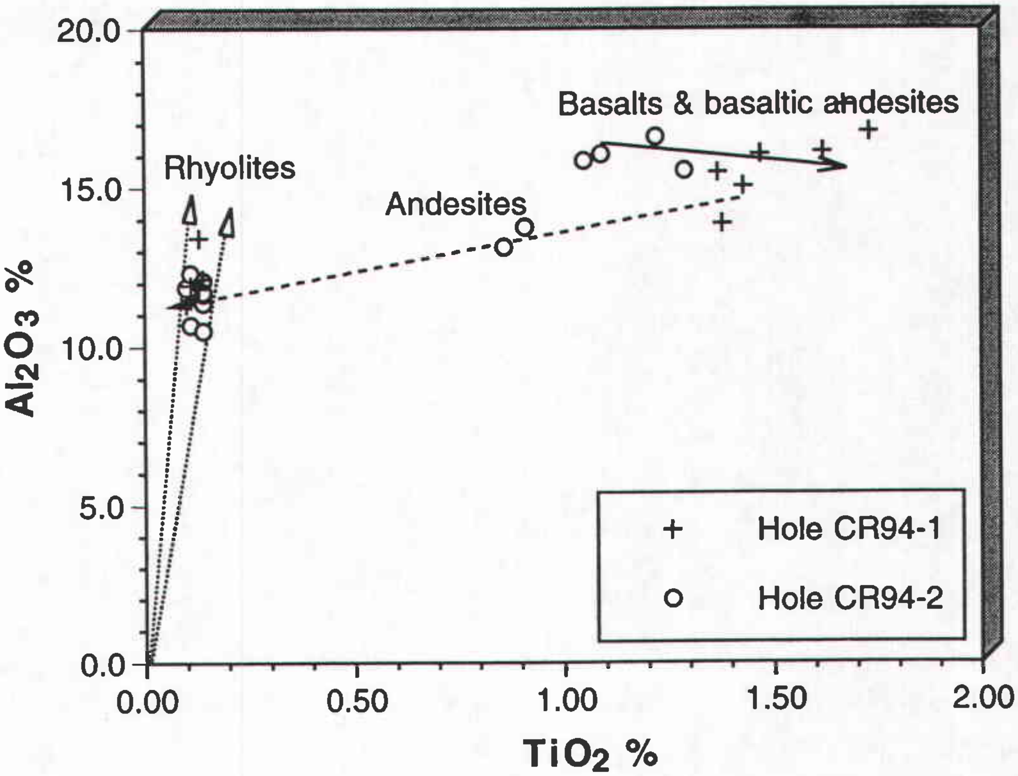


Fig. 13a

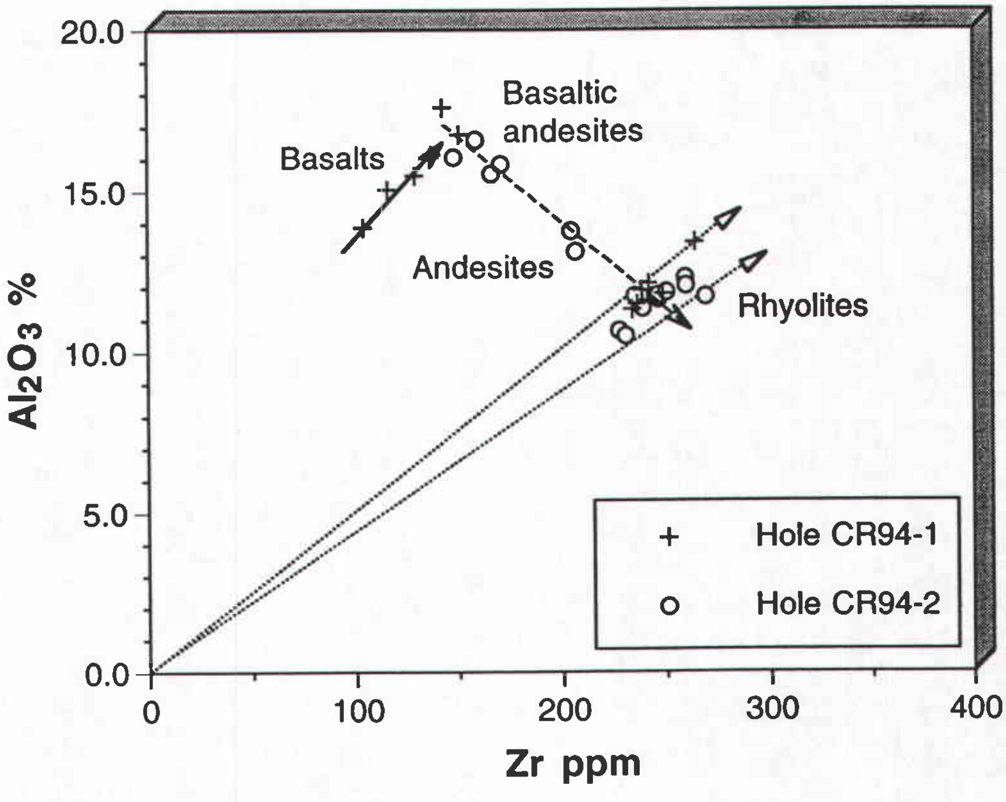


Fig. 13b

Noranda drill holes, eastern Reid Twp.

Fig. 14a

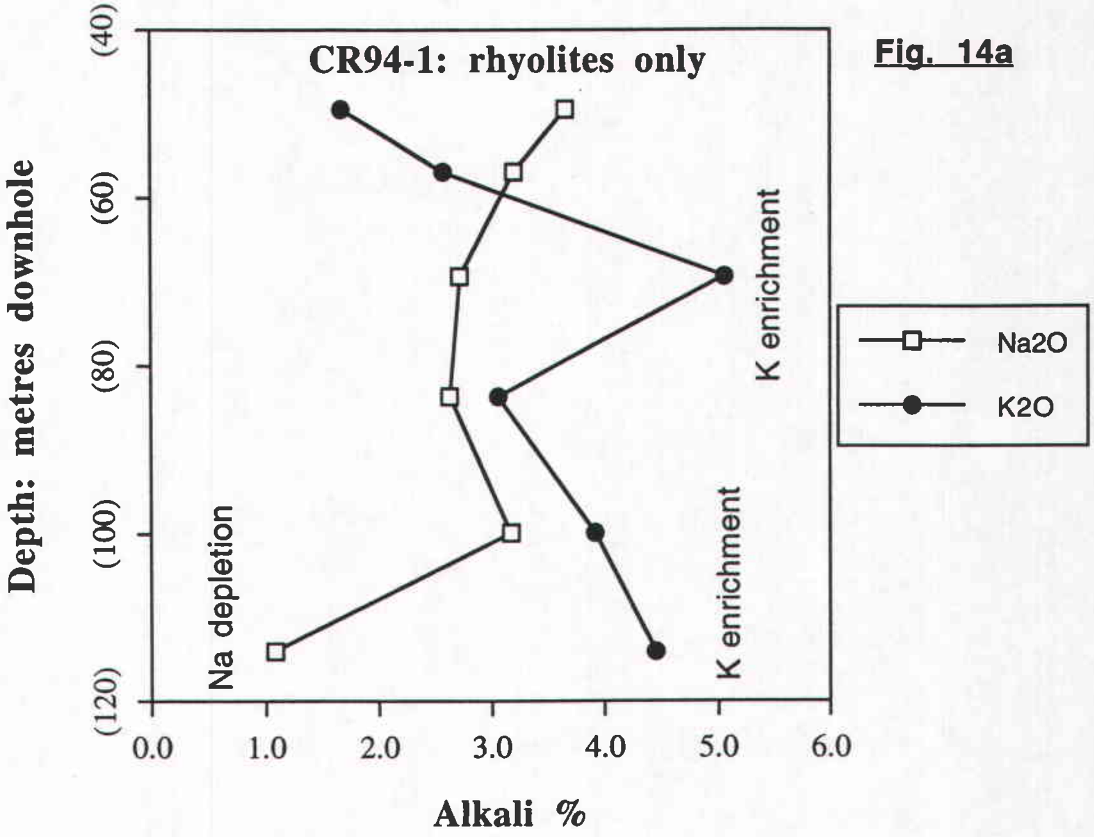
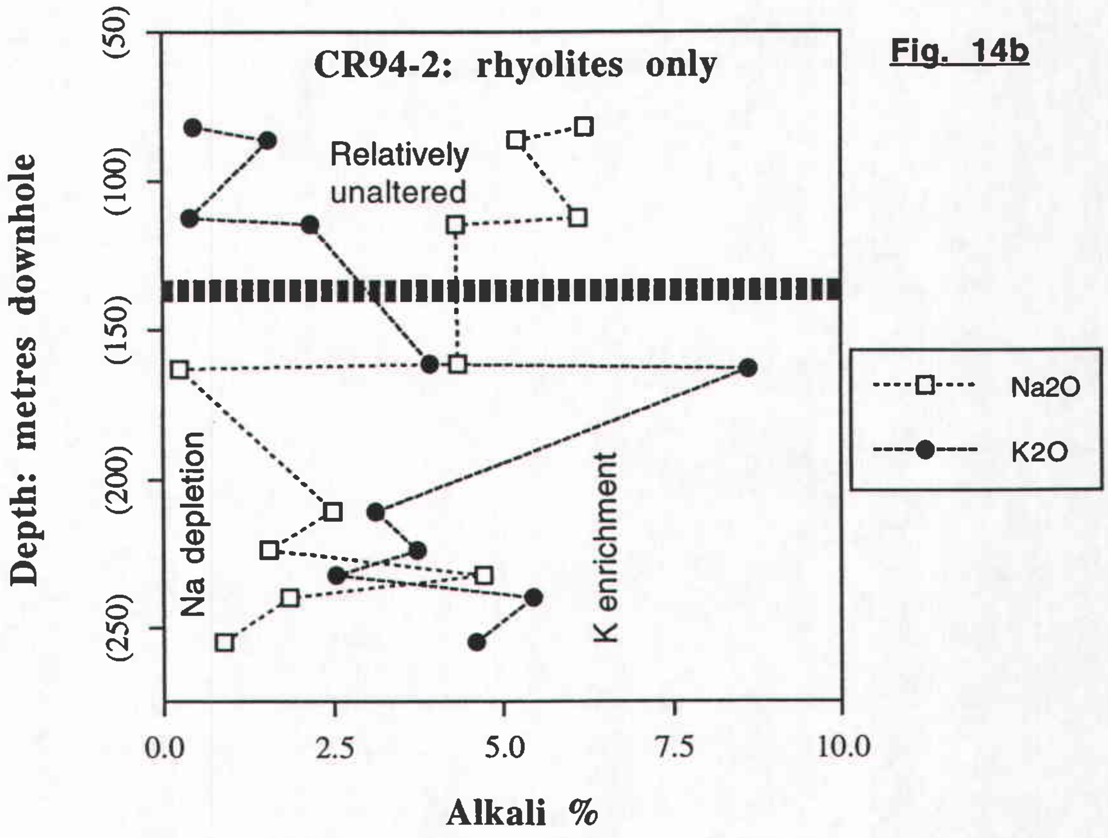


Fig. 14b



Considering only the rhyolites in CR94-2, alkali alteration is notably stronger starting with the unit at 158-164 metres and extending to the bottom of the hole at 257m (Fig. 14b). In this figure and also in Figure 17, the shaded horizontal bars outline the approximate division between weakly altered rhyolites and notably alkali-altered rhyolites. Intercalated basaltic andesites and andesites in the hole show limited to moderate alkali alteration; one mafic sample (208m) is very carbonatized and sericitized.

Holes CR94-3 and CR94-4

CR94-3. Plots of Al_2O_3-TiO_2-Zr (Figures 15a,b) indicate that the felsic rocks are generally strongly fractionated rhyolites. These form units up to 30m thick intercalated with mafic units of similar thickness. For the rhyolites, precursor contents of Al_2O_3 and TiO_2 are estimated as 10.6 and 0.16% respectively, based on the least altered sample (at 122m). The rhyolites are all of tholeiitic affinity, with Zr/Y ratios of 2.6-4.1 (there is also one calc-alkaline felsic dyke). Some of the rhyolites below a depth of 151m are of rhyolite A* type (Zr/Y<3.5 and Y>75 ppm) and are probably FIIIb rhyolites; others below this depth have somewhat higher Zr/Y ratios and lower Y contents, and are more likely FIIIa rhyolites.

For hole CR94-3, downhole variations in lithology (Al_2O_3/TiO_2) and in magmatic affinity (Zr/Y) are shown in Figure 16. The shaded horizontal bars at the top of the figure give the approximate ranges in Al_2O_3/TiO_2 for mafic through to felsic rocks; the bars at the bottom give Zr/Y ranges for tholeiitic, transitional, and calc-alkaline affinities. Alternations between rhyolites and mafic volcanic rocks are evident; it is also apparent that the rhyolites generally have lower Zr/Y ratios than the associated mafic rocks. This suggests (but does not prove) that the mafic volcanic rocks were derived from a separate magma source.

In CR94-3, the felsic rocks display a clear downhole increase in alteration, with Na depletion increasing strongly in four rhyolite units between 230m and the end of the hole at 299m (Fig. 17a). These rhyolites are moderately sericitized, and also have experienced carbonate alteration judging by their elevated CaO contents. Although these rhyolites do not display strong net mass losses (as indicated by Al_2O_3-TiO_2 contents similar to those of the precursor), it is of interest that strong alkali alteration extends to the end of this hole. The intercalated basaltic andesites and andesites show very little alkali alteration. The general lack of alteration of the mafic rocks in the CR-94 holes, relative to those parts of the intercalated felsic rocks which are notably altered, is an interesting point that suggests a separate and external source area for the mafic flows.

Southern Reid Township:
1994 Noranda drilling

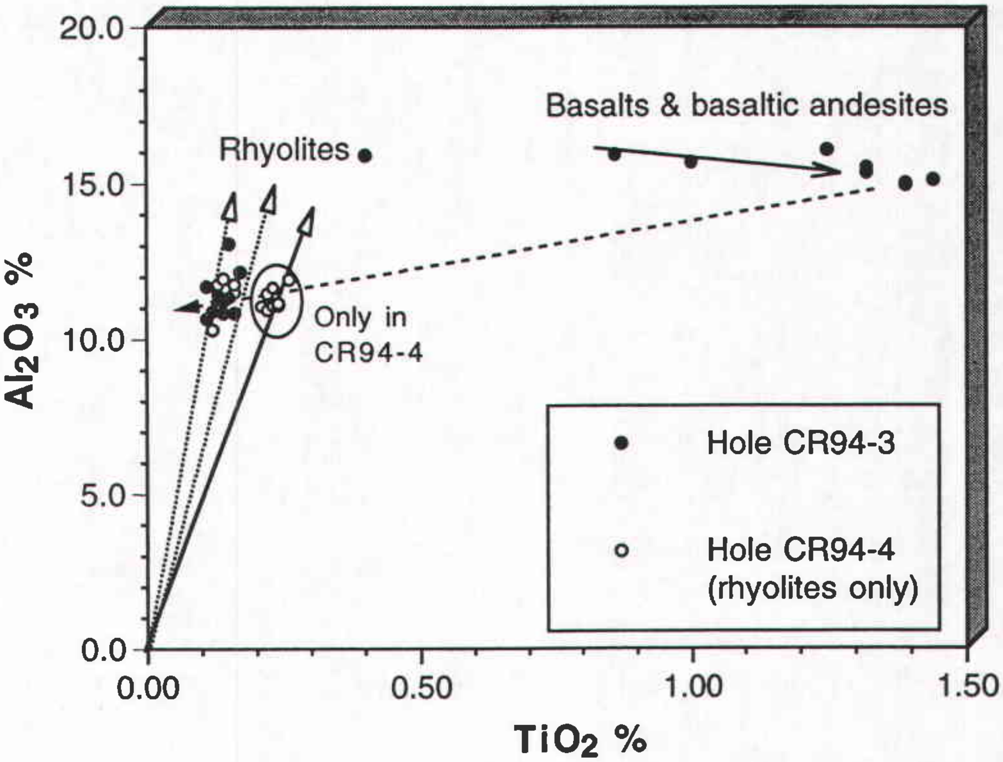


Fig. 15a

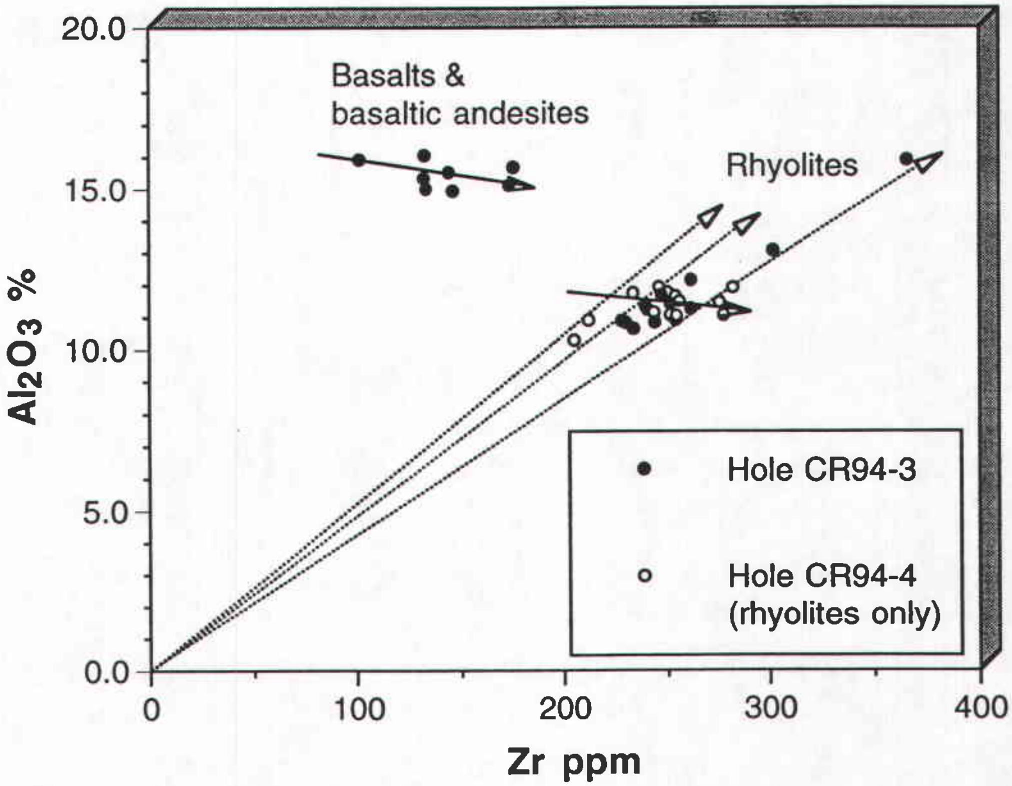


Fig. 15b

Hole CR94-3: rhyolites and basalts

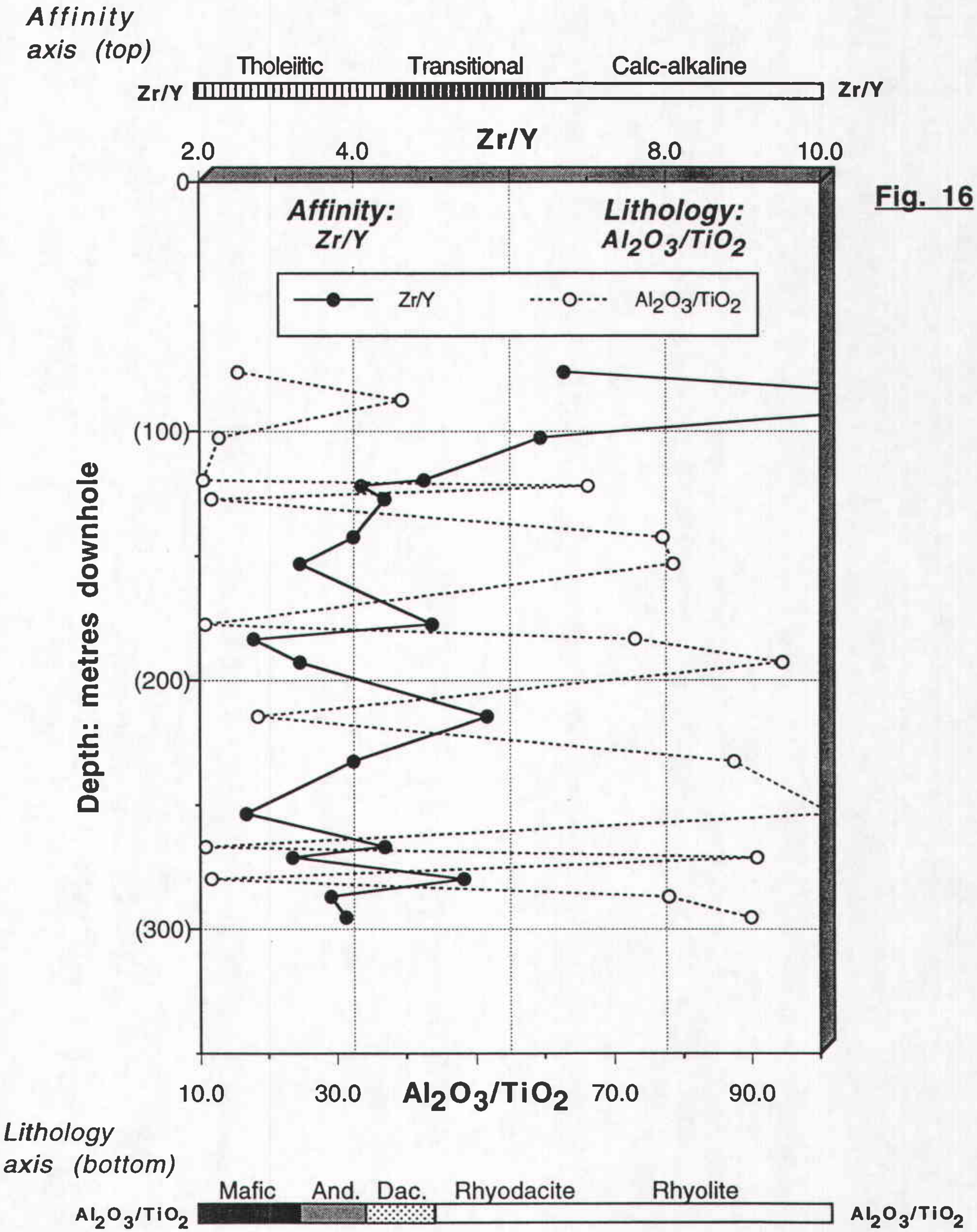


Fig. 16

Noranda drill holes, eastern Reid Twp.

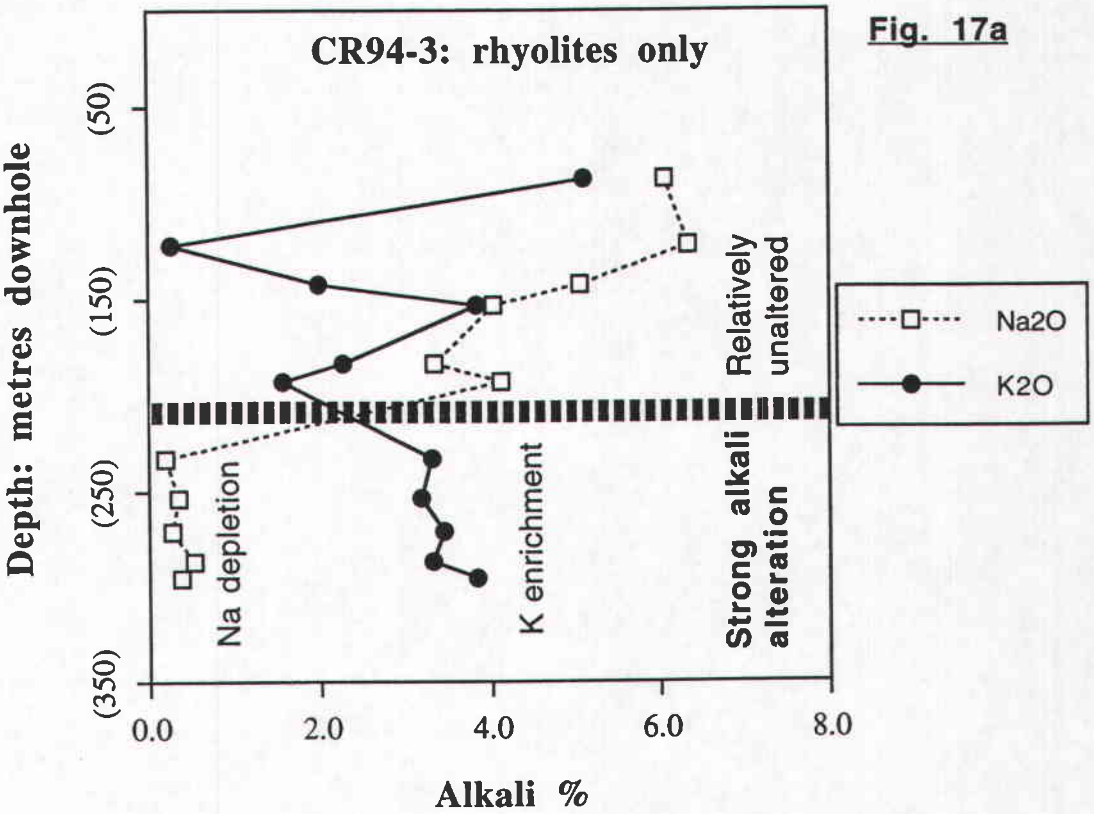


Fig. 17a

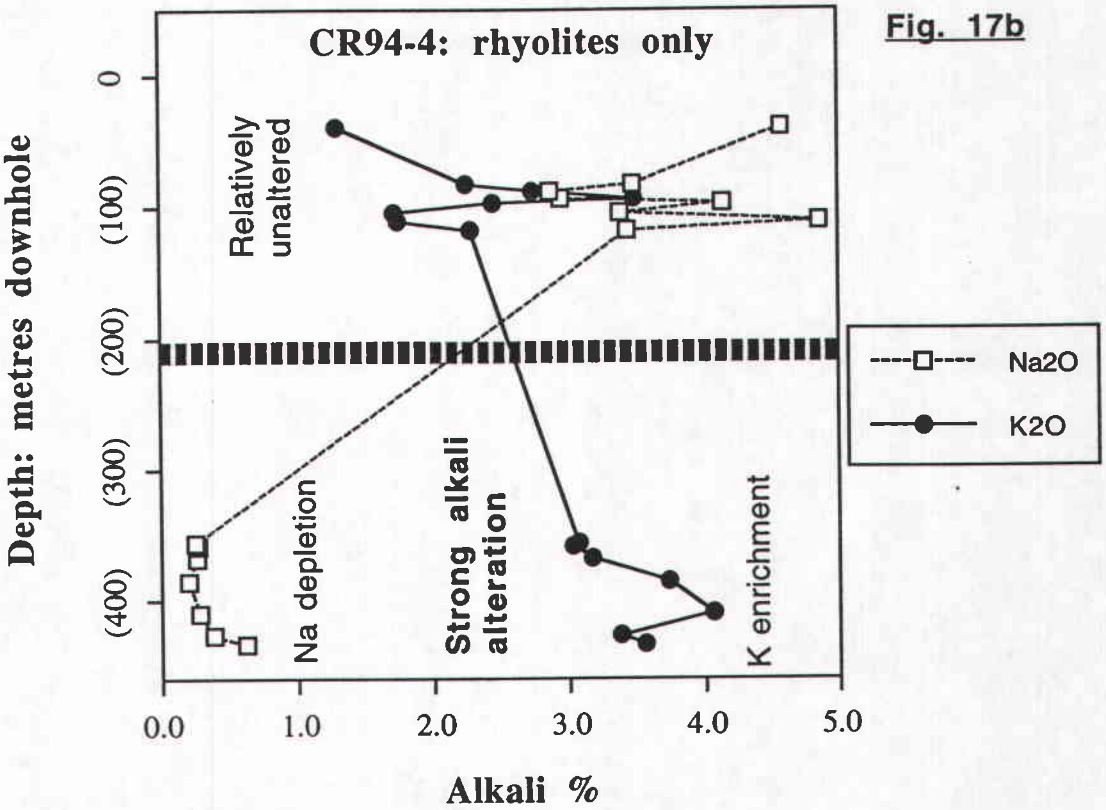


Fig. 17b

CR94-4. A major unit of rhyolite occurs in this hole at 78-122m; it has a distinctly higher TiO_2 content (Fig. 15a) than do rhyolites in the other CR94 holes. The precursor contents of Al_2O_3 and TiO_2 in this shallow rhyolite are ≈11.4% and 0.23% (based on the least altered sample, at 39m). This higher-TiO_2 rhyolite is still clearly of tholeiitic affinity, with Zr/Y mainly in the 2.7-3.2 range, and Y contents of 80-97 ppm. All rhyolites in CR94-4 are therefore of rhyolite A* type.

The next major unit of rhyolite in CR94-4, at 354-436m, has a low TiO_2 content, which is typical of rhyolites encountered in the other Noranda 1994 drill holes. This deeper rhyolite is also of strongly tholeiitic affinity, with Zr/Y ratios of 2.3-2.8, and Y contents of 75-98 ppm. Several thin units of rhyolite occur intercalated with mafics in the 122-354' interval, but these were not sampled (nor were the mafics).

In CR94-4, the two major rhyolite intervals (at 78-122m and 354-436m) contrast strongly in terms of alteration (and, as noted above, in primary composition). As shown in Fig. 17b, the deeper rhyolite is strongly Na depleted, and contains more relatively more sericite (and carbonate).

Considering only the rhyolites, downhole variations in composition (Al_2O_3/TiO_2) and magmatic affinity (Zr/Y) are shown in Figure 18. The difference between the felsic units in the shallower and deeper portions of the hole is clear, with the strongly fractionated rhyolites in the deeper portion having notably higher Al_2O_3/TiO_2 ratios. All rhyolites are of tholeiitic affinity, although the lower end of the Zr/Y range occurs in the deeper rhyolites.

