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

for:

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on behalf of:

The Reid Syndicate

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(This version replaces any earlier versions)

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-- Ore Systems Consulting --

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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, totalling 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, Ontar o

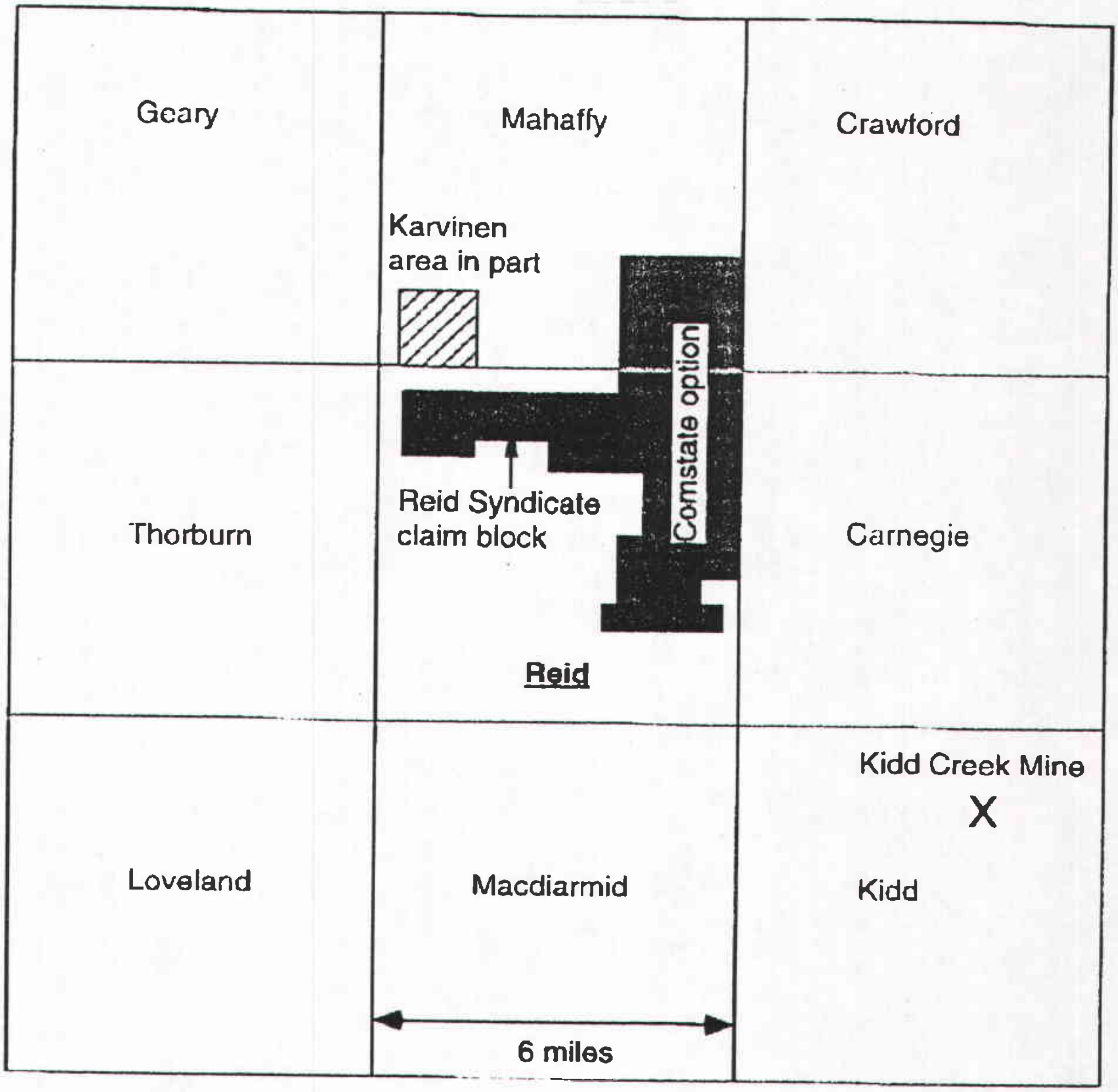


Figure 1. Location of Reid Syndicate claim block, Comstate option, part of the Karvinen option, and site of Kidd Creek Mine.

Recent geological and geophysical compilation maps and drill log summaries for the Reid claim group have been produced for the Reid Syndicate by Jensen, Grant and Van Hees (1994). The present report emphasizes primary and alteration lithogeochemistry and inferred stratigraphic relations as applied to evaluation of the property; observations from numerous drill logs are also utilized.

The lithogeochemical treatment and discussions in this report are divided into three sections based, respectively, on drilling to the south of the Reid claim group (Newmont 1973-74 holes), to the east and southeast (Gulf Minerals 1980 holes), and to the northwest (Falconbridge 1987-1991 holes).

Any future drilling project on the Reid claims should seek to advance knowledge on the overall disposition and composition of the volcanic stratigraphy, as it is important to determine if the Central Rhyolite in the vicinity of the Matagami River continues northwestwards across the Reid claim group. Similarly, it is also important to ascertain if the Upper Rhyolite appears on the Reid property. As shown below, both of these rhyolites have lithogeochemical features that mark them as potentially favorable units in terms of hosting VMS mineralization.

Purpose and Scope of Study

The purposes of this study are: 1) to characterize chemically the main volcanic rock types in the Gulf Minerals, Newmont, and Falconbridge drilling areas; 2) to compare the chemistry of the volcanic rocks with those hosting massive sulfide deposits in the Timmins area and elsewhere in the Abitibi greenstone belt; 3) to make recommendations for further lithogeochemical and related work on the property; and 4) to locate three drill holes designed to test for the extension of the Central and Upper Rhyolite volcanic stratigraphy.

No thin section petrography was made during this report, which places some limits on interpretations. However, Pyke provides petrographic details and photographs on representative volcanic rocks located mainly on the previous Comstate option east and southeast of the Reid claims.

Lithogeochemistry

Data and Methods

The new sample set consists of 41 samples that were analyzed for major elements and the trace elements Zr, Y, Nb, Ba, Rb and Sr. The samples were from the Gulf Minerals drilling area (Table 1A), the Rosario-Chance drilling area (Table 1B), and the Newmont drilling area (Table 1C). 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. Duplicate in-run analyses by XRAL yielded excellent agreement for all elements (traces agree to within 1-2%).

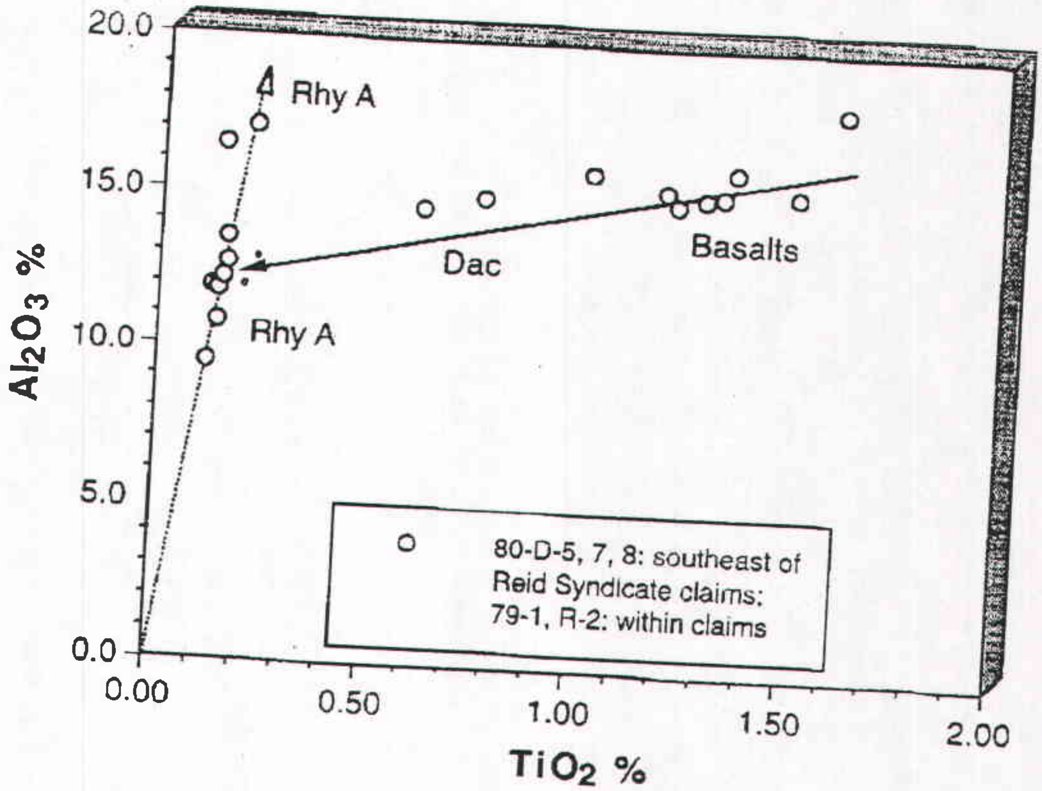
In the Lithogeochemistry Section I, a series of diagrams are presented with data from the Gulf Minerals and Rosario-Chance areas shown in the upper plots, and data from Newmont drilling shown in the lower plots. This procedure is adopted because the rocks in the two areas appear to belong to different volcanic sequences. The Gulf Minerals area to the east-southeast of the Reid Syndicate claims primarily comprises a bimodal sequence of basalts and rhyolite, with a few andesite-dacite compositions, whereas the Newmont area to the south of the Reid Syndicate claims is a mainly mafic sequence that contains abundant, more primitive magnesian basalts (plus ultramafics).

Also included with the Gulf Minerals data are samples from Rosario 79-1 and Chance R-2, the only two drill holes in the central to eastern part of the Reid Syndicate claims. In Lithogeochemistry Section II, the new analyses (excluding the Newmont data) are compared with a large data set reported by Pyke (1989) for the Gulf Minerals drilling area. In Lithogeochemistry Section III, these results are in turn compared with analyses from selected drill holes on Falconbridge's Karvinen property northwest of the Reid Syndicate claims.

Lithogeochemistry I -- New Data Set

Primary Geochemistry. A plot of Al_2O_3 versus TiO_2 highlights the differences between the volcanic stratigraphy east-southeast of the Reid claims (Fig. 2a), and that to the south of the claims (Fig. 2b). The eastern stratigraphy comprises normal basalts to basaltic andesites, on the one hand, and rhyolite of relatively constant composition on the other. The latter is termed rhyolite A, in keeping with our general terminology for strongly fractionated rhyolite with low TiO_2 content (0.1-0.2%).

Reid Township: New Data



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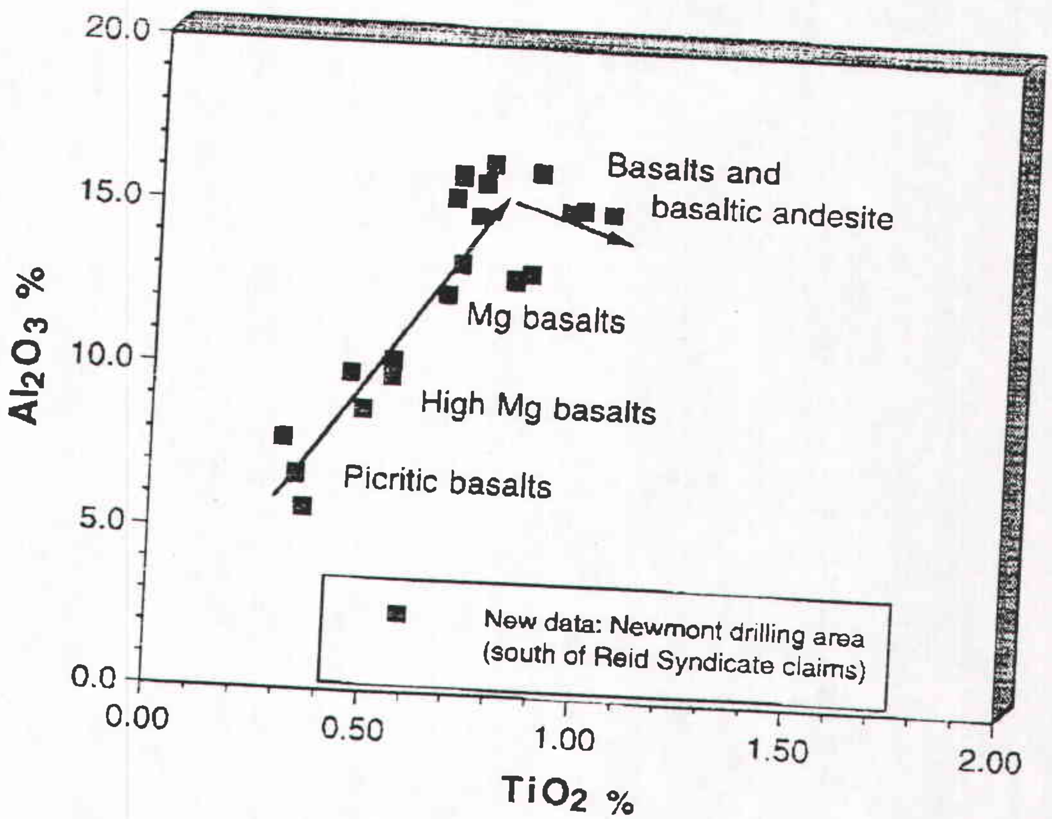


Fig.

The relatively uniform composition of this rhyolite is indicated by the fact that most samples plot along a single alteration line (Fig. 2a). The precursor composition of this rhyolite is estimated from least altered samples to contain about 0.15% TiO_2, 13% Al_2O_3 and 250 ppm Zr. A possible fractionation trend linking the mafic to intermediate volcanic rocks with the rhyolite end-member is shown in Fig. 2a by the solid line, which is drawn to intersect the rhyolite alteration line at the precursor composition. Several rhyolites that below this intersection have experienced mild mass gain of mobile elements (diluting Al_2O_3 down to about 10%), whereas two samples have been affected by mass loss (residually concentrating Al_2O_3 to 16-17%).

By contrast, in the Newmont drilling area to the south, the sampled volcanic rocks (Fig. 2b) lie entirely within a mafic sequence that extends in composition from picritic basalts to basaltic andesites. The most primitive part of the sequence, with high-Mg rocks containing 6-8% Al_2O_3, 0.3-0.4% TiO_2 and 0.3-0.4% Cr_2O_3, is compositionally similar to serpentinized ultramafics on the Hemingway property of the Kidd Creek volcanic complex (Schandl and Wicks, 1993) and to picritic and komatiitic rocks in general (cf. Ludden and Gelinas, 1981; Barnes et al., 1993). In the absence of petrographic data, it is not known if the very high-Mg rocks in the Newmont drilling area represent cumulates or lava flows, therefore we use the term provisional term picritic basalts. Similarly, some of the rocks compositionally classified as basalt to basaltic andesite could represent intrusive equivalents of a mafic magma (e.g. 74-5, 235', which comes from a thick diorite sill).

Plots of TiO_2 versus Zr (Fig. 4) show similar relationships to the Al_2O_3-TiO_2 diagram. The eastern stratigraphy in the Gulf Minerals area comprises a compositional range over which TiO_2 generally decreases from basalt to rhyolite with increase in Zr, which serves as a monitor of fractionation (Fig. 3a). This plot also shows a near-linear rhyolite alteration line. The southern stratigraphy in the Newmont area, by contrast, comprises a mafic compositional range over which TiO_2 mainly increases as Zr increases (Fig. 3b).

In both areas, the behavior of P_2O_5 is similar to that of TiO_2 (Fig. 4a). In the eastern stratigraphy, P_2O_5 appears to remain incompatible to a somewhat higher degree of fractionation than TiO_2 (it stays above 0.1% in the Zr = 100-180 ppm range, whereas TiO_2 decreases from about 1.5 to 0.5%). P_2O_5 has also behaved as an essentially immobile element in both areas.