Hole R94-1

This hole was drilled by Noranda about one mile due south (claims P1028167-P1028166) of the southwest corner of the Southern Claim Block of the Reid Syndicate. The hole intersected a series of rhyolites with intercalated basalts in the shallower portion (to about 160m), then a ferrodacite and basalt below this (to the end of the hole at 254m). The rhyolites are low-TiO_2 rhyolite A type, with tholeiitic to transitional Zr/Y values of 3.7-5.6, and Y contents of 33-61 ppm. These are probably FIIIa rhyolites. The ferrodacites have 62-68% SiO_2, 0.58-0.68% TiO_2, 4.3-6.7% FeO, and mainly transitional Zr/Y values of 5.5-6.5 (one value of 7.8). The basalts in the hole are all of tholeiitic affinity (Zr/Y = 2.6-3.3), and are relatively Fe-rich (11.2-13.1% FeO). The rhyolites and the ferrodacites show moderate alkali alteration; there is one very altered rhyolite at 90m. The basalts are largely unaltered chemically.

Hole CR94-4: rhyolites only

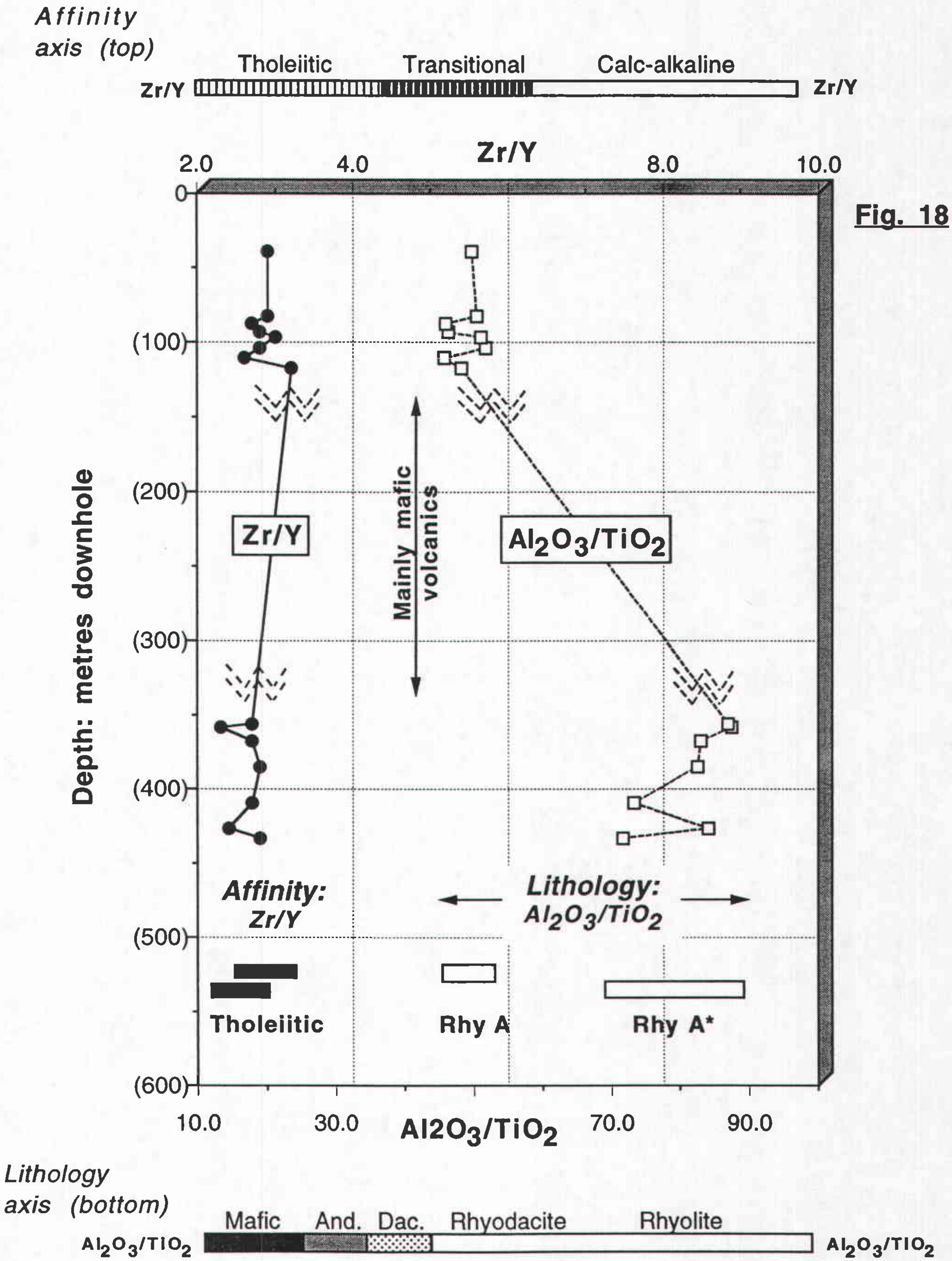


Fig. 18

Lithogeochemistry -- Falconbridge Drilling

Holes R43-01, R43-02, R44-01 and R54-01. Excluding R54-01, these holes are located about 0.5 miles north of the northeastern margin of the Reid Syndicate's Southern Claim Block (Fig. 2). Lithologies in hole R43-01, with eleven analyses over the 68-311m interval, and in hole R43-02, with two analyses at 175 and 194m, comprise a series of intercalated mafic rocks (basalts to basaltic andesites) and intermediate rocks (andesites to dacites-ferrodacites). These rocks display very little alkali or other alteration.

R44-01, with 18 analyses over the 43-333m interval, also contains a series of mafic and intermediate rocks. There are also two thin units of alkali-altered rhyolite (samples at 159 and 174m); these rhyolites have strongly tholeiitic Zr/Y ratios of <2.

R54-01 is located immediately southeast of the southeastern margin of the Reid Syndicate's Northern Claim Block (Fig. 2). This hole, with 11 analyses over the 68-314m interval, contains major intervals of ultramafic (68-134m) and basaltic rocks (137-314m). Although the ultramafic rocks are strongly serpentinized (MgO=16-28%, LOI=17-19%), the basalts are almost unaltered.

Discussion and Conclusions

Volcanic Stratigraphy and Composition

The volcanic rocks to the east of the NCA and SCA are mainly a bimodal series of rhyolites, and basaltic andesites to basalts. A few andesitic rocks are also present. The main lithological groups, from north to south, are the Central Rhyolite, the Southern Basalt, and Southern (Upper) Rhyolite. Each of these groups contains intercalations of other volcanic lithologies. Both the Central and Southern Rhyolites are strongly fractionated, with low Al_2O_3 and TiO_2 contents. However, they have distinctive lithogeochemical signatures. Trace element and REE data indicate that the Central Rhyolite has an FIIIa composition, which can be likened to the rhyolites of the Central Mine Sequence in the Noranda area (e.g. Barrett et al., 1991; Shriver and MacLean, 1993). By contrast, the Upper Rhyolite is mainly of FIIIb composition, similar to rhyolites associated with the Kidd Creek and Kamiskotia deposits (Coad, 1985; Lesher et al., 1986; Barrie et al., 1993), and also to the Watson Lake rhyolite in the Matagami mining camp (McGeehan and MacLean, 1980). With regard to terminology, the FIIIb and FIIIa rhyolites correspond, respectively, to the Group 1 and Group 2 rhyolites of Barrie et al. (1993).

Previous drilling in and to the north of the Reid Syndicate's northern claim block intersected rhyolites chemically comparable to the FIIIa Central Rhyolites immediately east of this block. As noted by Barrett and MacLean (1994), an interval of FIIIb rhyolite also occurs in the latter area, as indicated by intersections in R80-D-6 and especially in AE90-3 (Fig. 2). Of particular importance is the fact that Noranda's 1994 hole CR94-1, in this area, also encountered a major interval of FIIIb rhyolite (from 43-117m). The drill logs for these holes indicates that the rhyolitic interval comprises essentially monolithic fragmental units, mostly 5-10 metres thick, ranging texturally from lapilli tuff to agglomerate. In these holes, thick rhyolite intervals pass southwards into mafic volcanic sections (hole R80-D-3 appears to lie mainly in the mafic stratigraphy judging from the logs). Further along strike to the west-northwest, between RC94-1 and the eastern margin of the northern claim block, holes R80-D-7, R80-D-5, and R80-D-2 (Fig. 2) intersected entirely felsic volcanic rocks. As there are no archived cores or analyses for R80-D-2, it remains an untested possibility that the FIIIb rhyolite of CR94-1 extends west-northwest through the area of R80-D-2, and onto the northern claim block. It is likely that the main contact between the Central Rhyolite and the Southern Basalt also extends in a parallel fashion, from RC94-1 and AE90-3, through to Chance R-2 within the northern claim block.

There are therefore two contacts of interest to examine for mineralization: 1) the contact between FIIIa rhyolite (which forms the majority of the Central Rhyolite) and the FIIIb rhyolite that apparently occurs at the southern margin of the Central Rhyolite; and 2) the mafic-felsic contact between the Central Rhyolite and the Southern Basalt.

As shown in an earlier report (Barrett and MacLean, 1994), the volcanic rocks in the area immediately south of the Reid Syndicate's northern claim block (drilled mainly by Newmont) are basalts to basaltic andesites, with some ultramafic and picritic basaltic compositions. This belt may also extend to the west and into the southwest corner of the northern claim block, where basalts and ferrobasalts were intersected in holes HC-R1-67 and HC-R2-67. It apparently also extends to the southeast of the northern claim block, as indicated by the mafic and ultramafic rocks in R54-01 (discussed above), and by the ultramafic rocks intersected in hole R80-D-9 half a mile further to the east. Thus, a belt of mafic and ultramafic rocks seems to lie between the Reid Syndicate's two claim blocks. In this area, however, there are also a few felsic lithologies, as for example in R44-01, where two thin units of altered tholeiitic rhyolite are present. Andesitic to dacitic rocks are present in R43-01 and R43-02, in addition to more mafic compositions. To the east of these holes, mafic and felsic volcanics occur in R80-C-1, but mafic volcanics (+ argillite) in R-80-C-2.

To the south of R80-C-1 and R80-C-2, that is, in the area immediately east of the Reid Syndicate's southern claim block, gabbro and diabase were intersected in BBU-4, R80-C-3 and BBU-3. However, an important series of tholeiitic rhyolite A flows, intercalated with basaltic andesite flows, was intersected in Noranda's recent hole CR94-2, immediately east of R80-C-3. Some tholeiitic rhyolite A was also intersected in BBU-4.

Noranda's hole CR94-2 may lie in a transitional zone of intercalated lithologies occurring between a major mafic belt to the north (Southern Basalt), and a major felsic belt to the south (Southern Rhyolite). In this transitional zone, gabbroic intrusions may have been emplaced along some volcanic contacts, thereby modifying original stratigraphic relations. In R80-C-4, just south of BBU-4, intercalated felsic and mafic rocks are present, as in Noranda hole CR94-2 (although there are no analyses from R80-C-4).

Half a mile to the southwest of R80-C-4, intercalated felsic and mafic rocks are again present in Noranda holes CR94-3 and CR94-4, located off the southeast corner of the Reid Syndicate's southern claim block. Here the felsic units consist entirely of strongly fractionated tholeiitic rhyolite A (FIIIb type). The rhyolite intervals also become thicker in this area, reaching 40 to 80 metres in thickness in CR94-4. Alkali alteration of the rhyolites is significant in the deeper parts of each of these two holes.

The FIIIb rhyolites in CR94-3 and CR94-4 are clearly the same as those in R80-C-5, R80-C-7 and BBU-5 (the latter holes are discussed in Barrett and MacLean, 1994; lithogeochemical data in Pyke, 1989). Therefore, a major unit of FIIIb rhyolite must extend west-northwestwards from the area of these five holes onto the Reid Syndicate's southern claim block. The projected strike of this favourable rhyolite unit would place it between the mainly mafic rocks of holes RA3-67 and RA1-67 (Fig. 2). In this regard, it is of interest that virtually no drilling has been done in any but the easternmost part of the southern claim block. It is also important that the rhyolites in R80-C-5 and R80-C-7 form units 20 to 150 metres thick that commonly consist of lapilli tuffs, crystal tuffs, and possibly massive rhyolites; R80-C-5 also contains coarse flesic breccias with fragments up to 10 cm across.

Alteration

Alteration of felsic volcanic rocks in eastern Reid Township involves variable amounts of sericitization, silicification, and local formation of alkali feldspar. The latter phase is interpreted as an alteration product, rather than a primary feature of the lavas, given their mainly tholeiitic character (as opposed to calc-alkaline). Chloritization is locally developed in some flows, probably in originally glassier portions such as flow margins.

It is of interest that the rhyolites immediately east of the southern claim block are commonly notably more altered than the intercalated mafic volcanic flows. One explanation may be that the most intense hydrothermal alteration is spatially associated with the felsic vent area, and to an extent also affects a peripheral apron of felsic volcaniclastic/pyroclastic products. In this scenario, mafic flows are episodically introduced into the area from an unrelated and distant mafic eruptive source. The rhyolite eruptive products encountered by drilling to date are interpreted in this model as lying peripheral to a main zone of coeval hydrothermal activity. In such a marginal zone, rhyolitie lithologies would include breccias, tuffs and occasional massive flows (e.g. R80-C-5); the main alteration would involve alkali-exchange and local silicification. Accumulation of felsic material in this region would be interrupted by the arrival of mafic flows from outside the zone of hydrothermal acitivity.

Recommendations

(1) Suggested areas recommended for drilling in the Reid Syndicate's northern claim block, given a program of three 300-metre holes, would be in the southeast to central portion of block, and also in the northeast corner. Possible locations are given in Figure 19. Depending on the results of such a program, drilling could be extended further to the northwest, as Central-type rhyolites intercalated with mafic volcanic rocks are also known from previous drill holes to the northwest of the claim block.

(2) Areas recommended for drilling in the southern claim block, given a program of three 300-metre holes, would be along a transect extending from the southeast portion of block through to its northwest portion. Possible locations are given in Figure 19.

Objectives in both claim blocks are: 1) to intersect mafic-felsic contacts; 2) to drill through thick felsic intervals that might be mineralized along contacts between chemcially and texturally contrasting rhyolite types; 3) to define proximal to distal facies variations within the felsic stratigraphy in order to locate eruptive volcanic centres; and 4) to locate spatial trends in the intensity of hydorthermal alteration within the volcanic stratigraphy.

Following completion of such a drill program, it is important to define the volcanic lithostratigraphic units within the holes, the affinity of the volcanic units, and the degree of hydrothermal alteration, though follow-up lithogeochemical and petrographic analysis. This also allows correlation with volcanic units established by earlier studies in eastern Reid township. A subset of REE data would be particularly useful in this regard (including samples from Noranda's 1994 holes discussed above).

REID SYNDICATE: NORTHERN AND SOUTHERN CLAIM BLOCKS AND DRILL HOLES IN VICINITY

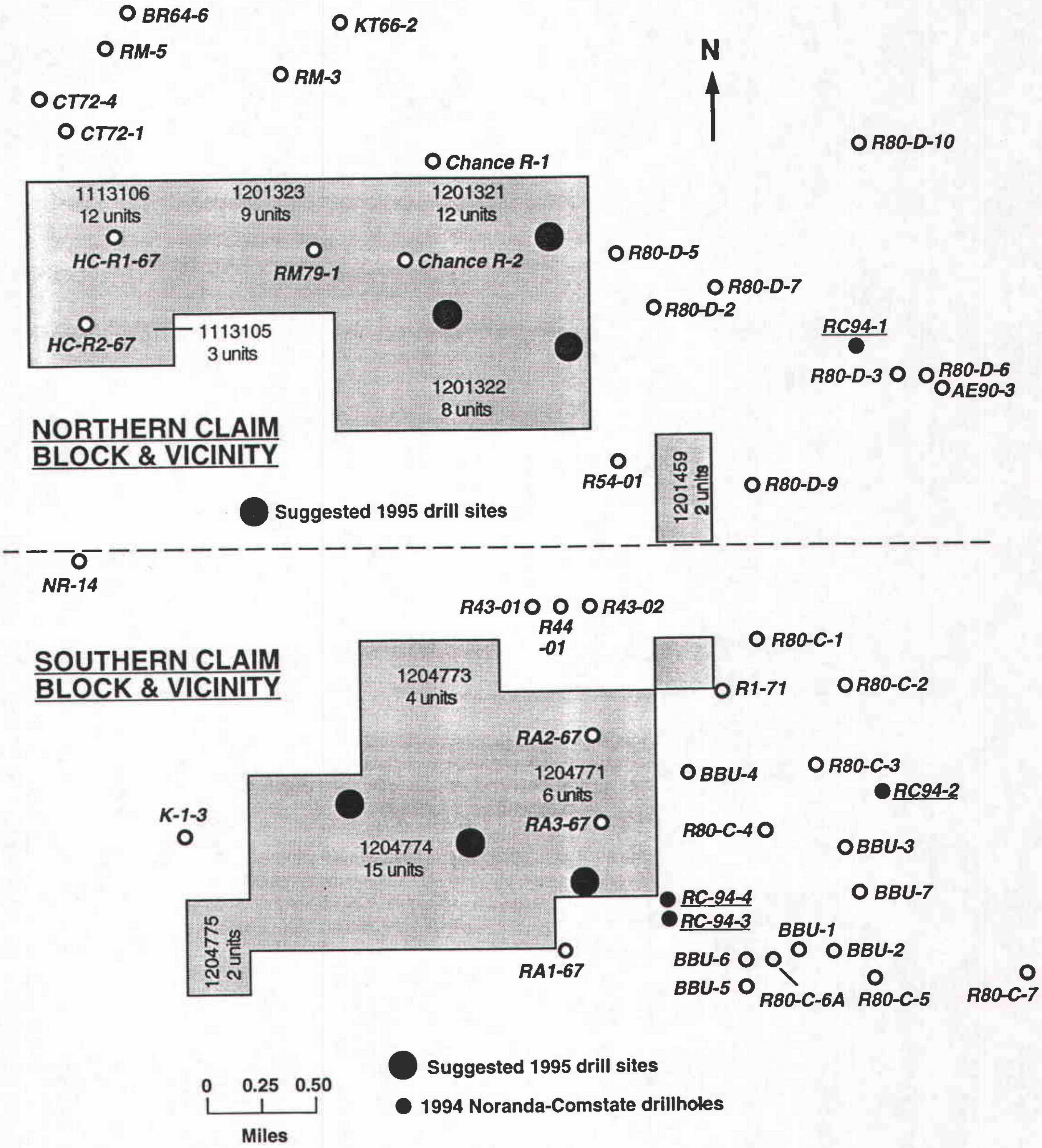


Fig. 19

Acknowledgements

We would like to thank Lionel Bonhomme of Timmins for initiating this project, and for providing geological information during the course of the study. K. Jensen and J. Grant provided geological and geophysical compilations for parts of Reid Township. We are very grateful to Noranda Exploration and Falconbridge Ltd. for permission to use various drill logs and lithogeochemical analyses during our study. Roger Dahn and Wayne Corstophine of Noranda Exploration (Timmins) kindly provided lithogeochemical analyses and detailed drill logs for their 1994 Reid exploration holes.

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Table 1. Chemical composition of selected volcanic rocks from northern claim area, Reid Township, Timmins area, Ontario.

Hole	Depth (ft)	Lithology	Co.	No.	SiO_2	Al_2O_3	TiO_2	Fe_2O_3	FeO*	MnO	CaO	MgO	K_2O	Na_2O	P_2O_5	BaO
BR64-6	in 155-300 int.	Rhyolite A	RS	5301	77.8	12.1	0.18	1.81	1.63	0.06	0.56	0.93	3.26	0.51	0.05	0.09
BR64-6	in 155-300 int.	Basalt	RS	5302	46.0	13.2	1.04	7.61	6.85	0.26	9.52	4.28	3.50	0.56	0.13	0.07
BR64-6	124	Rhyolite A	RS	5303	73.5	12.8	0.20	3.76	3.38	0.06	0.18	2.37	2.66	0.81	0.04	0.09
RM-5	77	Basalt	RS	5304	50.0	12.8	1.10	8.67	7.80	0.27	5.78	6.14	0.26	4.48	0.13	0.02
RM-5	65	Basalt	RS	5305	43.8	12.0	1.00	10.4	9.36	0.39	8.41	6.60	0.81	3.22	0.12	0.04
RM-3	206	Rhyolite A	RS	5306	73.6	13.9	0.21	3.01	2.71	0.09	0.82	1.04	2.73	2.26	0.05	0.06
RM-3	290	Ferrobasalt	RS	5307	44.9	16.3	1.33	11.2	10.1	0.50	9.86	1.27	1.83	3.40	0.18	0.06
RM-3	332	Rhyolite A	RS	5308	78.1	11.3	0.16	1.35	1.21	0.04	0.89	0.53	1.21	4.76	0.04	0.03
RM-3	367	Sil-carb. rhyolite	RS	5309	78.1	4.9	0.09	1.48	1.33	0.11	6.19	0.60	0.98	1.10	0.04	0.02
RM-3	382	Rhyolite A	RS	5310	76.9	12.7	0.17	0.74	0.67	0.03	0.56	0.36	1.79	5.16	0.06	0.04
RM-3	518	Rhyolite A	Ros.	945	72.7	12.5	0.23	1.71	1.54	0.04	1.47	0.16	3.95	2.67	0.02	
KT66-2	335	Rhyolite A	RS	5311	76.9	12.3	0.23	1.45	1.30	0.04	0.24	0.41	0.20	7.35	0.05	0.01
KT66-2	280	Rhyolite A	RS	5312	74.4	12.6	0.23	3.15	2.83	0.04	0.20	1.71	1.45	4.11	0.06	0.04
KT66-2	375	Rhyolite A	RS	5313	85.6	7.1	0.14	0.62	0.56	0.04	0.58	0.27	1.62	1.09	0.05	0.04
KT66-2	550?	Rhyolite A	RS	5314	71.8	12.9	0.24	4.07	3.66	0.06	1.02	1.50	3.15	1.20	0.07	0.05
CT72-1	76	Rhyolite A	RS	5315	73.5	13.2	0.19	3.99	3.59	0.09	0.18	1.56	3.21	0.45	0.04	0.13
CT72-1	83	Basaltic andesite	RS	5316	56.3	15.2	0.83	4.99	4.49	0.14	5.40	2.11	0.26	7.10	0.17	0.02
CT72-1	148	Rhyolite A	RS	5317	74.6	10.2	0.13	5.01	4.51	0.11	0.31	1.73	2.51	0.50	0.04	0.07
CT72-1	227	Rhyolite A	RS	5318	77.6	10.5	0.15	2.52	2.27	0.07	0.99	2.13	2.61	0.43	0.04	0.04
CT72-1	276	Ferrobasalt	RS	5319	48.6	13.3	1.51	15.0	13.5	0.20	6.12	5.00	1.04	2.35	0.24	0.05
CT72-1	346	Prim. ferrobasalt	RS	5320	44.4	13.1	0.99	12.6	11.3	0.31	6.98	5.01	2.06	1.12	0.14	0.06
CT72-1	406	Prim. ferrobasalt	RS	5321	41.5	14.0	1.02	11.6	10.4	0.33	10.6	4.70	0.61	3.29	0.14	0.02
CT72-1	475	Prim. ferrobasalt	RS	5322	36.2	11.8	1.14	19.3	17.4	0.40	10.7	8.11	0.01	0.57	0.12	0.01
HC R-1-67	275	Basalt	RS	5323	49.1	15.9	1.33	7.85	7.06	0.21	8.64	3.95	0.44	5.60	0.14	0.03
HC R-1-67	375	Prim. ferrobasalt	RS	5324	45.4	15.4	1.29	14.2	12.8	0.26	13.3	3.95	0.08	0.72	0.13	0.02
HC R-1-67	700	Prim. ferrobasalt	RS	5325	53.9	13.3	1.10	10.9	9.81	0.26	7.98	2.85	0.41	2.84	0.11	0.02
HC R-2-67	225	Basalt	RS	5326	46.3	14.5	1.58	8.78	7.90	0.26	12.1	1.72	0.50	3.96	0.29	0.03
HC R-2-67	500	Ferrobasalt	RS	5327	47.5	14.1	1.67	15.6	14.0	0.37	9.59	2.11	0.74	2.12	0.30	0.03
HC R-2-67	550	Ferrobasalt	RS	5328	46.8	13.9	1.65	17.0	15.3	0.20	7.77	3.45	0.63	2.88	0.28	0.04
July visit by TJB																
Chance R-1	500	Rhyolite A	TJB	30201	77.4	11.8	0.18	1.39	1.25	0.04	0.65	0.66	2.31	3.65	0.02	0.07
Chance R-2	450	Rhyolite A	TJB	30202	76.7	10.4	0.18	2.00	1.80	0.08	1.67	0.89	2.25	2.90	0.02	0.08
Chance R-2	604	Rhyolite A	TJB	30203	80.5	10.4	0.15	1.26	1.13	0.01	1.10	0.14	2.79	3.13	0.01	0.07
CT72-4	461	Rhyolite A	TJB	30204	71.5	11.4	0.16	5.60	5.04	0.18	0.27	3.30	2.47	0.31	0.02	0.09
CT72-4	347	Rhyolite A	TJB	30205	72.8	12.0	0.18	5.97	5.37	0.06	0.29	2.76	2.24	0.49	0.02	0.07

RS = Reid Syndicate. Ros. = Rosario Resources. TJB = T.J. Barrett
Samples analyzed by X-ray fluorescence at XRAL, Toronto. *Calculated from Fe_2O_3. Anhydrous sum uses FeO value.

Table 1. Chemical composition of selected volcanic rocks from northern claim area, Reid Township, Timmins area, Ontario.

no Ni, Cr

Hole	Depth (ft)	Lithology	No.	LOI	Sum**	Anh sum	Ba	Sr	Y	Zr	Rb	Nb	Zr/Y	Zr/Nb	Al2O3/ TiO2	Y/Nb
BR64-6	in 155-300 int.	Rhyolite A	5301	2.6	99.95	97.17	819	31	57	266	61	15	4.7	17.7	68.8	3.80
BR64-6	in 155-300 int.	Basalt	5302	12.3	98.47	85.40	590	129	22	98	70	5	4.5	19.6	12.7	4.40
BR64-6	124	Rhyolite A	5303	3.05	99.52	96.09	778	27	65	280	52	16	4.3	17.5	64.0	4.06
RM-5	77	Basalt	5304	10.0	99.65	88.78	152	152	23	91	12	7	4.0	13.0	11.6	3.29
RM-5	65	Basalt	5305	12.4	99.19	85.75	333	193	21	88	14	7	4.2	12.6	12.0	3.00
RM-3	206	Rhyolite A	5306	2.60	100.37	97.47	568	50	62	291	110	17	4.7	17.1	66.5	3.65
RM-3	290	Ferrobasalt	5307	8.65	99.48	89.71	549	179	31	97	64	7	3.1	13.9	12.3	4.43
RM-3	332	Rhyolite A	5308	1.10	99.51	98.27	261	78	38	229	44	15	6.0	15.3	72.0	2.53
RM-3	367	Sil-carb. rhyolite	5309	5.15	98.76	93.46	200	132	26	108	29	9	4.2	12.0	57.0	2.89
RM-3	382	Rhyolite A	5310	1.55	100.05	98.43	329	62	44	265	48	14	6.0	18.9	77.0	3.14
RM-3	518	Rhyolite A	945	1.89	97.34	95.28									54.3	
KT66-2	335	Rhyolite A	5311	1.10	100.28	99.04	92	113	40	265	12	14	6.6	18.9	53.2	2.86
KT66-2	280	Rhyolite A	5312	2.25	100.24	97.67	378	70	48	268	56	17	5.6	15.8	56.0	2.82
KT66-2	375	Rhyolite A	5313	1.45	98.60	97.09	341	37	55	162	64	11	2.9	14.7	52.7	5.00
KT66-2	550?	Rhyolite A	5314	3.50	99.56	95.66	482	77	52	273	120	16	5.3	17.1	53.8	3.25
CT72-1	76	Rhyolite A	5315	3.45	99.99	96.14	1120	15	52	279	67	14	5.4	19.9	68.8	3.71
CT72-1	83	Basaltic andesite	5316	7.05	99.57	92.02	189	171	19	112	8	9	5.9	12.4	18.2	2.11
CT72-1	148	Rhyolite A	5317	4.05	99.26	94.71	643	8	49	227	50	11	4.6	20.6	77.9	4.45
CT72-1	227	Rhyolite A	5318	2.90	99.98	96.82	344	15	52	226	68	15	4.3	15.1	70.5	3.47
CT72-1	276	Ferrobasalt	5319	6.70	100.11	91.91	463	139	35	139	28	9	4.0	15.4	8.8	3.89
CT72-1	346	Prim. ferrobasalt	5320	12.0	98.77	85.51	526	78	25	83	37	6	3.3	13.8	13.2	4.17
CT72-1	406	Prim. ferrobasalt	5321	11.2	99.01	86.65	182	82	25	89	17	5	3.6	17.8	13.7	5.00
CT72-1	475	Prim. ferrobasalt	5322	11.2	99.56	86.43	119	74	24	83	4	6	3.5	13.8	10.4	4.00
HC R-1-67	275	Basalt	5323	6.35	99.54	92.40	248	52	23	86	11	6	3.7	14.3	12.0	3.83
HC R-1-67	375	Prim. ferrobasalt	5324	4.50	99.25	93.32	145	271	22	97	4	5	4.4	19.4	11.9	4.40
HC R-1-67	700	Prim. ferrobasalt	5325	5.20	98.87	92.58	193	73	19	82	16	8	4.3	10.3	12.1	2.38
HC R-2-67	225	Basalt	5326	8.00	98.02	89.14	239	258	27	122	22	6	4.5	20.3	9.2	4.50
HC R-2-67	500	Ferrobasalt	5327	6.40	100.53	92.56	248	368	34	131	26	10	3.9	13.1	8.4	3.40
HC R-2-67	550	Ferrobasalt	5328	5.00	99.60	92.90	351	227	23	114	24	6	5.0	19.0	8.4	3.83
July visit by TJB																
Chance R-1	500	Rhyolite A	30201	1.90	100.07	98.03	645	102	42	264	79	13	6.3	20.3	65.6	3.23
Chance R-2	450	Rhyolite A	30202	3.05	100.21	96.96	702	124	57	246	81	15	4.3	16.4	59.4	3.80
Chance R-2	604	Rhyolite A	30203	0.85	100.40	99.43	667	77	41	197	71	16	4.8	12.3	70.7	2.56
CT72-4	461	Rhyolite A	30204	5.05	100.35	94.74	805	15	46	243	53	13	5.3	18.7	71.7	3.54
CT72-4	347	Rhyolite A	30205	3.30	100.17	96.28	594	24	56	250	48	13	4.5	19.2	67.8	4.31

RS = Reid Syndicate. Ros. = Rosario Resources.
Samples analyzed by X-ray fluorescence at XRAL, Toronto. *Calculated from Fe2O3. Anhydrous sum uses FeO value.

TiO2

Table 2. Chemical composition of selected volcanic rocks from southern claim area, Reid Township, Timmins area, Ontario.

Hole	Depth (ft)	Lithology	Co.	No.	SiO_2	Al_2O_3	TiO_2	Fe_2O_3	FeO	MnO	CaO	MgO	K_2O	Na_2O	P_2O_5	BaO
R1-71	215-220	Rhyolite A	RS	6801	61.30	16.7	0.16	5.72	5.15	0.05	0.10	1.85	5.73	0.40	0.04	0.14
R1-71	in 329-340 int.	Andesite	RS	6802	55.40	14.0	0.71	8.58	7.72	0.14	5.76	4.37	1.76	1.75	0.10	0.04
R1-71	in 329-340 int.	Rhyolite B	RS	6802A	71.80	13.0	0.33	3.21	2.89	0.05	3.31	0.67	3.59	0.86	0.07	0.07
R1-71	475-490	Basalt	RS	6803	46.70	13.9	1.00	13.00	11.70	0.20	7.98	5.21	0.80	2.37	0.14	0.03
R1-71	520-525	Dacite	RS	6804	64.40	14.0	0.68	6.05	5.44	0.14	4.93	1.27	2.00	2.46	0.19	0.07
NR-14	250	Basaltic andesite	RS	6805	54.00	14.8	0.97	9.58	8.62	0.19	9.11	2.88	0.22	2.94	0.18	0.01
K-1-3	138	Andesite	RS	6806	60.50	13.8	1.09	9.10	8.19	0.12	4.95	2.63	0.47	4.87	0.25	0.01
K-1-3	284	Basalt	RS	6807	49.10	13.8	1.47	12.40	11.16	0.19	12.00	6.12	0.11	2.74	0.29	0.02
BBU-4	206	Basalt	RS	6808	50.20	14.2	1.15	12.30	11.07	0.19	12.30	4.91	0.22	2.07	0.16	0.02
BBU-4	271	Sil. basalt (low-Ti)	RS	6809	62.50	10.9	0.56	5.03	4.53	0.10	12.80	1.75	0.24	0.72	0.10	0.02
BBU-4	304	Basalt (low-Ti)	RS	6810	48.70	16.4	0.93	9.27	8.34	0.14	11.90	4.24	0.38	2.60	0.15	0.03
BBU-4	445	Basalt (low-Ti)	RS	6811	41.90	13.6	0.78	7.61	6.85	0.16	10.20	4.47	4.49	0.23	0.13	0.07
BBU-4	453	Sil. basalt (low-Ti)	RS	6812	54.50	11.5	0.66	6.65	5.98	0.21	7.11	3.60	1.58	3.89	0.13	0.04
BBU-4	461	Basalt (low-Ti)	RS	6813	50.50	13.9	0.86	6.97	6.27	0.18	10.90	1.24	2.52	3.30	0.16	0.04
BBU-4	494	Basalt (low-Ti)	RS	6814	53.20	13.2	0.80	8.44	7.59	0.18	6.42	3.99	1.41	2.92	0.15	0.04
BBU-4	496	Basalt (low-Ti)	RS	6815	52.00	14.3	0.96	8.81	7.93	0.19	5.97	3.65	1.46	3.17	0.18	0.04
RA3-67	193	Basalt (high-Ti-Al)	RS	6816	43.00	17.0	2.00	11.70	10.53	0.18	10.10	3.53	0.41	3.83	0.23	0.02
RA3-67	217	Basalt (high-Ti-Al)	RS	6817	47.40	17.8	1.33	9.79	8.81	0.19	13.20	2.69	0.40	1.38	0.21	0.02
RA3-67	249	Basalt (high-Ti-Al)	RS	6818	40.30	16.7	1.77	21.10	18.99	0.19	4.59	3.44	1.80	1.73	0.21	0.05
RA3-67	298	Basalt (high-Ti-Al)	RS	6819	52.40	15.8	1.45	10.90	9.81	0.22	6.33	3.73	0.45	3.05	0.24	0.03
RA3-67	373	Basalt (high-Ti-Al)	RS	6820	46.90	17.2	1.40	11.70	10.53	0.19	5.79	4.52	0.59	4.19	0.22	0.02
RA3-67	421	Basalt (high-Ti-Al)	RS	6821	45.90	17.4	1.52	12.90	11.61	0.19	7.44	5.71	0.19	2.57	0.21	0.02
RA3-67	450	Basalt (high-Ti-Al)	RS	6822	56.10	14.0	1.08	6.81	6.13	0.17	9.46	3.09	0.06	4.09	0.20	0.01
Collected in 1994																
R80-C-7	486	Rhyolite A	TJB	30206	79.70	10.4	0.15	1.26	1.13	0.01	0.88	0.56	0.99	4.74	0.01	0.04
Outcrop at NW corner, claim 1204773		Dacite	NE	29382	68.55	13.5	0.51	6.71	6.04	0.05	2.17	2.24	0.28	4.54	0.13	0.02

*Calculated from Fe_2O_3. Anhydrous sum uses FeO value.

RS = Reid Syndicate.

Samples analyzed by X-ray fluorescence at XRAL, Toronto.

Table 2. Chemical composition of selected volcanic rocks from southern claim area, Reid Township, Timmins area, Ontario.

↑K UNUSUAL ROCK: DIKE?

Hole	Depth (ft)	Lithology	No.	LOI	Sum	Anh sum	Ba	Sr	Y	Zr	Rb	Nb	Zr/Y	Zr/Nb	Al2O3/ TiO2	Y/Nb
R1-71	215-220	Rhyolite A	6801	7.55	99.74	91.62	1250	12	107	166	151	18	1.6	9.2	102.5	5.94
R1-71	in 329-340 int.	Andesite	6802	6.15	98.77	91.76	388	44	34	183	34	9	5.4	20.3	19.6	3.78
R1-71	in 329-340 int.	Rhyolite B	6802A	2.30	99.26	96.64	609	29	47	317	74	13	6.7	24.4	39.5	3.62
R1-71	475-490	Basalt	6803	8.50	99.83	90.03	282	63	28	105	14	5	3.8	21.0	13.9	5.60
R1-71	520-525	Dacite	6804	3.05	99.24	95.58	644	73	33	215	41	10	6.5	21.5	20.6	3.30
NR-14	250	Basaltic andesite	6805	4.20	99.09	93.93	130	301	25	159	9	9	6.4	17.7	15.2	2.78
K-1-3	138	Andesite	6806	1.65	99.44	96.88	133	189	31	196	11	8	6.3	24.5	12.7	3.88
K-1-3	284	Basalt	6807	1.55	99.79	96.99	142	265	24	103	8	6	4.3	17.2	9.4	4.00
BBU-4	206	Basalt	6808	2.15	99.87	96.49	169	259	21	108	4	5	5.1	21.6	12.3	4.20
BBU-4	271	Sil. basalt (low-Ti)	6809	4.65	99.37	94.21	193	263	16	91	9	6	5.7	15.2	19.6	2.67
BBU-4	304	Basalt (low-Ti)	6810	4.80	99.53	93.81	248	355	18	136	14	9	7.6	15.1	17.7	2.00
BBU-4	445	Basalt (low-Ti)	6811	15.50	99.13	82.87	583	171	25	100	143	8	4.0	12.5	17.5	3.13
BBU-4	453	Sil. basalt (low-Ti)	6812	6.50	96.37	89.21	350	154	17	103	57	7	6.1	14.7	17.3	2.43
BBU-4	461	Basalt (low-Ti)	6813	9.70	100.27	89.87	382	197	26	139	84	7	5.3	19.9	16.2	3.71
BBU-4	494	Basalt (low-Ti)	6814	8.70	99.45	89.90	322	112	27	142	43	11	5.3	12.9	16.4	2.45
BBU-4	496	Basalt (low-Ti)	6815	8.00	98.72	89.84	314	108	26	146	45	9	5.6	16.2	14.9	2.89
RA3-67	193	Basalt (high-Ti-Al)	6816	6.10	98.10	90.83	185	101	29	145	13	10	5.0	14.5	8.5	2.90
RA3-67	217	Basalt (high-Ti-Al)	6817	3.65	98.06	93.43	155	115	24	103	11	7	4.3	14.7	13.4	3.43
RA3-67	249	Basalt (high-Ti-Al)	6818	6.90	98.78	89.76	417	82	29	125	55	7	4.3	17.9	9.4	4.14
RA3-67	298	Basalt (high-Ti-Al)	6819	4.30	98.90	93.51	247	123	20	106	17	7	5.3	15.1	10.9	2.86
RA3-67	373	Basalt (high-Ti-Al)	6820	5.40	98.12	91.55	219	126	23	103	29	8	4.5	12.9	12.3	2.88
RA3-67	421	Basalt (high-Ti-Al)	6821	4.80	98.85	92.76	195	304	22	122	10	6	5.5	20.3	11.4	3.67
RA3-67	450	Basalt (high-Ti-Al)	6822	4.45	99.52	94.39	132	246	23	91	2	6	4.0	15.2	13.0	3.83
Collected in 1994																
R80-C-7	486	Rhyolite A	30206	1.25	99.98	98.60	333	45	82	244	30	25	3.0	9.8	68.4	3.28
Outcrop at NW corner, claim 1204773		Dacite	29382	1.55	100.22	98.00	157	92	36	264	60	14	7.3	18.9	26.4	2.57

*Calculated from Fe2O3. Anhydrous sum uses FeO value.
RS = Reid Syndicate.
Samples analyzed by X-ray fluorescence at XRAL, Toronto. Cr2O3<0.01% in all samples.

Table 3. Rare-earth-element data for some volcanic rocks from northern claim area, Reid Township, Timmins area, Ontario.

Hole	Sample	Depth	Lithology	La (ppm) INAA	Ce (ppm) INAA	Nd (ppm) INAA	Sm (ppm) INAA	Eu (ppm) INAA	Tb (ppm) INAA	Yb (ppm) INAA	Lu (ppm) INAA	Th (ppm) INAA	U (ppm) INAA	Zr (ppm) XRF	Nb (ppm) XRF	Y (ppm) XRF	Zr/Y XRF	(La/Yb)n INAA
RM-79-1	5015	237'	Basalt	7.9	20	12	3.60	1.11	0.7	3.25	0.51	0.5	0.1	116	7	24	4.8	1.6
RM-79-1	5016	303'	Andesite	12.1	28	16	3.74	1.13	0.7	2.74	0.42	1.1	0.4	144	11	31	4.6	3.0
RM-79-1	5001	527'	Dacite	19.9	42	20	4.30	1.18	0.6	2.03	0.31	3.0	1.1	175	10	20	8.8	6.6
RM-79-1	5002	540'	Dacite	19.0	38	18	3.84	0.88	0.5	1.85	0.26	3.2	1.5	161	10	17	9.5	6.9
Chance R-2	5003	473'	Rhyolite	44.0	92	42	9.07	1.14	1.3	6.25	1.01	7.0	2.9	223	17	51	4.4	4.7
Chance R-2	5005	374'	Rhyolite	30.4	63	28	6.70	0.85	0.7	3.66	0.55	5.8	2.7	171	12	30	5.7	5.6
R-80-D5	5007	127.5'	Rhyolite	61.0	130	62	13.60	1.93	2.0	8.37	1.31	12.0	3.6	386	25	79	4.9	4.9
R-80-D5	5008	209'	Rhyolite	37.2	76	36	7.32	1.43	1.1	4.18	0.63	9.0	2.2	304	17	49	6.2	6.0
BR-64-6	5301	in 155-300' int.	Rhyolite	40.0	82	41	8.35	1.59	1.1	5.63	0.86	6.4	1.5	266	15	57	4.7	4.8
BR-64-6	5302	in 155-300' int.	Basalt	7.8	19	11	2.84	1.01	0.5	2.26	0.35	1.0	0.1	98	5	22	4.5	2.3
BR-64-6	5303	124'	Rhyolite	45.5	97	46	9.78	1.12	1.6	6.54	0.98	6.8	2.0	280	16	65	4.3	4.7
RM-3	5306	206'	Rhyolite	48.6	101	47	9.34	1.62	1.3	5.89	0.93	6.8	1.5	291	17	62	4.7	5.6
RM-3	5307	290'	Ferrobasalt	9.5	23	14	3.48	1.09	0.6	2.65	0.42	0.5	0.3	97	7	31	3.1	2.4
RM-3	5308	332'	Rhyolite	39.1	77	34	6.46	0.97	0.7	3.53	0.55	4.6	0.9	229	15	38	6.0	7.5
RM-3	5310	382'	Rhyolite	45.1	92	41	7.70	1.20	0.9	4.60	0.75	4.9	1.3	265	14	44	6.0	6.6
KT-66-2	5312	280'	Rhyolite	41.6	83	38	7.13	1.17	0.9	4.65	0.75	4.8	1.5	268	17	48	5.6	6.0
KT-66-2	5314	550?	Rhyolite	53.3	108	49	9.37	1.48	1.2	4.36	0.65	5.1	1.2	273	16	52	5.3	8.2
CT-72-1	5315	76'	Rhyolite	38.6	82	39	8.45	1.39	1.2	6.12	0.98	6.9	1.9	279	14	52	5.4	4.2
CT-72-1	5318	227'	Rhyolite	37.4	77	36	7.15	1.57	1.0	4.81	0.77	5.5	1.4	226	15	52	4.3	5.2
CT-72-1	5321	406'	Ferrobasalt	6.1	15	10	2.68	1.02	0.5	2.50	0.39	0.5	0.2	89	5	25	3.6	1.6
HC-R-1	5324	375'	Ferrobasalt	6.0	15	10	2.81	1.58	0.6	2.55	0.39	0.5	0.3	97	5	22	4.4	1.6
	(La/Yb)n = chondrite-normalized ratio chondrite (Evensen et al., 1978)			0.245	0.638	0.474	0.154	0.058	0.038	0.165	0.025							

Table 4. Chemical composition of volcanic rocks from Noranda's 1994 drilling program in Reid Township, Timmins area, Ontario.

RC 94-1 on fig 2, etc...

Hole	Depth (m)	Lab No.	Affinity	Lithology	SiO2	Al2O3	TiO2	Fe2O3	MnO	MgO	CaO	Na2O	K2O
CR94-1 (east central Reid)													
CR94-1	49.4	29301	Tholeiitic	Rhyolite A	70.60	11.10	0.11	7.54	0.34	0.77	1.67	3.53	1.61
CR94-1	56.9	29302	Tholeiitic	Rhyolite A	74.70	11.50	0.13	3.69	0.08	0.51	1.37	3.11	2.50
CR94-1	69.3	29303	Tholeiitic	Rhyolite A	75.50	11.20	0.10	3.46	0.07	0.20	0.86	2.69	5.00
CR94-1	83.7	29304	Tholeiitic	Rhyolite A	74.00	11.80	0.14	3.72	0.10	0.56	1.71	2.56	2.98
CR94-1	99.9	29305	Tholeiitic	Rhyolite A	74.70	11.60	0.11	2.74	0.06	0.35	1.04	3.08	3.81
CR94-1	114.0	29306	Tholeiitic	Rhyolite A	73.90	13.20	0.13	3.19	0.05	0.58	2.13	1.06	4.38
CR94-1	125.4	29307	Tholeiitic	Basaltic andesite	50.50	15.90	1.64	12.40	0.21	4.68	4.90	4.46	1.08
CR94-1	142.6	29308	Tholeiitic	Basaltic andesite	52.00	15.20	1.39	11.60	0.26	4.12	6.98	2.89	1.10
CR94-1	160.8	29309	Tholeiitic	Basaltic andesite	54.90	15.00	1.33	10.70	0.19	3.47	7.96	3.61	0.55
CR94-1	200.1	29310	Tholeiitic	Basaltic andesite	55.40	15.40	1.54	9.63	0.25	2.30	7.00	4.14	0.41
CR94-1	267.5	29311	Tholeiitic	Basaltic andesite	49.80	16.30	1.55	8.36	0.22	3.16	8.70	4.57	0.51
CR94-1	293.3	29312	Tholeiitic	Basalt	53.00	14.30	1.36	9.71	0.26	4.71	8.64	3.32	0.53
CR94-1	355.0	29313	Tholeiitic	Basalt	51.10	13.20	1.31	13.30	0.29	5.24	6.67	4.62	0.61
CR94-2 (east central Reid)													
CR94-2	78.9-79.2	29314	Transitional	Basaltic andesite	54.60	15.00	0.99	10.10	0.13	4.89	4.94	3.54	1.29
CR94-2	81.6-81.9	29315	Tholeiitic	Rhyolite A	78.10	10.60	0.11	1.86	0.05	0.48	1.57	6.17	0.46
CR94-2	86.1-86.4	29316	Tholeiitic	Rhyolite A	76.50	11.10	0.14	2.33	0.05	0.33	0.72	5.09	1.51
CR94-2	107.6-108.1	29317	Transitional	Basaltic andesite	51.10	15.80	1.16	11.20	0.17	6.75	5.50	2.74	1.62
CR94-2	112.3-112.7	29318	Tholeiitic	Rhyolite A	76.30	10.20	0.14	2.28	0.05	0.76	1.17	5.94	0.40
CR94-2	114.5-115.0	29319	Tholeiitic	Rhyolite A	77.50	11.60	0.13	1.82	0.04	0.55	0.84	4.25	2.13
CR94-2	119.5-120.0	29320	Tholeiitic	Andesite	60.00	12.30	0.81	8.41	0.12	2.33	5.12	3.56	1.84
CR94-2	142.8-143.2	29321	Transitional	Basaltic andesite	54.20	15.50	1.05	10.60	0.17	5.04	5.64	3.99	1.24
CR94-2	161.1-161.5	29322	Tholeiitic	Rhyolite A	76.40	11.40	0.14	1.28	0.03	0.19	0.34	4.24	3.84
CR94-2	162.8-163.2	29323	Tholeiitic	Rhyolite A	74.10	11.50	0.13	2.44	0.04	0.43	0.66	0.24	8.43
CR94-2	170.1-170.6	29324	Tholeiitic	Andesite	59.30	13.10	0.87	9.31	0.13	5.43	2.53	3.47	1.85
CR94-2	208.2	29325	Tholeiitic	Carb. basalt	34.00	18.80	0.79	13.30	0.26	2.56	12.00	0.15	5.60
CR94-2	210.5-210.9	29326	Tholeiitic	Rhyolite A	75.60	11.60	0.13	2.11	0.04	0.47	0.98	2.39	3.00
CR94-2	216.0-216.3	29328	Transitional	Basaltic andesite	49.90	14.10	1.17	10.20	0.13	2.93	8.69	1.95	2.49
CR94-2	223.6-224.1	29327	Tholeiitic	Rhyolite A	76.80	11.80	0.13	2.43	0.05	0.75	0.97	1.55	3.74
CR94-2	232.1-232.4	29329	Tholeiitic	Rhyolite A	74.30	11.40	0.14	3.49	0.05	0.78	0.31	4.58	2.47
CR94-2	239.6-240.0	29330	Tholeiitic	Rhyolite A	75.00	11.50	0.10	2.67	0.05	0.53	0.26	1.79	5.27
CR94-2	254.7-255.1	29331	Tholeiitic	Rhyolite A	74.80	11.90	0.11	2.53	0.04	0.55	1.70	0.85	4.45

Table 4. Chemical composition of volcanic rocks from Noranda's 1994 drilling program in Reid Township, Timmins area, Ontario.

Hole	Depth (m)	Affinity	Lithology	P_2O_5	Cr_2O_3	LOI	Total	Ba	Rb	Sr	Nb	Zr	Y	Zr/Y	Al_2O_3/ TiO_2	Iskikawa Index
CR94-1 (east central Reid)																
CR94-1	49.4	Tholeiitic	Rhyolite A	0.03	<0.01	2.65	100.00	426	62	102	28	228	119	1.9	101	31.4
CR94-1	56.9	Tholeiitic	Rhyolite A	0.03	<0.01	2.00	99.60	528	115	77	25	242	97	2.5	88.5	40.2
CR94-1	69.3	Tholeiitic	Rhyolite A	0.03	<0.01	0.75	99.90	715	112	87	27	231	144	1.6	112	59.4
CR94-1	83.7	Tholeiitic	Rhyolite A	0.03	<0.01	2.20	99.80	565	111	54	27	235	123	1.9	84.3	45.3
CR94-1	99.9	Tholeiitic	Rhyolite A	0.02	<0.01	1.05	98.60	729	108	90	26	232	127	1.8	105	50.2
CR94-1	114.0	Tholeiitic	Rhyolite A	0.05	<0.01	1.40	100.10	422	157	96	31	260	158	1.6	102	60.9
CR94-1	125.4	Tholeiitic	Basaltic andesite	0.26	0.01	2.65	98.70	336	28	98	9	143	33	4.3	9.7	
CR94-1	142.6	Tholeiitic	Basaltic andesite	0.22	<0.01	2.90	98.70	389	37	155	8	129	29	4.4	10.9	
CR94-1	160.8	Tholeiitic	Basaltic andesite	0.23	<0.01	1.75	99.70	239	17	119	9	125	31	4.0	11.3	
CR94-1	200.1	Tholeiitic	Basaltic andesite	0.24	<0.01	3.50	99.80	220	15	172	8	131	32	4.1	10.0	
CR94-1	267.5	Tholeiitic	Basaltic andesite	0.25	<0.01	6.55	100.00	268	17	143	11	132	34	3.9	10.5	
CR94-1	293.3	Tholeiitic	Basalt	0.14	<0.01	3.25	99.20	290	24	123	7	110	27	4.1	10.5	
CR94-1	355.0	Tholeiitic	Basalt	0.13	<0.01	2.45	98.90	374	17	45	7	99	27	3.7	10.1	
CR94-2 (east central Reid)																
CR94-2	78.9-79.2	Transitional	Basaltic andesite	0.17	<0.01	4.00	99.60	327	27	183	11	162	23	7.0	15.2	
CR94-2	81.6-81.9	Tholeiitic	Rhyolite A	0.03	<0.01	0.85	100.30	117	7	34	25	226	80	2.8	96.4	10.8
CR94-2	86.1-86.4	Tholeiitic	Rhyolite A	0.03	<0.01	0.80	98.60	416	33	34	30	233	89	2.6	79.3	24.1
CR94-2	107.6-108.1	Transitional	Basaltic andesite	0.19	<0.01	3.50	99.70	407	28	163	10	151	33	4.6	13.6	
CR94-2	112.3-112.7	Tholeiitic	Rhyolite A	0.04	<0.01	1.05	98.30	123	11	19	25	224	106	2.1	72.9	14.0
CR94-2	114.5-115.0	Tholeiitic	Rhyolite A	0.04	<0.01	1.25	100.10	353	47	22	29	242	81	3.0	89.2	34.5
CR94-2	119.5-120.0	Tholeiitic	Andesite	0.13	<0.01	5.30	99.90	288	46	50	17	194	53	3.7	15.2	
CR94-2	142.8-143.2	Transitional	Basaltic andesite	0.17	<0.01	2.50	100.10	328	23	179	11	143	26	5.5	14.8	
CR94-2	161.1-161.5	Tholeiitic	Rhyolite A	0.04	<0.01	0.50	98.40	884	40	42	32	241	83	2.9	81.4	46.8
CR94-2	162.8-163.2	Tholeiitic	Rhyolite A	0.03	<0.01	0.85	98.90	1590	78	23	30	230	84	2.7	88.5	90.8
CR94-2	170.1-170.6	Tholeiitic	Andesite	0.14	<0.01	2.15	98.30	373	45	131	14	195	49	4.0	15.1	
CR94-2	208.2	Tholeiitic	Carb. basalt	0.07	0.02	12.80	100.30	630	105	145	4	54	26	2.1	23.8	
CR94-2	210.5-210.9	Tholeiitic	Rhyolite A	0.02	<0.01	2.10	98.40	662	60	32	28	250	91	2.7	89.2	50.7
CR94-2	216.0-216.3	Transitional	Basaltic andesite	0.20	<0.01	8.50	100.30	281	44	95	11	151	33	4.6	12.1	
CR94-2	223.6-224.1	Tholeiitic	Rhyolite A	0.03	<0.01	2.15	100.40	612	81	33	29	247	98	2.5	90.8	64.1
CR94-2	232.1-232.4	Tholeiitic	Rhyolite A	0.03	<0.01	0.85	98.40	420	54	43	30	262	101	2.6	81.4	39.9
CR94-2	239.6-240.0	Tholeiitic	Rhyolite A	0.02	<0.01	1.10	98.30	607	97	44	28	243	100	2.4	115.0	73.9
CR94-2	254.7-255.1	Tholeiitic	Rhyolite A	0.02	<0.01	3.00	99.90	726	92	42	29	251	108	2.3	108.2	66.2

Table 4. Chemical composition of volcanic rocks from Noranda's 1994 drilling program in Reid Township, Timmins area, Ontario.

Hole	Depth (m)	Lab No.	Affinity	Lithology	SiO2	Al2O3	TiO2	Fe2O3	MnO	MgO	CaO	Na2O	K2O
CR94-3 (southeastern Reid)													
CR94-3	76.3-76.7	29332	Transitional	Basaltic andesite	54.70	15.00	0.96	9.98	0.16	5.17	7.14	2.88	0.51
CR94-3	87.5-87.8	29333	Calc-alkaline	Rhyolite B	60.30	15.00	0.38	4.48	0.12	1.09	2.69	5.72	4.81
CR94-3	102.7	29334	Transitional	Basaltic andesite	51.70	15.40	1.20	12.10	0.16	4.87	8.89	2.22	0.33
CR94-3	119.1-120.0 (2)	29335#	Transitional	Basaltic andesite	52.00	14.20	1.35	12.70	0.17	4.32	7.62	2.25	0.34
CR94-3	122.0	29336	Tholeiitic	Rhyolite A	75.20	10.60	0.16	2.51	0.06	0.42	2.62	6.20	0.25
CR94-3	126.7-127.8 (2)	29337#	Tholeiitic	Basaltic andesite	50.00	14.20	1.21	11.80	0.18	3.83	7.34	2.98	0.95
CR94-3	140.8-144.1 (3)	29338#	Tholeiitic	Rhyolite A	78.70	10.80	0.14	1.99	0.04	0.28	0.76	5.03	1.98
CR94-3	153.1-153.4	29339	Tholeiitic	Rhyolite A	75.30	11.00	0.14	2.44	0.04	0.26	0.86	3.93	3.73
CR94-3	177.4-177.8	29356	Transitional	Basaltic andesite	51.70	14.20	1.32	12.30	0.19	5.42	7.66	2.84	0.42
CR94-3	185.3-185.6	29357	Tholeiitic	Rhyolite A	75.00	11.70	0.16	2.10	0.05	0.51	1.54	3.21	2.19
CR94-3	192.7-193.1	29358	Tholeiitic	Rhyolite A	79.00	10.40	0.11	1.52	0.04	0.29	0.76	4.02	1.52
CR94-3	214.2-214.7	29359	Transitional	Basalt	48.90	15.20	0.82	12.10	0.19	6.85	9.00	3.27	0.19
CR94-3	232.4-232.8	29360	Tholeiitic	Rhyolite A	78.20	10.50	0.12	1.13	0.05	0.25	2.92	0.18	3.18
CR94-3	253.3-253.8	29361	Tholeiitic	Rhyolite A	74.10	11.20	0.11	2.76	0.05	0.39	4.05	0.33	3.05
CR94-3	266.7-267.1	29362	Tholeiitic	Basaltic andesite	47.40	13.40	1.24	12.00	0.18	4.75	8.17	1.93	1.21
CR94-3	270.9-271.4	29363	Tholeiitic	Rhyolite A	75.40	10.90	0.12	1.92	0.05	0.64	3.01	0.25	3.28
CR94-3	279.7-280.0	29364	Transitional	Basaltic andesite	47.30	13.70	1.18	11.50	0.19	4.80	8.23	2.77	0.55
CR94-3	287.0	29365	Tholeiitic	Rhyolite A	75.70	10.90	0.14	1.67	0.05	0.41	3.60	0.50	3.18
CR94-3	295.2-295.8	29366	Tholeiitic	Rhyolite A	76.10	12.60	0.14	1.45	0.04	0.26	1.86	0.36	3.69
# two or three pieces taken within interval													
CR94-4 (southeastern Reid)													
CR94-4	38.9-39.4	29367	Tholeiitic	Rhyolite A	75.17	11.43	0.23	3.00	0.03	1.21	1.46	4.48	1.27
CR94-4	82.2-82.6	29368	Tholeiitic	Rhyolite A	75.61	10.58	0.21	2.68	0.04	1.07	1.23	3.37	2.18
CR94-4	87.3-87.9	29369	Tholeiitic	Rhyolite A	73.59	10.57	0.23	2.92	0.04	1.04	1.87	2.74	2.61
CR94-4	92.9-93.6	29370	Tholeiitic	Rhyolite A	74.15	11.59	0.25	3.24	0.03	1.26	0.78	2.87	3.39
CR94-4	96.4-96.9	29371	Tholeiitic	Rhyolite A	74.77	11.22	0.22	3.29	0.04	1.21	0.94	4.05	2.40
CR94-4	103.6-104.1	29372	Tholeiitic	Rhyolite A	76.17	10.86	0.21	3.33	0.03	0.91	1.94	3.33	1.69
CR94-4	110.0-110.8	29373	Tholeiitic	Rhyolite A	71.27	10.53	0.23	3.39	0.05	1.19	1.76	4.59	1.65
CR94-4	117.0-117.6	29374	Tholeiitic	Rhyolite A	72.76	10.60	0.22	3.85	0.05	0.82	2.24	3.29	2.18
CR94-4	355.7-356.5	29375	Tholeiitic	Rhyolite A*	76.30	10.44	0.12	0.99	0.02	0.21	4.39	0.24	2.93
CR94-4	358.1-358.6	29376	Tholeiitic	Rhyolite A*	76.84	11.37	0.13	1.81	0.01	0.25	3.33	0.26	2.93
CR94-4	367.5-367.9	29377	Tholeiitic	Rhyolite A*	78.30	11.64	0.14	1.75	0.01	0.39	2.10	0.25	3.09
CR94-4	385.0-385.6	29378	Tholeiitic	Rhyolite A*	76.10	10.74	0.13	1.99	0.02	0.26	2.69	0.19	3.57
CR94-4	409.4-409.9	29379	Tholeiitic	Rhyolite A*	75.70	11.00	0.15	2.43	0.03	0.41	2.03	0.27	3.88
CR94-4	426.5-427.1	29380	Tholeiitic	Rhyolite A*	79.60	10.09	0.12	2.05	0.03	0.33	2.20	0.37	3.31
CR94-4	432.9-433.6	29381	Tholeiitic	Rhyolite A*	77.96	11.47	0.16	2.13	0.02	0.41	1.44	0.60	3.47

Table 4. Chemical composition of volcanic rocks from Noranda's 1994 drilling program in Reid Township, Timmins area, Ontario.