Reid Township: New Data

Fig. 3a

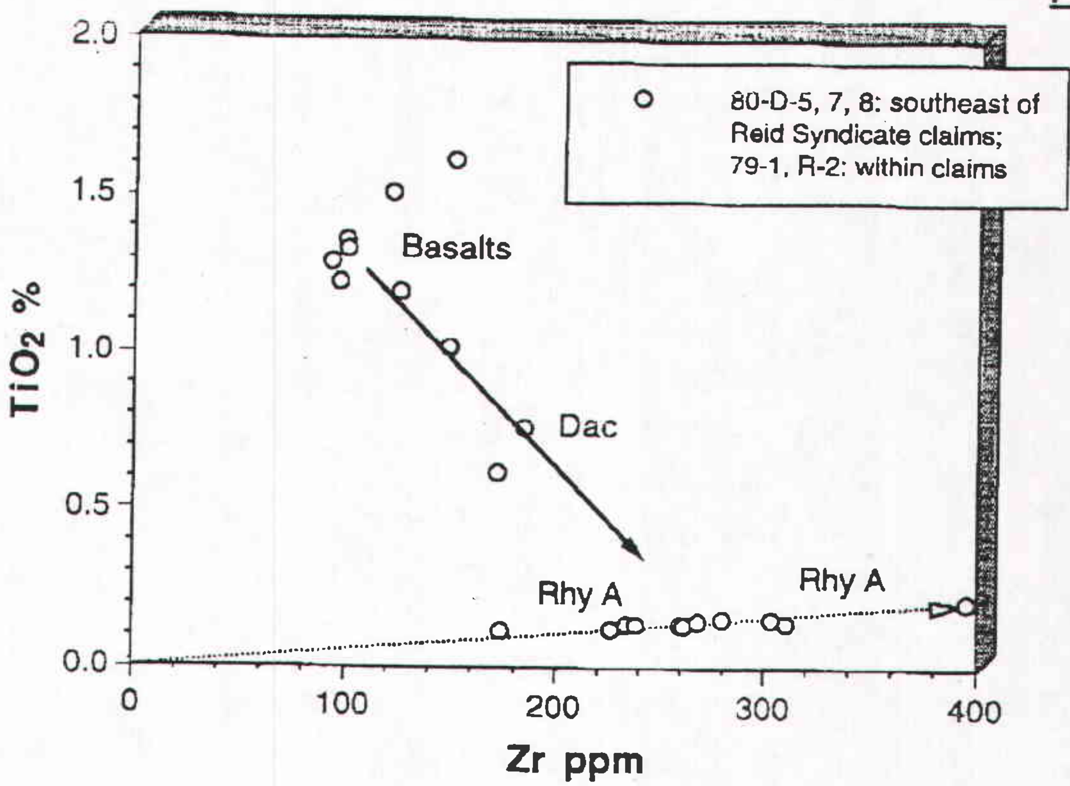
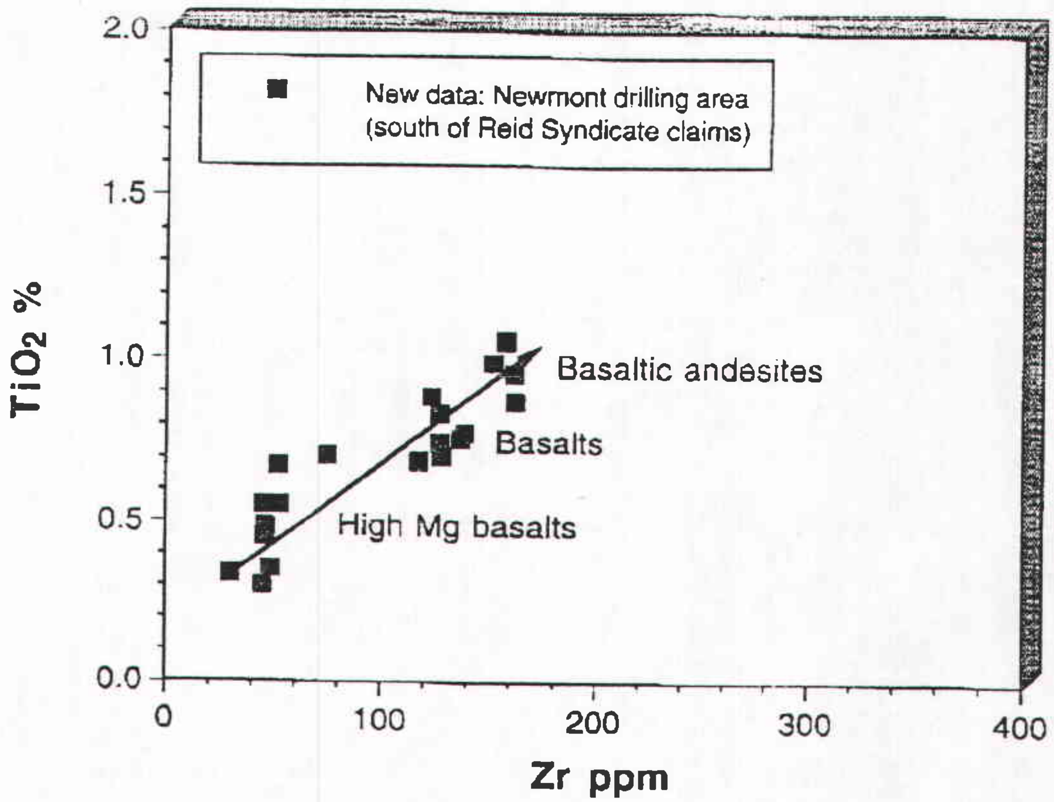


Fig. 3b



Reid Township: New Data

Fig. 4a

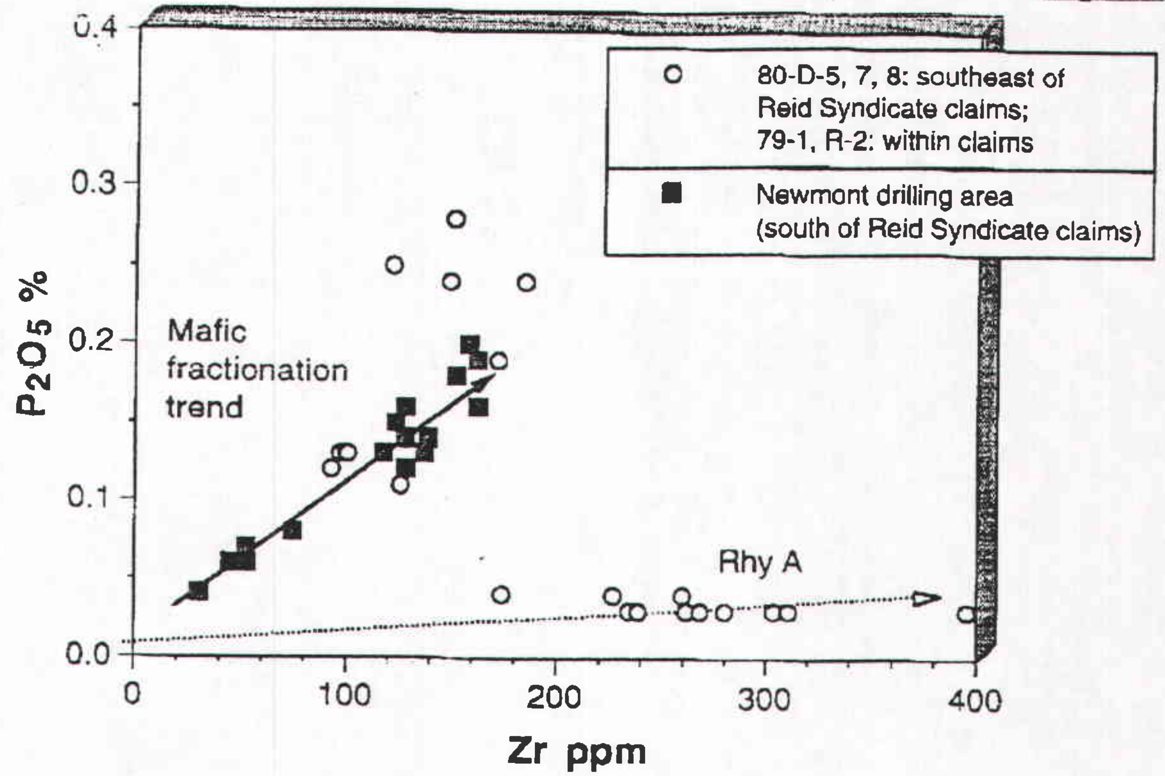
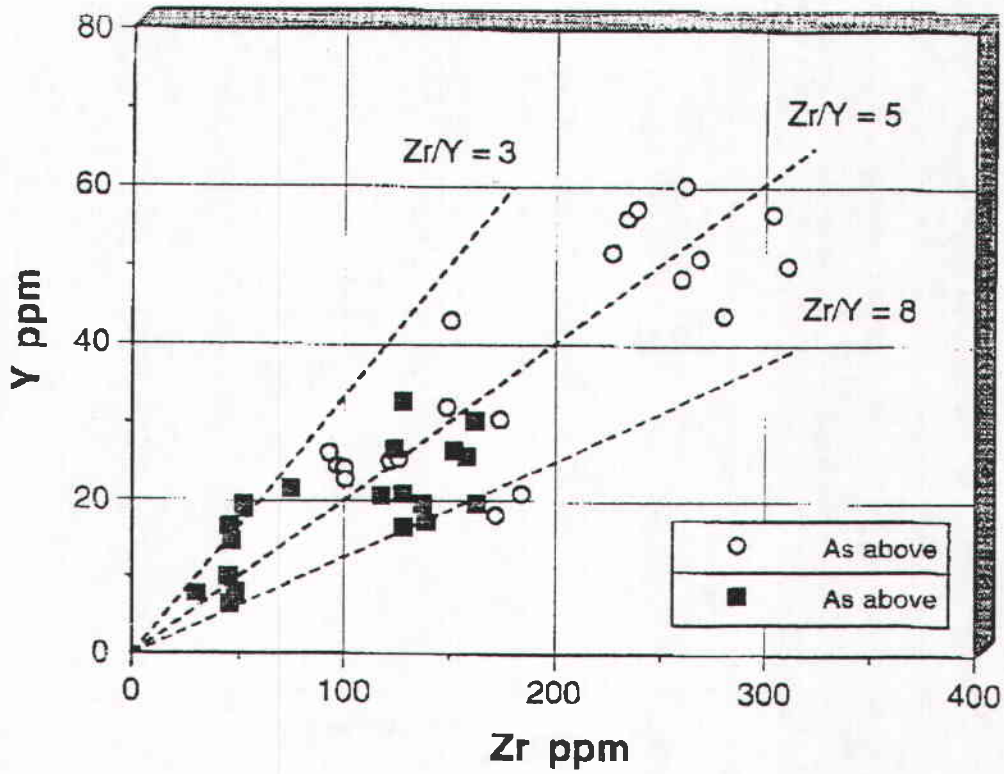


Fig. 4b



A plot of Y versus Zr (Fig. 4b) shows that the affinities of most volcanic rocks range from tholeiitic (Zr/Y≈3-5) to transitional (Zr/Y≈5-7). Altered samples of rhyolite A, which have Zr contents ranging from about 200 to 400 ppm as a result of mass change effects, commonly have Zr/Y values in the range of 4 to 6. The two open circles with Zr/Y values of ≈9 are of andesite-dacite composition, and are both from the deepest part of hole Chance 79-1 (within the claim block). Mafic volcanic rocks show a greater spread in Zr/Y values from 3 to 8 (Fig. 4b).

Plots of MgO versus Zr show that most rocks lie along expected fractionation trends, that is, not strongly modified by alteration. MgO values in basalts from the eastern stratigraphy reach about 5% (Fig. 5a), but are in excess of 20% in picritic and high-Mg basalts in the southern stratigraphy (Fig. 5b).

Alteration Geochemistry. Plots of SiO_2 versus Zr (Fig. 6) show that, with the exception of a few rhyolites, silica values also appear to reasonably outline typical fractionation trends. A notably silicified rhyolite with a decreased Zr value (Fig. 6a) is from hole R-2, 373', in the eastern part of the Reid Syndicate claim block. Two rhyolites with significant silica loss and consequently elevated Zr values are from R-80-D-5 (127.5' and 209') on the eastern border of the Reid Syndicate claim block. The former sample also has gained significant Fe and K relative to least altered rhyolites.

A plot of Na_2O versus K_2O (Fig. 7a) shows that the majority of the rhyolites have relatively high Na_2O values of 3 to 5%, indicating that they are not strongly altered. These rhyolites, however, have moderately high K_2O values of 1.5 to 3.5%. This suggests addition of K during alteration, since least altered rhyolites of tholeiitic to transitional affinity commonly have initial K_2O contents of <1% (MacLean and Barrett, 1993). On the other hand, the elevated K_2O contents could be a primary feature if the rocks are of calc-alkaline affinity. Potassic rhyolites averaging about 7.6% K_2O and only 0.9% Na_2O have been reported from the Kamiskotia area by Barrie et al. (1993), but these rhyolites have other geochemical features that suggest they are of tholeiitic affinity.

High-K rhyolites in which the K occurs mainly in the form of alkali feldspar can be distinguised from sericitized rhyolites by the fact that the former rhyolites retain low Al_2O_3 values even for high K_2O contents. By contrast, the formation of increasing amounts of sericite in altered rhyolites leads to progressively higher Al_2O_3 contents.

Reid Township: New Data

Fig. 5a

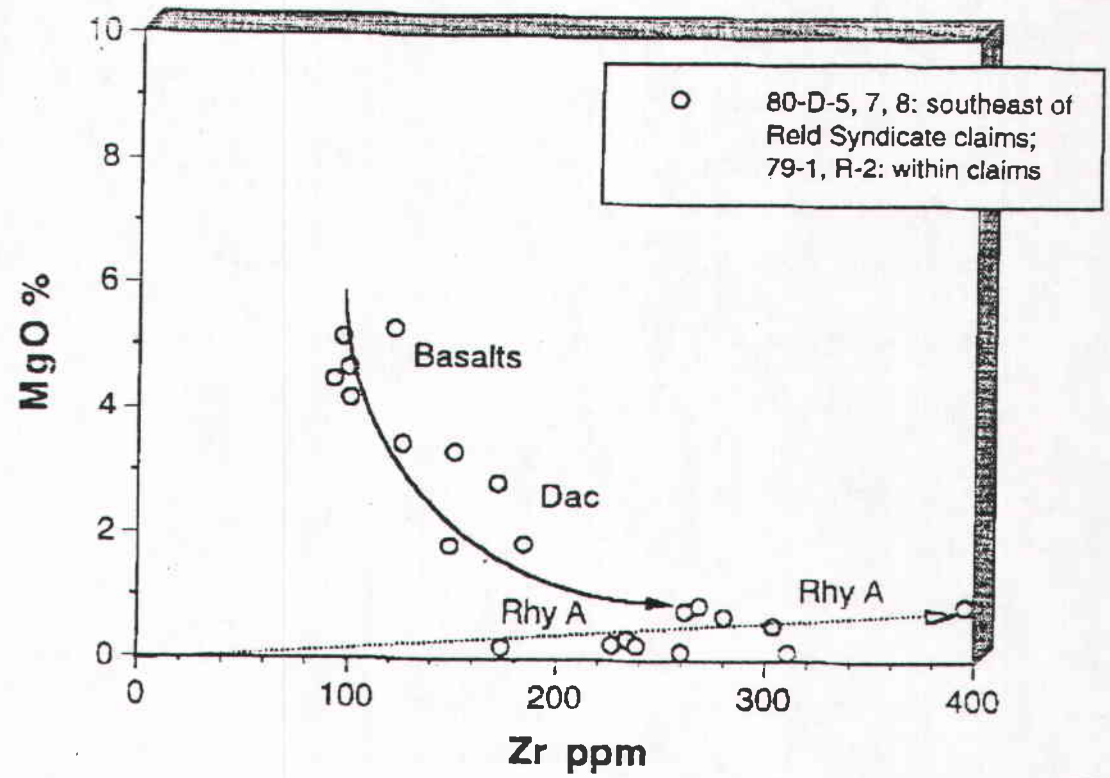
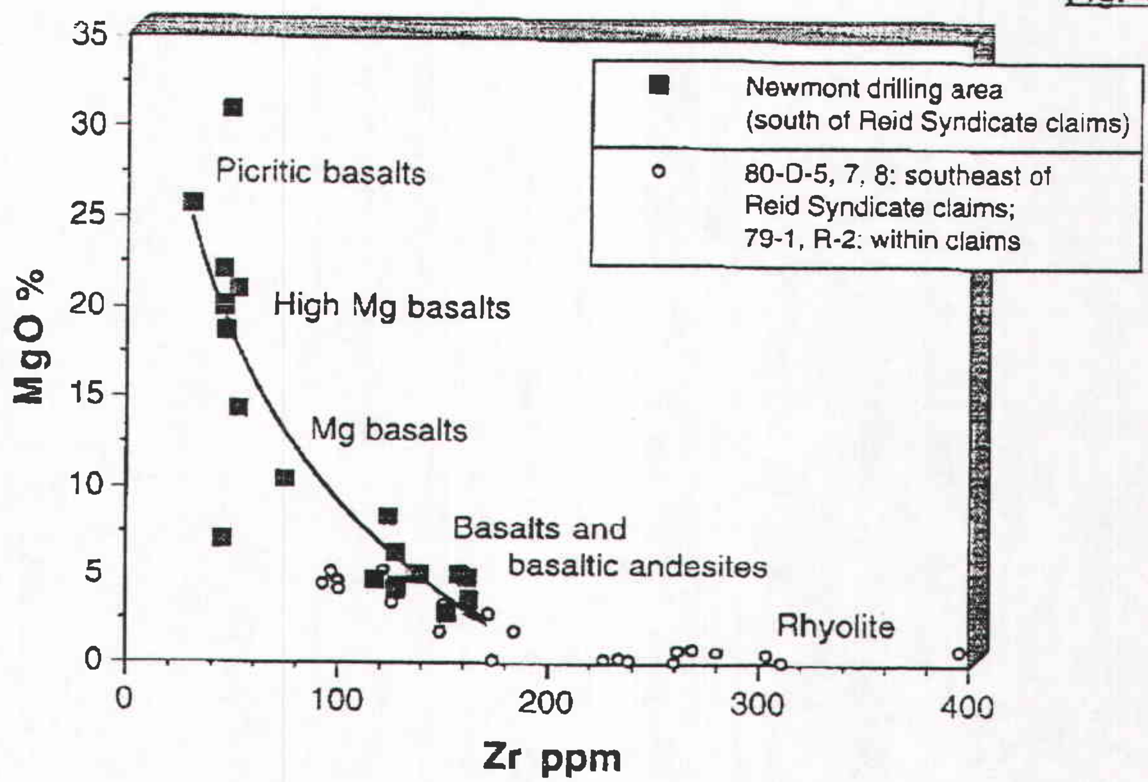


Fig. 5b



Reid Township: New Data

Fig. 6a

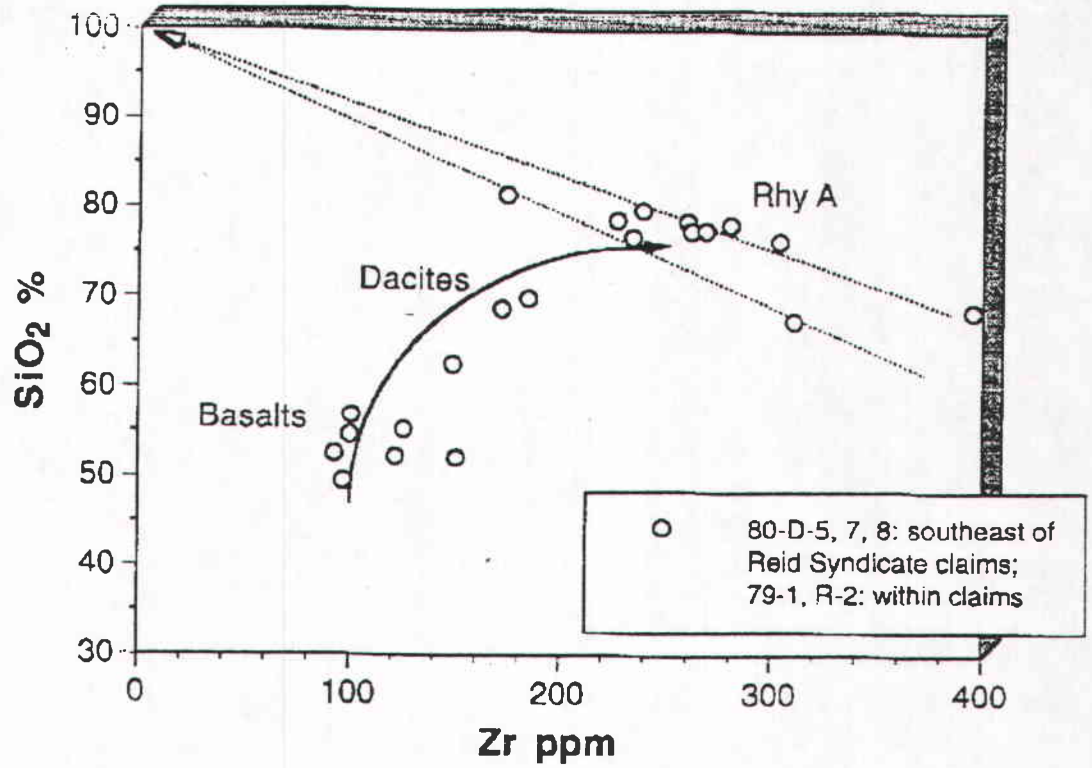
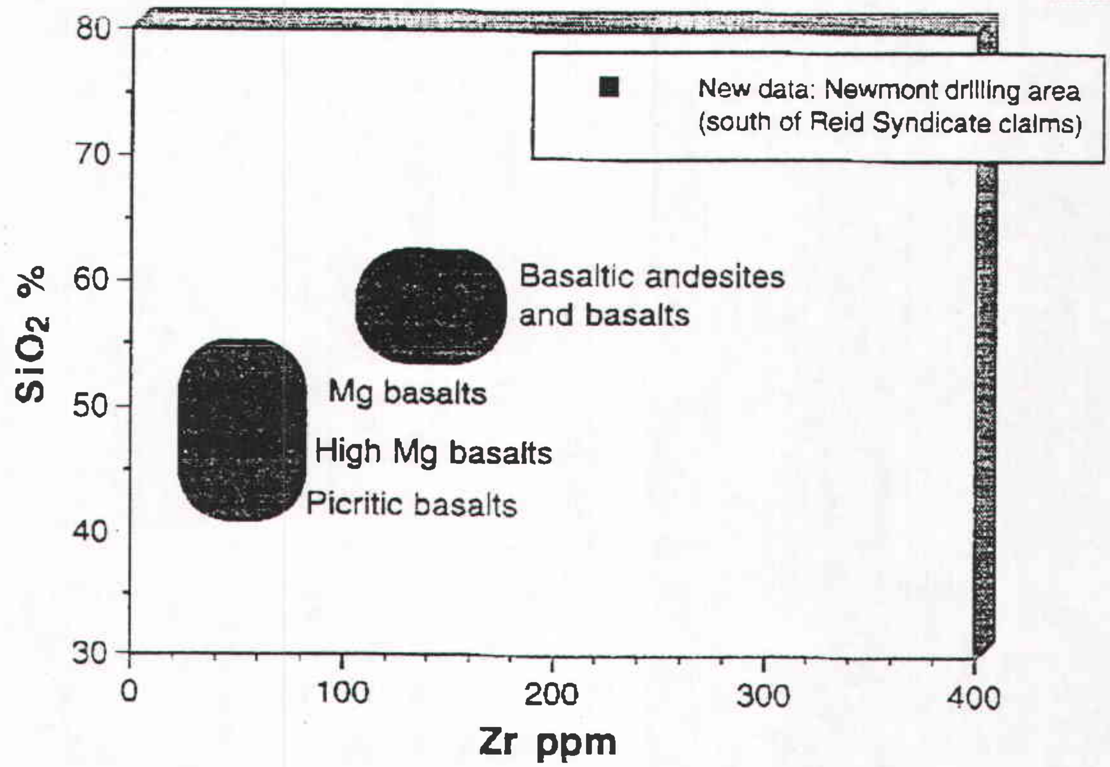


Fig. 6b



Reid Township: New Data

Fig. 7a

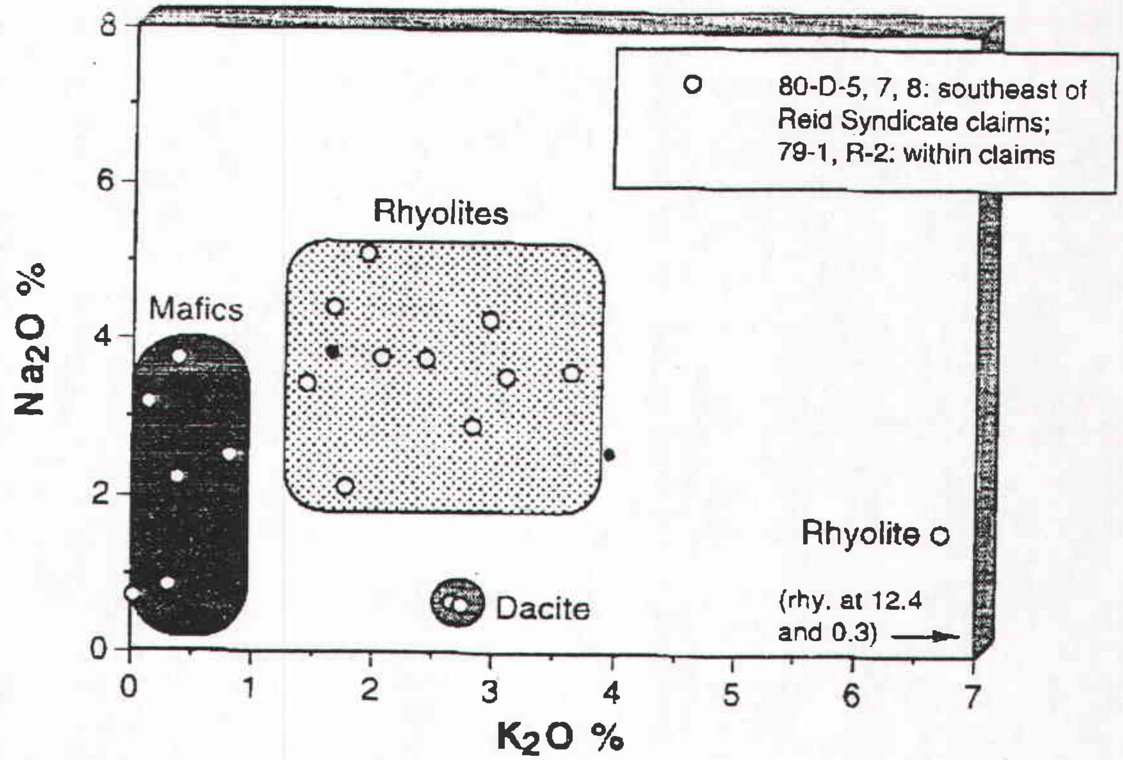
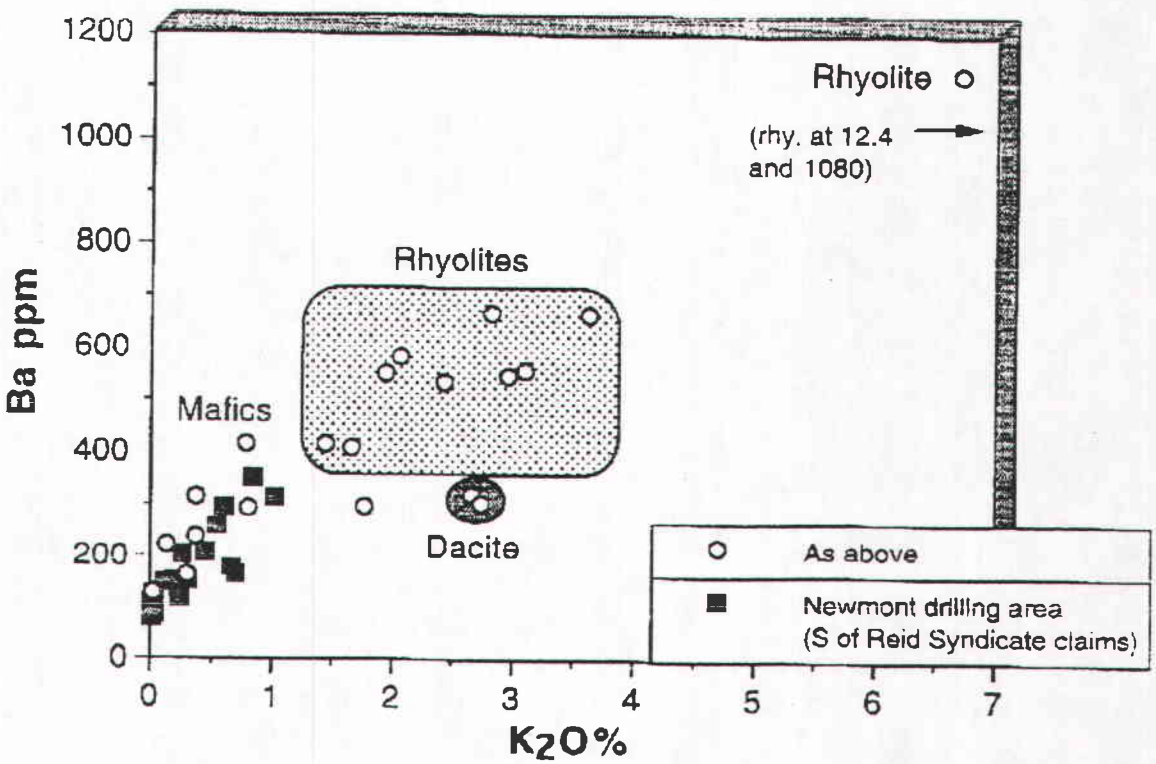


Fig. 7b



Even in those rhyolites that have K mainly in the form of alkali feldspar, it is possible that the K was introduced by metasomatism rather than being a primary magmatic feature. If so, the decreased Na values in these rhyolites could well reflect a feldspar alkali exchange process during alteration, with K being gained as Ca+Na are lost from the rock. In order to determine the main K-bearing phases in these rocks, it would be useful to carry out petrographic and X-ray diffraction studies of these samples.

Hole 80-D-5, located at the eastern margin of the Reid Syndicate claim block, intersected massive to quartz porphyritic rhyolite alternating with intervals of rhyolite breccia. Two closely spaced rhyolites from hole 80-D-5 were sampled to compare a large (0.2m) slightly silicified block in rhyolite breccia at 127.5' with its greyish, sericitized matrix at 128.0'. The latter material shows silica and Na loss in addition to K gain. Another rhyolite at 209' with silica loss has an extremely high K_2O content of 12.4%, and only 0.3% Na_2O. This rhyolite must contain some K-feldspar in order to account for its high K/Al ratio. Deeper rhyolites in 80-D-5 (330' and 370') show weak K addition.

Hole 79-1, in the central part of the claim block, intersected mafic volcanic rocks and, in its deeper portion, massive dacitic rocks with apparent Na loss (Fig. 7a). Although the dacites have Al_2O_3 and TiO_2 contents in the range of some of the basaltic andesitic rocks in the Newmont drilling area, they have lower Fe-Mg-Ca values and higher silica and Zr contents.

The mafic rocks from the eastern stratigraphy in the area of the Comstate option are uniformly low in K_2O (<1%) but have Na_2O values ranging from from <1% to almost 4% (Fig. 7a). As Ca decreases, Na increases (but K is little modified). suggesting that the Na range in these mafic rocks reflects fractionation from calcic to sodic plagioclase, or early spilitization, rather than Na depletion during K-related alteration.

A plot of Ba versus K_2O (Fig. 7b) shows that Ba content of the rocks is mainly a function of K_2O content. However, it is not known if the increased level of K and Ba in felsic relative to mafic rocks reflects a primary feature or an alteration trend, or some combination of both.

Lithogeochemistry II-- Pyke Data Set

Primary Geochemistry. The lithogeochemical and petrographic data set obtained by Pyke (1989) comprises 36 samples from eastern Reid Township, mainly the Comstate option and immediately to the south, plus 5 samples from each of Thornburn and Mahaffey Townships. Except for 8 samples reported by Pyke from Agnico-Eagle holes AE-R-90-3 and 90-5, all analyses were carried out by XRF at the XRAL lab, using glass beads for major and trace elements. Of particular interest are several of the R-80-D holes, which intersected the Central Rhyolite immediately east of the Reid Syndicate claim group, and several R-80-C holes, which intersected the Upper Rhyolite southeast of the Reid claims. Analytical results for 46 samples from Pyke (1989) are summarized in Table 2.

The new data set (open circles) and Pyke's data set (solid circles) are compared in terms of Al_2O_3-TiO_2 and TiO_2-Zr relations in Figures 8a and 8b, respectively. The same, mainly bimodal sequence of rhyolite and basalt to basaltic andesite dominates both data sets. All felsic rocks are of rhyolite A-type, and display a broad spread along single alteration lines as a result of mass gain or loss during alteration. The Pyke data set contains two additional lithologies: a rhyodacitic group of 3 samples, and 3 samples of low-TiO_2 basaltic composition (shaded). Two of the rhyodacitic samples are from Mahaffey and Thorburn Townships; the other is from 80-C-5, 244'. Two of the low-TiO_2 basaltic samples are from Thorburn Township, the other is from 80-D-13, 575' (claim 952100). These low-TiO_2 basalts are less fractionated than the main group of basalt to basaltic andesites, and resemble basalts from the Newmont drilling area discussed above.

A Zr-Y plot (Fig. 9a) indicates that most volcanic rocks in Pyke's data set have Zr/Y ratios of between 2 and 6. Of interest is the fact that this data set includes eight rhyolites with Zr/Y ratios in the strongly tholeiitic range of 1.2 to 2.8. These rhyolites occur mainly in the Upper Rhyolite sequence, but one sample comes from the southern margin of the Central Rhyolite (80-D-6, 153').

The southern margin of the Central Rhyolite was also intersected by hole AE-R-90-3 (data given in Table 2 but not plotted). It is interesting that rhyolites in the 49-70 m interval of this S-directed hole have strongly tholeiitic Zr/Y ratios of 1.6-2.0, within the range for Upper Rhyolite, whereas rhyolites in the 75-83 m interval have Zr/Y ratios of 4.2-4.8, within the range for Central Rhyolite. It therefore appears that a change in rhyolite composition occurs immediately north of the contact between Central Rhyolite and Southern Basalt. [The Central Rhyolite otherwise has a near-uniform composition.]