Hole	Depth (m)	Affinity	Lithology	P2O5	Cr2O3	LOI	Total	Ba	Rb	Sr	Nb	Zr	Y	Zr/Y	Al2O3/ TiO2	Iskikawa Index
CR94-3 (southeastern Reid)																
CR94-3	76.3-76.7	Transitional	Basaltic andesite	0.14	0.01	3.15	99.80	186	21	260	12	168	25	6.7	15.6	
CR94-3	87.5-87.8	Calc-alkaline	Rhyolite B	0.18	<0.01	1.95	96.70	1240	79	604	23	345	28	12.3	39.5	41.2
CR94-3	102.7	Transitional	Basaltic andesite	0.19	0.01	3.00	100.10	184	14	216	7	127	20	6.4	12.8	
CR94-3	119.1-120.0 (2)	Transitional	Basaltic andesite	0.21	<0.01	4.80	100.00	187	15	221	10	163	33	4.9	10.5	
CR94-3	122.0	Tholeiitic	Rhyolite A	0.04	<0.01	2.00	100.10	126	9	62	23	225	55	4.1	66.3	7.1
CR94-3	126.7-127.8 (2)	Tholeiitic	Basaltic andesite	0.19	<0.01	5.95	98.60	347	29	145	11	132	30	4.4	11.7	
CR94-3	140.8-144.1 (3)	Tholeiitic	Rhyolite A	0.03	<0.01	0.40	100.20	550	40	54	28	243	61	4.0	77.1	28.1
CR94-3	153.1-153.4	Tholeiitic	Rhyolite A	0.03	<0.01	0.70	98.40	688	69	53	25	255	77	3.3	78.6	45.4
CR94-3	177.4-177.8	Transitional	Basaltic andesite	0.23	<0.01	3.32	99.60	223	19	260	10	139	28	5.0	10.8	
CR94-3	185.3-185.6	Tholeiitic	Rhyolite A	0.04	<0.01	2.60	99.10	353	57	31	31	252	94	2.7	73.1	36.2
CR94-3	192.7-193.1	Tholeiitic	Rhyolite A	0.03	<0.01	1.10	98.80	769	42	29	26	228	70	3.3	94.5	27.5
CR94-3	214.2-214.7	Transitional	Basalt	0.09	0.01	2.70	99.30	174	11	349	7	97	17	5.7	18.5	
CR94-3	232.4-232.8	Tholeiitic	Rhyolite A	0.04	<0.01	3.45	100.00	771	67	30	23	220	55	4.0	87.5	52.5
CR94-3	253.3-253.8	Tholeiitic	Rhyolite A	0.02	<0.01	4.45	100.50	196	74	38	25	237	91	2.6	101.8	44.0
CR94-3	266.7-267.1	Tholeiitic	Basaltic andesite	0.18	<0.01	9.70	100.20	337	41	93	10	119	27	4.4	10.8	
CR94-3	270.9-271.4	Tholeiitic	Rhyolite A	0.03	<0.01	4.20	99.80	446	88	53	24	240	75	3.2	90.8	54.6
CR94-3	279.7-280.0	Transitional	Basaltic andesite	0.18	<0.01	9.05	99.50	263	25	140	7	118	22	5.4	11.6	
CR94-3	287.0	Tholeiitic	Rhyolite A	0.04	<0.01	3.65	99.80	344	80	45	25	230	62	3.7	77.9	46.7
CR94-3	295.2-295.8	Tholeiitic	Rhyolite A	0.04	<0.01	3.25	99.80	329	82	37	29	291	75	3.9	90.0	64.0
# two or three pieces taken within interval																
CR94-4 (southeastern Reid)																
CR94-4	38.9-39.4	Tholeiitic	Rhyolite A	0.03	<0.01	1.67	99.98	566	28	37	30	249	87	2.9	49.7	29.5
CR94-4	82.2-82.6	Tholeiitic	Rhyolite A	0.02	<0.01	2.05	99.04	579	53	51	28	246	84	2.9	50.4	41.4
CR94-4	87.3-87.9	Tholeiitic	Rhyolite A	0.04	<0.01	2.90	98.55	590	59	43	27	240	89	2.7	46.0	44.2
CR94-4	92.9-93.6	Tholeiitic	Rhyolite A	0.03	<0.01	2.27	99.86	826	65	55	32	275	97	2.8	46.4	56.0
CR94-4	96.4-96.9	Tholeiitic	Rhyolite A	0.03	0.01	1.96	100.14	694	48	79	31	270	89	3.0	51.0	42.0
CR94-4	103.6-104.1	Tholeiitic	Rhyolite A	0.03	<0.01	2.45	100.95	554	44	70	30	258	80	3.2	51.7	33.0
CR94-4	110.0-110.8	Tholeiitic	Rhyolite A	0.03	<0.01	4.18	98.87	423	49	87	30	330	87	3.8	45.8	30.9
CR94-4	117.0-117.6	Tholeiitic	Rhyolite A	0.03	<0.01	3.07	99.11	451	66	89	25	266	83	3.2	48.2	35.2
CR94-4	355.7-356.5	Tholeiitic	Rhyolite A*	0.02	<0.01	4.63	100.29	238	56	61	27	208	75	2.8	87.0	40.4
CR94-4	358.1-358.6	Tholeiitic	Rhyolite A*	0.01	<0.01	3.86	100.80	198	58	52	29	226	98	2.3	87.5	47.0
CR94-4	367.5-367.9	Tholeiitic	Rhyolite A*	0.01	<0.01	3.13	100.81	196	72	33	26	240	90	2.7	83.1	59.7
CR94-4	385.0-385.6	Tholeiitic	Rhyolite A*	0.02	<0.01	3.29	99.00	186	75	33	31	230	83	2.8	82.6	57.1
CR94-4	409.4-409.9	Tholeiitic	Rhyolite A*	0.01	<0.01	3.29	99.20	249	82	36	32	245	90	2.7	73.3	65.1
CR94-4	426.5-427.1	Tholeiitic	Rhyolite A*	0.03	<0.01	2.46	100.59	349	75	38	27	201	85	2.4	84.1	58.6
CR94-4	432.9-433.6	Tholeiitic	Rhyolite A*	0.03	<0.01	2.22	99.91	385	80	33	30	244	86	2.8	71.7	65.5

Table 4. Chemical composition of volcanic rocks from Noranda's 1994 drilling program in Reid Township, Timmins area, Ontario.

Hole	Depth (m)	Lab No.	Affinity	Lithology	SiO_2	Al_2O_3	TiO_2	Fe_2O_3	MnO	MgO	CaO	Na_2O	K_2O
<u>R94-1 (south central Reid)</u>													
C94-1	88.5	29340	Tholeiitic	Basalt	48.40	13.40	1.28	11.50	0.27	4.65	8.33	2.95	0.61
C94-1	90.0	29341	Transitional	Rhyolite A	75.50	10.60	0.17	2.07	0.04	0.37	1.07	0.51	7.01
C94-1	96.8	29342	Transitional	Rhyolite A	77.00	11.30	0.19	2.11	0.05	0.45	0.90	6.42	0.27
C94-1	102.9	29343	Tholeiitic	Rhyolite A	75.60	12.30	0.16	2.33	0.06	1.77	1.32	1.27	2.76
C94-1	111.5	29344	Tholeiitic	Basalt	44.60	12.80	1.19	13.10	0.27	4.86	9.53	1.48	0.60
C94-1	137.5	29345	Tholeiitic	Rhyolite A	73.80	12.00	0.15	2.30	0.05	0.92	1.98	2.21	2.43
C94-1	143.6	29346	Tholeiitic	Rhyolite A	72.80	12.10	0.14	1.38	0.07	0.63	2.54	1.88	3.10
C94-1	144.2	29347	Tholeiitic	Rhyolite A	78.60	8.86	0.10	1.16	0.06	0.29	2.46	3.47	1.12
C94-1	157.2	29348	Tholeiitic	Rhyolite A	74.30	10.50	0.13	2.84	0.06	0.72	2.21	3.44	1.27
C94-1	173.9	29349	Transitional	Ferrodacite	63.10	14.00	0.61	6.73	0.16	2.38	3.42	0.23	2.80
C94-1	189.5	29350	Tholeiitic	Basalt	42.20	11.20	1.17	11.80	0.32	3.60	10.60	0.45	2.01
C94-1	195.0	29351	Transitional	Ferrodacite	63.30	13.10	0.58	5.71	0.19	2.30	3.46	0.33	2.98
C94-1	208.7	29352	Tholeiitic	Basalt	51.60	11.90	1.28	11.20	0.19	5.56	5.55	2.06	0.13
C94-1	227.2	29353	Transitional	Ferrodacite	66.60	15.30	0.71	4.88	0.08	1.10	2.80	0.72	2.94
C94-1	236.8	29354	Transitional	Ferrodacite	67.90	13.60	0.64	4.33	0.10	1.00	3.63	1.23	2.42
C94-1	253.6	29355	Transitional	Ferrodacite	62.30	14.20	0.68	5.52	0.14	1.16	4.56	1.95	2.31

Table 4. Chemical composition of volcanic rocks from Noranda's 1994 drilling program in Reid Township, Timmins area, Ontario.

Hole	Depth (m)	Affinity	Lithology	P2O5	Cr2O3	LOI	Total	Ba	Rb	Sr	Nb	Zr	Y	Zr/Y	Al2O3/ TiO2	Iskikawa Index
<u>R94-1 (south central Reid)</u>																
CR94-1	88.5	Tholeiitic	Basalt	0.13	<0.01	8.35	99.90	268	21	41	7	99	38	2.6	10.5	
CR94-1	90.0	Transitional	Rhyolite A	0.05	<0.01	1.15	98.50	929	119	81	12	181	40	4.5	62.4	82.4
CR94-1	96.8	Transitional	Rhyolite A	0.04	<0.01	0.97	99.70	130	12	99	15	184	33	5.6	59.5	9.0
CR94-1	102.9	Tholeiitic	Rhyolite A	0.04	<0.01	2.65	100.30	531	125	42	15	236	64	3.7	76.9	63.6
CR94-1	111.5	Tholeiitic	Basalt	0.12	<0.01	10.70	99.30	229	18	72	8	92	28	3.3	10.8	
CR94-1	137.5	Tholeiitic	Rhyolite A	0.03	<0.01	3.30	99.20	323	79	51	14	248	61	4.1	80.0	44.4
CR94-1	143.6	Tholeiitic	Rhyolite A	0.03	<0.01	3.75	98.40	385	113	47	14	230	61	3.8	86.4	45.8
CR94-1	144.2	Tholeiitic	Rhyolite A	0.03	<0.01	2.40	98.60	182	39	64	12	181	46	3.9	88.6	19.2
CR94-1	157.2	Tholeiitic	Rhyolite A	0.03	<0.01	2.70	98.20	200	44	61	15	218	53	4.1	80.8	26.0
CR94-1	173.9	Transitional	Ferrodacite	0.18	<0.01	5.20	98.80	454	62	42	10	224	35	6.4	23.0	
CR94-1	189.5	Tholeiitic	Basalt	0.12	<0.01	15.70	99.20	329	40	72	7	95	29	3.3	9.6	
CR94-1	195.0	Transitional	Ferrodacite	0.17	<0.01	6.70	98.80	425	71	33	10	215	39	5.5	22.6	
CR94-1	208.7	Tholeiitic	Basalt	0.12	<0.01	9.65	99.20	133	5	46	6	100	31	3.2	9.3	
CR94-1	227.2	Transitional	Ferrodacite	0.20	<0.01	4.25	99.60	475	82	79	11	226	29	7.8	21.5	
CR94-1	236.8	Transitional	Ferrodacite	0.18	<0.01	4.90	99.90	449	69	57	12	226	35	6.5	21.3	
CR94-1	253.6	Transitional	Ferrodacite	0.20	<0.01	5.40	98.40	373	64	116	13	225	33	6.8	20.9	

Geochemistry of Archean Volcanic Rocks from Reid Township and Vicinity, Timmins Region, Ontario

for:
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on behalf of:
The Reid Syndicate

-- March 27, 1994 --
(This version replaces any earlier versions)

T.J. Barrett and W.H. MacLean
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Introduction

The Reid Syndicate claim group (Figure 1) is located in the northeastern part of Reid Township, just west of the Matagami River, within Archean volcanic rocks of the Stoughton-Roquemore Group of the southern Abitibi greenstone belt. The claim group lies about 11 km northwest of the Kidd Creek mine, which has past production and reserves, as of the end of 1991, totaling 130 million tonnes at 2.86% Cu, 6.14% Zn and 85 g/t Ag (Shandl and Wicks, 1993).

Almost no outcrop is exposed in the Reid Syndicate claim group, as bedrock is covered by up to 50 metres of glacial overburden. Claim drilling to date is extremely limited, although the areas surrounding the claims on all sides have been subjected to fairly extensive drill coverage. Little is presently known about the geology of the Reid claims, other than that they probably contain, by extrapolation, a prospective belt of rhyolites and flanking mafic volcanic rocks that runs between holes drilled to the southeast of the claims mainly by Gulf Minerals, and holes drilled to the northwest of the claims mainly by Falconbridge Ltd. The presence of rhyolites and basalts within the Reid claim group is confirmed by two holes in the eastern part of the group (RM-79-1 and Chance R-2). In addition, a series of reverse circulation holes (UR-81-01 to UR-81-15), located along an east-west transect near the northern boundary of the claim group, encountered mainly felsic volcanic rocks in the several metres intersected immediately below overburden. Two holes in the western part of the claim group (HC-R-1-67 and R-2-67) intersected mainly mafic volcanic and graphitic sedimentary rocks.

The volcanic rocks immediately east of the Reid claims have been divided into Central Rhyolite, Southern Basalt, and Upper Rhyolite units. These are described in a petrographic and lithogeochemical survey by Pyke (1989) that focused on drill holes located mainly in the previous Comstate option claim block, which flanked the Matagami River, but did not extend west into the area presently covered by the Reid claim block. The Central Rhyolite is thought to be folded about an anticlinal axis that trends to the west-northwest (Pyke, 1989); it is interpreted to be overlain stratigraphically to the south by first the Southern Basalt, then the Upper Rhyolite. A U-Pb zircon date of 2706 ± 2 m.y. was obtained by Barrie and Davis (1990) for a rhyolite tuff from a drill hole apparently located near the southern contact of the Upper Rhyolite. This is the same age as the Kamiskotia gabbro complex and Kamiskotia rhyolite located ≈30 km to the south, but younger than the age of 2717 ± 2 m.y. for the Kidd Creek rhyolite (Barrie and Davis, 1990).

Reid and surrounding townships, Porcupine Mining Division, Ontario

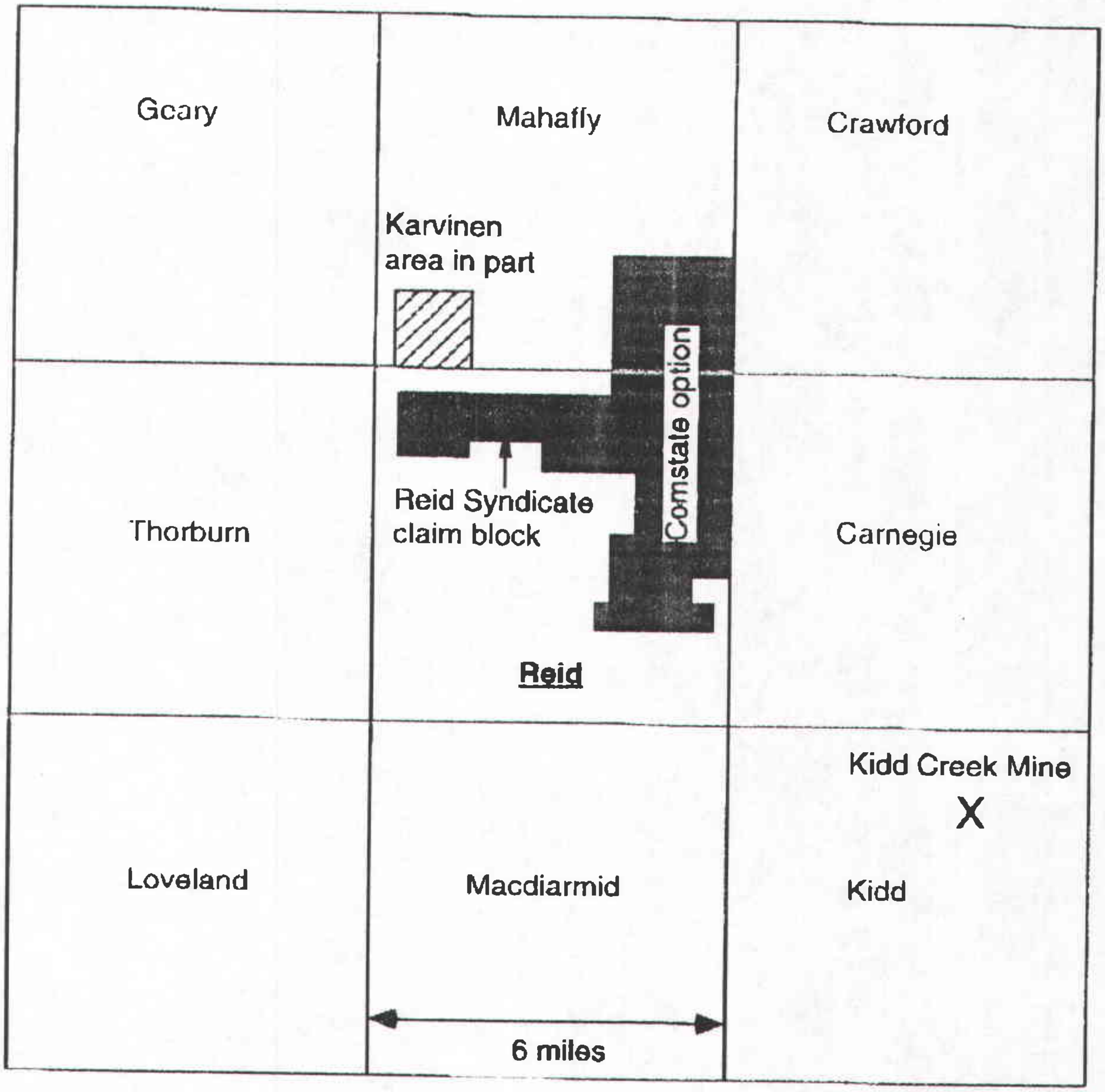


Figure 1. Location of Reid Syndicate claim block, Comstate option, part of the Karvinen option, and site of Kidd Creek Mine.

The REE patterns of mafic volcanic rocks from the Southern Basalts, just south of the southern margin of the Central Rhyolite, are shown in Figure 14a. Two samples (80-D-4, 346.5' and 80 D-6, 509.5') have almost REE flat patterns ($La_n/Yb_n \sim 1.5$), low Zr/Y ratios of 2.8 and 3.5, and low Zr contents of 93 and 84 ppm, respectively. These are the most tholeiitic and MORB-like basalts of the present sample set. A third sample of andesitic composition (80-D-6, 679.5') is enriched in the light REE ($La_n/Yb_n = 3.5$) relative to the basalts, and has a high Zr/Y ratio of 11.9; these features indicate a calc-alkaline affinity.

The REE patterns of basalts and basaltic andesites from Thorburn and Mahaffey Townships (Fig. 14b) have moderate light REE enrichment ($La_n/Yb_n = 3.5$-4.4). The REE patterns, together with Zr/Y ratios ranging from 3.5 to ~8.8, indicate that these mafic volcanic rocks are mainly of transitional to moderately calc-alkaline affinity.

Lithogeochemistry III-- Falconbridge Data Set

Primary Geochemistry. 246 XRF analyses from holes MF-12-01 to 12-13 inclusive of the Karvinen option to the northwest of the Reid Syndicate claim group were kindly made available by Falconbridge (Kidd Creek Mines), as well as MF-13-01 to the north of the claim group. Results of analyses from selected holes MF-12-02, 12-03, 12-07, and 12-09 are given in Table 3. At present, it is difficult to make any correlations between individual holes because of our uncertainties in the locations of the Karvinen holes.

The Karvinen data set (solid circles) is compared with the new data set from this report (open circles) in terms of Al_2O_3-TiO_2 and TiO_2-Zr relations in Figures 15a and 15b, respectively. The Karvinen data set contains 116 samples of dacitic to basaltic composition, and 130 rhyolites; there is a compositional gap between dacite and rhyolite. The Karvinen rhyolites appear to overlap in part with the rhyolite A alteration line of the present report (Figs. 2 and 3), but also to extend to slightly less fractionated rhyolite compositions as inferred from their slightly higher TiO_2 contents. The Karvinen data set contains more basaltic rocks with <100 ppm Zr (these samples are relatively unaltered). These low-Zr basalts are common in holes 12-08, 09, 12 and 13, where they alternate with rhyolites in a very bimodal sequence that contains few intervening compositions.

Most of the rhyolites in the Karvinen data set have Zr/Y ratios of 3 to 6 (Fig. 16a). A group of basaltic andesites and andesites, with Zr of about 100-200 ppm, has Zr/Y ratios of about 4 to 10. Basaltic rocks with <100 ppm have Zr/Y ratios ranging from 2 to 10, and include a tholeiitic subgroup not evident in the basaltic andesite to andesite group.

Mafic volcanics -- Pyke data

Fig. 14a

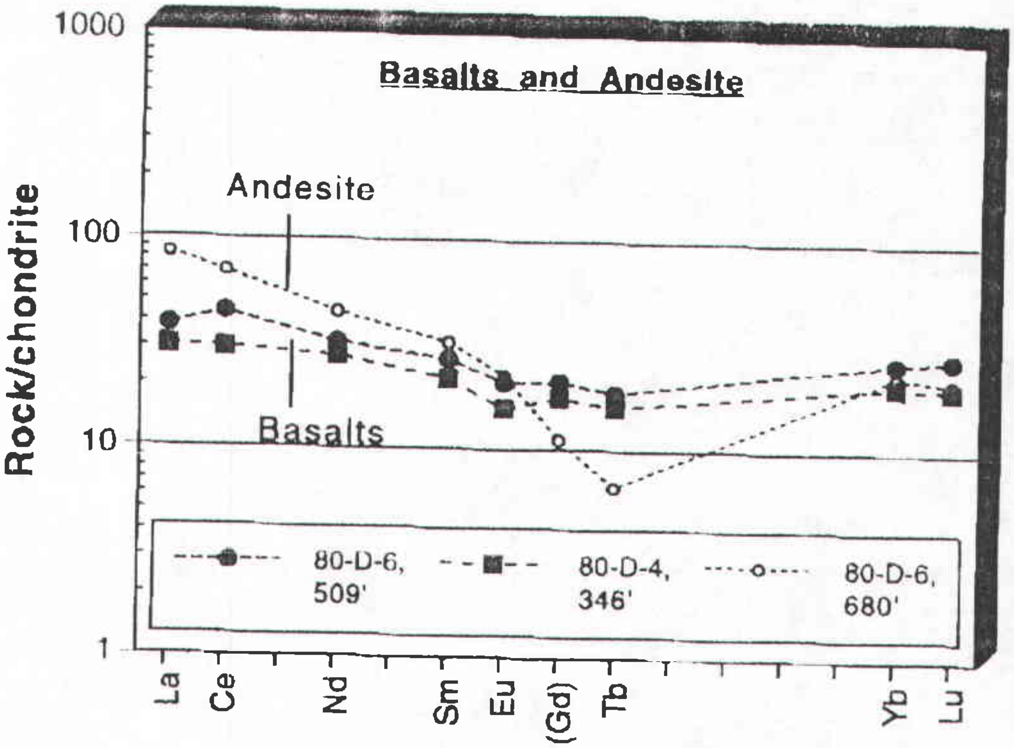
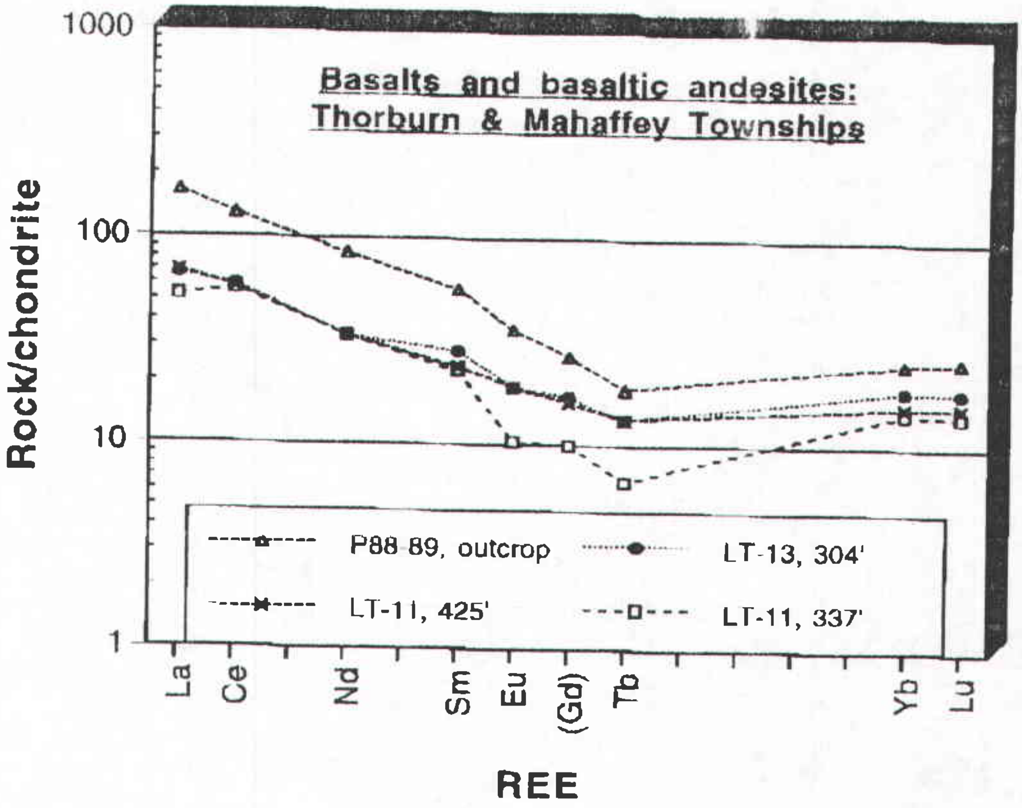