Reid Township: new data + Pyke data

Fig. 8a

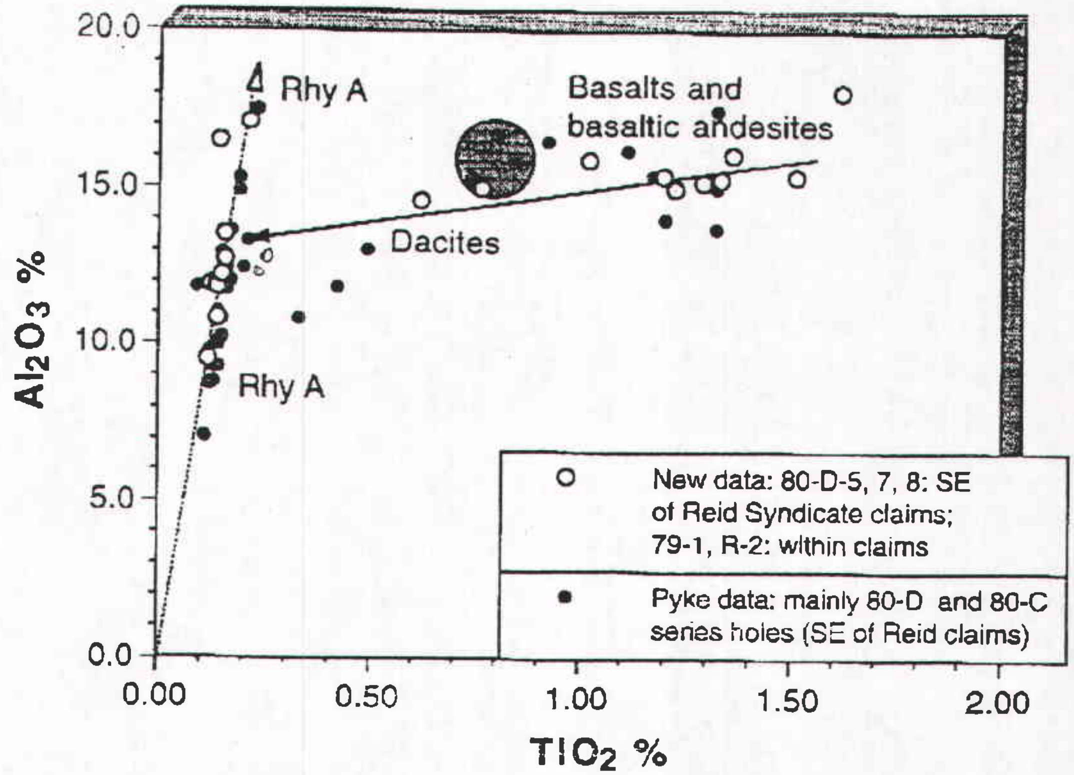
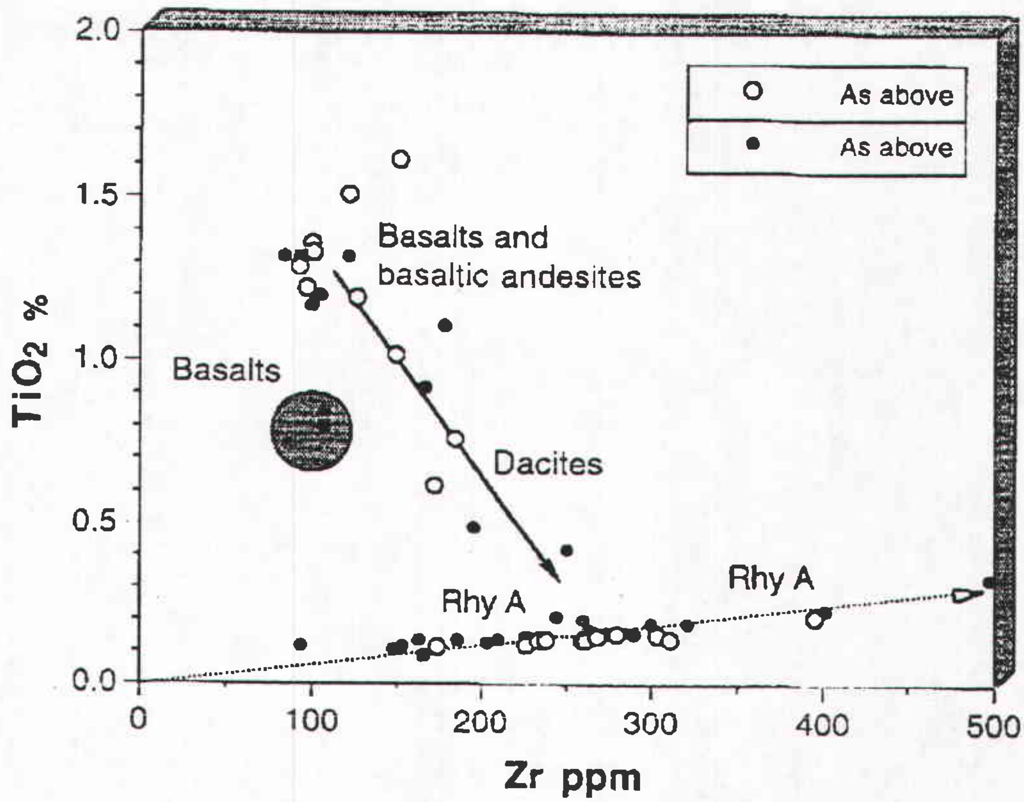


Fig. 8b



Reid Township: new data + Pyke data

Fig. 9a

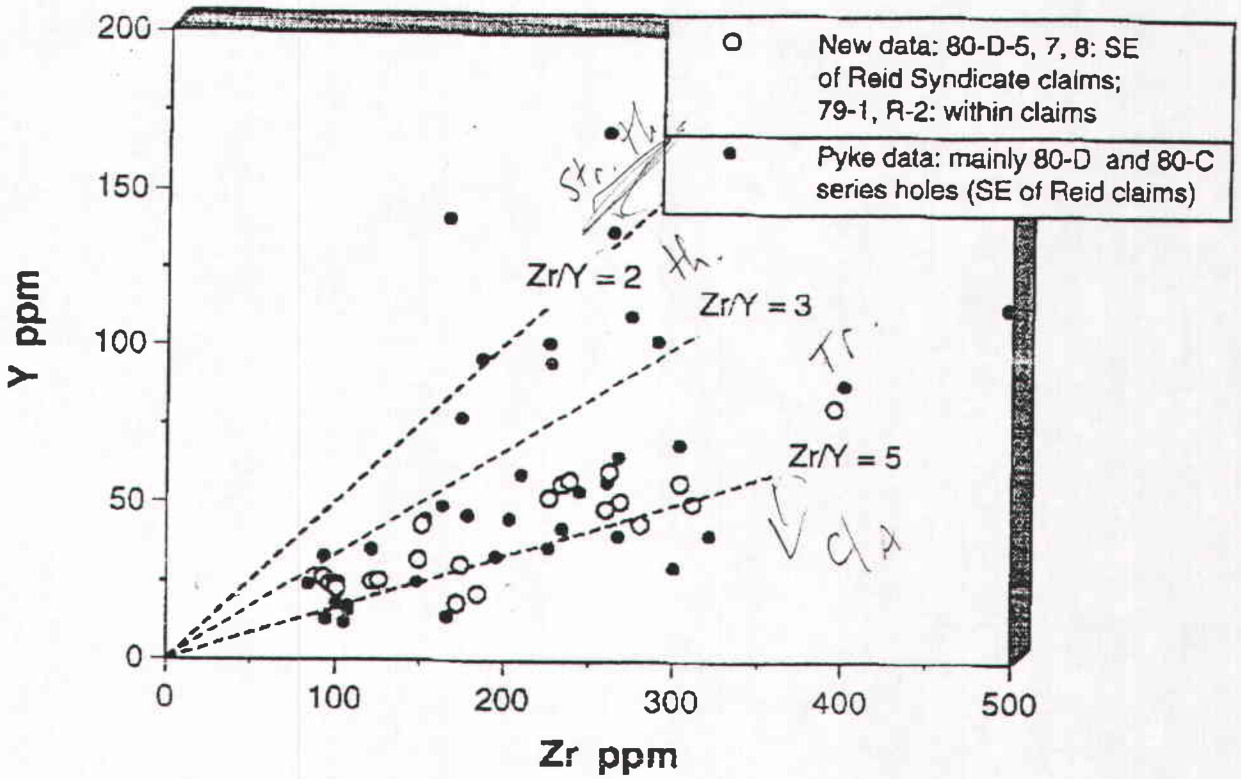
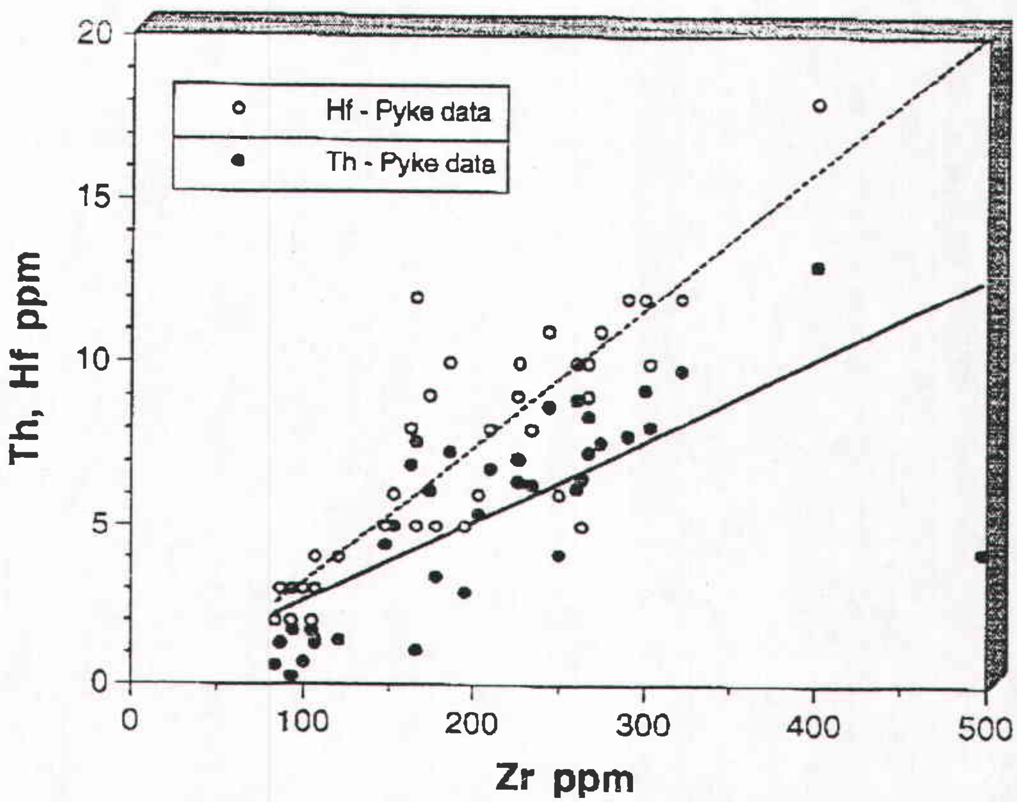


Fig. 9b



Plots of Th-Zr and Hf-Zr (Fig. 9b) show that Th and Hf generally increase with increasing Zr. In the felsic region (Zr >200 ppm), Hf values are ≈8-12 ppm, whereas Th values are slightly less, ≈5-9 ppm. Th/Yb ratios in the felsic rocks range from about 0.5 to 1, with the lowest ratios corresponding to samples with the lowest Zr/Y values. As shown below, these samples generally also have the highest REE contents and flattest patterns.

Alteration Geochemistry. A SiO_2-Zr plot (Fig. 10a) shows that the Pyke data set contains notably more silicified rhyolites than the new data set, as well as a few silica-leached rhyolites. In the Na_2O-K_2O plot (Fig. 10b), rhyolites in the Pyke data set generally become less sodic as K_2O content increases. The supports the earlier supposition that rhyolites with 1.5 to 3.5% K_2O have gained K through metasomatism (as opposed to primary K-enrichment). As before, the range of Na values in mafic rocks probably reflects fractionation or spilitization rather than alteration, as K does not increase as Na decreases.

Rare-Earth Element Geochemistry. All samples analyzed by Pyke (1989) for major and trace elements by XRF were also analyzed by instrumental neutron activation for the REE and elements such as Th. Hf and U (Table 2). Selected chondrite-normalized plots of the data are discussed below. The raw data were normalized to the chondrite values given in Evensen et al. (1978). La_n/Yb_n ratios are given in Table 2.

The REE patterns of samples from the Upper Rhyolite, which is located southeast of the Reid Syndicate claims, are shown in Figure 11 (hole R-80-C-7) and Figure 12a (hole R-80-C-7). These rhyolites have the highest REE contents and flattest patterns (La_n/Yb_n = 1.1 to 3.6) of those in the Pyke data set. As shown in Figure 12b, the Upper Rhyolite has an REE signature very similar to that of the Kamiskotia rhyolite (Barrie et al., 1993), and to the footwall rhyolite of the Kidd Creek orebody (Lesher et al., 1986).

Samples of Upper Rhyolites shown in Figure 11 (hole R-80-C-5) mostly have very tholeiitic Zr/Y ratios of 1.2 to 2.8, with the exception of the rhyolite at 244', which has a Zr/Y value of 4.4. Of interest is the fact that a rhyolite sample (80-D-6, 153', Zr/Y = 1.5) located near the southern margin of the Central Rhyolite has an REE pattern equivalent to those of the Upper Rhyolites. This Central Rhyolite sample and the Upper Rhyolites have high contents of Y (90-170 ppm) and Yb (9-20 ppm).

It would be useful to obtain REE data for the rhyolites in Agnico-Eagle hole AE-R-90-3, which is located only ≈100 m southeast of hole 80-D-6. As noted earlier, hole AE-R-90-3 contains a rhyolite unit with Zr/Y = 1.6-2.0, which is thus probably an FIIIb rhyolite.

Reid Township: new data + Pyke data

Fig. 10a

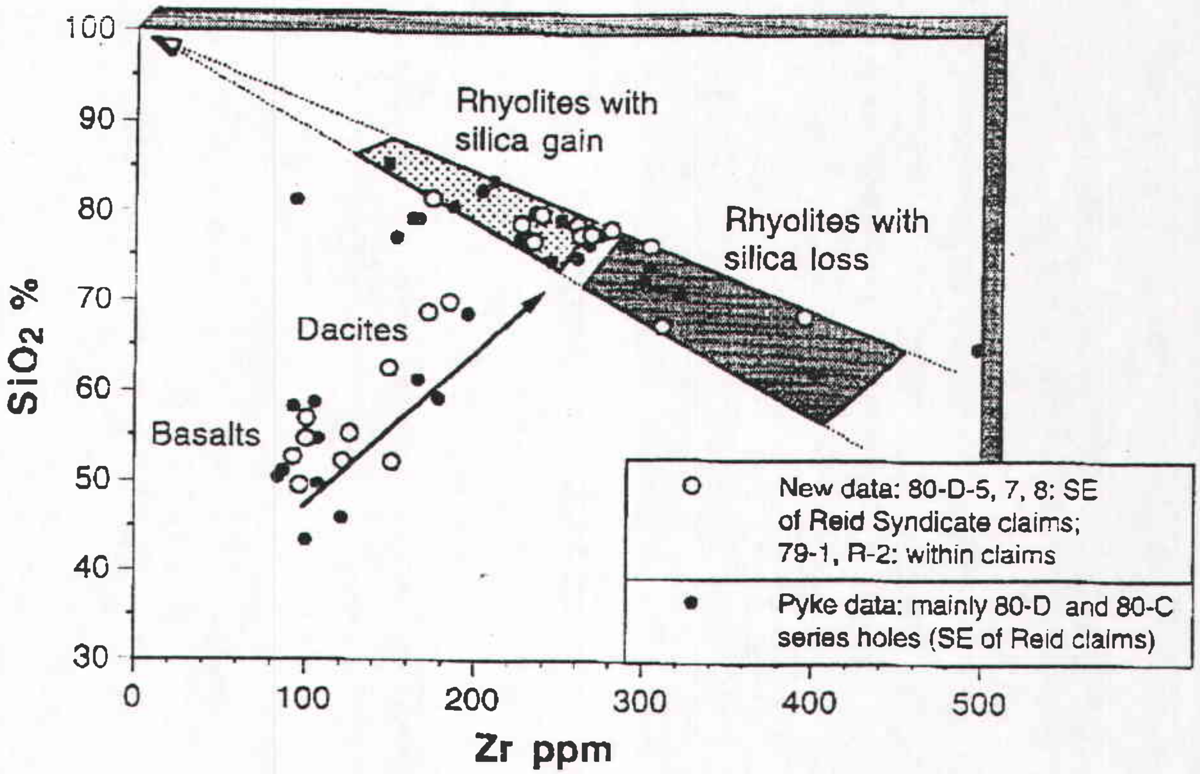
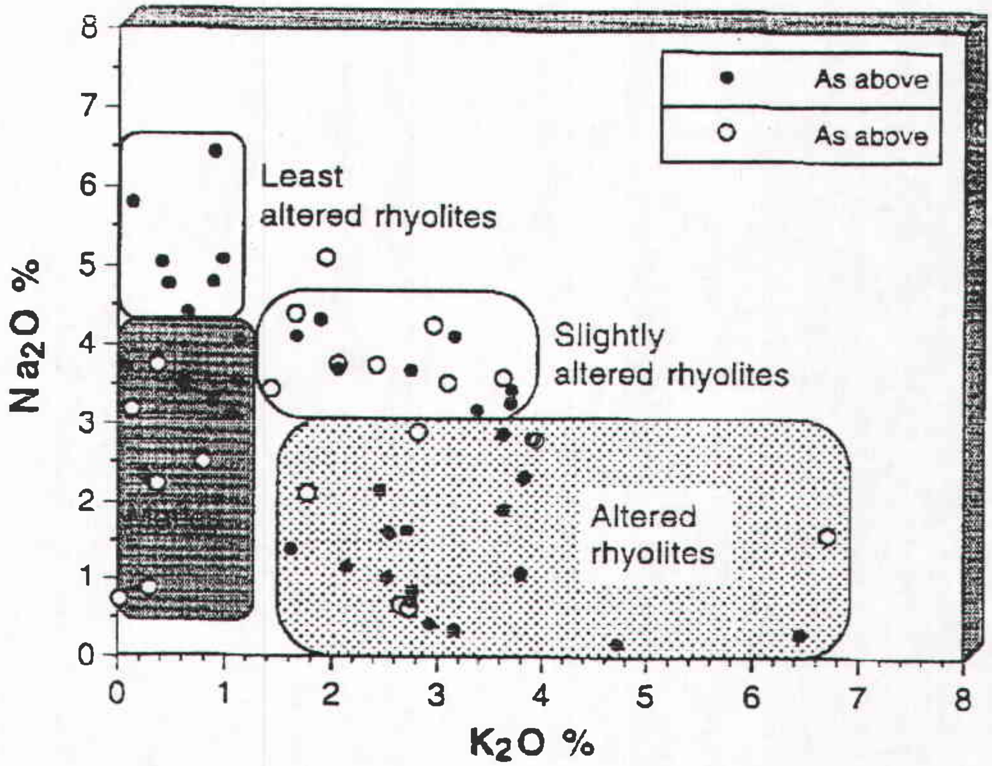


Fig. 10b



Reid Township volcanics -- Pyke data

Fig. 11a

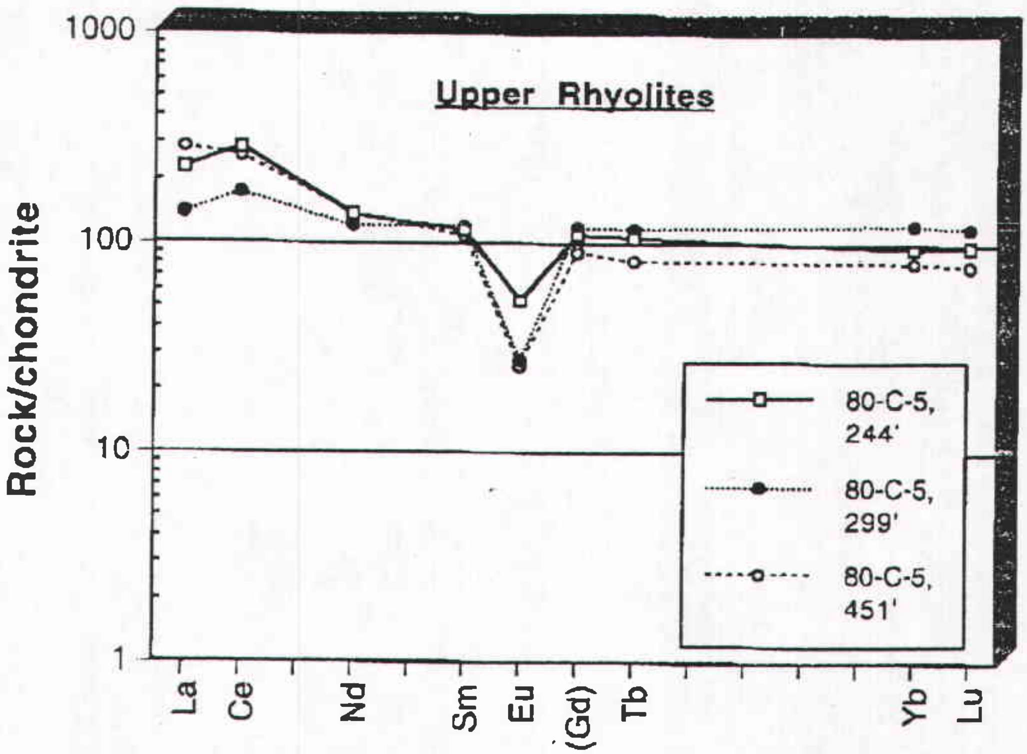
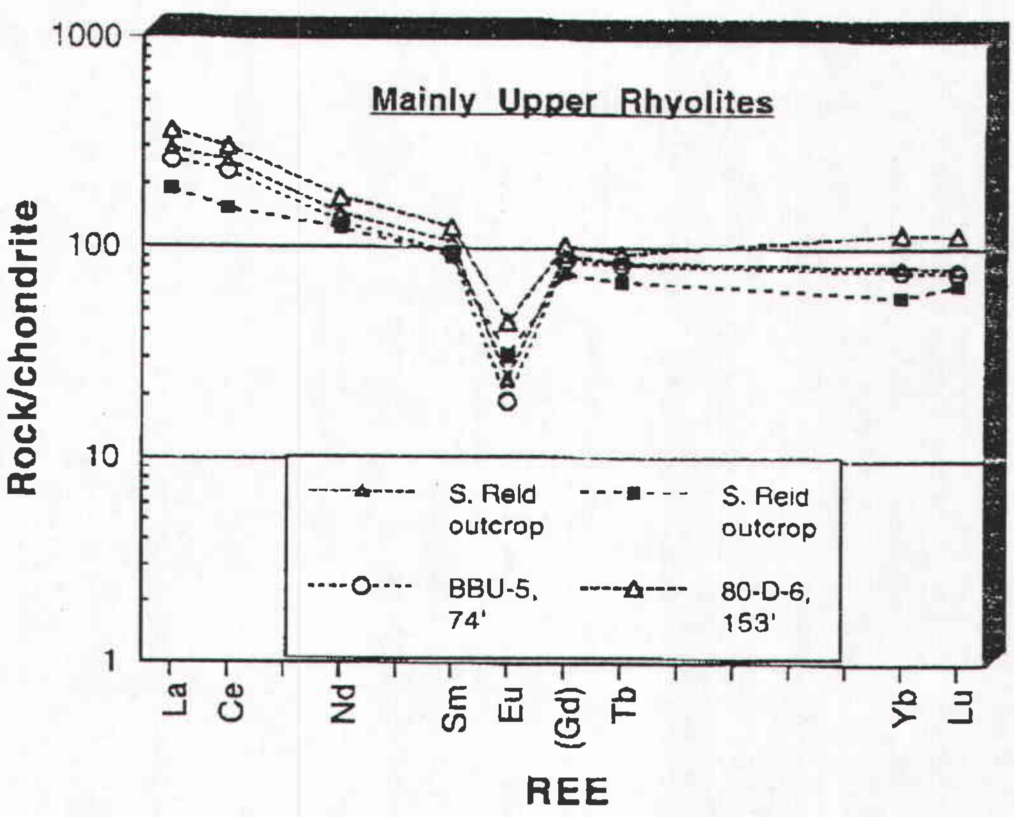


Fig. 11b



The Upper Rhyolites have all of the chemical features of an FIIIb rhyolite in the classification of Lesher et al. (1986), and a Group 1 rhyolite in the classification of Barrie et al. (1993). Other FIIIb rhyolites associated with massive sulfide deposits in the Timmins region include the Kamiskotia rhyolife, which has an average Zr/Y ratio of 3.2, and average Y and Yb contents of 98 ppm and 8.6 ppm, respectively (Barrie et al., 1993), and the Kidd Creek rhyolite, with a single-analysis Zr/Y ratio of 2.5, Y = 126 ppm and Yb = 14.6 ppm (Lesher et al., 1986). Other FIIIb rhyolites associated with massive sulfide deposits in the Abitibi greenstone belt include those in the Matagami and Chibougamau areas (Lesher et al., 1986; Kranidiotis and MacLean, 1987; Barrett and MacLean, 1991).

The rhyolites in Figure 12a (hole R-80-C-7) have REE patterns that are very similar to those in Figure 11, although their La_n/Yb_n ratios of 3.6 to 5.1 are slightly higher. Three of the five rhyolites in hole R-80-C-7 are tholeiitic (La_n/Yb_n = 3.6 to 4.1; Zr/Y = 2.2 to 2.4); the rhyolite at 476.5' has a slightly steeper REE pattern (La_n/Yb_n = 5.1) and a higher Zr/Y ratio of 4.6. A rhyolite at 402.5' (not shown) has lower overall REE concentrations relative to other rhyolites in this hole due to the diluting effect of silica addition.

Typical REE patterns of samples from the Central Rhyolite are shown in Figure 13. Their La_n/Yb_n ratios of 3.0 to 6.4 are generally somewhat higher than those of Upper Rhyolites. The heavy REEs (Tb to Lu) are fairly flat in the Central Rhyolite, and clearly have lower concentrations than the heavy REEs in the Upper Rhyolites in Figure 11 (even though the light REE in both groups are closely comparable).

The Central Rhyolite has tholeiitic to transitional Zr/Y ratios of 4.1 to 6.3, also higher than those of the Upper Rhyolite, and somewhat lower Y and Yb contents of 40-70 and 5-10 ppm, respectively. The Central Rhyolite has the chemical features of an FIIIa rhyolite in the classification of Lesher et al. (1986), and a Group 2 rhyolite in the classification of Barrie et al. (1993). Other FIIIa rhyolites associated with massive sulfide deposits in the Abitibi greenstone belt are found in the Central Mine Sequence of the Noranda camp (Barrett et al., 1991a,b,c; 1992, 1993).

The Central Rhyolite appears to form a major unit of near-uniform composition in eastern Reid Township, extending from its contact with the Southern Basalts (in R-80-D-6 and AE-90-3) to the Jocko Creek Fault (R-80-D-10 and AE-R-90-3). The Central Rhyolite extends to the west towards the Reid Syndicate claim group (through holes R-80-D-5, D-7 and D-8), and is also present immediately north of the northeast corner of the claim group (Chance R-1) and again ≈1.5 km north of this corner (in hole UR-80-5).

Reid Township rhyolites

Fig. 12a

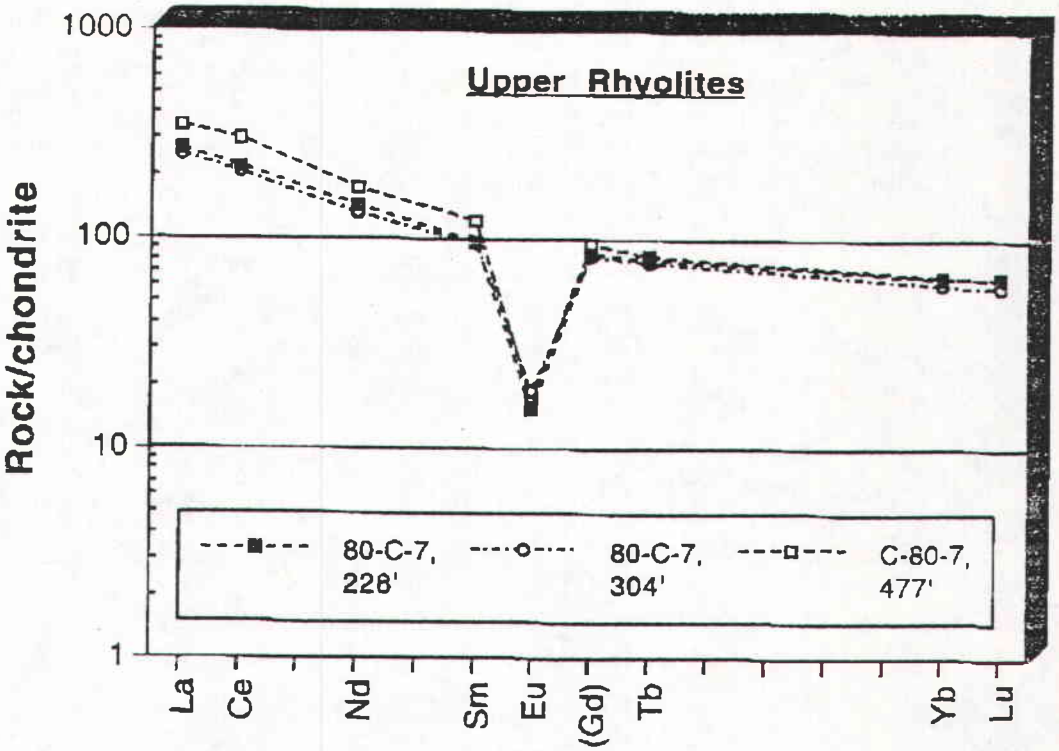
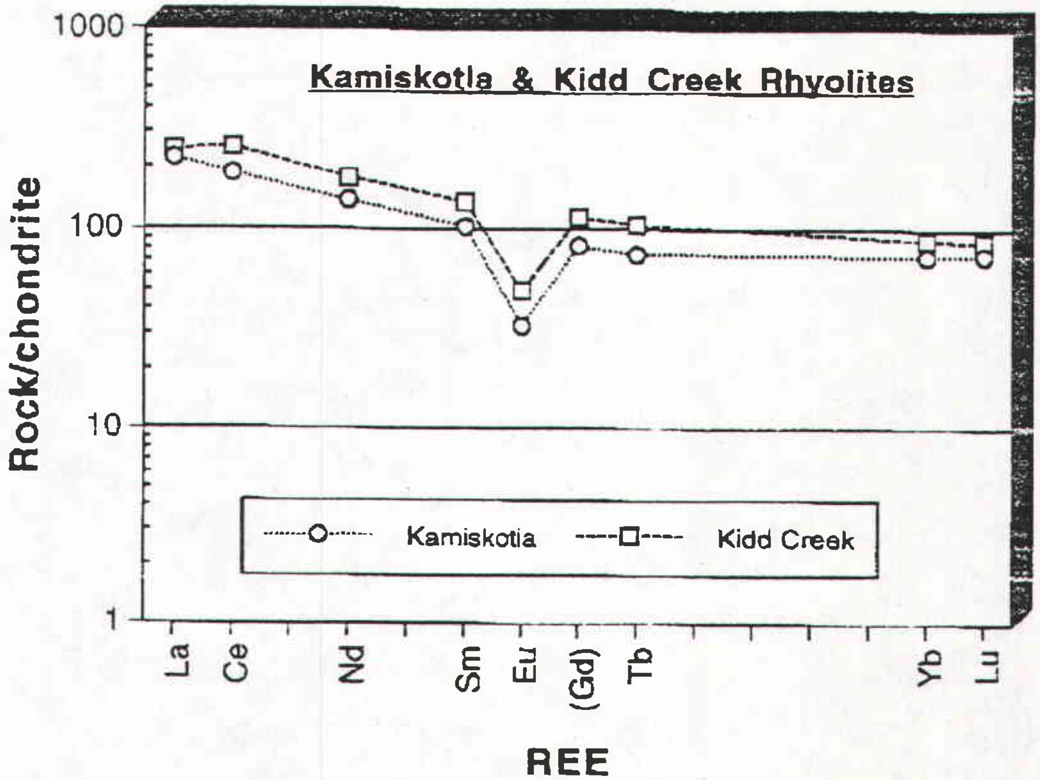


Fig. 12b



Reid Township rhyolites

Fig. 13a

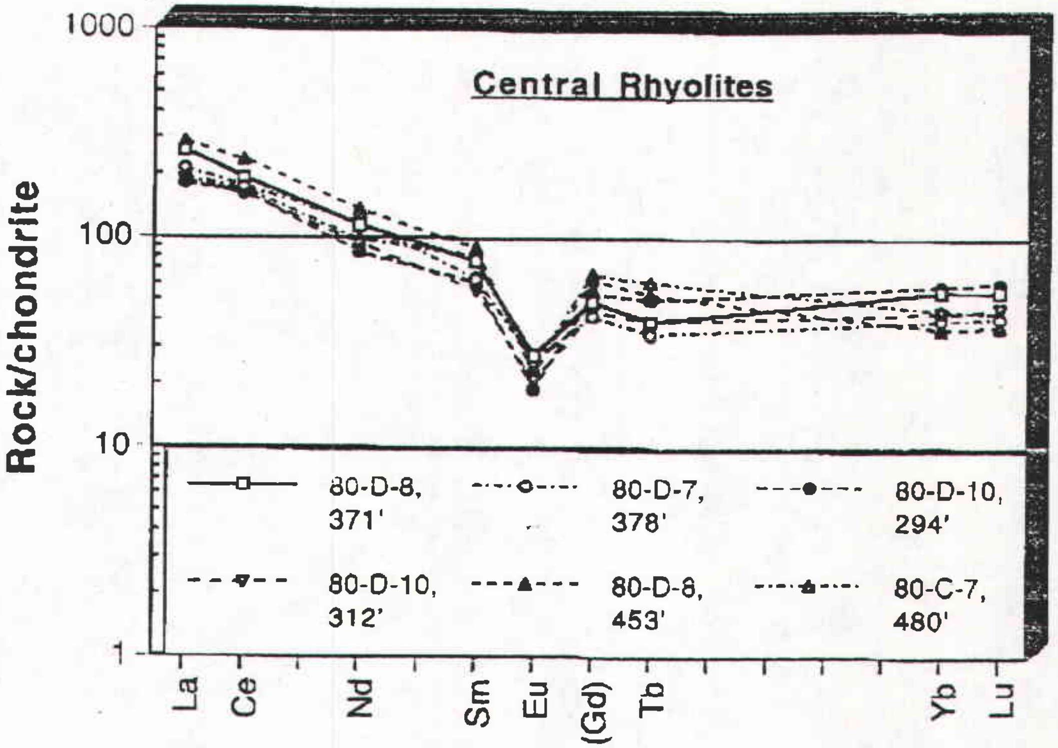
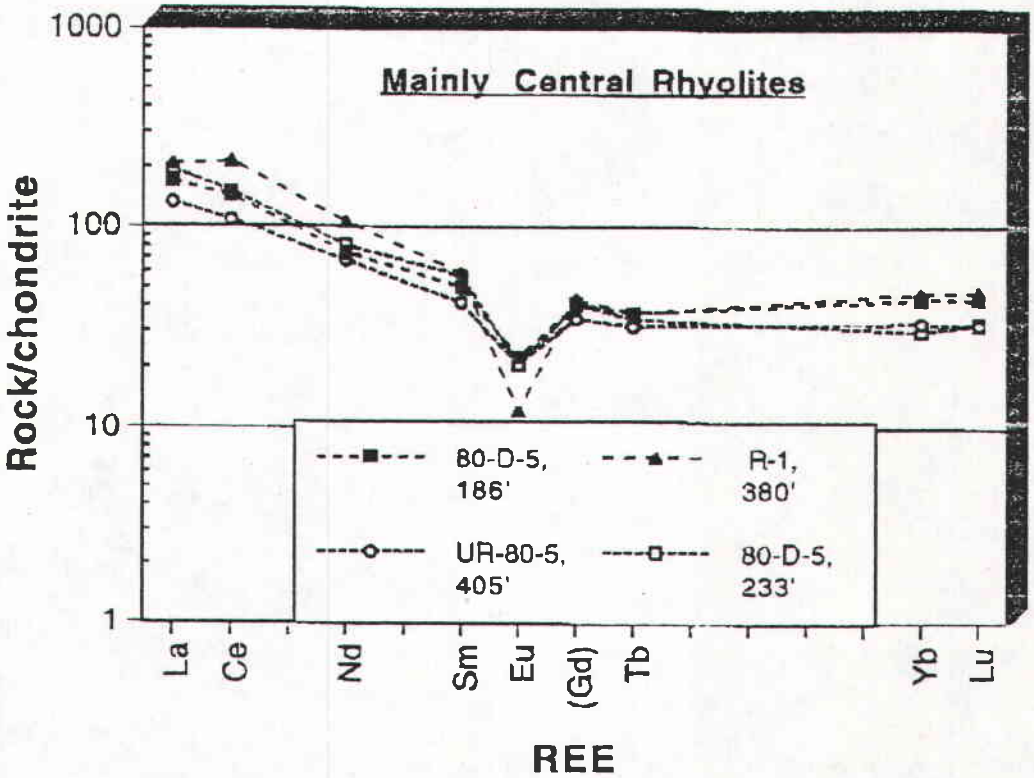