Fig. 14b



New data + Karvinen data

Fig. 15a

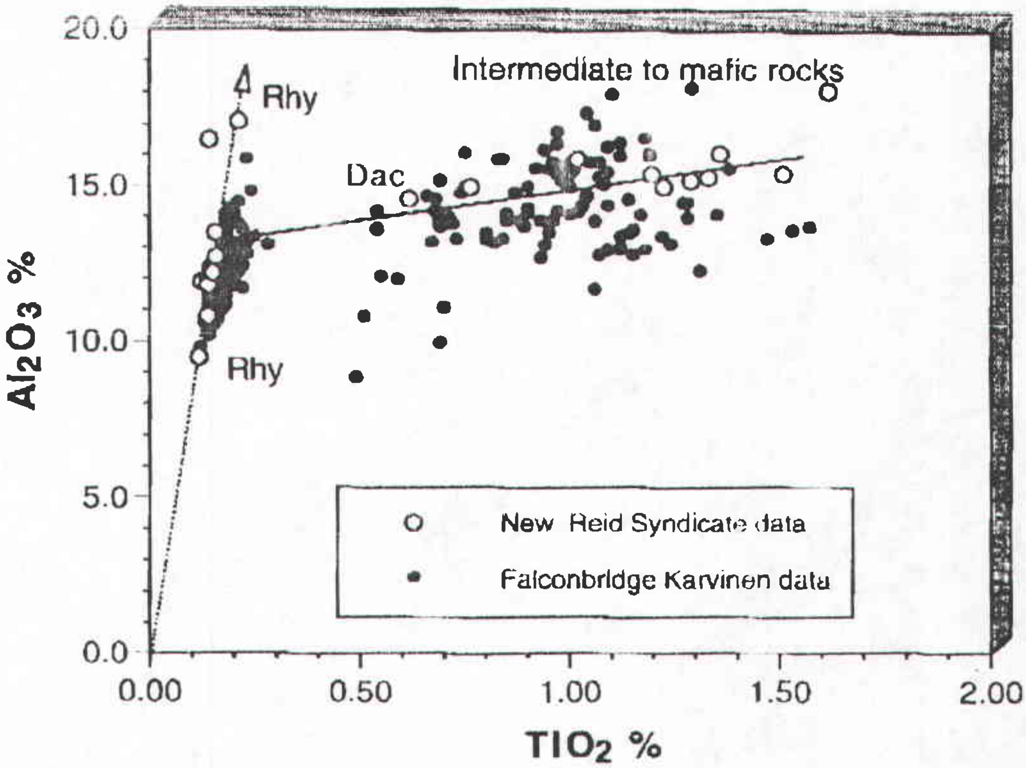
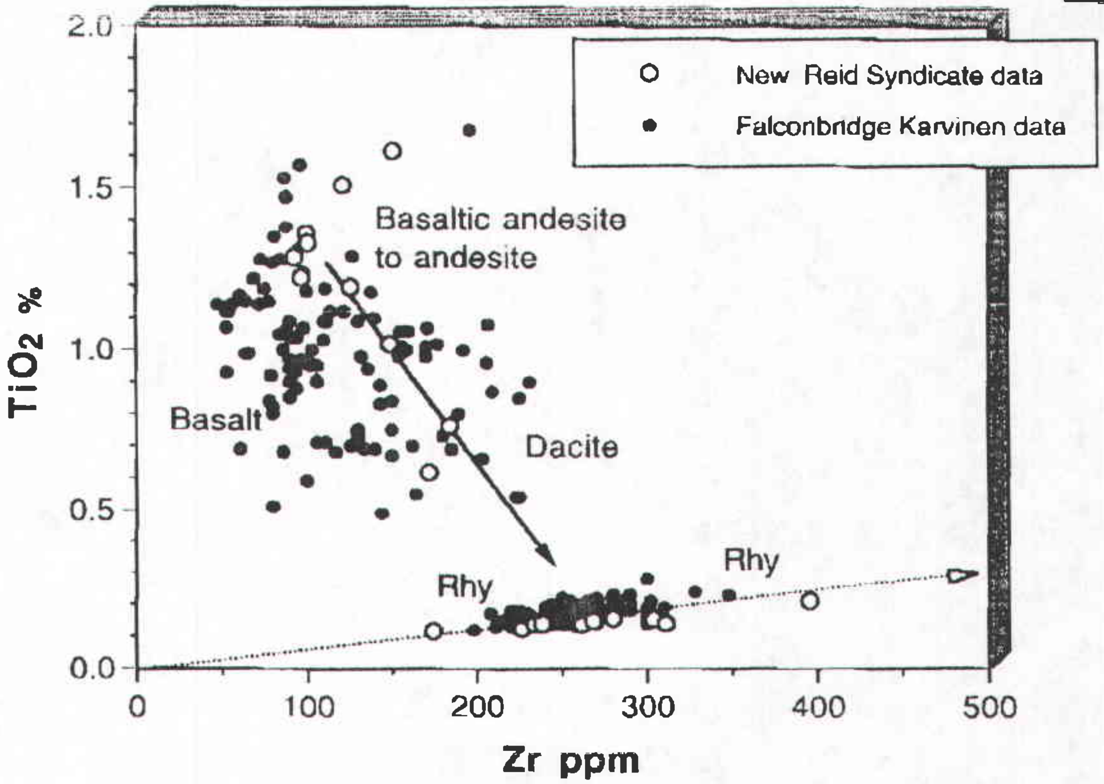


Fig. 15b



The felsic Karvinen volcanic rocks, regardless of degree of alteration, generally have Zr >200 ppm (Fig. 15b). A plot of Y versus Zr (Fig. 16a) indicates that the felsic rocks generally have Zr/Y ratios of 3 to ≈8, that is tholeiitic to mildly calc-alkaline. The strongly tholeiitic affinities (Zr/Y=1.5-2.5) found in the Upper Rhyolite southeast of the Reid Syndicate claim group (and also in the southernmost part of the Central Rhyolite) are not present. The mafic Karvinen volcanic rocks (Zr <100 ppm) also generally have Zr/Y ratios of 3 to ≈8, but have an additional tholeiitic group with Zr/Y ≈2-3. Andesitic to dacitic compositions, with Zr of ≈100-200 ppm, mainly have Zr/Y ratios of ≈4-8, that is, in the transitional affinity range.

Alteration Geochemistry. The majority of the volcanic rocks outline general fractionation trends in plots of major elements versus Zr, for example Ca-Zr and Fe-Zr, although some samples show moderate departures in the felsic range as a result of alteration. In the case of Mg-Zr, a significant group of rocks that were mainly of rhyolitic composition, as indicated by their Al_2O_3/TiO_2 ratios, now have MgO values of 2-5% (shown by shaded area in Fig. 16b). A typical MgO fractionation trend for mafic to felsic rocks is shown by the solid line in Fig. 16b. Although the MgO contents of the altered rhyolites have increased relative to typical primary rhyolite MgO values of ≤1%, an mobile-immobile element plot such as this cannot be used to determine true mass gains because of the complex effects of other mobile element changes on MgO contents. The same is true of Fe, which also appears to have been added substantially to some of the rhyolites. In a SiO_2-Zr plot (Fig. 17a), most Karvinen volcanics outline a general fractionation trend, although there are some moderate displacements of felsic samples from the trend due to SiO_2 loss or gain (such SiO_2 changes can only be roughly estimated from this plot). Although it would be possible to calculate mass changes for each element in each altered rock as outlined by MacLean (1990), a more comprehensive study would be required than is possible in this initial report.

The Karvinen rocks range from least altered, high-Na low-K compositions, to altered high-K, low-Na compositions (Fig. 17b). Many rhyolites with <1% Na_2O have 2.5-4.5% K_2O but only 13-18% Al_2O_3, indicating that some of the K must occur as alkali feldspar rather than entirely as sericite. Some of the apparently Na-depleted rhyolites (Na_2O <1%) are also low in CaO (<0.7%), and at the same time have apparent enrichments in FeO and MgO. Examples occur in hole MF12-02 (within the major felsic interval from 257 to 711 metres), and over shorter intervals in holes 12-08, 12-09 and elsewhere.

Falconbridge Karvinen data

Fig. 16a

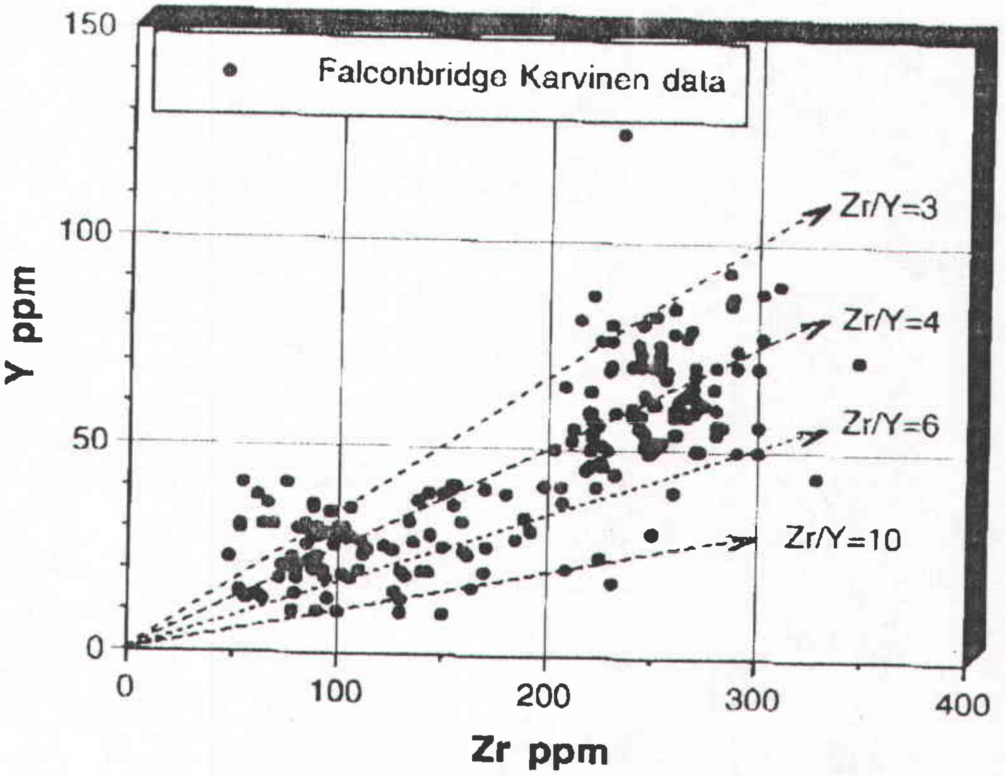
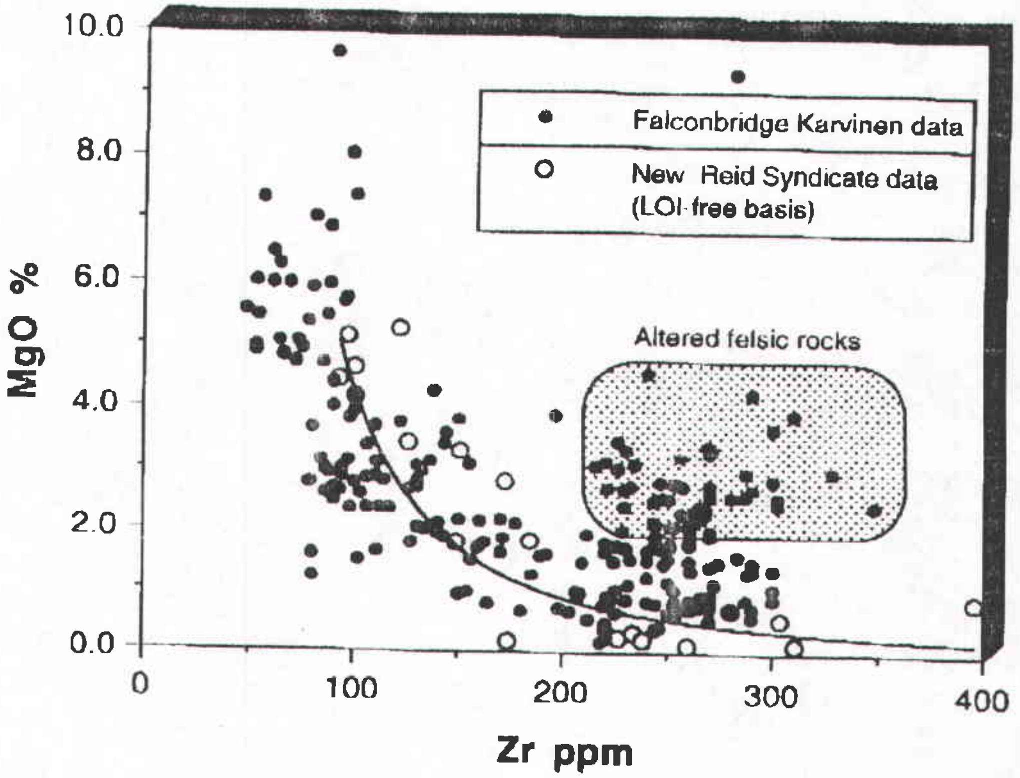


Fig. 16b



New data + Karvinen data

Fig. 17a

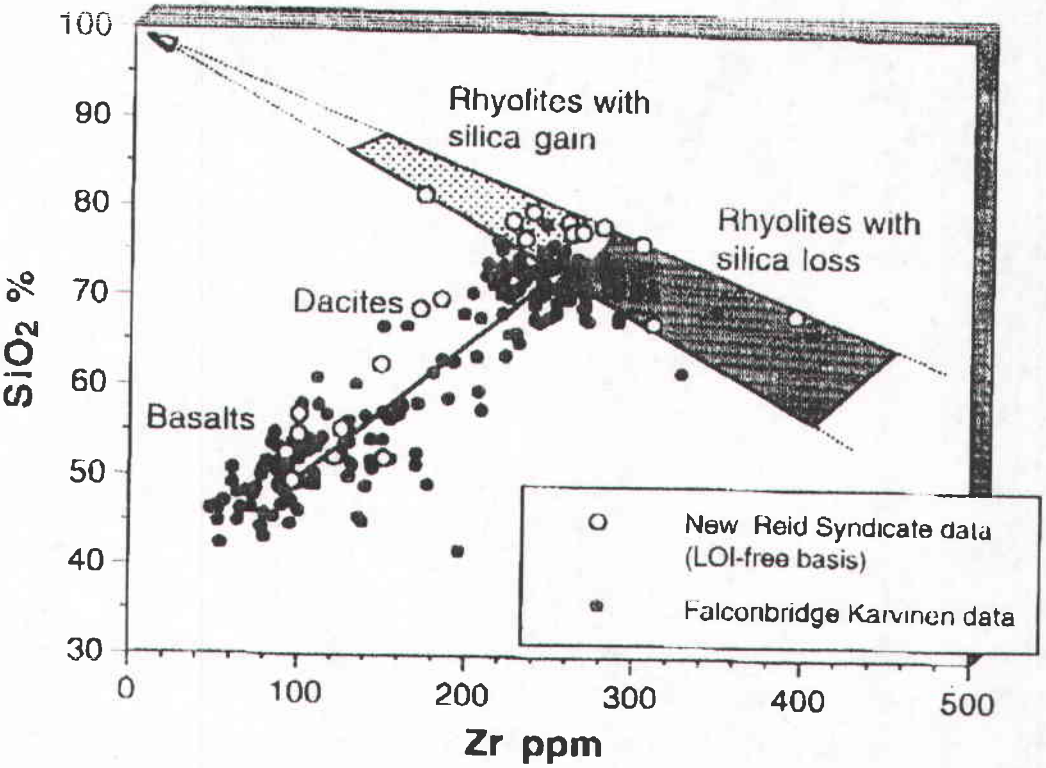
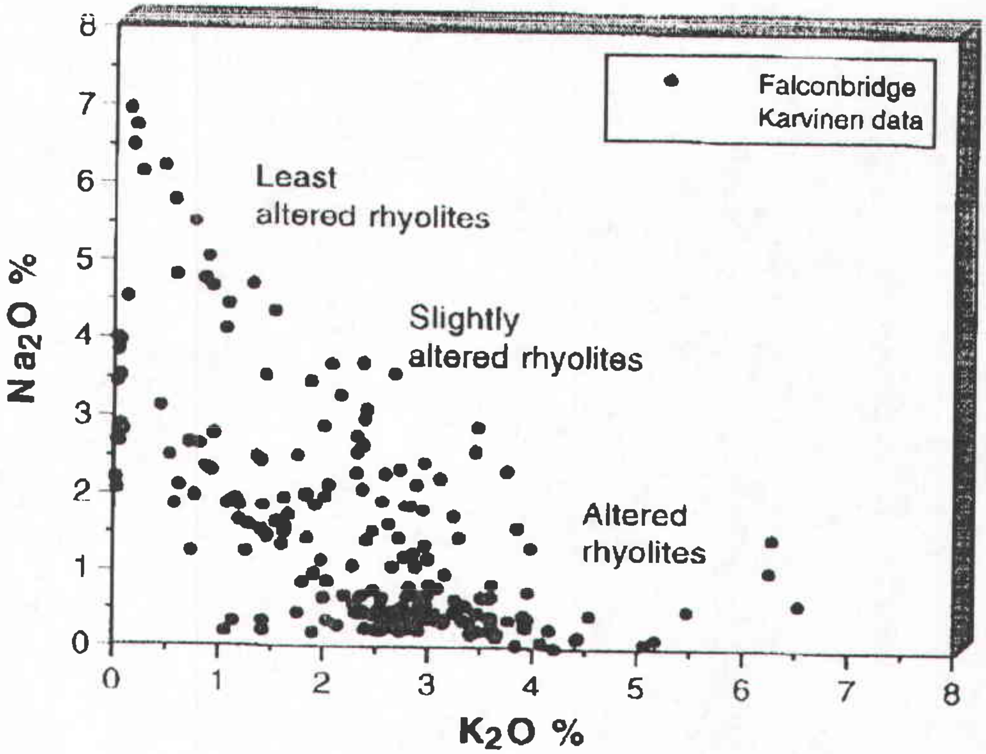


Fig. 17b



Rare-Earth Element Geochemistry. About 50 of the Karvinen rocks were analyzed by Falconbridge for REEs by ICP-MS, which requires that the sample be digested completely prior to analysis. The results are not necessarily directly comparable with Pyke's (1989) data, which were obtained using the non-destructive neutron activation method. Some Karvinen rhyolites have REE patterns similar to those of most Central Rhyolites in eastern Reid Township, i.e. of FIIIa type. These Karvinen REE patterns are have distinctly lower concentrations and steeper slopes than those of the Kidd Creek or Kamiskotia rhyolites, i.e. the former are of transitional, as opposed to tholeiitic affinity.

However, other Karvinen rhyolites, and also many intermediate to mafic volcanic rocks, are rather depleted in the heavy REE Dy and Er, which produces a distinctive concave upward shape to the right side of the REE pattern. These could be termed modified-transitional patterns. For example, in hole MF12-03, FIIIa type rhyolites occur in the upper part of the hole (Fig. 18a), but heavy REE-depleted rhyolite, dacite and basalt occur in the middle portion of the hole (Fig. 18b), and also in the lower portion of the hole (Figs. 19a,b).

We are assuming at present that this heavy REE depletion is a real feature of the volcanic rocks in this area, and not an artifact of the analytical method. In some holes, the REE patterns for mafic through felsic rocks display a close similarity of shape (apart from Eu anomalies), which suggests that these volcanic rocks were derived from the same magma. For example, the mafic and felsic rocks in hole MF12-04 (not shown) have very similar REE patterns, differing only in the slightly lower absolute concentrations of REE in the mafic volcanic rocks.

Rhyolites and basalts in hole MF12-07 also have HREE-depleted patterns, as shown in Figures 20a and 20b, respectively. Rhyolites and basalts in hole MF12-09 (Figs. 21a and 21b) and hole MF12-08 (not shown) have the same respective REE patterns as rhyolites and basalts in MF12-07, and thus are probably correlatable. Holes MF12-09 and 12-08 also contain some different basalts that have much flatter MORB-type patterns (e.g. Fig. 21b). Although the REE data indicate that there are two contrasting groups of mafic volcanic rocks in this group of holes, all of the samples have Zr/Y ratios of <4, indicating that they are essentially of tholeiitic affinity.

Falconbridge data: NW of Reid Syndicate claims

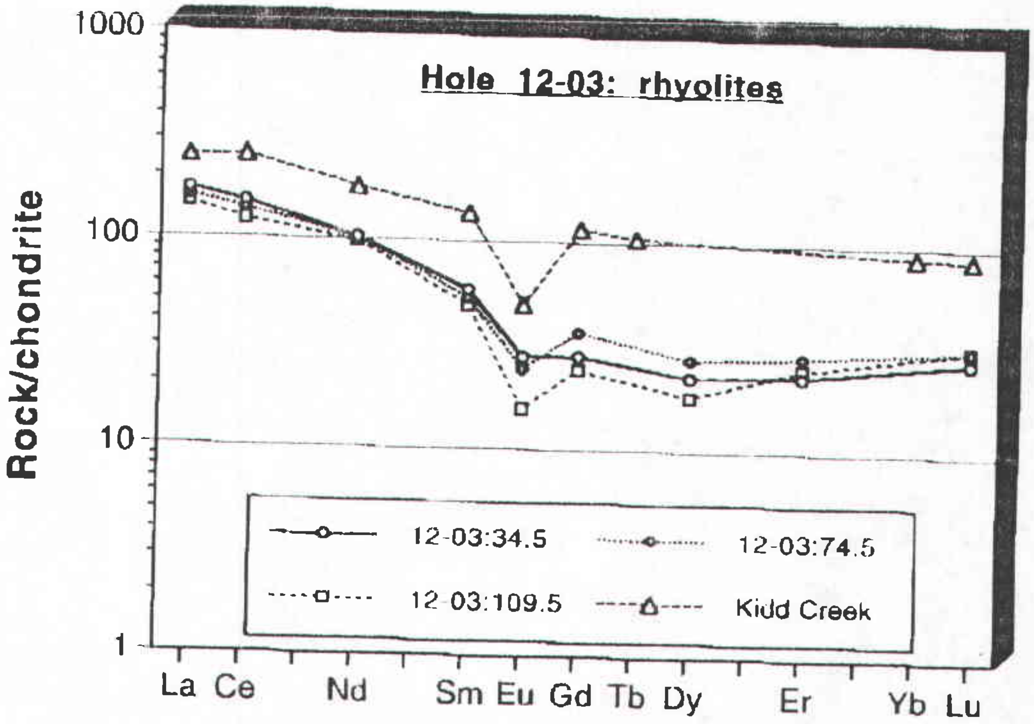


Fig. 18a

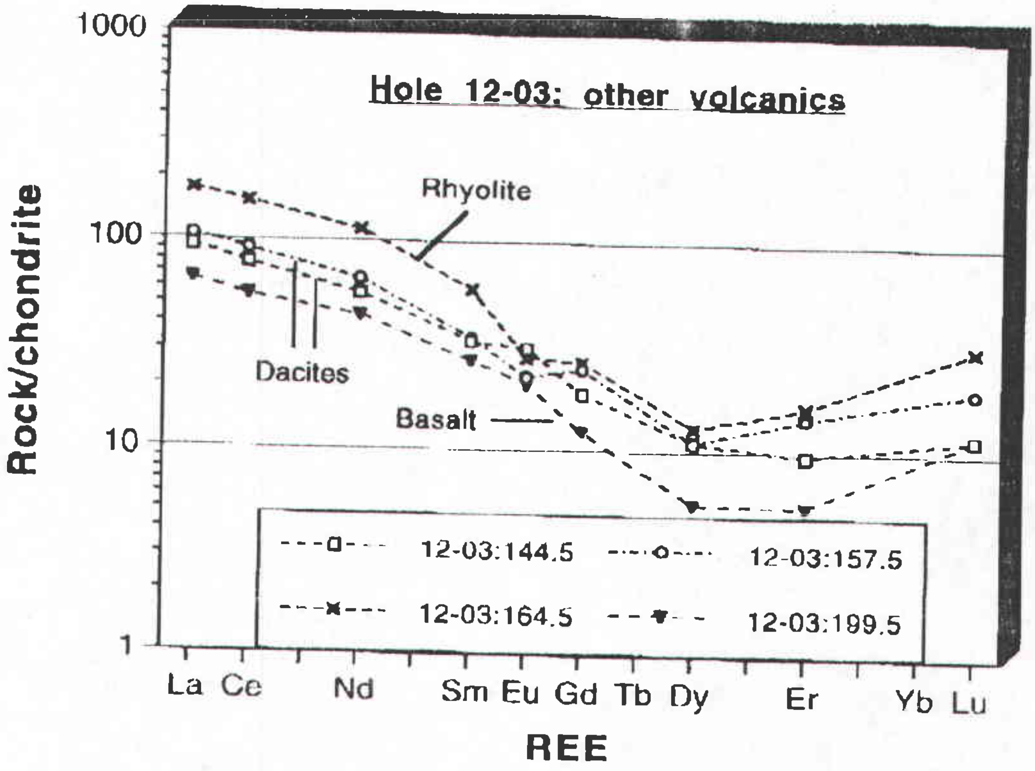


Fig. 18b

Falconbridge data: NW of Reid Syndicate claims

Fig. 19a

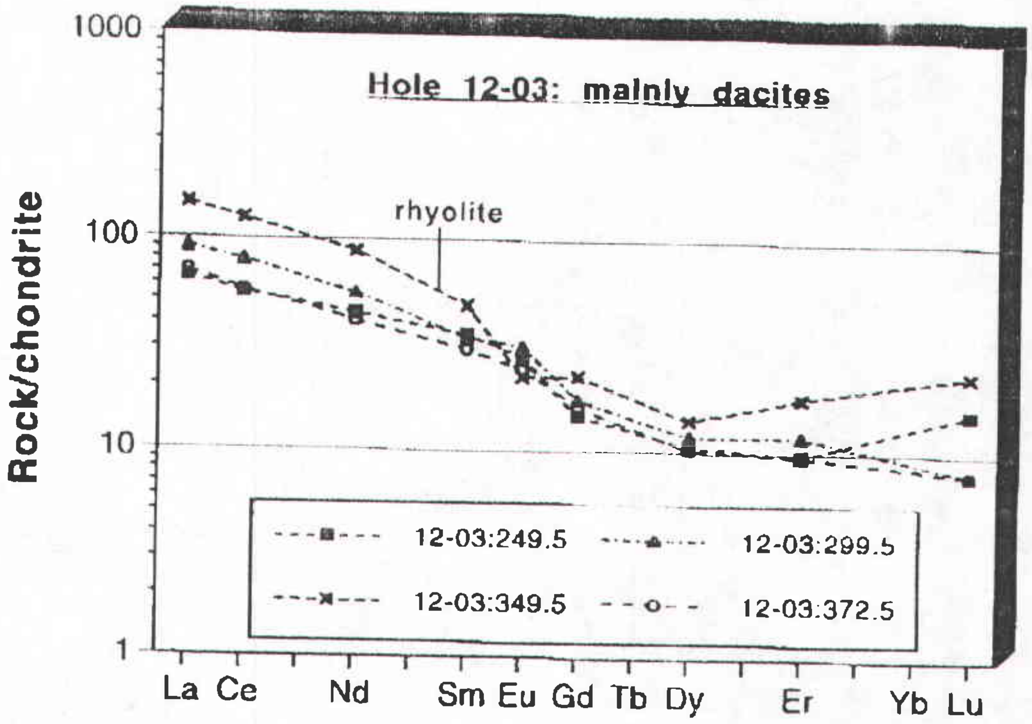
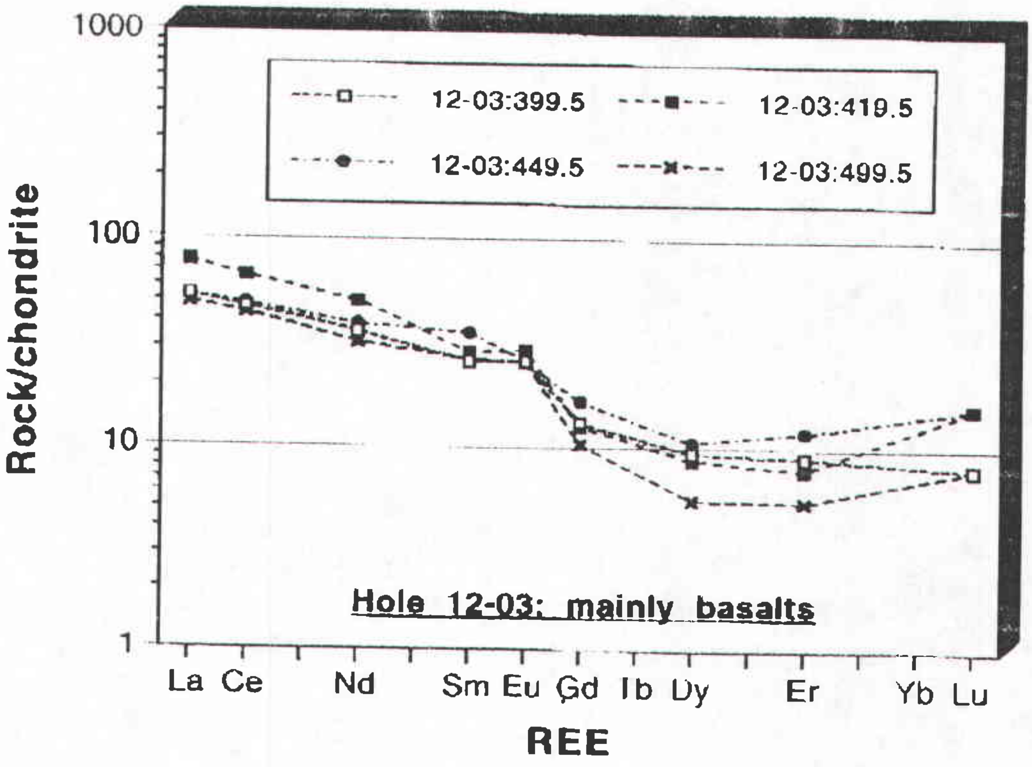


Fig. 19b



Falconbridge data: NW of Reid Syndicate claims

Fig. 20a

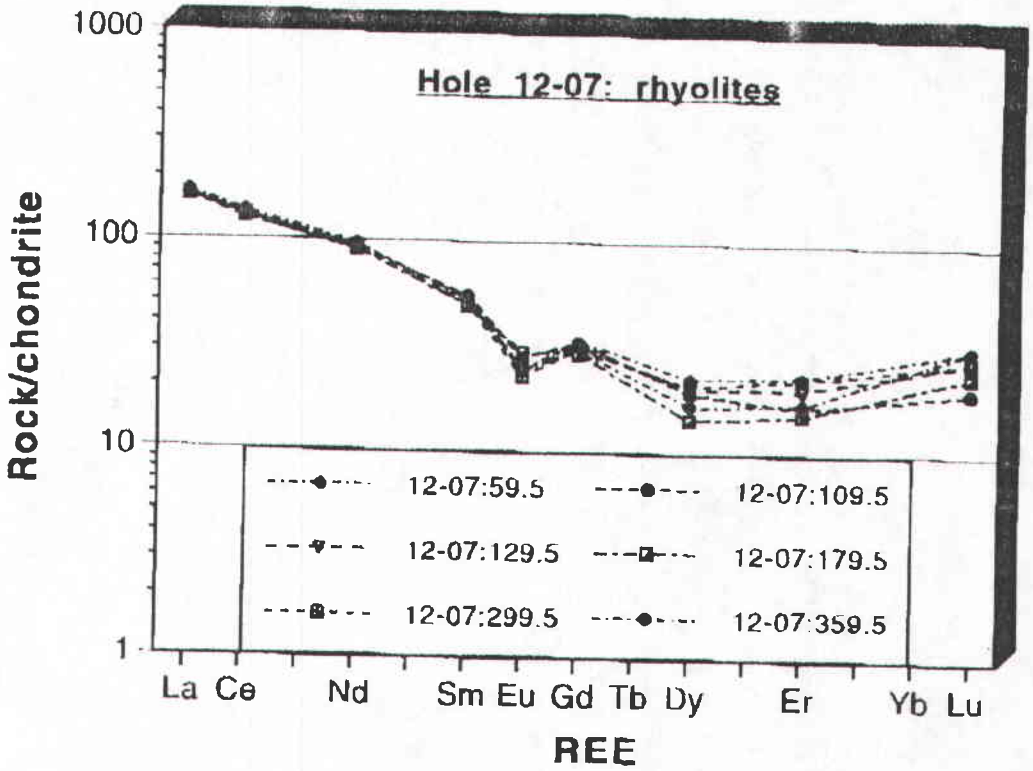
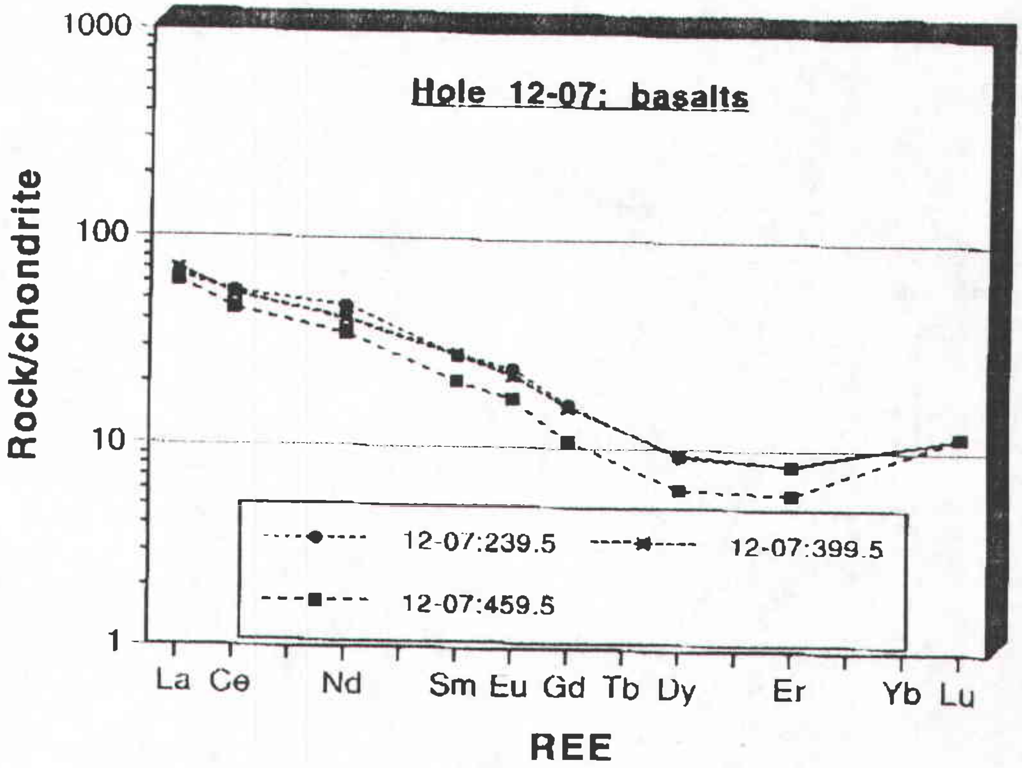


Fig. 20b



Falconbridge data: NW of Reid Syndicate claims

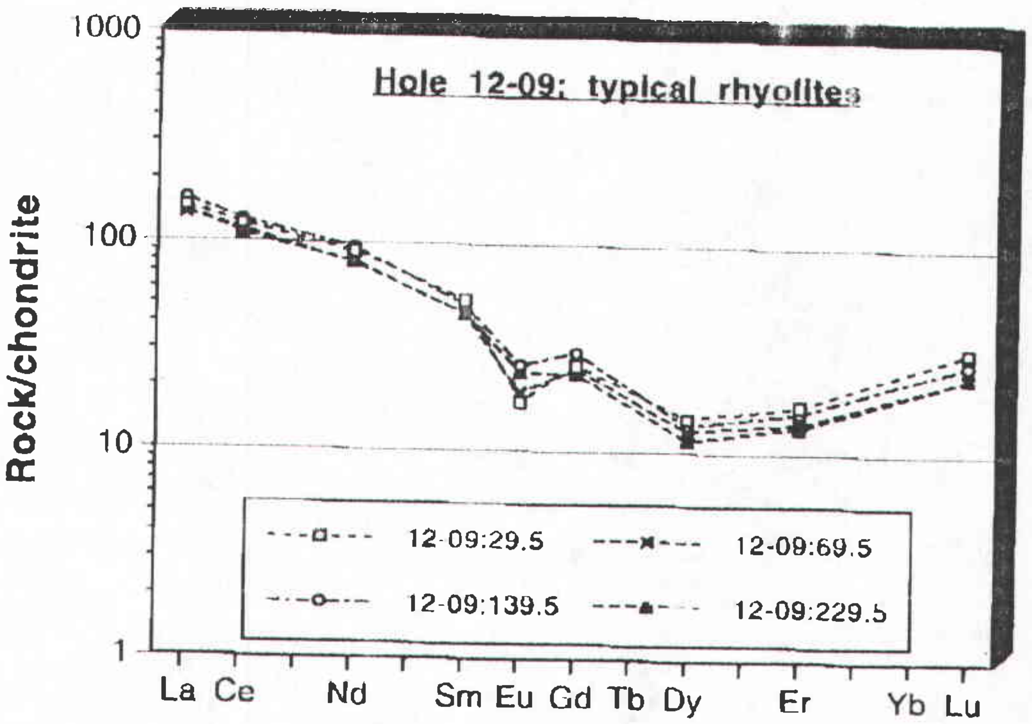


Fig. 21a

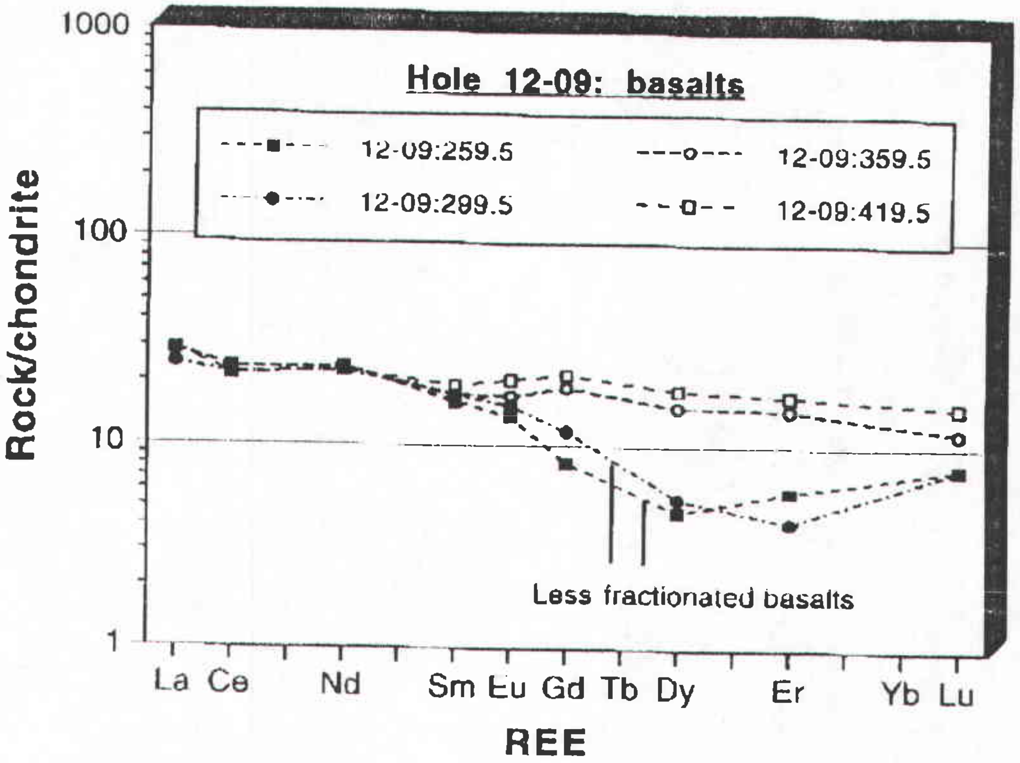


Fig. 21b

Discussion and Conclusions

Volcanic Composition

The volcanic rocks in the Newmont drilling area to the south of the Reid Syndicate claim group mostly fall along a fractionation trend from basalt to basaltic andesite, which is accompanied by Ti-P-enrichment similar to rift-related tholeiitic trends at Kamiskotia (Barrie et al., 1991) and in the Skaergaard Intrusion (Hunter and Sparks, 1987). However, Zr/Y ratios in the Newmont drilling area range from tholeiitic to mildly calc-alkaline. The Newmont area contains some primitive high-Mg (picritic) basalts that resemble komatiitic compositions in the Kidd Creek area.

The volcanic rocks to the east and southeast of the Reid Syndicate claim group are mainly a bimodal series of rhyolites on the one hand, and andesites to basalts on the other. The main lithological units from north to south are the Central Rhyolite, Southern Basalt, and Upper Rhyolite formations. Both rhyolite formations, where sampled, are relatively uniform in terms of their immobile element ratios. The rhyolites are all strongly fractionated, with low Al_2O_3 and TiO_2 contents. Trace element and REE data indicate that the Central Rhyolite has an FIIIa composition, whereas the Upper Rhyolite is mainly of FIIIb composition. There is also a FIIIb rhyolitic unit of untested thickness and unknown northwesterly extent that occurs immediately north of the Southern Basalt formation.

The FIIIb rhyolites have low TiO_2 contents and very low Zr/Y ratios, with high REE, Y and Yb contents and relatively flat REE patterns, and are therefore closely comparable to the fractionated tholeiitic rhyolites at Kamiskotia (Barrie et al., 1993) and Kidd Creek (Coad, 1985; Lesher et al., 1986). The FIIIa rhyolites are geochemically similar to those of the Central Mine Sequence at Noranda (Lesher et al., 1986; Barrett et al., 1991a,b,c). With respect to terminology, the FIIIb and FIIIa rhyolites correspond, respectively, to the tholeiitic and transitional rhyolites of MacLean and Barrett (1993), and to the Group 1 and Group 2 rhyolites of Barrie et al. (1993).

The volcanic rocks in the Karvinen option to the northwest of the Reid Syndicate claim group also are mainly a bimodal series of rhyolites on the one hand, and andesites to basalts on the other. Some of the Karvinen rhyolites geochemically resemble those of the FIIIa rhyolites of the Central Rhyolite Formation in eastern Reid Township. However, other rhyolites in the Karvinen area show a rather different REE pattern with an apparent relative depletion in the heavy REE, a feature also shared by associated dacitic to basaltic rocks in this area. Assuming these differences are real, they could be used to help correlate volcanic stratigraphy within the Karvinen area, and also to compare with the REE patterns of volcanic rocks in untested areas immediately to the southeast. Such an attempt has not been made in our initial study in view of the large size of the Karvinen data set, and our present uncertainty in the locations of the drill holes in this area.

Alteration

Alteration in eastern Reid Township involves variable amounts of sericitization, silicification, and, apparently, formation of alkali feldspar. The latter phase is interpreted as an alteration product and not a primary feature of the lavas in view of the overall tholeiitic to transitional character of the volcanic rocks (as opposed to calc-alkaline). X-ray diffraction analysis of two K-rich samples with relatively low Al_2O_3 contents in hole R-D-80-5 (128 and 209') confirms that K-bearing feldspar is the dominant phase in these samples, with sericite a minor phase (as also inferred from geochemical relations).

Plots of K_2O versus Al_2O_3 for volcanic rocks from the Comstate and Karvinen options indicate that many rocks contain significant proportions of K-feldspar in addition to sericite. Since K-feldspar has not been noted on the drill logs, it probably occurs as a fine-grained phase that is only readily detectable in the field by chemical staining. It would be of interest to outline the distribution of K-feldspar versus sericite in these areas. Since K-feldspar can form in alteration systems where the hydrothermal fluids are not sufficiently acidic to form sericite, it is possible that a broad zonation from K-feldspar into sericitic alteration would reflect the direction of increasingly intensity of hydrothermal alteration. Such a transition has been documented in parts of the altered footwall rhyolite at Eskay Creek (Roth 1993; Barrett et al., 1993). Alteration in the Karvinen option area has not been investigated systematically, although within the rhyolites there are zones of strong Na depletion, locally with Ca depletion as well. Many rhyolites also show apparent Mg+Fe addition, although these and other alteration effects should be quantified using calculated mass changes based on immobile element methods.

Recommendations

Preamble. The Central Rhyolite in eastern Reid Township was interpreted by Pyke (1989) and Jensen et al. (1994) to be overlain stratigraphically to the south by the Southern Basalt and then the Upper Rhyolite, with the contacts between these units striking to the west northwest. If so, then these units would extend onto and across the Reid Syndicate claim group.

Rhyolites chemically comparable to the FIIIa-type Central Rhyolite are indeed present in drill holes located to the north and northwest of the Reid Syndicate claim group. In addition, rhyolites of unknown affinity have been encountered in RC holes along the northern property boundary. Since so much of the Reid Syndicate claim group remains untested, it is entirely possible that part of the Central Rhyolite crosses the claim group from ESE to WNW. It is equally possible that the contact between the Central Rhyolite and the Southern Basalt extends across the property in roughly the same direction, and as well the thin unit of FIIIb rhyolite located near the southern margin of the Central Rhyolite.

Given the unknown effects of folding and faulting, parts of the Upper Rhyolite, the main FIIIb rhyolite, could also appear on the claim group. Finally, it is also possible, given the geochemical similarities, that the Central Rhyolite and Southern Basalt reappear, albeit with a different regional strike, as part of the Karvinen area stratigraphy.

(1) The logical areas in which to drill in the Reid Syndicate claim group, given an initial restricted program of two 300-metre holes, would be in the northeast and northwest corners of the claim group. These areas would also have the advantage of being relatively close to recent and ongoing drilling programs by Noranda Exploration to the east of the claim group, and by Falconbridge Exploration to the northwest of the claim group.

A hole in the <u>northeast corner</u> could tie into the drill results from surrounding holes Chance R-2 to the west, Chance R-1 to the north, and R-80-D-5 and D-2 to the east. The hole could be collared some 1500-2000' west-northwest of hole R-80-D-5.

A hole in the <u>northwest corner</u> of the Reid Syndicate claim group could tie into the limited RC drill results from holes UR-81-04, 05 and 07 immediately north of the northern boundary of the claim group, and also to the Karvinen drilling further to the northwest. The hole could be collared some 2000-2500' south of hole UR-81-05. Both of the suggested holes are within half a mile of access roads.

(2) In order to further define volcanic units and facies variations in stratigraphy surrounding and possibly crossing the property, lithogeochemical and petrographic data are required for any holes that have not yet been sampled by the Pyke (1989) report and the present study. The lithogeochemical data allow identification of individual volcanic units and their magmatic affinity on the one hand, and chemical alteration effects on the other. The petrographic data allow identification of flows, breccias and tuffs, as well as textural alteration effects (cf. Allen, 1988).

Holes that should be sampled for lithogeochemistry and petrography include R-80-D-1 and D-2 to the east of the Reid Syndicate claim group, RM-3, UR 80-1 and KT66-2 to the north, and RM-5, C72-1 and BR64-6 to the northwest.

It would be of interest to search for the extension and source of the coarse breccias that were interpreted as mass flow 'lahars' by Pyke (1989) in hole R-80-D-5 on the eastern margin of the Reid Syndicate claim group. Similarly, in holes drilled to date to the east of the claim group, it would be useful to document the spatial distribution of massive felsic flows or domes relative to breccias and tuffs (with intercalated argillites), the latter of which could reflect more distal equivalents deposited in areas flanking major felsic eruptive centres (cf. McPhee and Allen, 1992).

(3) Rare-earth element patterns should be obtained by neutron activation analysis for a subset of these new lithogeochemical samples (and also from RM79-1 and Chance R-2) to confirm the volcanic geochemistry of these samples, and to allow closer comparisons with the Kamiskotia, Kidd Creek and other terranes.

(4) One high-precision U-Pb zircon date should be obtained from the Central Rhyolite, the age of which is not certain (the 2705 ma date of Barrie and Davis (1990) is apparently for the Upper Rhyolite). For comparison, the age of the Kamiskotia rhyolite is 2705±2 ma, and that of the Kidd Creek rhyolite is 2717±2 ma (Barrie and Davis, 1990).

(5) Following the completion of the proposed two-hole drilling program, a lithogeochemical program should be completed, based on about 15 samples per 300 metres, in order to define the volcanic stratigraphic units, to assess hydrothermal alteration. Of these 30 drill samples, about 10 should be analyzed for REE by neutron activation.

(6) Because of the near-absence of drilling and outcrop data over most of the claim group, the best approach to working out the trends in volcanic stratigraphy and alteration would be to locate and track the northwestwards extension of the broad stratigraphic relations recognized in eastern Reid Township, in particular the Central and Upper Rhyolites, both of which are geochemically favorable as hosts for VMS mineralization. This is the purpose of the first hole suggested above. The purpose of the second hole would be to locate the southeastern extension of the felsic stratigraphy intersected in the Karvinen area about one mile to the northwest, some of which resembles the FIIIa Central Rhyolite, and some of which is notably altered.

If a framework volcanic stratigraphy can be established in these two holes, further drilling can test the intervening area to search for a hydrothermally active and proximal eruptive volcanic centre. Both mafic-felsic and felsic-felsic contacts have the potential to host VMS deposits.

It is worth emphasizing that some of the largest VMS deposits in the Abitibi greenstone belt, including those at the Horne mine (MacLean and Hoy, 1991; Barrett et al., 1991a; Kerr and Gibson, 1993) and at Kidd Creek (Coad, 1985; Lesher et al., 1986), are directly hosted within felsic volcanic rocks of tholeiitic affinity. In addition, several felsic-hosted VMS deposits in the Abitibi greenstone belt, such as those at Mobrun (Barrett et al., 1992), Delbridge (Barrett et al., 1993) and Lemoine (Barrett and MacLean, 1991b), occur at or close to primary chemical contacts between contrasting tholeiitic and transitional rhyolite types. In this regard, the contact between FIIIa and FIIIb rhyolites in the southern part of the Central Rhyolite formation may be significant, and should be located and tested across the Reid Syndicate claim group.

Acknowledgements

We would like to thank Mr. L. Bonhomme of Timmins for initiating this project, and for providing geological information during the course of the study. K. Jensen and J. Grant provided useful geological and geophysical compilations for parts of Reid Township. We are very grateful to Noranda Exploration and Falconbridge Ltd. for permission to use various drill logs and lithogeochemical analyses during our study.

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April 25/94.

Samples Taken Reid Mahaffy –
By L Borbeau For Whole Rock All
R.E.E. To Be Determined.

	Sample #		Hole		Footage	
F T ✓	S301	●	BR64-6		155' to 300'	
F T ✓	S302		BR 64-6		" "	Black Qtz Eyes
F Agglo.	S303	●	BR 64-6.		124'	
F?I/M ✓	S304		RM. -5		77'	
F?I/M ✓	S305		RM-5		65'	Au Ag Zn
F. Frag ✓	S306	●	RM-3		206'	Feldspars
Mafic ✓	S307		RM-3		290'	
F Tuff ✓	S308	•	RM-3		332'	Bleached Sericite Black Min
F Tuff ✓	S309	•	RM-3		367'	15% Qtz Vein
F Weld Tuff ✓	S310	•	RM-3		382'	Black Dot
I ✓	S311	•	K.T.	66-2	335'	Fine Fragments ↑ CuZn
⬟ I ✓ I	S312	•	K.T.	66-2	280'	Black Qtz Eyes... CuZn
I ✓	S313	•	KT.	66-2	375'	
Feldspars I	S314	•	KT	66-2	Unknown Suspect 550'	
Felsic Agglo. X	S315	•	Caltor	72-1	76'	
X	S316		CT.	72-1	83'	
X	S317	•	CT	72-1	148'	
X	S318		CT.	72-1	227'	
X	S319		CT.	72-1	276'	
I.Mo X	S320		CT	72-1	346'	
X	S321		CT	72-1	406'	
X	S322		CT	72-1	475'	
Mafic X	S323		Holl	R-1	275'	
X	S324		Holl	R-1	375'	
Mafic Pillow X	S325		Holl	R-1	700'	
M And ✓	S326		Holl	R-2	225'	
And "B" ✓	S327		Holl	R-2	500'	
And "B" ✓	S328		Holl	R-2	550	

549 1.09

367 3.2

5.64 15 2

M 6. I/m. 5 I. 5 FR. 12

X-RAY ASSAY LABORATORIES 13-May-94 REPORT ----- REF. 18201 PAGE 1

SAMPLE	AU G/MT FA	NA2O % XRF-F	MGO % XRF-F	AL2O3 % XRF-F	SIO2 % XRF-F	P2O5 % XRF-F	K2O % XRF-F	CAO % XRF-F	TIO2 % XRF-F	CR2O3 % XRF-F	MNO XRF-
5301	--	.51	.93	12.1	77.8	.05	3.26	.56	.176	<.01	.0
5302	--	.56	4.28	13.2	46.0	.13	3.50	9.52	1.04	<.01	.25
5303	--	.81	2.37	12.8	73.5	.04	2.66	.18	.200	<.01	.06
5304	--	4.48	6.14	12.8	50.0	.13	.26	5.78	1.10	<.01	.27
5305	<.03	3.22	6.60	12.0	43.8	.12	.81	8.41	1.00	<.01	.39
5306	--	2.26	1.04	13.9	73.5	.05	2.73	.82	.209	<.01	.09
5307	--	3.40	1.27	16.3	44.9	.18	1.88	9.85	1.33	.02	.50
5308	--	4.76	.53	11.3	78.1	.04	1.21	.89	.157	<.01	.04
5309	--	1.10	.60	4.90	78.1	.04	.98	6.19	.086	<.01	.11
5310	--	5.16	.36	12.7	76.9	.06	1.79	.56	.165	<.01	.03
5311	--	7.35	.41	12.3	76.9	.05	.20	.24	.231	<.01	.04
5312	--	4.11	1.71	12.6	74.4	.06	1.45	.20	.225	<.01	.04
5313	--	1.09	.27	7.11	85.6	.05	1.62	.58	.135	<.01	.04
5314	--	1.20	1.50	12.9	71.8	.07	3.15	1.02	.240	<.01	.06
5315	--	.45	1.56	13.2	73.5	.04	3.21	.18	.192	<.01	.09
5316	--	7.10	2.11	15.2	56.3	.17	.26	5.40	.833	<.01	.14
5317	--	.50	1.73	10.2	74.6	.04	2.51	.31	.131	<.01	.11
5318	--	.43	2.13	10.5	77.6	.04	2.61	.99	.149	<.01	.07
5319	--	2.35	5.00	13.3	48.6	.24	1.04	6.12	1.51	<.01	.20
5320	--	1.12	5.01	13.1	44.4	.14	2.06	6.96	.993	<.01	.31
5321	--	3.29	4.70	14.0	41.5	.14	.61	10.6	1.02	<.01	.33
5322	--	.57	8.11	11.8	36.2	.12	<.01	10.7	1.14	<.01	.40
5323	--	5.60	3.95	15.9	49.1	.14	.44	8.64	1.33	<.01	.21
5324	--	.72	3.95	15.4	45.4	.13	.03	13.3	1.29	<.01	.26
5325	--	2.84	2.85	13.3	53.9	.11	.41	7.98	1.10	<.01	.26
5326	--	3.96	1.72	14.5	46.8	.29	.50	12.1	1.58	<.01	.26
5327	--	2.12	2.11	14.1	47.5	.30	.74	9.59	1.67	<.01	.37
5328	--	2.88	3.45	13.9	46.8	.28	.63	7.77	1.65	<.01	.20
D 5301	--	.52	.92	12.1	77.6	.05	3.25	.55	.171	<.01	.05
D 5305	<.03	--	--	--	--	--	--	--	--	--	--
D 5314	--	1.15	1.50	12.9	72.1	.07	3.14	1.02	.235	<.01	.06
D 5328	--	2.90	3.44	13.9	46.7	.28	.64	7.75	1.65	<.01	.20

SAMPLE	FE2O3 % XRF-F	CU PPM ICP	ZN PPM ICP	RB PPM XRF-F	SR PPM XRF-F	Y PPM XRF-F	ZR PPM XRF-F	NB PPM XRF-F	AG PPM ICP	BA PPM XRF-F	PB PPM ICP
5301	1.81	--	--	70	11	55	269	31	--	1060	--
5302	7.61	--	--	63	128	23	76	18	--	587	--
5303	3.76	--	--	56	24	71	288	22	--	893	--
5304	8.67	--	--	<10	157	24	79	24	--	140	--
5305	10.4	--	71.8	29	212	13	60	23	.4	295	--
5306	3.01	--	--	124	54	56	292	34	--	703	--
5307	11.2	--	--	58	171	20	84	18	--	466	--
5308	1.35	--	55.9	54	78	36	245	30	<.1	322	6
5309	1.48	--	--	32	151	25	94	12	--	213	--
5310	.74	--	60.4	62	68	64	279	29	<.1	396	3
5311	1.45	4.8	77.0	10	137	66	280	22	<.1	165	--
5312	3.15	5.0	85.0	61	78	66	300	17	<.1	456	--
5313	.62	--	--	67	32	57	162	25	--	432	--
5314	4.07	--	--	128	74	45	286	20	--	571	--
5315	3.99	--	--	56	<10	73	293	22	--	1390	--
5316	4.99	--	--	<10	187	19	98	22	--	156	--
5317	5.01	--	--	67	<10	44	232	28	--	790	--
5318	2.52	--	--	73	<10	44	235	25	--	425	--
5319	15.0	--	--	36	133	23	147	34	--	462	--
5320	12.6	--	--	32	56	15	72	29	--	457	--
5321	11.6	--	--	22	69	16	74	19	--	148	--
5322	19.3	--	--	<10	53	19	80	31	--	91	--
5323	7.85	--	--	14	53	13	93	<10	--	195	--
5324	14.2	--	--	<10	270	21	73	<10	--	<50	--
5325	10.9	--	--	<10	73	26	65	13	--	172	--
5326	8.78	--	--	15	256	23	91	24	--	169	--
5327	15.6	--	--	27	344	26	105	20	--	176	--
5328	17.0	--	--	15	203	19	91	23	--	286	--
D 5301	1.80	--	--	71	18	61	270	20	--	1050	--
D 5305	--	--	74.7	--	--	--	--	--	.5	--	--
D 5314	4.08	--	--	128	83	48	280	17	--	557	--
D 5328	16.9	--	--	17	207	15	96	26	--	283	--

SAMPLE	LOI % XRF-F	SUM % XRF-F
5301	2.60	100.0
5302	12.3	98.5
5303	3.05	99.6
5304	10.0	99.7
5305	12.4	99.2
5306	2.60	100.4
5307	8.65	99.6
5308	1.10	99.6
5309	5.15	93.8

SAMPLE	LOI % XRF-F	SUM % XRF-F
5310	1.55	100.1
5311	1.10	100.4
5312	2.25	100.3
5313	1.45	98.7
5314	3.50	99.6
5315	3.45	100.1
5316	7.05	99.6
5317	4.05	99.3
5318	2.90	100.0
5319	6.70	100.2
5320	12.0	98.8
5321	11.2	99.0
5322	11.2	99.6
5323	6.35	99.6
5324	4.50	99.3
5325	5.20	98.9
5326	8.00	98.6
5327	6.40	100.6
5328	5.00	99.6
D 5301	3.45	100.6
D 5305	--	--
D 5314	3.60	100.0
D 5328	5.15	99.6

Reid Twshp.