Fig. 13b



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 = 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

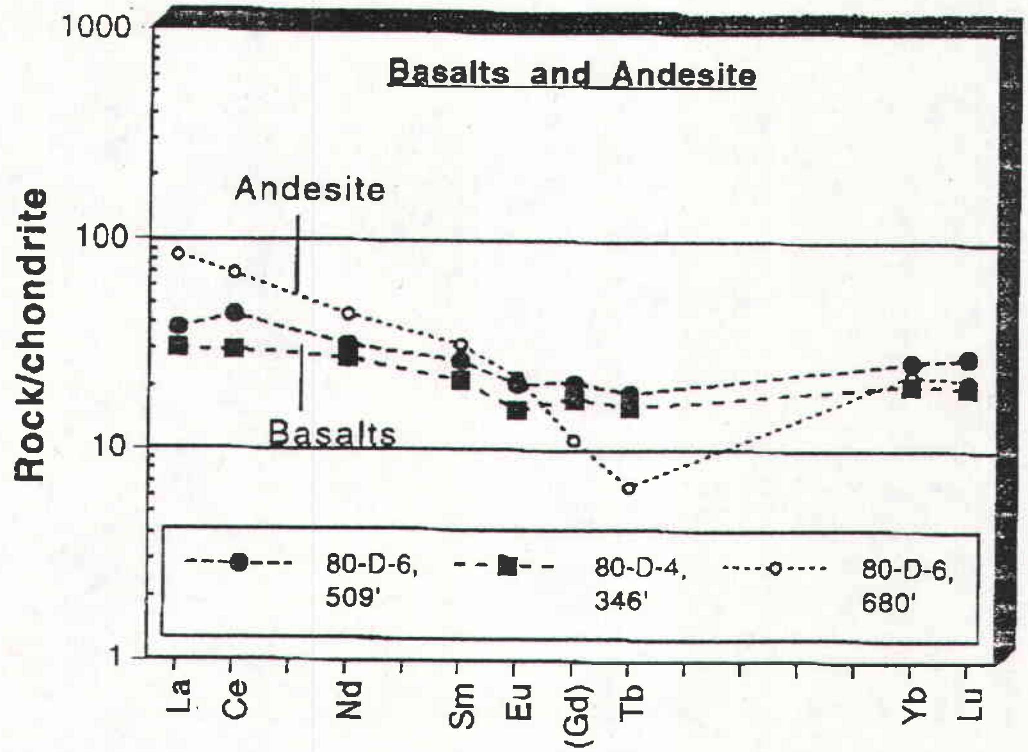
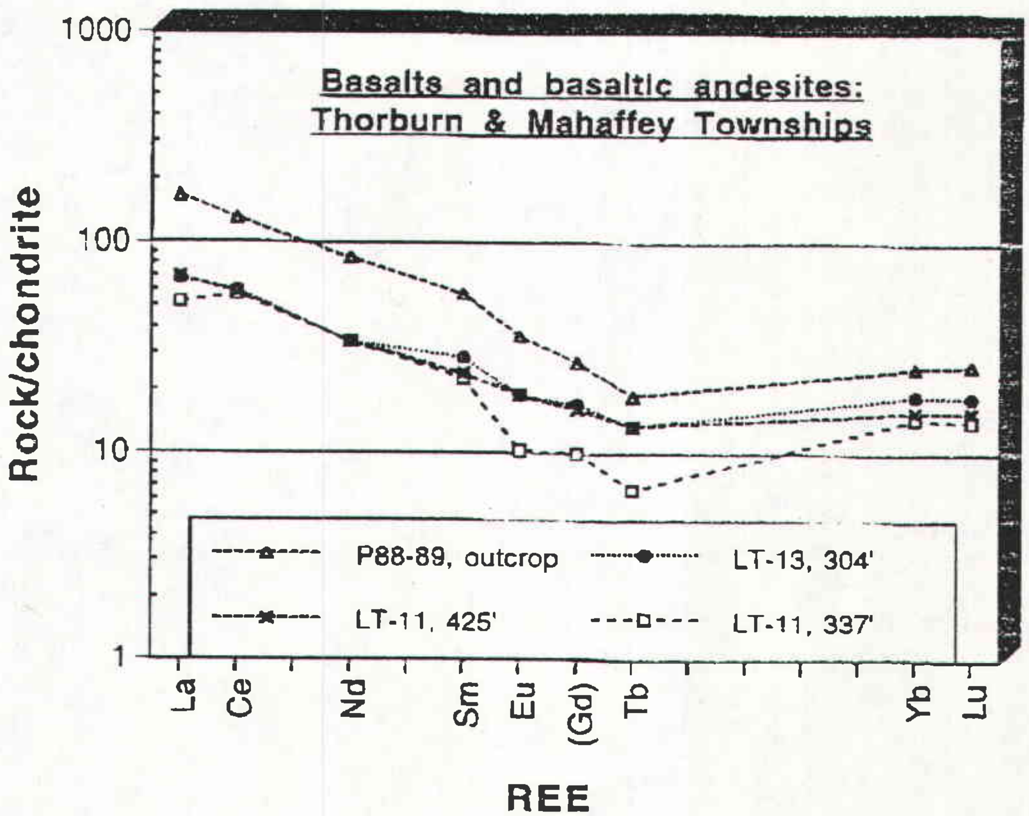


Fig. 14b



New data + Karvinen data

Fig. 15a

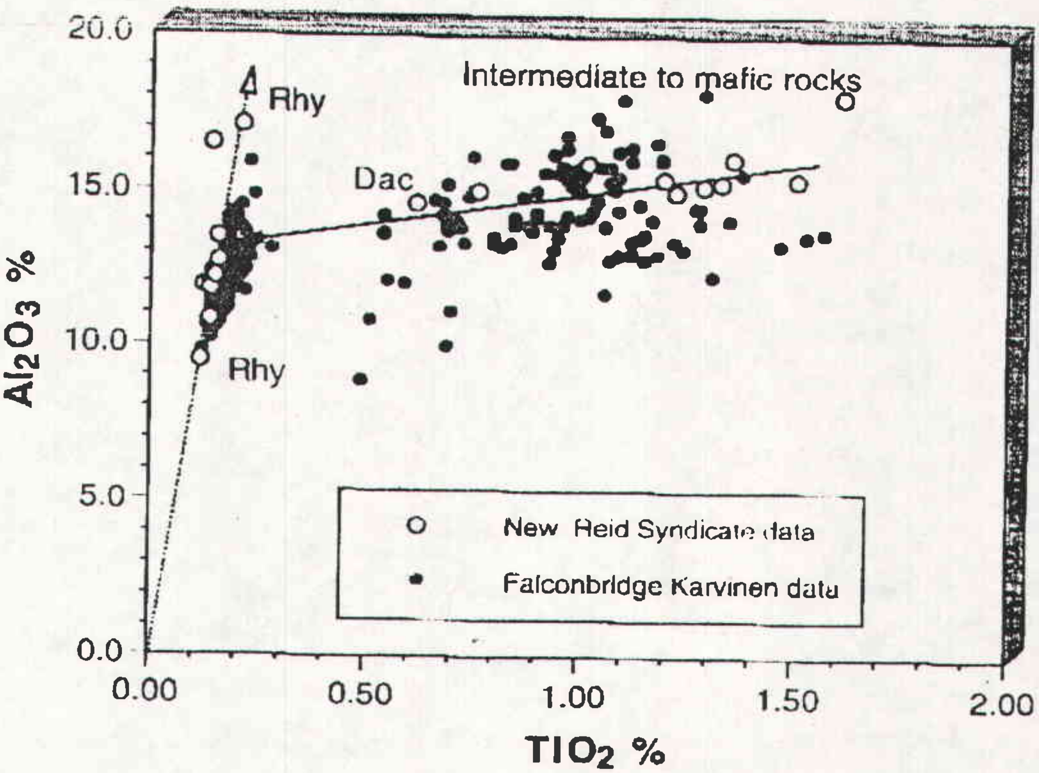
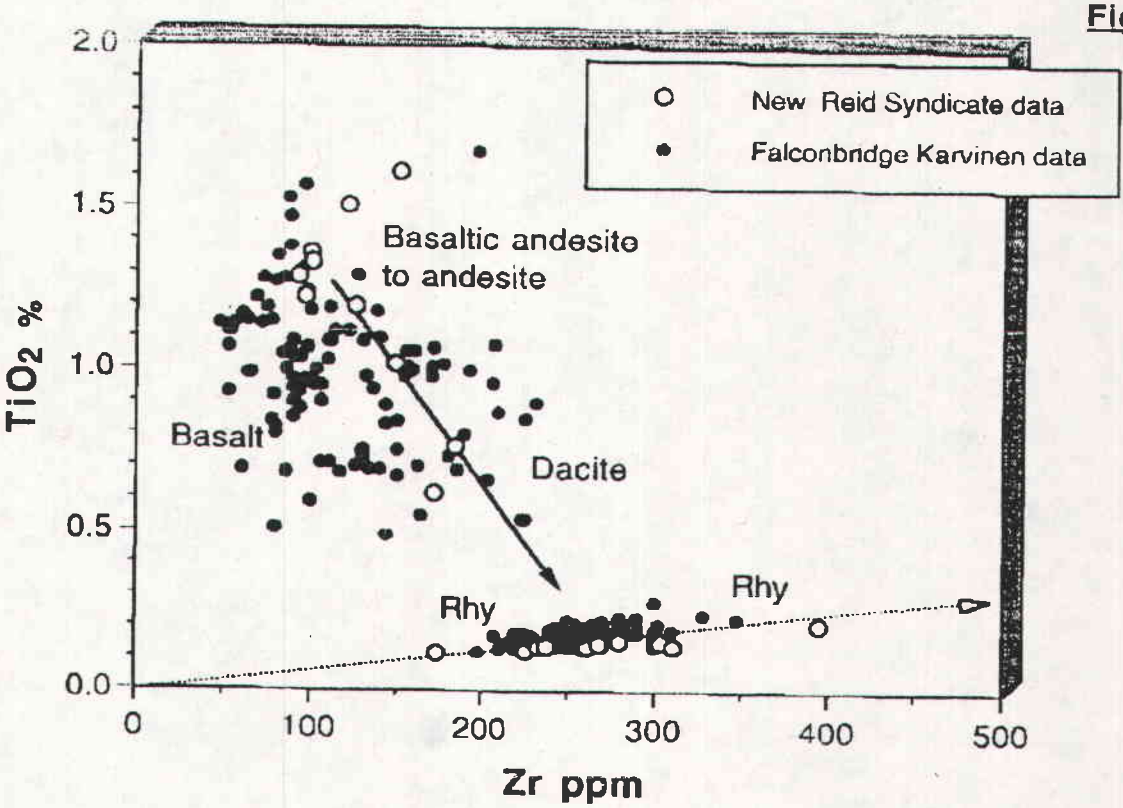


Fig. 15b



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

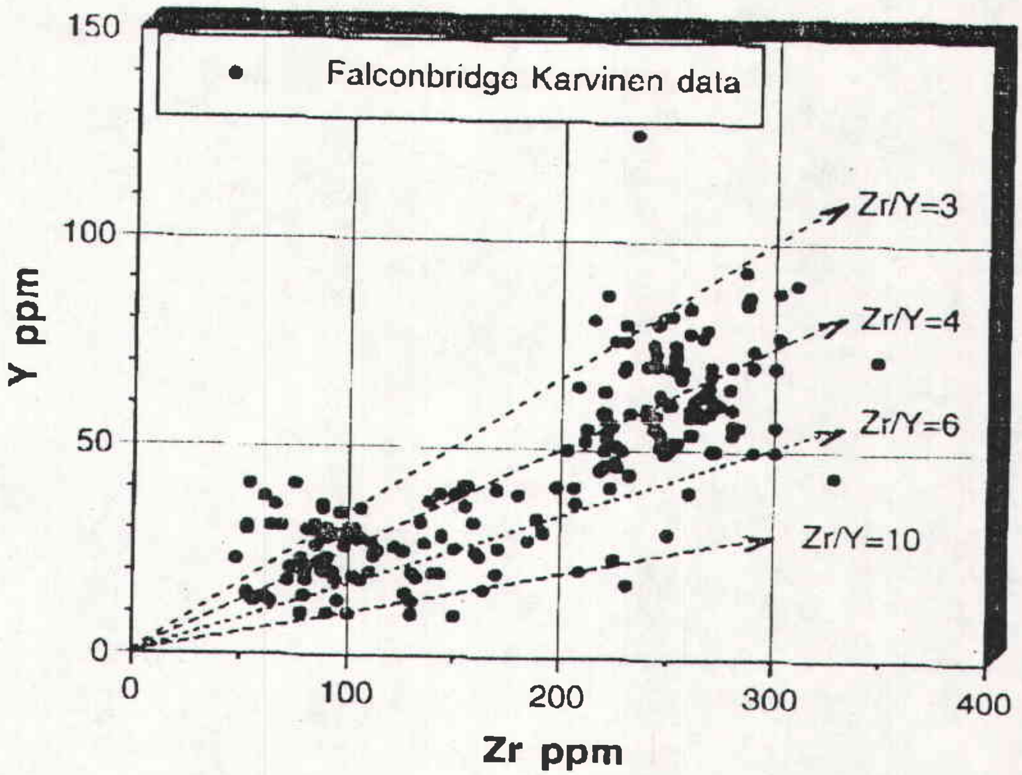


Fig. 16b

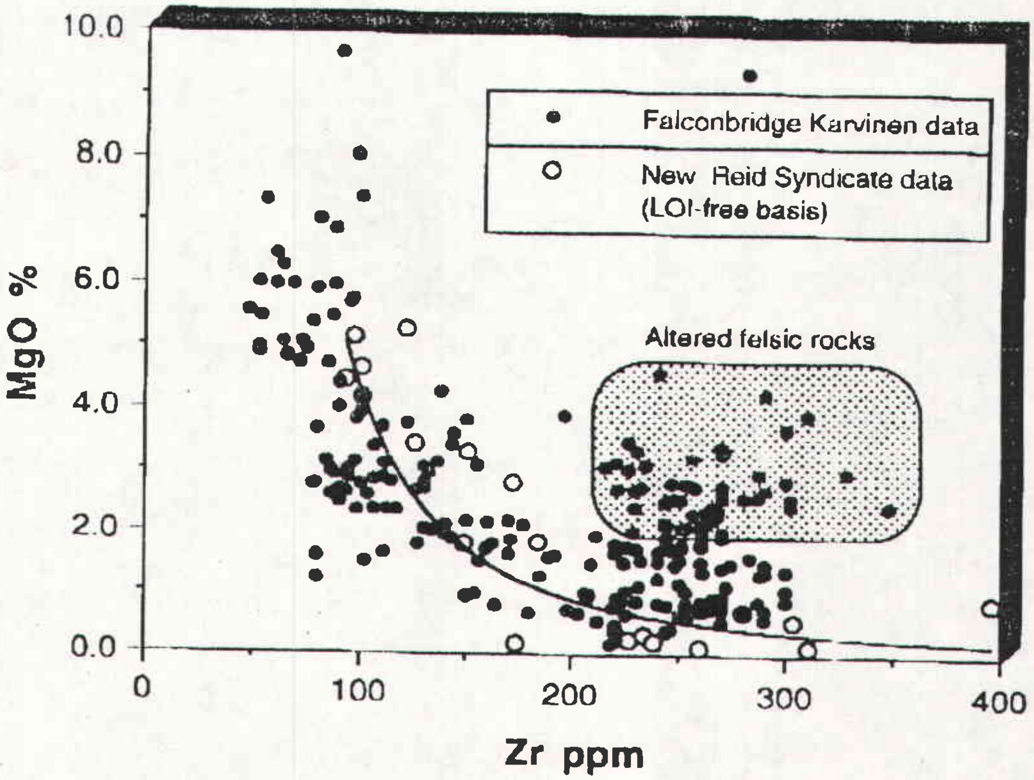


Fig. 17a

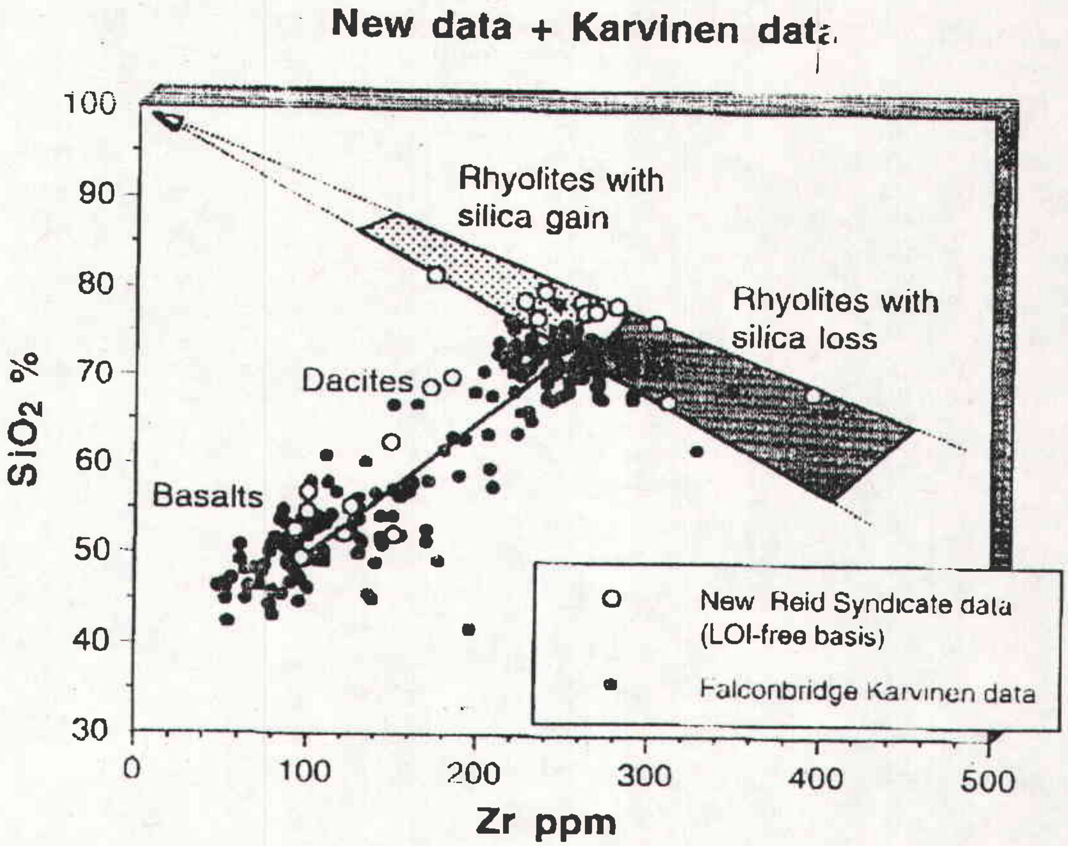
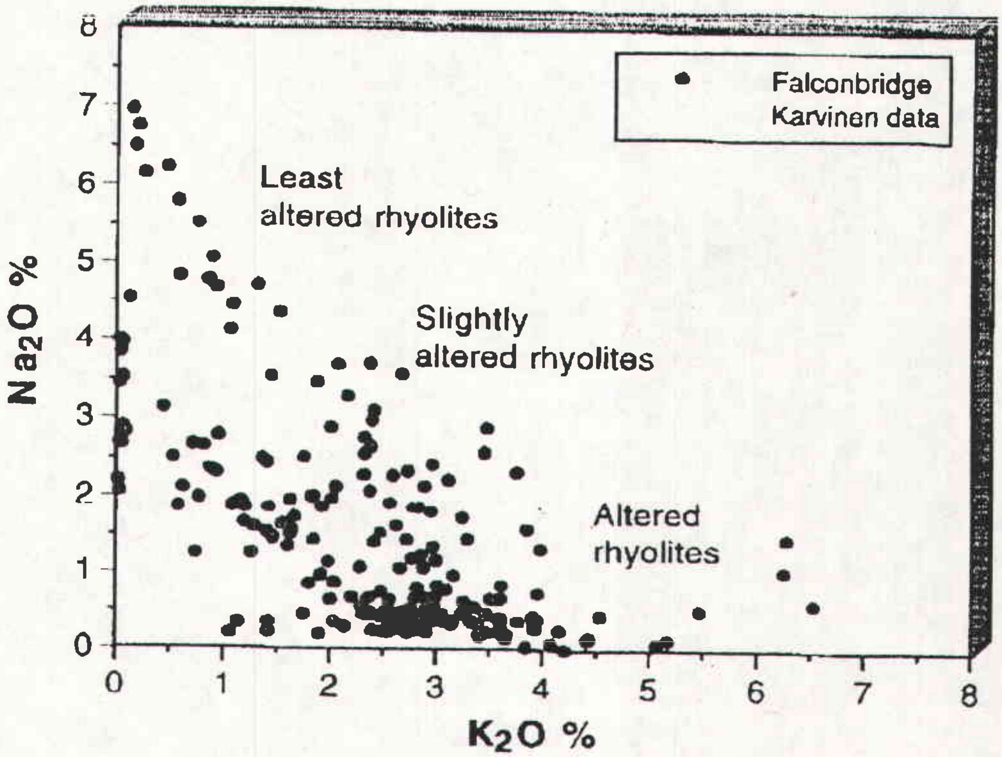


Fig. 17b



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

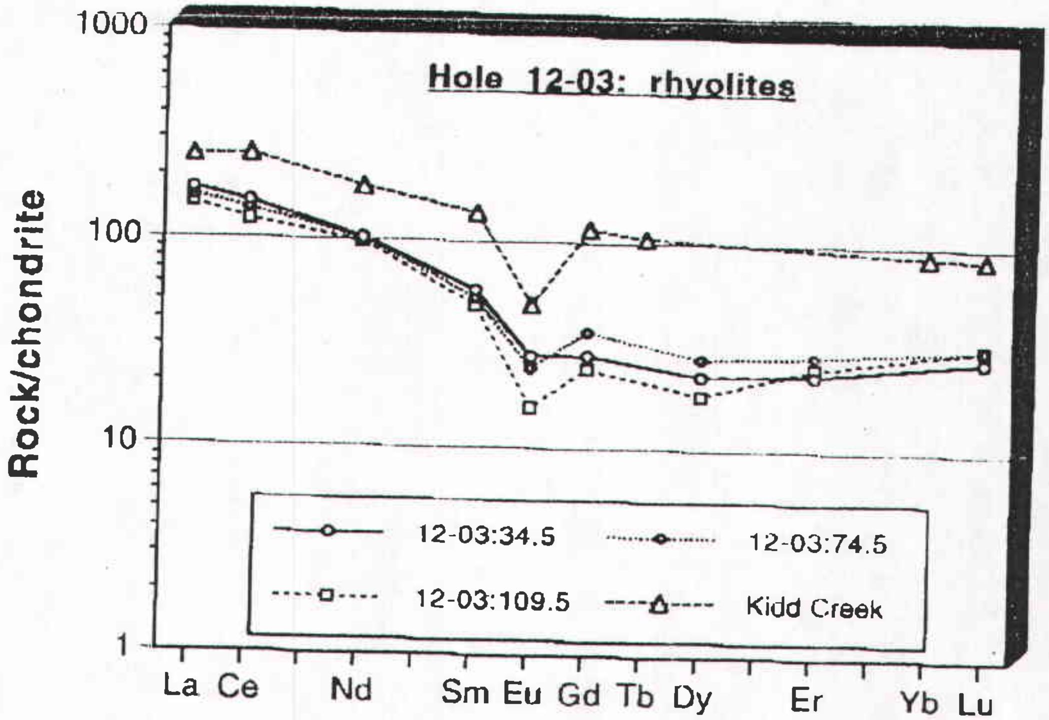


Fig. 18a

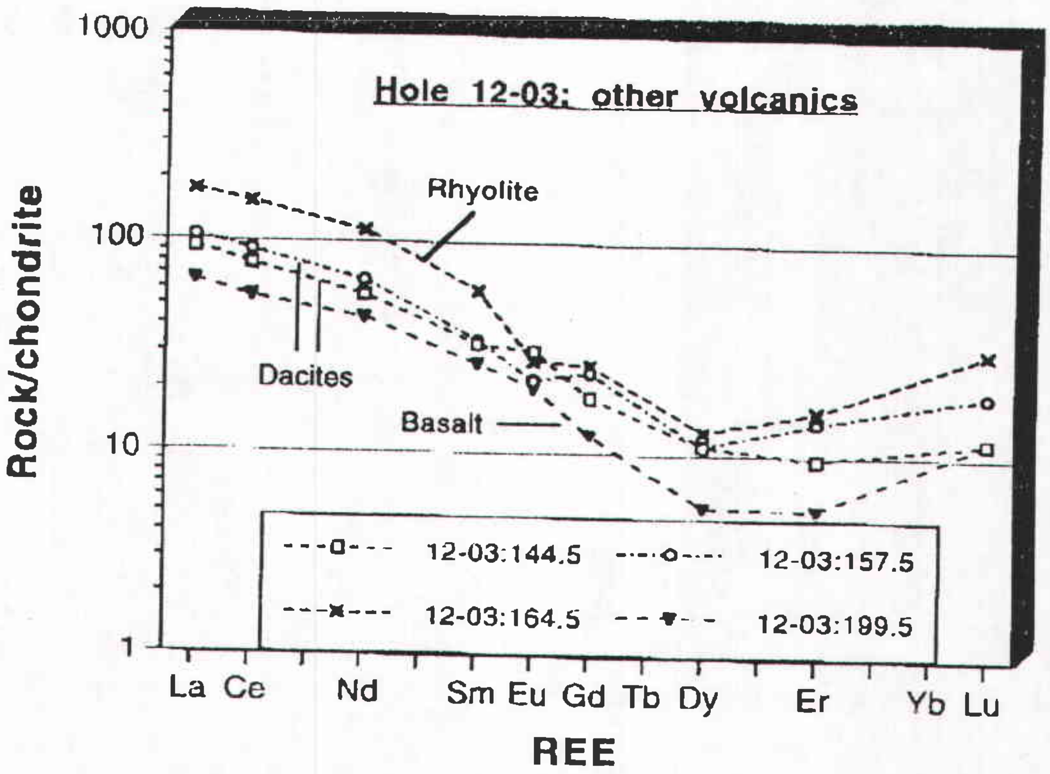


Fig. 18b

Falconbridge data: NW of Reid Syndicate claims

Fig. 19a

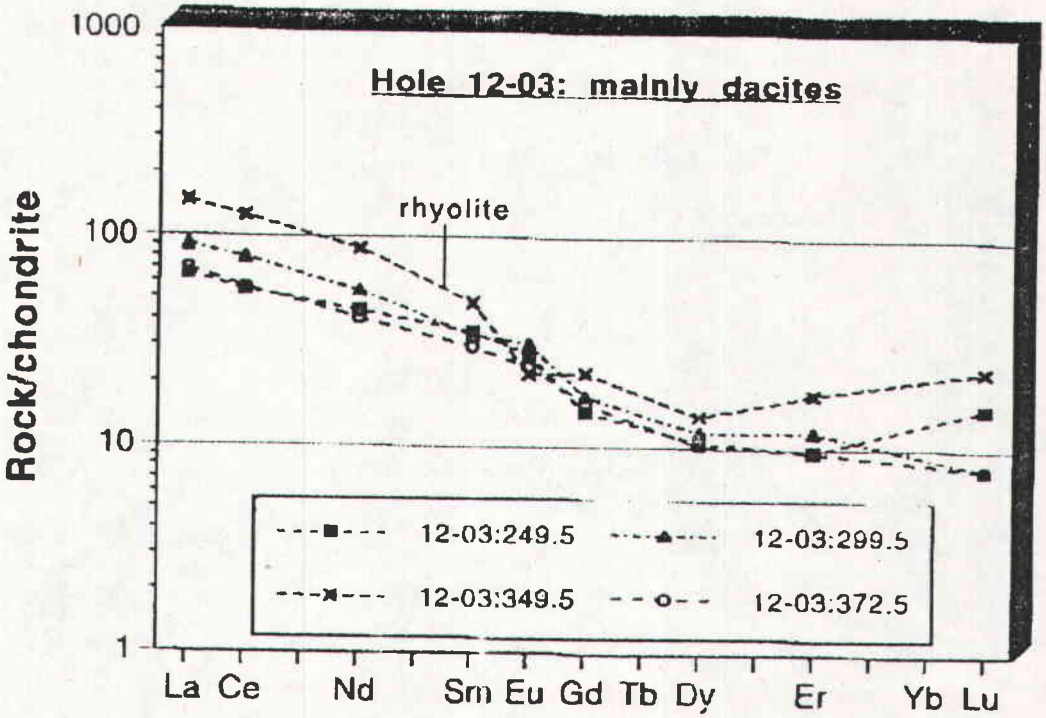
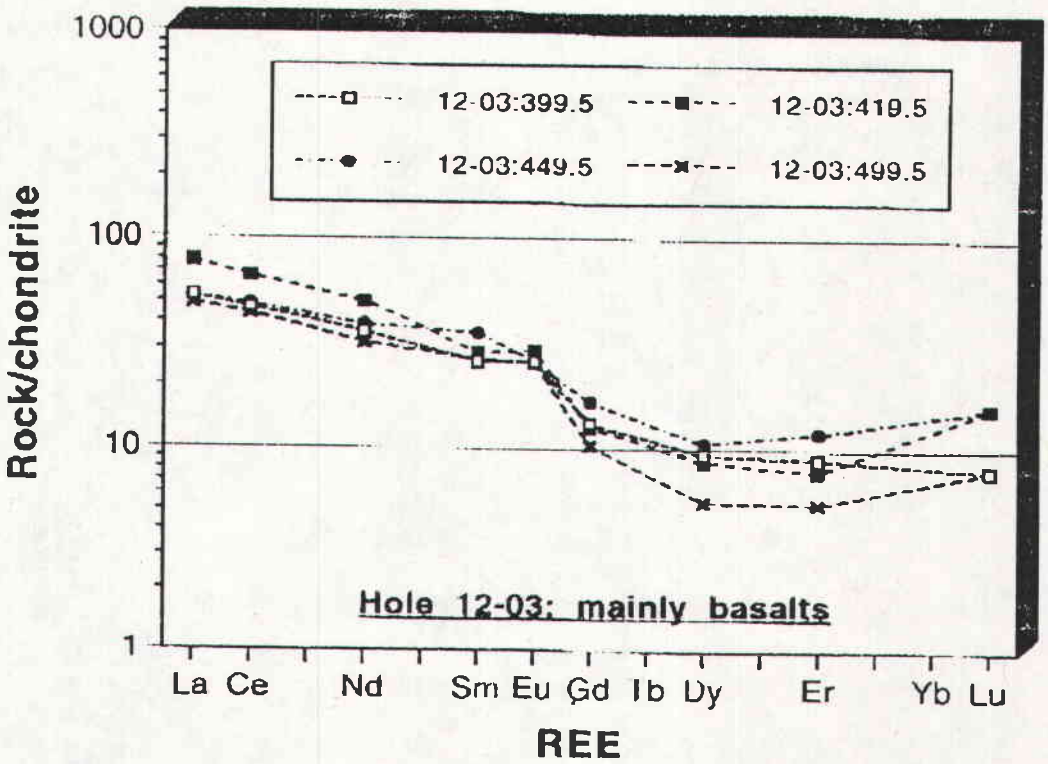


Fig. 19b



Falconbridge data: NW of Reid Syndicate claims

Fig. 20a

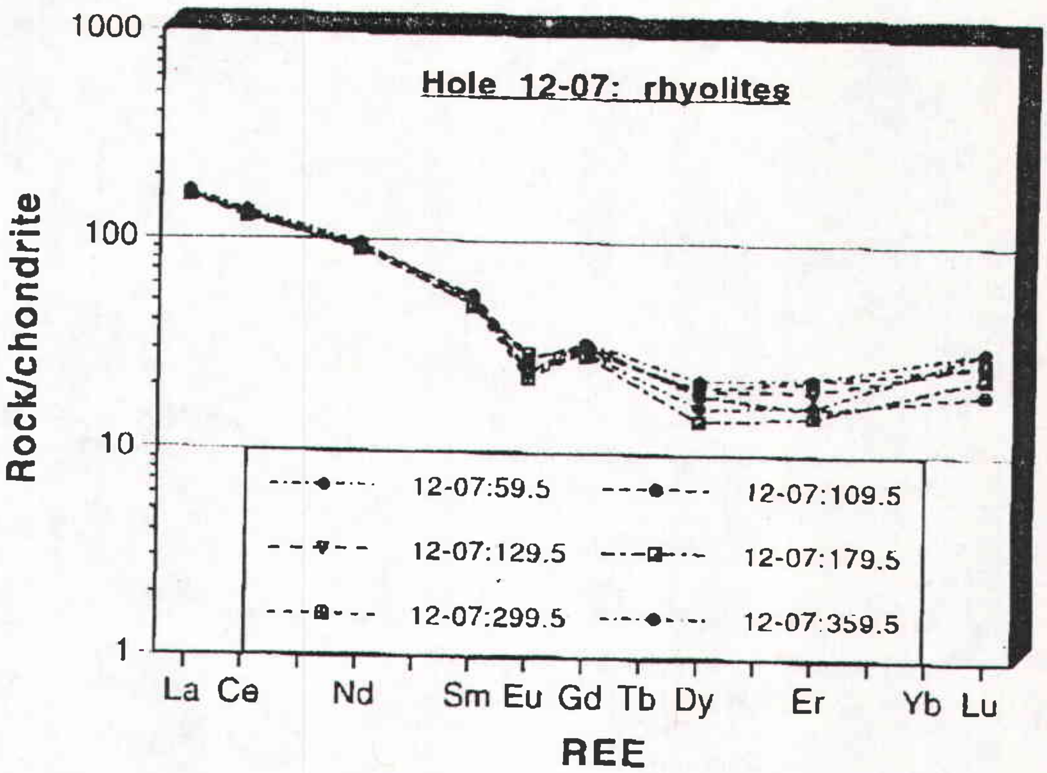
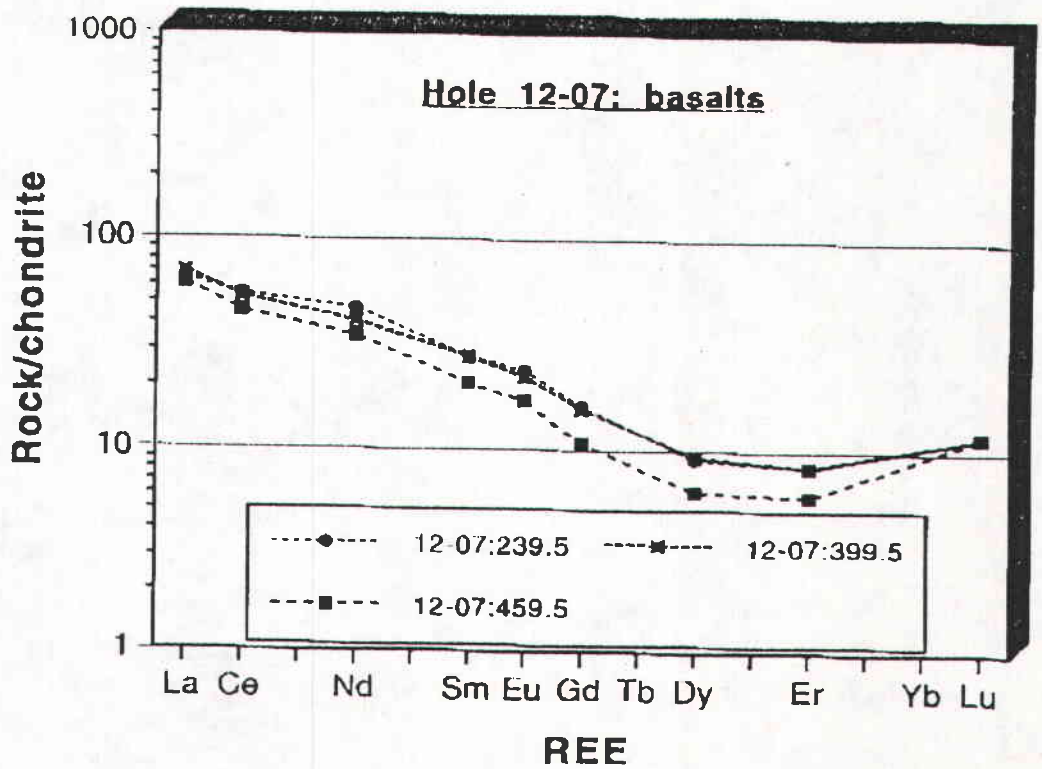