Sample taken By Lionel Bohomme -

for W.R.A. November 1993 -

Sample #	Hole #		Location	
19981	Newmont 74-6		265'	Andesite Tuff.
19982	74-6		340'	Andesite Tuff -
19983	74-6		440'	Andesite Tuff. Chloritic.
19984	74-6		540'	Andesite Tuff Epidote chlorite Alteration
19985	74-6		590'	As Above - -
19986	74-4		205'	Amygdular Andesite.
19987	74-4		755'	Basalt -
19988	74-5	84	830'	Andesite Tuff Grey
19989	74-5		905'	Andesite Tuff Grey -
19990	73-4		235'	Rhyodacite
19991	73-4		420'	Andesite Fragmental -
19992	73-4		445'	Andesite Tuff.
19993	73-4	90	635'	Peridotite -
19994	73-3		410'	Serpentinized. Mafic Tuff -
19995	73-3		485'	Agglomerate, Tuff - Black Shale.
19996	73-3	86	515'	Agglomerate Tuff, Grey Green -
19997	74-4		765'	Basalt
19998	74-4		720'	Andesite
19999	74-4		645'	Andesite
20000	74-5		965'	Mafic tuff Albite Chlorite Epidote -
5001	Newmont ~~Rosario~~ 79-1		527'	Rhyolite
5002	Newmont ~~Rosario~~ 79-1		EOH.	Rhyolite
5003	Chance R-2		473'	Rhyolite.
5004	Chance R-2		326'	Rhyodacite
5005	Chance. R-2		374'	Brecciated Rhyodacite Carbonate Filling

Bonhomme
data to
review
8-2921

RBR

X-RAY ASSAY LABORATORIES 19-Nov-93 REPORT ----- REF. 16679 PAGE 1

AMPLE	NA2O % XRF-F	MGO % XRF-F	AL2O3 % XRF-F	SIO2 % XRF-F	P2O5 % XRF-F	K2O % XRF-F	CAO % XRF-F	TIO2 % XRF-F	CR2O3 % XRF-F	MNO % XRF-F	FE2O3 % XRF-F	HAI
001	.59	1.76	14.3	66.5	.23	2.60	2.83	.725	<.01	.25	5.82	56
002	.62	2.64	13.7	64.4	.18	2.49	3.99	.579	<.01	.16	5.38	53
003	3.49	.25	11.7	77.5	.04	3.05	1.16	.121	<.01	.04	1.21	42
004	1.97	3.08	16.8	48.4	.26	1.64	9.33	1.50	.01	.14	10.8	30
005	3.38	.19	9.30	80.1	.04	1.42	2.53	.115	<.01	.05	1.27	22
9981	5.37	4.65	15.2	54.8	.13	.29	5.84	.717	<.01	.12	6.30	31
9982	4.07	4.31	15.6	59.0	.12	.99	5.40	.632	.01	.12	7.84	36
9983	.39	13.7	9.84	50.0	.06	.57	9.05	.527	.11	.22	11.9	61
9984	.72	5.67	6.26	34.3	.05	.19	27.3	.244	.05	.14	5.80	18
9985	.21	18.9	9.28	45.8	.06	.04	7.56	.428	.16	.22	12.7	71
9986	3.99	4.06	12.6	59.6	.14	.25	5.84	.816	<.01	.19	11.5	31
9987	2.04	7.87	15.2	52.2	.14	.79	5.41	.832	.05	.14	10.2	54
9988	4.00	6.03	14.1	56.2	.15	.19	3.31	.711	<.01	.10	11.9	46
9989	.10	19.3	11.4	46.7	.06	<.01	3.58	.620	.16	.15	10.8	84
9990	.95	4.59	14.8	56.5	.13	.44	11.9	.665	.02	.12	7.57	29
9991	4.59	4.86	15.3	59.1	.13	.12	4.29	.733	.02	.14	8.52	36
9992	.25	16.5	7.75	40.3	.05	<.01	12.8	.431	.34	.19	10.9	56
9993	.22	27.5	5.02	40.9	.05	.02	3.06	.315	.40	.18	12.4	90
9994	.18	18.6	8.22	36.9	.05	<.01	8.59	.465	.35	.25	11.8	68
9995	.73	9.68	12.3	46.1	.07	.03	11.3	.652	.06	.22	12.6	45
9996	.14	23.0	5.99	46.5	.04	<.01	3.83	.301	.31	.13	10.3	86
9997	3.96	4.92	14.6	55.8	.19	.64	7.18	1.03	<.01	.15	9.90	34
9998	.53	3.32	12.0	51.7	.15	.21	13.5	.798	<.01	.12	10.3	21
9999	3.35	2.70	14.3	56.9	.17	.66	8.64	.936	<.01	.12	7.63	22
000	3.16	4.69	14.4	54.4	.18	.52	8.58	.916	.02	.21	9.62	31
01	.57	1.76	14.2	66.2	.22	2.58	2.84	.712	.01	.25	5.86	
989	.12	19.3	11.6	47.0	.07	<.01	3.55	.628	.16	.15	10.8	

SAMPLE	RB PPM XRF	K/Rb	SR PPM XRF	Y PPM XRF	ZR PPM XRF	NB PPM XRF	BA PPM XRF	LOI % XRF-F	SUM % XRF-F	Zr/Y
5001	62	419	50	20	175	10	290	4.50	100.1	8.75
5002	59	422	39	17	161	10	301	5.95	100.1	9.47
5003	65	469	71	51	223	17	550	1.10	99.7	4.38
5004	42	390	220	40	140	9	277	4.25	98.2	3 50
5005	41	346	47	30	171	12	410	1.75	100.1	5 70
19981	13	223	142	16	129	7	142	4.80	98.2	8.07
19982	28	353	214	16	125	6	307	2.15	100.3	7.82
19983	19	300	34	18	50	<2	282	3.05	99.4	2.78
19984	3	633	57	8	36	3	95	18.9	99.6	4.50
19985	6	66	7	6	43	4	83	4.85	100.2	7.17
19986	7		61	32	125	6	198	1.45	100.4	
19987	20		80	25	116	6	331	3.85	98.7	
19988	4		62	20	122	7	144	3.50	100.2	
19989	2		2	18	48	3	87	6.60	99.5	
19990	12		98	20	114	5	200	2.05	99.7	
19991	6		133	19	133	9	145	2.40	100.2	
19992	6		45	13	41	6	80	3.30	97.8	
19993	7		6	7	43	6	101	8.85	98.9	
19994	<2		61	14	38	2	92	15.1	100.5	
19995	5		63	20	69	3	117	5.95	99.7	
19996	5		21	7	27	6	71	9.10	99.6	
19997	16		150	25	154	9	173	1.75	100.1	
19998	8		805	18	149	7	127	6.80	99.4	
19999	18		170	25	144	8	156	3.80	99.2	
20000	12		180	29	155	10	249	2.85	99.6	
D 5001	65		47	25	173	10	305	4.55	99.7	
D 19989	4		3	15	47	3	82	6.75	100.1	

8158

SAMPLES NOVEMBER 30th, 1993

L. BONHOMME - REID TOWNSHIP

SAMPLE NUMBER	HOLE	FOOTAGE
5006 (no tag)	RD 5	128
5007	RD 5	127.5
5008	RD 5	209
5009	RD 5	330
5010	RD 5	370
5011	RD 7	148
5012	RD 7	136
5013	RD 8	177
5014	RD 8	267
5015	79.1	237
5016	79.1	303
5017	79.1	335
5018	79.1	411
5019	79.1	444
5020	79.1	447
5021	79.1	515

SAMPLES NOVEMBER 30th, 1993

L. BONHOMME - REID TOWNSHIP

SAMPLE NUMBER	HOLE	FOOTAGE
5006 (no tag)	RD 5	128
5007	RD 5	127.5
5008	RD 5	209
5009	RD 5	330
5010	RD 5	370
5011	RD 7	148
5012	RD 7	136
5013	RD 8	177
5014	RD 8	267
5015	79.1	237
5016	79.1	303
5017	79.1	335
5018	79.1	411
5019	79.1	444
5020	79.1	447
5021	79.1	515

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SAMPLE	NA2O % XRF-F	MGO % XRF-F	AL2O3 % XRF-F	SIO2 % XRF-F	P2O5 % XRF-F	K2O % XRF-F	CAO % XRF-F	TIO2 % XRF-F	CR2O3 % XRF-F	MNO % XRF-F	FE2O3 % XRF-F
5007	1.55	.86	16.7	67.0	.03	6.55	.41	.206	<.01	.08	4.59
5008	.28	.14	16.1	66.0	.03	12.4	1.47	.139	<.01	.08	1.18
5009	2.85	.85	12.0	76.1	.03	2.76	1.02	.146	<.01	.05	2.36
5010	4.32	.77	11.6	75.9	.03	1.63	1.65	.134	<.01	.06	1.96
5011	3.70	.70	12.5	76.8	.03	2.02	.11	.154	.01	.05	2.27
5012	5.05	.56	13.3	75.5	.03	1.92	.71	.153	.01	.04	1.64
5013	4.23	.13	11.8	77.8	.04	2.93	.89	.137	.03	.04	1.03
5014	3.54	.32	11.6	75.2	.03	3.56	1.06	.135	.02	.11	2.59
5015	3.05	5.04	14.7	49.8	.24	.12	8.08	1.44	<.01	.19	14.2
5016	3.63	1.75	15.4	60.6	.23	.36	8.17	.986	.01	.13	6.05
5017	.68	3.25	14.6	52.3	.10	.02	10.7	1.18	.02	.23	12.8
5018	2.04	4.09	13.9	48.2	.11	.34	12.1	1.18	<.01	.24	10.4
5019	.81	4.84	14.1	46.5	.12	.28	12.2	1.15	<.01	.32	15.2
5020	2.39	4.43	15.3	52.0	.12	.76	10.6	1.29	<.01	.23	8.71
5021	2.38	3.87	14.2	52.5	.12	.72	9.97	1.23	.01	.24	7.92
D 5007	1.54	.85	16.7	66.7	.03	6.54	.41	.201	<.01	.08	4.57
D 5020	2.36	4.49	15.3	51.8	.12	.74	10.6	1.28	<.01	.23	8.74

SAMPLE	RB PPM XRF	SR PPM XRF	Y PPM XRF	ZR PPM XRF	NB PPM XRF	BA PPM XRF	LOI % XRF-F	SUM % XRF-F
5007	203	86	79	386	25	1100	2.00	100.0
5008	158	94	49	304	17	1080	1.40	99.2
5009	76	96	50	263	17	665	1.90	100.1
5010	43	109	59	256	15	402	2.00	100.1
5011	63	64	48	275	15	576	1.95	100.3
5012	70	100	56	300	19	547	1.25	100.2
5013	56	64	48	257	17	543	1.05	100.1
5014	73	69	55	229	15	654	2.30	100.5
5015	6	151	24	116	7	213	2.55	99.4
5016	18	245	31	144	11	231	2.85	100.2
5017	<2	223	24	119	6	122	3.55	99.4
5018	10	131	24	85	5	290	5.60	98.2
5019	9	177	23	91	6	153	3.55	99.1
5020	30	134	23	95	6	280	3.20	99.1
5021	34	107	21	93	8	386	5.20	98.4
D 5007	204	84	78	391	25	1120	2.05	99.7
D 5020	29	132	24	96	8	286	3.25	98.9

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SAMPLE	NA2O % XRF-F	MGO % XRF-F	AL2O3 % XRF-F	SIO2 % XRF-F	P2O5 % XRF-F	K2O % XRF-F	CAO % XRF-F	TIO2 % XRF-F	CR2O3 % XRF-F	MNO % XRF-F	FE2O3 % XRF-F
NO TAG	3.74	.22	10.7	79.3	.03	2.42	1.40	.138	.03	.06	1.45
D 5007	1.54	.85	16.7	66.7	.03	6.54	.41	.201	<.01	.08	4.57
D 5020	2.36	4.49	15.3	51.8	.12	.74	10.6	1.28	<.01	.23	8.74

SAMPLE	RB PPM XRF	SR PPM XRF	Y PPM XRF	ZR PPM XRF	NB PPM XRF	BA PPM XRF	LOI % XRF-F	SUM % XRF-F
NO TAG	66	129	57	237	13	533	.80	100.3
D 5007	204	84	78	391	25	1120	2.05	99.7
D 5020	29	132	24	96	8	286	3.25	98.9

Table 4. Chemical composition of volcanic rocks from Noranda's 1994 drilling program in Reid Township, Timmins area, Ontario.

Hole	Depth (m)	Affinity	Lithology	P2O5	Cr2O3	LOI	Total	Ba	Rb	Sr	Nb	Zr	Y	Zr/Y	Al2O3/ TiO2	Iskikawa Index
CR94-1	49.4	Tholeiitic	Rhyolite A*	0.03	<0.01	2.65	100.00	426	62	102	28	228	119	1.9	101	31.4
CR94-1	56.9	Tholeiitic	Rhyolite A*	0.03	<0.01	2.00	99.60	528	115	77	25	242	97	2.5	88.5	40.2
CR94-1	69.3	Tholeiitic	Rhyolite A*	0.03	<0.01	0.75	99.90	715	112	87	27	231	144	1.6	112	59.4
CR94-1	83.7	Tholeiitic	Rhyolite A*	0.03	<0.01	2.20	99.80	565	111	54	27	235	123	1.9	84.3	45.3
CR94-1	99.9	Tholeiitic	Rhyolite A*	0.02	<0.01	1.05	98.60	729	108	90	26	232	127	1.8	105	50.2
CR94-1	114.0	Tholeiitic	Rhyolite A*	0.05	<0.01	1.40	100.10	422	157	96	31	260	158	1.6	102	60.9
CR94-1	125.4	Tholeiitic	Basaltic andesite	0.26	0.01	2.65	98.70	336	28	98	9	143	33	4.3	9.7	
CR94-1	142.6	Tholeiitic	Basaltic andesite	0.22	<0.01	2.90	98.70	389	37	155	8	129	29	4.4	10.9	
CR94-1	160.8	Tholeiitic	Basaltic andesite	0.23	<0.01	1.75	99.70	239	17	119	9	125	31	4.0	11.3	
CR94-1	200.1	Tholeiitic	Basaltic andesite	0.24	<0.01	3.50	99.80	220	15	172	8	131	32	4.1	10.0	
CR94-1	267.5	Tholeiitic	Basaltic andesite	0.25	<0.01	6.55	100.00	268	17	143	11	132	34	3.9	10.5	
CR94-1	293.3	Tholeiitic	Basalt	0.14	<0.01	3.25	99.20	290	24	123	7	110	27	4.1	10.5	
CR94-1	355.0	Tholeiitic	Basalt	0.13	<0.01	2.45	98.90	374	17	45	7	99	27	3.7	10.1	
CR94-2	78.9-79.2	Calc-alk	Basaltic andesite	0.17	<0.01	4.00	99.60	327	27	183	11	162	23	7.0	15.2	
CR94-2	81.6-81.9	Tholeiitic	Rhyolite A*	0.03	<0.01	0.85	100.30	117	7	34	25	226	80	2.8	96.4	10.8
CR94-2	86.1-86.4	Tholeiitic	Rhyolite A*	0.03	<0.01	0.80	98.60	416	33	34	30	233	89	2.6	79.3	24.1
CR94-2	107.6-108.1	Transitional	Basaltic andesite	0.19	<0.01	3.50	99.70	407	28	163	10	151	33	4.6	13.6	
CR94-2	112.3-112.7	Tholeiitic	Rhyolite A*	0.04	<0.01	1.05	98.30	123	11	19	25	224	106	2.1	72.9	14.0
CR94-2	114.5-115.0	Tholeiitic	Rhyolite A*	0.04	<0.01	1.25	100.10	353	47	22	29	242	81	3.0	89.2	34.5
CR94-2	119.5-120.0	Tholeiitic	Andesite	0.13	<0.01	5.30	99.90	288	46	50	17	194	53	3.7	15.2	
CR94-2	142.8-143.2	Transitional	Basaltic andesite	0.17	<0.01	2.50	100.10	328	23	179	11	143	26	5.5	14.8	
CR94-2	161.1-161.5	Tholeiitic	Rhyolite A*	0.04	<0.01	0.50	98.40	884	40	42	32	241	83	2.9	81.4	46.8
CR94-2	162.8-163.2	Tholeiitic	Rhyolite A*	0.03	<0.01	0.85	98.90	1590	78	23	30	230	84	2.7	88.5	90.8
CR94-2	170.1-170.6	Tholeiitic	Andesite	0.14	<0.01	2.15	98.30	373	45	131	14	195	49	4.0	15.1	
CR94-2	208.2	Tholeiitic	Carb. basalt	0.07	0.02	12.80	100.30	630	105	145	4	54	26	2.1	23.8	
CR94-2	210.5-210.9	Tholeiitic	Rhyolite A*	0.02	<0.01	2.10	98.40	662	60	32	28	250	91	2.7	89.2	50.7
CR94-2	223.6-224.1	Tholeiitic	Rhyolite A*	0.03	<0.01	2.15	100.40	612	81	33	29	247	98	2.5	90.8	64.1
CR94-2	216.0-216.3	Transitional	Basaltic andesite	0.20	<0.01	8.50	100.30	281	44	95	11	151	33	4.6	12.1	
CR94-2	232.1-232.4	Tholeiitic	Rhyolite A*	0.03	<0.01	0.85	98.40	420	54	43	30	262	101	2.6	81.4	39.9
CR94-2	239.6-240.0	Tholeiitic	Rhyolite A*	0.02	<0.01	1.10	98.30	607	97	44	28	243	100	2.4	115.0	73.9
CR94-2	254.7-255.1	Tholeiitic	Rhyolite A*	0.02	<0.01	3.00	99.90	726	92	42	29	251	108	2.3	108.2	66.2

Table 4. Chemical composition of volcanic rocks from Noranda's 1994 drilling program in Reid Township, Timmins area, Ontario.

Bole	Depth (m)	Lab No.	Affinity	Lithology	SiO2	Al2O3	TiO2	Fe2O3	MnO	MgO	CaO	Na2O	K2O
CR94-3 (southeastern Reid)													
CR94-3	76.3-76.7	29332	Transitional	Basaltic andesite	54.70	15.00	0.96	9.98	0.16	5.17	7.14	2.88	0.51
CR94-3	87.5-87.8	29333	Calc-alk?	Rhyolite B	60.30	15.00	0.38	4.48	0.12	1.09	2.69	5.72	4.81
CR94-3	102.7	29334	Transitional	Basaltic andesite	51.70	15.40	1.20	12.10	0.16	4.87	8.89	2.22	0.33
CR94-3	119.1-120.0 (2)	29335#	Transitional	Basaltic andesite	52.00	14.20	1.35	12.70	0.17	4.32	7.62	2.25	0.34
CR94-3	122.0	29336	Tholeiitic	Rhyolite A	75.20	10.60	0.16	2.51	0.06	0.42	2.62	6.20	0.25
CR94-3	126.7-127.8 (2)	29337#	Tholeiitic	Basaltic andesite	50.00	14.20	1.21	11.80	0.18	3.83	7.34	2.98	0.95
CR94-3	140.8-144.1 (3)	29338#	Tholeiitic	Rhyolite A*	78.70	10.80	0.14	1.99	0.04	0.28	0.76	5.03	1.98
CR94-3	153.1-153.4	29339	Tholeiitic	Rhyolite A*	75.30	11.00	0.14	2.44	0.04	0.26	0.86	3.93	3.73
CR94-3	177.4-177.8	29356	Transitional	Basaltic andesite	51.70	14.20	1.32	12.30	0.19	5.42	7.66	2.84	0.42
CR94-3	185.3-185.6	29357	Tholeiitic	Rhyolite A*	75.00	11.70	0.16	2.10	0.05	0.51	1.54	3.21	2.19
CR94-3	192.7-193.1	29358	Tholeiitic	Rhyolite A*	79.00	10.40	0.11	1.52	0.04	0.29	0.76	4.02	1.52
CR94-3	214.2-214.7	29359	Transitional	Basalt	48.90	15.20	0.82	12.10	0.19	6.85	9.00	3.27	0.19
CR94-3	232.4-232.8	29360	Tholeiitic	Rhyolite A*	78.20	10.50	0.12	1.13	0.05	0.25	2.92	0.18	3.18
CR94-3	253.3-253.8	29361	Tholeiitic	Rhyolite A*	74.10	11.20	0.11	2.76	0.05	0.39	4.05	0.33	3.05
CR94-3	266.7-267.1	29362	Tholeiitic	Basaltic andesite	47.40	13.40	1.24	12.00	0.18	4.75	8.17	1.93	1.21
CR94-3	270.9-271.4	29363	Tholeiitic	Rhyolite A*	75.40	10.90	0.12	1.92	0.05	0.64	3.01	0.25	3.28
CR94-3	279.7-280.0	29364	Transitional	Basaltic andesite	47.30	13.70	1.18	11.50	0.19	4.80	8.23	2.77	0.55
CR94-3	287.0	29365	Tholeiitic	Rhyolite A*	75.70	10.90	0.14	1.67	0.05	0.41	3.60	0.50	3.18
CR94-3	295.2-295.8	29366	Tholeiitic	Rhyolite A*	76.10	12.60	0.14	1.45	0.04	0.26	1.86	0.36	3.69
# two or three pieces taken within interval													
CR94-4 (southeastern Reid)													
CR94-4	38.9-39.4	29367	Tholeiitic	Rhyolite A	75.17	11.43	0.23	3.00	0.03	1.21	1.46	4.48	1.27
CR94-4	82.2-82.6	29368	Tholeiitic	Rhyolite A	75.61	10.58	0.21	2.68	0.04	1.07	1.23	3.37	2.18
CR94-4	87.3-87.9	29369	Tholeiitic	Rhyolite A	73.59	10.57	0.23	2.92	0.04	1.04	1.87	2.74	2.61
CR94-4	92.9-93.6	29370	Tholeiitic	Rhyolite A	74.15	11.59	0.25	3.24	0.03	1.26	0.78	2.87	3.39
CR94-4	96.4-96.9	29371	Tholeiitic	Rhyolite A	74.77	11.22	0.22	3.29	0.04	1.21	0.94	4.05	2.40
CR94-4	103.6-104.1	29372	Tholeiitic	Rhyolite A	76.17	10.86	0.21	3.33	0.03	0.91	1.94	3.33	1.69
CR94-4	110.0-110.8	29373	Tholeiitic	Rhyolite A	71.27	10.53	0.23	3.39	0.05	1.19	1.76	4.59	1.65
CR94-4	117.0-117.6	29374	Tholeiitic	Rhyolite A	72.76	10.60	0.22	3.85	0.05	0.82	2.24	3.29	2.18
CR94-4	355.7-356.5	29375	Tholeiitic	Rhyolite A*	76.30	10.44	0.12	0.99	0.02	0.21	4.39	0.24	2.93
CR94-4	358.1-358.6	29376	Tholeiitic	Rhyolite A*	76.84	11.37	0.13	1.81	0.01	0.25	3.33	0.26	2.93
CR94-4	367.5-367.9	29377	Tholeiitic	Rhyolite A*	78.30	11.64	0.14	1.75	0.01	0.39	2.10	0.25	3.09
CR94-4	385.0-385.6	29378	Tholeiitic	Rhyolite A*	76.10	10.74	0.13	1.99	0.02	0.26	2.69	0.19	3.57
CR94-4	409.4-409.9	29379	Tholeiitic	Rhyolite A*	75.70	11.00	0.15	2.43	0.03	0.41	2.03	0.27	3.88
CR94-4	426.5-427.1	29380	Tholeiitic	Rhyolite A*	79.60	10.09	0.12	2.05	0.03	0.33	2.20	0.37	3.31
CR94-4	432.9-433.6	29381	Tholeiitic	Rhyolite A*	77.96	11.47	0.16	2.13	0.02	0.41	1.44	0.60	3.47

Table 4. Chemical composition of volcanic rocks from Noranda's 1994 drilling program in Reid Township, Timmins area, Ontario.

Hole	Depth (m)	Affinity	Lithology	P2O5	Cr2O3	LOI	Total	Ba	Rb	Sr	Nb	Zr	Y	Zr/Y	Al2O3/ TiO2	Iskikawa Index
CR94-3	76.3-76.7	Transitional	Basaltic andesite	0.14	0.01	3.15	99.80	186	21	260	12	168	25	6.7	15.6	
CR94-3	87.5-87.8	Calc-alk?	Rhyolite B	0.18	<0.01	1.95	96.70	1240	79	604	23	345	28	12.3	39.5	41.2
CR94-3	102.7	Transitional	Basaltic andesite	0.19	0.01	3.00	100.10	184	14	216	7	127	20	6.4	12.8	
CR94-3	119.1-120.0 (2)	Transitional	Basaltic andesite	0.21	<0.01	4.80	100.00	187	15	221	10	163	33	4.9	10.5	
CR94-3	122.0	Tholeiitic	Rhyolite A	0.04	<0.01	2.00	100.10	126	9	62	23	225	55	4.1	66.3	7.1
CR94-3	126.7-127.8 (2)	Tholeiitic	Basaltic andesite	0.19	<0.01	5.95	98.60	347	29	145	11	132	30	4.4	11.7	
CR94-3	140.8-144.1 (3)	Tholeiitic	Rhyolite A*	0.03	<0.01	0.40	100.20	550	40	54	28	243	61	4.0	77.1	28.1
CR94-3	153.1-153.4	Tholeiitic	Rhyolite A*	0.03	<0.01	0.70	98.40	688	69	53	25	255	77	3.3	78.6	45.4
CR94-3	177.4-177.8	Transitional	Basaltic andesite	0.23	<0.01	3.32	99.60	223	19	260	10	139	28	5.0	10.8	
CR94-3	185.3-185.6	Tholeiitic	Rhyolite A*	0.04	<0.01	2.60	99.10	353	57	31	31	252	94	2.7	73.1	36.2
CR94-3	192.7-193.1	Tholeiitic	Rhyolite A*	0.03	<0.01	1.10	98.80	769	42	29	26	228	70	3.3	94.5	27.5
CR94-3	214.2-214.7	Transitional	Basalt	0.09	0.01	2.70	99.30	174	11	349	7	97	17	5.7	18.5	
CR94-3	232.4-232.8	Tholeiitic	Rhyolite A*	0.04	<0.01	3.45	100.00	771	67	30	23	220	55	4.0	87.5	52.5
CR94-3	253.3-253.8	Tholeiitic	Rhyolite A*	0.02	<0.01	4.45	100.50	196	74	38	25	237	91	2.6	101.8	44.0
CR94-3	266.7-267.1	Tholeiitic	Basaltic andesite	0.18	<0.01	9.70	100.20	337	41	93	10	119	27	4.4	10.8	
CR94-3	270.9-271.4	Tholeiitic	Rhyolite A*	0.03	<0.01	4.20	99.80	446	88	53	24	240	75	3.2	90.8	54.6
CR94-3	279.7-280.0	Transitional	Basaltic andesite	0.18	<0.01	9.05	99.50	263	25	140	7	118	22	5.4	11.6	
CR94-3	287.0	Tholeiitic	Rhyolite A*	0.04	<0.01	3.65	99.80	344	80	45	25	230	62	3.7	77.9	46.7
CR94-3	295.2-295.8	Tholeiitic	Rhyolite A*	0.04	<0.01	3.25	99.80	329	82	37	29	291	75	3.9	90.0	64.0
CR94-4	38.9-39.4	Tholeiitic	Rhyolite A	0.03	<0.01	1.67	99.98	566	28	37	30	249	87	2.9	49.7	29.5
CR94-4	82.2-82.6	Tholeiitic	Rhyolite A	0.02	<0.01	2.05	99.04	579	53	51	28	246	84	2.9	50.4	41.4
CR94-4	87.3-87.9	Tholeiitic	Rhyolite A	0.04	<0.01	2.90	98.55	590	59	43	27	240	89	2.7	46.0	44.2
CR94-4	92.9-93.6	Tholeiitic	Rhyolite A	0.03	<0.01	2.27	99.86	826	65	55	32	275	97	2.8	46.4	56.0
CR94-4	96.4-96.9	Tholeiitic	Rhyolite A	0.03	0.01	1.96	100.14	694	48	79	31	270	89	3.0	51.0	42.0
CR94-4	103.6-104.1	Tholeiitic	Rhyolite A	0.03	<0.01	2.45	100.95	554	44	70	30	258	80	3.2	51.7	33.0
CR94-4	110.0-110.8	Tholeiitic	Rhyolite A	0.03	<0.01	4.18	98.87	423	49	87	30	330	87	3.8	45.8	30.9
CR94-4	117.0-117.6	Tholeiitic	Rhyolite A	0.03	<0.01	3.07	99.11	451	66	89	25	266	83	3.2	48.2	35.2
CR94-4	355.7-356.5	Tholeiitic	Rhyolite A*	0.02	<0.01	4.63	100.29	238	56	61	27	208	75	2.8	87.0	40.4
CR94-4	358.1-358.6	Tholeiitic	Rhyolite A*	0.01	<0.01	3.86	100.80	198	58	52	29	226	98	2.3	87.5	47.0
CR94-4	367.5-367.9	Tholeiitic	Rhyolite A*	0.01	<0.01	3.13	100.81	196	72	33	26	240	90	2.7	83.1	59.7
CR94-4	385.0-385.6	Tholeiitic	Rhyolite A*	0.02	<0.01	3.29	99.00	186	75	33	31	230	83	2.8	82.6	57.1
CR94-4	409.4-409.9	Tholeiitic	Rhyolite A*	0.01	<0.01	3.29	99.20	249	82	36	32	245	90	2.7	73.3	65.1
CR94-4	426.5-427.1	Tholeiitic	Rhyolite A*	0.03	<0.01	2.46	100.59	349	75	38	27	201	85	2.4	84.1	58.6
CR94-4	432.9-433.6	Tholeiitic	Rhyolite A*	0.03	<0.01	2.22	99.91	385	80	33	30	244	86	2.8	71.7	65.5

Table 4. Chemical composition of volcanic rocks from Noranda's 1994 drilling program in Reid Township, Timmins area, Ontario.

Hole	Depth (m)	Lab No.	Affinity	Lithology	SiO2	Al2O3	TiO2	Fe2O3	MnO	MgO	CaO	Na2O	K2O
R94-1 (south central Reid)													
C94-1	88.5	29340	Tholeiitic	Basalt	48.40	13.40	1.28	11.50	0.27	4.65	8.33	2.95	0.61
C94-1	90.0	29341	Transitional	Rhyolite A	75.50	10.60	0.17	2.07	0.04	0.37	1.07	0.51	7.01
C94-1	96.5	29342	Transitional	Rhyolite A	77.00	11.30	0.19	2.11	0.05	0.45	0.90	6.42	0.27
C94-1	102.9	29343	Tholeiitic	Rhyolite A*	75.60	12.30	0.16	2.33	0.06	1.77	1.32	1.27	2.76
C94-1	111.5	29344	Tholeiitic	Basalt	44.60	12.80	1.19	13.10	0.27	4.86	9.53	1.48	0.60
C94-1	137.5	29345	Tholeiitic	Rhyolite A*	73.80	12.00	0.15	2.30	0.05	0.92	1.98	2.21	2.43
C94-1	143.6	29346	Tholeiitic	Rhyolite A*	72.80	12.10	0.14	1.38	0.07	0.63	2.54	1.88	3.10
C94-1	144.2	29347	Tholeiitic	Rhyolite A*	78.60	8.86	0.10	1.16	0.06	0.29	2.46	3.47	1.12
C94-1	157.2	29348	Tholeiitic	Rhyolite A*	74.30	10.50	0.13	2.84	0.06	0.72	2.21	3.44	1.27
C94-1	173.9	29349	Transitional	Ferrodacite	63.10	14.00	0.61	6.73	0.16	2.38	3.42	0.23	2.80
C94-1	189.5	29350	Tholeiitic	Basalt	42.20	11.20	1.17	11.80	0.32	3.60	10.60	0.45	2.01
C94-1	195.0	29351	Transitional	Ferrodacite	63.30	13.10	0.58	5.71	0.19	2.30	3.46	0.33	2.98
C94-1	208.7	29352	Tholeiitic	Basalt	51.60	11.90	1.28	11.20	0.19	5.56	5.55	2.06	0.13
C94-1	227.2	29353	Transitional	Ferrodacite	66.60	15.30	0.71	4.88	0.08	1.10	2.80	0.72	2.94
C94-1	236.8	29354	Transitional	Ferrodacite	67.90	13.60	0.64	4.33	0.10	1.00	3.63	1.23	2.42
C94-1	253.6	29355	Transitional	Ferrodacite	62.30	14.20	0.68	5.52	0.14	1.16	4.56	1.95	2.31

Table 4. Chemical composition of volcanic rocks from Noranda's 1994 drilling program in Reid Township, Timmins area, Ontario.

Hole	Depth (m)	Affinity	Lithology	P2O5	Cr2O3	LOI	Total	Ba	Rb	Sr	Nb	Zr	Y	Zr/Y	Al2O3/ TiO2	Iskikawa Index
CR94-1	88.5	Tholeiitic	Basalt	0.13	<0.01	8.35	99.90	268	21	41	7	99	38	2.6	10.5	
CR94-1	90.0	Transitional	Rhyolite A	0.05	<0.01	1.15	98.50	929	119	81	12	181	40	4.5	62.4	82.4
CR94-1	96.8	Transitional	Rhyolite A	0.04	<0.01	0.97	99.70	130	12	99	15	184	33	5.6	59.5	9.0
CR94-1	102.9	Tholeiitic	Rhyolite A*	0.04	<0.01	2.65	100.30	531	125	42	15	236	64	3.7	76.9	63.6
CR94-1	111.5	Tholeiitic	Basalt	0.12	<0.01	10.70	99.30	229	18	72	8	92	28	3.3	10.8	
CR94-1	137.5	Tholeiitic	Rhyolite A*	0.03	<0.01	3.30	99.20	323	79	51	14	248	61	4.1	80.0	44.4
CR94-1	143.6	Tholeiitic	Rhyolite A*	0.03	<0.01	3.75	98.40	385	113	47	14	230	61	3.8	86.4	45.8
CR94-1	144.2	Tholeiitic	Rhyolite A*	0.03	<0.01	2.40	98.60	182	39	64	12	181	46	3.9	88.6	19.2
CR94-1	157.2	Tholeiitic	Rhyolite A*	0.03	<0.01	2.70	98.20	200	44	61	15	218	53	4.1	80.8	26.0
CR94-1	173.9	Transitional	Ferrodacite	0.18	<0.01	5.20	98.80	454	62	42	10	224	35	6.4	23.0	
CR94-1	189.5	Tholeiitic	Basalt	0.12	<0.01	15.70	99.20	329	40	72	7	95	29	3.3	9.6	
CR94-1	195.0	Transitional	Ferrodacite	0.17	<0.01	6.70	98.80	425	71	33	10	215	39	5.5	22.6	
CR94-1	208.7	Tholeiitic	Basalt	0.12	<0.01	9.65	99.20	133	5	46	6	100	31	3.2	9.3	
CR94-1	227.2	Transitional	Ferrodacite	0.20	<0.01	4.25	99.60	475	82	79	11	226	29	7.8	21.5	
CR94-1	236.8	Transitional	Ferrodacite	0.18	<0.01	4.90	99.90	449	69	57	12	226	35	6.5	21.3	
CR94-1	253.6	Transitional	Ferrodacite	0.20	<0.01	5.40	98.40	373	64	116	13	225	33	6.8	20.9	

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NOTE All files are in 2 formats: normal Excel workbook (created using Excel 5.0), and WK1 (1-2-3) format

April 22/95

Dear John:

Enclosed are 2 disks with spreadsheet files of analytical data from the Reid I and Reid II reports by Barrett & MacLean.

Reid I Disk

File: Reid 1-1: Lithogeochem: various (≡ Table 1)
1-2: Lithogeochem: Pyke data (≡ Table 2)
1-3: Lithogeochem: selected Falcon data (Karv)
1-4: All Karvinen data (MF01 to 12) (≡ Table 3)
1-5: Karvinen REE data: chondrite-normalized

Reid II Disk

File: Reid 2-1: Lithogeochem: northern claim block (≡ Table 1)
2-2: Lithogeochem: southern claim block (≡ Table 2)
2-3: REE data (≡ Table 3)
2-4: Noranda 1994 drilling in eastern Reid (≡ Table 4) →

File: REID 1-4 KARUINEN AREA REE DATA (& normalized values

No. Trou	Ech. de	Ech. a	Depth (m)	Al2O3	TiO2	Y	Zr	Ba	Rb	Sr	La	Ce	Nd	Sm	Eu	Gd	Dy	Er	Lu
MF12-03	33.00	36.00	34.50	12.300	0.1400	61.000	250.00	614.00	129.00	37.000	42.000	96.000	48.400	8.9000	1.6000	5.7000	5.7000	3.8000	0.7000
MF12-03	73.00	76.00	74.50	12.400	0.1400	72.000	253.00	644.00	81.000	49.000	39.000	88.000	47.800	8.1000	1.4000	7.4000	6.9000	4.7000	0.8000
MF12-03	108.00	111.00	109.50	11.400	0.1400	51.000	246.00	497.00	72.000	10.000	36.000	78.000	46.000	7.4000	0.9000	4.9000	4.6000	4.1000	0.8000
MF12-03	143.00	146.00	144.50	13.300	0.7300	39.000	180.00	327.00	89.000	41.000	23.000	50.000	26.700	5.1000	1.8000	3.8000	2.8000	1.6000	0.3000
MF12-03	156.00	159.00	157.50	14.200	0.5400	41.000	223.00	420.00	114.00	24.000	26.000	58.000	31.400	5.3000	1.3000	5.0000	2.8000	2.4000	0.5000
MF12-03	163.00	166.00	164.50	13.200	0.1700	70.000	253.00	479.00	107.00	46.000	43.000	98.000	53.900	9.1000	1.6000	5.4000	3.3000	2.7000	0.8000
MF12-03	198.00	201.00	199.50	16.300	1.0900	20.000	110.00	442.00	61.000	106.00	16.000	35.000	20.800	4.1000	1.2000	2.5000	1.4000	0.9000	0.3000
MF12-03	248.00	251.00	249.50	13.300	0.8000	33.000	189.00	356.00	59.000	131.00	16.000	35.000	20.900	5.4000	1.6000	3.0000	2.7000	1.6000	0.4000
MF12-03	298.00	301.00	299.50	12.100	0.5500	16.000	164.00	472.00	60.000	94.000	22.000	50.000	25.900	5.2000	1.8000	3.6000	3.0000	2.0000	0.2000
MF12-03	348.00	351.00	349.50	10.700	0.1400	55.000	212.00	464.00	78.000	47.000	36.000	79.000	41.300	7.4000	1.3000	4.6000	3.6000	3.0000	0.6000
MF12-03	371.00	374.00	372.50	11.100	0.7000	24.000	162.00	400.00	62.000	87.000	17.000	36.000	19.300	4.6000	1.4000	3.3000	2.6000	1.6000	0.2000
MF12-03	398.00	401.00	399.50	15.400	0.9700	34.000	97.000	300.00	27.000	168.00	13.000	30.000	17.000	4.0000	1.5000	2.7000	2.4000	1.5000	0.2000
MF12-03	418.00	421.00	419.50	16.600	1.1800	37.000	138.00	382.00	69.000	154.00	19.000	42.000	23.900	4.4000	1.7000	2.6000	2.2000	1.3000	0.4000
MF12-03	448.00	451.00	449.50	15.800	1.0500	31.000	84.000	130.00	37.000	199.00	13.000	31.000	18.400	5.5000	1.5000	3.4000	2.7000	2.0000	0.4000
MF12-03	498.00	501.00	499.50	15.600	0.9500	28.000	106.00	367.00	62.000	125.00	12.000	28.000	15.100	4.1000	1.5000	2.1000	1.4000	0.9000	0.2000
MF12-04	38.00	41.00	39.50	13.900	0.8500	24.000	225.00	331.00	66.000	115.00	23.000	49.000	24.400	6.5000	2.2000	5.1000	4.0000	2.3000	0.4000
MF12-04	73.00	76.00	74.50	10.800	0.1400	59.000	219.00	429.00	88.000	156.00	37.000	83.000	42.400	8.0000	1.7000	6.2000	4.5000	3.0000	0.7000
MF12-04	98.00	101.00	99.50	13.700	0.8900	39.000	143.00	205.00	74.000	210.00	25.000	59.000	35.900	8.1000	2.3000	5.5000	3.8000	2.8000	0.4000
MF12-04	138.00	141.00	139.50	15.600	1.0100	41.000	156.00	181.00	67.000	247.00	22.000	52.000	34.300	5.5000	1.9000	4.7000	3.3000	2.7000	0.5000
MF12-04	148.00	151.00	149.50	13.000	0.1900	50.000	272.00	229.00	110.00	70.000	35.000	79.000	44.700	7.9000	1.5000	5.5000	5.1000	4.1000	0.9000
MF12-04	188.00	191.00	189.50	14.100	0.2000	74.000	290.00	342.00	117.00	32.000	38.000	85.000	46.200	7.8000	1.7000	6.1000	5.6000	4.3000	0.9000
MF12-04	233.00	236.00	234.50	11.400	0.1600	87.000	221.00	292.00	78.000	37.000	37.000	86.000	44.600	8.6000	2.0000	5.8000	4.4000	3.1000	0.8000
MF12-04	258.00	261.00	259.50	11.700	1.0600	36.000	155.00	126.00	27.000	76.000	23.000	52.000	31.800	5.7000	1.8000	4.1000	2.9000	2.1000	0.5000
MF12-04	298.00	301.00	299.50	15.800	0.9600	<10.	98.000	176.00	16.000	181.00	11.000	25.000	16.800	4.4000	1.4000	2.7000	2.1000	1.7000	0.4000
MF12-04	348.00	351.00	349.50	15.700	0.9800	19.000	132.00	440.00	72.000	112.00	15.000	33.000	18.000	3.3000	1.6000	2.4000	1.7000	1.0000	0.3000
MF12-04	403.00	406.00	404.50	15.100	1.0800	37.000	207.00	542.00	94.000	55.000	17.000	38.000	22.200	5.0000	1.7000	4.7000	3.7000	2.7000	0.6000
MF12-04	523.00	526.00	524.50	15.200	0.9800	41.000	154.00	273.00	62.000	84.000	25.000	59.000	38.400	6.8000	2.3000	5.8000	3.2000	3.2000	0.5000
MF12-04	530.00	533.00	531.50	13.200	0.6700	39.000	150.00	298.00	57.000	78.000	22.000	47.000	25.300	5.1000	1.8000	4.0000	3.4000	2.3000	0.6000
MF12-07	58.00	61.00	59.50	11.200	0.1400	57.000	221.00	626.00	139.00	<10.	40.000	84.000	44.800	8.2000	1.4000	6.8000	5.7000	3.8000	0.8000
MF12-07	108.00	111.00	109.50	11.500	0.1700	30.000	250.00	282.00	130.00	14.000	40.000	83.000	43.300	8.4000	1.6000	6.7000	4.8000	2.7000	0.5000
MF12-07	128.00	131.00	129.50	11.900	0.1500	45.000	218.00	529.00	85.000	47.000	39.000	84.000	44.500	8.1000	1.4000	6.4000	5.1000	3.3000	0.7000
MF12-07	178.00	181.00	179.50	14.700	0.6600	50.000	203.00	437.00	94.000	56.000	40.000	80.000	42.500	7.5000	1.7000	5.9000	3.6000	2.5000	0.6000
MF12-07	238.00	241.00	239.50	15.300	1.0700	<10.	98.000	210.00	87.000	95.000	16.000	35.000	22.400	4.3000	1.4000	3.3000	2.3000	1.4000	0.3000
MF12-07	298.00	301.00	299.50	11.400	0.1600	58.000	220.00	373.00	103.00	60.000	39.000	80.000	43.200	7.7000	1.3000	6.2000	5.2000	3.7000	0.7000
MF12-07	358.00	361.00	359.50	12.000	0.1400	70.000	244.00	431.00	99.000	136.00	41.000	87.000	45.200	8.1000	1.4000	6.1000	4.2000	2.8000	0.8000
MF12-07	398.00	401.00	399.50	16.200	0.9400	27.000	136.00	258.00	55.000	144.00	17.000	34.000	19.500	4.3000	1.3000	3.2000	2.4000	1.4000	0.3000
MF12-07	458.00	461.00	459.50	15.900	0.8400	26.000	150.00	270.00	44.000	98.000	15.000	29.000	16.600	3.2000	1.0000	2.2000	1.6000	1.0000	0.3000
MF12-08	28.00	31.00	29.50	11.200	0.1700	65.000	208.00	391.00	99.000	42.000	38.000	81.000	43.600	8.1000	1.6000	5.7000	3.6000	2.6000	0.7000
MF12-08	58.00	61.00	59.50	13.700	0.1800	87.000	288.00	809.00	113.00	14.000	42.000	92.000	49.000	8.4000	1.3000	5.8000	3.5000	2.5000	0.6000
MF12-08	78.00	81.00	79.50	11.200	0.1800	49.000	248.00	1040.0	76.000	<10.	34.000	74.000	37.500	5.9000	1.0000	3.0000	1.9000	1.8000	0.5000
MF12-08	98.00	101.00	99.50	12.200	0.1800	54.000	261.00	1120.0	84.000	<10.	37.000	80.000	43.500	7.7000	1.3000	5.3000	3.1000	2.3000	0.7000
MF12-08	148.00	151.00	149.50	12.000	0.1500	69.000	229.00	524.00	82.000	13.000	41.000	87.000	45.800	7.8000	1.1000	5.1000	2.6000	1.9000	0.6000

No. Trou	Ech. de	Ech. a	Depth (m)	Al2O3	TiO2	Y	Zr	Ba	Rb	Sr	La	Ce	Nd	Sm	Eu	Gd	Dy	Er	Lu
MF12-08	198.00	201.00	199.50	10.700	0.1600	51.000	226.00	380.00	78.000	30.000	34.000	75.000	41.400	7.1000	1.5000	5.3000	3.5000	2.5000	0.7000
MF12-08	248.00	251.00	249.50	12.800	0.1600	82.000	251.00	688.00	80.000	<10.	47.000	101.00	53.200	8.6000	1.4000	5.0000	2.8000	2.0000	0.6000
MF12-08	268.00	271.00	269.50	14.300	0.1900	56.000	283.00	588.00	106.00	20.000	40.000	86.000	44.700	7.3000	1.5000	4.9000	3.3000	2.5000	0.7000
MF12-08	298.00	301.00	299.50	12.000	0.1800	67.000	256.00	714.00	86.000	<10.	41.000	87.000	45.000	7.9000	1.0000	5.6000	3.9000	2.9000	0.8000
MF12-08	358.00	361.00	359.50	14.500	1.2800	21.000	73.000	56.000	<10.	107.00	7.0000	16.000	11.900	3.3000	1.1000	3.3000	3.3000	2.1000	0.4000
MF12-08	418.00	421.00	419.50	15.200	0.9900	36.000	66.000	45.000	<10.	53.000	6.0000	13.000	9.4000	2.2000	0.8000	1.5000	1.0000	0.6000	0.2000
MF12-08	498.00	501.00	499.50	13.400	1.1200	31.000	53.000	23.000	13.000	61.000	7.0000	15.000	10.900	3.1000	1.1000	3.7000	4.6000	2.6000	0.3000
MF12-09	28.00	31.00	29.50	10.700	0.1400	59.000	232.00	510.00	76.000	<10.	36.000	77.000	42.800	8.2000	1.0000	5.3000	3.7000	2.8000	0.8000
MF12-09	38.00	41.00	39.50	10.700	0.1500	69.000	229.00	362.00	83.000	19.000	34.000	72.000	41.200	7.5000	1.4000	5.2000	3.8000	2.9000	0.7000
MF12-09	68.00	71.00	69.50	10.600	0.1300	52.000	211.00	343.00	83.000	21.000	33.000	72.000	37.600	7.0000	1.1000	5.1000	3.2000	2.3000	0.6000
MF12-09	98.00	101.00	99.50	10.700	0.1600	53.000	221.00	325.00	92.000	<10.	31.000	68.000	36.800	6.5000	1.1000	4.5000	3.0000	2.3000	0.6000
MF12-09	138.00	141.00	139.50	12.500	0.1800	61.000	274.00	483.00	124.00	17.000	39.000	81.000	44.800	7.8000	1.5000	6.1000	3.4000	2.6000	0.7000
MF12-09	178.00	181.00	179.50	11.700	0.1700	75.000	243.00	485.00	111.00	59.000	32.000	69.000	39.200	7.3000	1.5000	5.4000	3.6000	2.6000	0.7000
MF12-09	228.00	231.00	229.50	10.500	0.1500	81.000	215.00	306.00	98.000	21.000	34.000	69.000	38.200	7.0000	1.4000	4.8000	2.9000	2.2000	0.6000
MF12-09	258.00	261.00	259.50	13.000	1.1200	41.000	54.000	212.00	38.000	91.000	7.0000	15.000	11.400	2.5000	0.8000	1.7000	1.2000	1.0000	0.2000
MF12-09	298.00	301.00	299.50	13.600	1.1500	31.000	64.000	34.000	<10.	78.000	6.0000	14.000	10.800	2.7000	0.9000	2.4000	1.4000	0.7000	0.2000
MF12-09	358.00	361.00	359.50	14.500	1.2700	21.000	80.000	49.000	<10.	58.000	7.0000	15.000	11.300	2.7000	1.0000	3.9000	3.9000	2.5000	0.3000
MF12-09	418.00	421.00	419.50	15.600	1.3800	35.000	88.000	24.000	15.000	67.000	7.0000	14.000	10.900	3.0000	1.2000	4.5000	4.7000	2.9000	0.4000
MF12-09	483.00	486.00	484.50	12.800	1.0700	15.000	53.000	41.000	18.000	66.000	6.0000	12.000	9.5000	2.4000	0.9000	2.6000	1.8000	0.7000	0.2000
								Evensen et al. (1978)			0.245	0.638	0.474	0.154	0.058	0.204	0.254	0.166	0.025
No. Trou	Ech. de	Ech. a	Depth (m)	Al2O3	TiO2	Y?	Zr	Chondrite-normalized			La	Ce	Nd	Sm	Eu	Gd	Dy	Er	Lu
MF12-03	33.00	36.00	34.50	12.300	0.1400	61.000	250.00				171.4	150.5	102.1	57.8	27.6	27.9	22.4	22.9	27.6
MF12-03	73.00	76.00	74.50	12.400	0.1400	72.000	253.00				159.2	137.9	100.8	52.6	24.1	36.3	27.2	28.3	31.5
MF12-03	108.00	111.00	109.50	11.400	0.1400	51.000	246.00				146.9	122.3	97.0	48.1	15.5	24.0	18.1	24.7	31.5
MF12-03	143.00	146.00	144.50	13.300	0.7300	39.000	180.00				93.9	78.4	56.3	33.1	31.0	18.6	11.0	9.6	11.8
MF12-03	156.00	159.00	157.50	14.200	0.5400	41.000	223.00				106.1	90.9	66.2	34.4	22.4	24.5	11.0	14.5	19.7
MF12-03	163.00	166.00	164.50	13.200	0.1700	70.000	253.00				175.5	153.6	113.7	59.1	27.6	26.5	13.0	16.3	31.5
MF12-03	198.00	201.00	199.50	16.300	1.0900	20.000	110.00				65.3	54.9	43.9	26.6	20.7	12.3	5.5	5.4	11.8
MF12-03	248.00	251.00	249.50	13.300	0.8000	33.000	189.00				65.3	54.9	44.1	35.1	27.6	14.7	10.6	9.6	15.7
MF12-03	298.00	301.00	299.50	12.100	0.5500	16.000	164.00				89.8	78.4	54.6	33.8	31.0	17.6	11.8	12.0	7.9
MF12-03	348.00	351.00	349.50	10.700	0.1400	55.000	212.00				146.9	123.8	87.1	48.1	22.4	22.5	14.2	18.1	23.6
MF12-03	371.00	374.00	372.50	11.100	0.7000	24.000	162.00				69.4	56.4	40.7	29.9	24.1	16.2	10.2	9.6	7.9
MF12-03	398.00	401.00	399.50	15.400	0.9700	34.000	97.000				53.1	47.0	35.9	26.0	25.9	13.2	9.4	9.0	7.9
MF12-03	418.00	421.00	419.50	16.600	1.1800	37.000	138.00				77.6	65.8	50.4	28.6	29.3	12.7	8.7	7.8	15.7
MF12-03	448.00	451.00	449.50	15.800	1.0500	31.000	84.000				53.1	48.6	38.8	35.7	25.9	16.7	10.6	12.0	15.7
MF12-03	498.00	501.00	499.50	15.600	0.9500	28.000	106.00				49.0	43.9	31.9	26.6	25.9	10.3	5.5	5.4	7.9
MF12-04	38.00	41.00	39.50	13.900	0.8500	24.000	225.00				93.9	76.8	51.5	42.2	37.9	25.0	15.7	13.9	15.7
MF12-04	73.00	76.00	74.50	10.800	0.1400	59.000	219.00				151.0	130.1	89.5	51.9	29.3	30.4	17.7	18.1	27.6
MF12-04	98.00	101.00	99.50	13.700	0.8900	39.000	143.00				102.0	92.5	75.7	52.6	39.7	27.0	15.0	16.9	15.7
MF12-04	138.00	141.00	139.50	15.600	1.0100	41.000	156.00				89.8	81.5	72.4	35.7	32.8	23.0	13.0	16.3	19.7

No. Trou	Ech. de	Ech. a	Depth (m)	Al2O3	TiO2	Y?	Zr	Chondrite-normalized			La	Ce	Nd	Sm	Eu	Gd	Dy	Er	Lu
MF12-04	148.00	151.00	149.50	13.000	0.1900	50.000	272.00				142.9	123.8	94.3	51.3	25.9	27.0	20.1	24.7	35.4
MF12-04	188.00	191.00	189.50	14.100	0.2000	74.000	290.00				155.1	133.2	97.5	50.6	29.3	29.9	22.0	25.9	35.4
MF12-04	233.00	236.00	234.50	11.400	0.1600	87.000	221.00				151.0	134.8	94.1	55.8	34.5	28.4	17.3	18.7	31.5
MF12-04	258.00	261.00	259.50	11.700	1.0600	36.000	155.00				93.9	81.5	67.1	37.0	31.0	20.1	11.4	12.7	19.7
MF12-04	298.00	301.00	299.50	15.800	0.9600	<10.	98.000				44.9	39.2	35.4	28.6	24.1	13.2	8.3	10.2	15.7
MF12-04	348.00	351.00	349.50	15.700	0.9800	19.000	132.00				61.2	51.7	38.0	21.4	27.6	11.8	6.7	6.0	11.8
MF12-04	403.00	406.00	404.50	15.100	1.0800	37.000	207.00				69.4	59.6	46.8	32.5	29.3	23.0	14.6	16.3	23.6
MF12-04	523.00	526.00	524.50	15.200	0.9800	41.000	154.00				102.0	92.5	81.0	44.2	39.7	28.4	12.6	19.3	19.7
MF12-04	530.00	533.00	531.50	13.200	0.6700	39.000	150.00				89.8	73.7	53.4	33.1	31.0	19.6	13.4	13.9	23.6
MF12-07	58.00	61.00	59.50	11.200	0.1400	57.000	221.00				163.3	131.7	94.5	53.2	24.1	33.3	22.4	22.9	31.5
MF12-07	108.00	111.00	109.50	11.500	0.1700	30.000	250.00				163.3	130.1	91.4	54.5	27.6	32.8	18.9	16.3	19.7
MF12-07	128.00	131.00	129.50	11.900	0.1500	45.000	218.00				159.2	131.7	93.9	52.6	24.1	31.4	20.1	19.9	27.6
MF12-07	178.00	181.00	179.50	14.700	0.6600	50.000	203.00				163.3	125.4	89.7	48.7	29.3	28.9	14.2	15.1	23.6
MF12-07	238.00	241.00	239.50	15.300	1.0700	<10.	98.000				65.3	54.9	47.3	27.9	24.1	16.2	9.1	8.4	11.8
MF12-07	298.00	301.00	299.50	11.400	0.1600	58.000	220.00				159.2	125.4	91.1	50.0	22.4	30.4	20.5	22.3	27.6
MF12-07	358.00	361.00	359.50	12.000	0.1400	70.000	244.00				167.3	136.4	95.4	52.6	24.1	29.9	16.5	16.9	31.5
MF12-07	398.00	401.00	399.50	16.200	0.9400	27.000	136.00				69.4	53.3	41.1	27.9	22.4	15.7	9.4	8.4	11.8
MF12-07	458.00	461.00	459.50	15.900	0.8400	26.000	150.00				61.2	45.5	35.0	20.8	17.2	10.8	6.3	6.0	11.8
MF12-08	28.00	31.00	29.50	11.200	0.1700	65.000	208.00				155.1	127.0	92.0	52.6	27.6	27.9	14.2	15.7	27.6
MF12-08	58.00	61.00	59.50	13.700	0.1800	87.000	288.00				171.4	144.2	103.4	54.5	22.4	28.4	13.8	15.1	23.6
MF12-08	78.00	81.00	79.50	11.200	0.1800	49.000	248.00				138.8	116.0	79.1	38.3	17.2	14.7	7.5	10.8	19.7
MF12-08	98.00	101.00	99.50	12.200	0.1800	54.000	261.00				151.0	125.4	91.8	50.0	22.4	26.0	12.2	13.9	27.6
MF12-08	148.00	151.00	149.50	12.000	0.1500	69.000	229.00				167.3	136.4	96.6	50.6	19.0	25.0	10.2	11.4	23.6
MF12-08	198.00	201.00	199.50	10.700	0.1600	51.000	226.00				138.8	117.6	87.3	46.1	25.9	26.0	13.8	15.1	27.6
MF12-08	248.00	251.00	249.50	12.800	0.1600	82.000	251.00				191.8	158.3	112.2	55.8	24.1	24.5	11.0	12.0	23.6
MF12-08	268.00	271.00	269.50	14.300	0.1900	56.000	283.00				163.3	134.8	94.3	47.4	25.9	24.0	13.0	15.1	27.6
MF12-08	298.00	301.00	299.50	12.000	0.1800	67.000	256.00				167.3	136.4	94.9	51.3	17.2	27.5	15.4	17.5	31.5
MF12-08	358.00	361.00	359.50	14.500	1.2800	21.000	73.000				28.6	25.1	25.1	21.4	19.0	16.2	13.0	12.7	15.7
MF12-08	418.00	421.00	419.50	15.200	0.9900	36.000	66.000				24.5	20.4	19.8	14.3	13.8	7.4	3.9	3.6	7.9
MF12-08	498.00	501.00	499.50	13.400	1.1200	31.000	53.000				28.6	23.5	23.0	20.1	19.0	18.1	18.1	15.7	11.8
MF12-09	28.00	31.00	29.50	10.700	0.1400	59.000	232.00				146.9	120.7	90.3	53.2	17.2	26.0	14.6	16.9	31.5
MF12-09	38.00	41.00	39.50	10.700	0.1500	69.000	229.00				138.8	112.9	86.9	48.7	24.1	25.5	15.0	17.5	27.6
MF12-09	68.00	71.00	69.50	10.600	0.1300	52.000	211.00				134.7	112.9	79.3	45.5	19.0	25.0	12.6	13.9	23.6
MF12-09	98.00	101.00	99.50	10.700	0.1600	53.000	221.00				126.5	106.6	77.6	42.2	19.0	22.1	11.8	13.9	23.6
MF12-09	138.00	141.00	139.50	12.500	0.1800	61.000	274.00				159.2	127.0	94.5	50.6	25.9	29.9	13.4	15.7	27.6
MF12-09	178.00	181.00	179.50	11.700	0.1700	75.000	243.00				130.6	108.2	82.7	47.4	25.9	26.5	14.2	15.7	27.6
MF12-09	228.00	231.00	229.50	10.500	0.1500	81.000	215.00				138.8	108.2	80.6	45.5	24.1	23.5	11.4	13.3	23.6
MF12-09	258.00	261.00	259.50	13.000	1.1200	41.000	54.000				28.6	23.5	24.1	16.2	13.8	8.3	4.7	6.0	7.9
MF12-09	298.00	301.00	299.50	13.600	1.1500	31.000	64.000				24.5	21.9	22.8	17.5	15.5	11.8	5.5	4.2	7.9
MF12-09	358.00	361.00	359.50	14.500	1.2700	21.000	80.000				28.6	23.5	23.8	17.5	17.2	19.1	15.4	15.1	11.8
MF12-09	418.00	421.00	419.50	15.600	1.3800	35.000	88.000				28.6	21.9	23.0	19.5	20.7	22.1	18.5	17.5	15.7
MF12-09	483.00	486.00	484.50	12.800	1.0700	15.000	53.000				24.5	18.8	20.0	15.6	15.5	12.7	7.1	4.2	7.9

Oversized Attachments

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COMMENTS

2 diskettes-