Fig. 20b



Falconbridge data: NW of Reid Syndicate claims

Fig. 21a

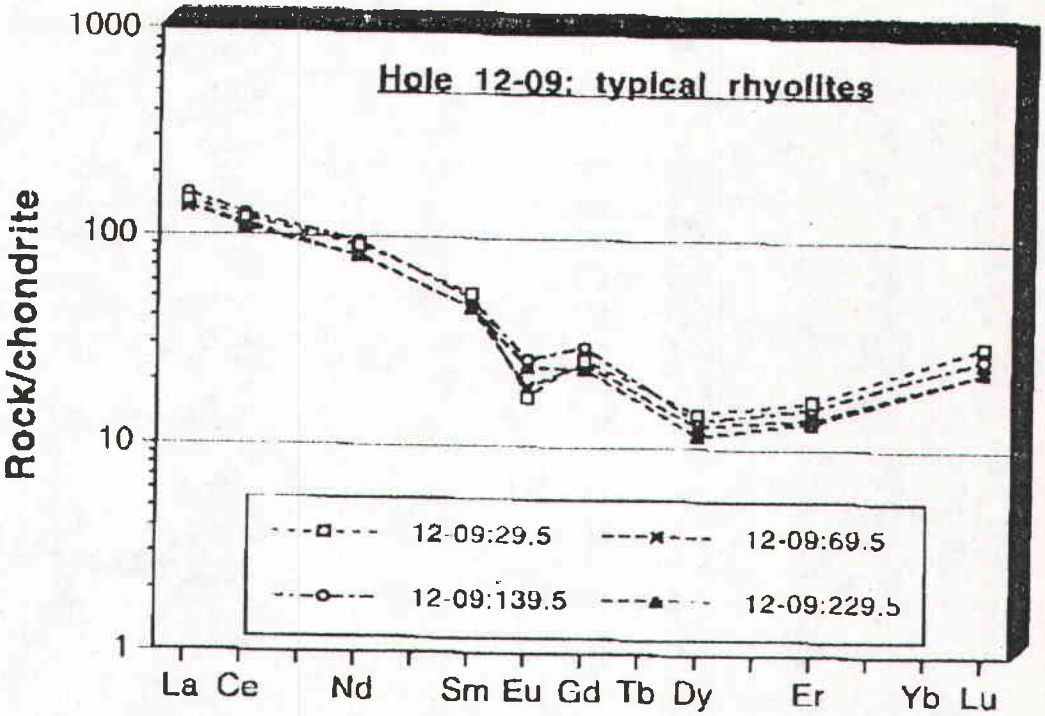
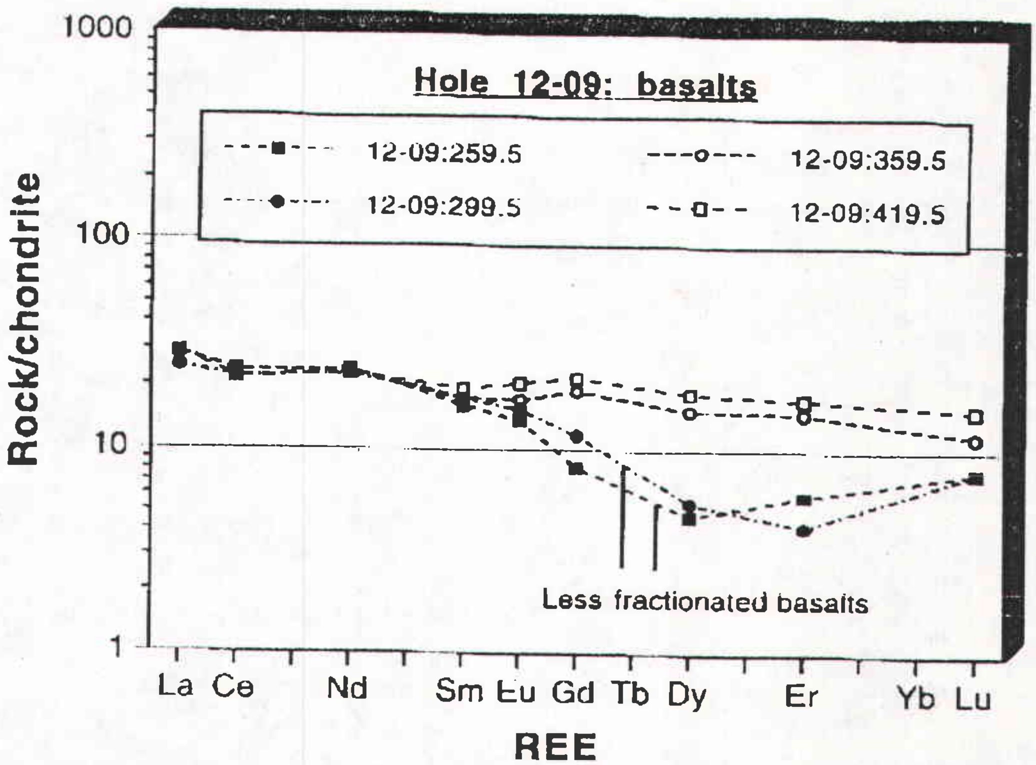


Fig. 21b



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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Table 1A. Chemical composition of volcanic rocks from the Rosario-Chance drilling area

Hole	Depth (ft)	Composition	Co.	No.	SiO2	Al2O3	TiO2	Fe2O3	MnO	CaO	MgO	K2O	Na2O	P2O5	BaO	Cr2O3
79-1	237	Basalt	RS	5015	49.8	14.7	1.440	14.20	0.19	8.08	5.04	0.12	3.05	0.24	0.02	0.01
79-1	303	Andesite	RS	5016	60.6	15.4	0.986	6.05	0.13	8.17	1.75	0.36	3.63	0.23	0.03	0.01
79-1	335	Basalt	RS	5017	52.3	14.6	1.130	12.80	0.23	10.70	3.25	0.02	0.68	0.10	0.01	0.02
79-1	411	Basalt	RS	5018	48.2	13.9	1.180	10.40	0.24	12.10	4.09	0.34	2.04	0.11	0.03	0.01
79-1	444	Basalt	RS	5019	46.5	14.1	1.150	15.20	0.32	12.20	4.84	0.28	0.81	0.12	0.02	0.01
79-1	447	Basalt	RS	5020	52.0	15.3	1.290	8.71	0.23	10.60	4.43	0.76	2.39	0.12	0.03	0.01
79-1	515	Basalt	RS	5021	52.6	14.2	1.230	7.92	0.24	9.97	3.87	0.72	2.38	0.12	0.04	0.01
79-1	527	Dacite	RS	5001	66.5	14.3	0.725	5.82	0.25	2.83	1.76	2.60	0.59	0.23	0.03	0.01
79-1	540 (EOH)	Dacite	RS	5002	64.4	13.7	0.579	5.38	0.16	3.99	2.64	2.49	0.62	0.18	0.03	0.01
R-2	326	Basaltic andesite	RS	5004	48.4	16.8	1.500	10.80	0.14	9.33	3.08	1.64	1.97	0.26	0.03	0.01
R-2	374	Rhyolite	RS	5005	80.1	9.3	0.115	1.27	0.05	2.53	0.19	1.42	3.38	0.04	0.05	0.01
R-2	473	Rhyolite	RS	5003	77.5	11.7	0.121	1.21	0.04	1.16	0.25	3.05	3.49	0.04	0.06	0.01

Table 1B. Chemical composition of volcanic rocks from the Gulf Minerals drilling area

Hole	Depth (ft)	Composition	Co.	No.	SiO2	Al2O3	TiO2	Fe2O3	MnO	CaO	MgO	K2O	Na2O	P2O5	BaO	Cr2O3
RD-80-5	128	Rhyolite	RS	5006	79.3	10.7	0.138	1.45	0.06	1.40	0.22	2.42	3.74	0.03	0.06	0.03
RD-80-5	127.5	Rhyolite	RS	5007	67.0	16.7	0.206	4.59	0.08	0.41	0.86	6.55	1.55	0.03	0.12	0.01
RD-80-5	209	Rhyolite	RS	5008	66.0	16.1	0.139	1.18	0.08	1.47	0.14	12.40	0.28	0.03	0.12	0.01
RD-80-5	330	Rhyolite	RS	5009	76.1	12.0	0.146	2.36	0.05	1.02	0.85	2.76	2.85	0.03	0.07	0.01
RD-80-5	370	Rhyolite	RS	5010	75.9	11.6	0.134	1.96	0.06	1.65	0.77	1.63	4.32	0.03	0.04	0.01
RD-80-7	136	Rhyolite	RS	5012	75.5	13.3	0.153	1.64	0.04	0.71	0.55	1.92	5.05	0.03	0.06	0.01
RD-80-7	148	Rhyolite	RS	5011	76.8	12.5	0.154	2.27	0.05	0.11	0.70	2.02	3.70	0.03	0.06	0.01
RD-80-8	177	Rhyolite	RS	5013	77.8	11.8	0.137	1.03	0.04	0.89	0.13	2.93	4.23	0.04	0.06	0.03
RD-80-8	267	Rhyolite	RS	5014	75.2	11.6	0.135	2.59	0.11	1.06	0.32	3.56	3.54	0.03	0.07	0.02

Table 1A. Chemical composition of volcanic rocks from the Rosario-Chance drilling area

Hole	Depth (ft)	Lithology	No.	LOI	Sum	Anh	Ba	Sr	Y	Zr	Rb	Nb	Zr/Y	Zr/Nb
79-1	237	Basalt	5015	2.55	99.44	82.69	213	151	24	116	6	7	4.8	16.6
79-1	303	Andesite	5016	2.85	100.19	91.29	231	245	31	144	18	11	4.6	13.1
79-1	335	Basalt	5017	3.55	99.39	83.04	122	223	24	119	1	6	5.0	19.8
79-1	411	Basalt	5018	5.60	98.24	82.24	290	131	24	85	10	5	3.5	17.0
79-1	444	Basalt	5019	3.55	99.09	80.34	153	177	23	91	9	6	4.0	15.2
79-1	447	Basalt	5020	3.20	99.07	87.16	280	134	23	95	30	6	4.1	15.8
79-1	515	Basalt	5021	5.20	98.50	85.38	386	107	21	93	34	8	4.4	11.6
79-1	527	Dacite	5001	4.50	100.14	89.82	290	50	20	175	62	10	8.8	17.5
79-1	EOH	Dacite	5002	5.95	100.13	88.80	301	39	17	161	59	10	9.5	16.1
R-2	326	Basalt	5004	4.25	98.21	83.16	277	220	40	140	42	9	3.5	15.6
R-2	374	Rhyolite	5005	1.76	100.21	97.18	410	47	30	171	41	12	5.7	14.3
R-2	473	Rhyolite	5003	1.10	99.73	97.42	550	71	51	223	65	17	4.4	13.1

Table 1B. Chemical composition of volcanic rocks from the Gulf Minerals drilling area

RD-80-5	128	Rhyolite	5006	0.80	100.35	98.10	533	129	57	237	66	13	4.2	18.2
RD-80-5	127.5	Rhyolite	5007	2.00	100.10	93.51	1100	86	79	386	203	25	4.9	15.4
RD-80-5	209	Rhyolite	5008	1.40	99.34	96.76	1080	94	49	304	158	17	6.2	17.9
RD-80-5	330	Rhyolite	5009	1.90	100.14	95.88	655	96	50	263	76	17	5.3	15.5
RD-80-5	370	Rhyolite	5010	2.00	100.10	96.14	402	109	59	256	43	15	4.3	17.1
RD-80-7	136	Rhyolite	5012	1.25	100.21	97.32	547	100	56	300	70	19	5.4	15.8
RD-80-7	148	Rhyolite	5011	1.95	100.36	96.14	575	64	43	275	63	15	6.4	18.3
RD-80-8	177	Rhyolite	5013	1.05	100.17	98.09	543	64	48	257	56	17	5.4	15.1
RD-80-8	267	Rhyolite	5014	2.30	100.54	95.65	654	69	55	229	73	15	4.2	15.3

Table 1C. Chemical composition of volcanic rocks from the Newmont drilling area

Hole	Depth (ft)	Composition	Co.	No.	SiO2	Al2O3	TiO2	Fe2O3	MnO	CaO	MgO	K2O	Na2O	P2O5	BaO	Cr2O3
73-3	410	High-Mg basalt	RS	19994	36.9	8.22	0.465	11.8	0.25	8.59	18.60	0.01	0.18	0.05	0.01	0.35
73-3	485	Mg basalt	RS	19995	46.1	12.3	0.652	12.6	0.22	11.30	9.68	0.03	0.73	0.07	0.01	0.06
73-3	515	High-Mg basalt	RS	19996	46.5	5.99	0.301	10.3	0.13	3.83	23.00	0.01	0.14	0.04	0.01	0.31
73-4	420	Basaltic andesite	RS	19991	59.1	15.3	0.733	8.52	0.14	4.29	4.86	0.12	4.59	0.13	0.02	0.02
73-4	445	High-Mg basalt	RS	19992	40.3	7.76	0.431	10.9	0.19	12.80	16.50	0.01	0.25	0.05	0.01	0.34
73-4	635	Picritic basalt	RS	19993	40.9	5.02	0.315	12.4	0.18	3.06	27.50	0.02	0.22	0.05	0.01	0.40
74-4	205	Basaltic andesite	RS	19986	59.6	12.6	0.816	11.5	0.19	5.84	4.06	0.25	3.99	0.14	0.02	0.01
74-4	645	Basaltic andesite	RS	19999	56.9	14.3	0.936	7.63	0.12	8.64	2.70	0.66	3.35	0.17	0.02	0.01
74-4	720	Basaltic andesite	RS	19998	51.7	12.0	0.798	10.3	0.12	13.50	3.32	0.21	0.53	0.15	0.01	0.01
74-4	755	Basaltic andesite	RS	19987	52.2	15.2	0.832	10.2	0.14	5.41	7.87	0.79	2.04	0.14	0.04	0.05
74-4	765	Basaltic andesite	RS	19997	55.8	14.6	1.030	9.90	0.15	7.18	4.92	0.64	3.96	0.19	0.02	0.01
74-4	830	Basaltic andesite	RS	19988	56.2	14.1	0.711	11.9	0.10	3.31	6.03	0.19	4.00	0.15	0.02	0.01
74-5	235	Basaltic andesite	RS	19990	56.5	14.8	0.665	7.57	0.12	11.90	4.59	0.44	0.95	0.13	0.02	0.02
74-5	905	High-Mg basalt	RS	19989	46.7	11.4	0.620	10.8	0.15	3.68	19.30	0.01	0.10	0.06	0.01	0.16
74-5	965	Basaltic andesite	RS	20000	54.4	14.4	0.916	9.62	0.21	8.58	4.69	0.52	3.16	0.18	0.03	0.02
74-6	265	Basaltic andesite	RS	19981	54.8	15.2	0.717	6.30	0.12	5.84	4.65	0.29	5.37	0.13	0.02	0.01
74-6	340	Basaltic andesite	RS	19982	59.0	15.6	0.682	7.84	0.12	5.40	4.31	0.99	4.07	0.12	0.03	0.01
74-6	440	High-Mg basalt	RS	19983	50.0	9.84	0.527	11.9	0.22	9.05	13.70	0.57	0.39	0.06	0.03	0.11
74-6	540	Carb? basalt?	RS	19984	34.3	6.26	0.244	5.80	0.14	27.30	5.67	0.19	0.72	0.05	0.01	0.05
74-6	590	High-Mg basalt	RS	19985	45.8	9.28	0.428	12.7	0.22	7.56	18.90	0.04	0.21	0.06	0.01	0.16

RS = Reid Syndicate

Table 1C. Chemical composition of volcanic rocks from the Newmont drilling area

Hole	Depth (ft)	Lithology	No.	LOI	Sum	Anh sum	Ba	Sr	Y	Zr	Rb	Nb	Zr/Y	Zr/Nb
73-3	410	High-Mg basalt	19994	15.10	100.52	73.62	92	61	14	38	1	2	2.7	19.0
73-3	485	Mg basalt	19995	5.95	99.71	81.16	117	63	20	69	5	3	3.5	23.0
73-3	515	High-Mg basalt	19996	9.10	99.65	80.25	71	21	7	27	5	6	3.9	4.5
73-4	420	Basaltic andesite	19991	2.40	100.22	89.30	145	133	19	133	6	9	7.0	14.8
73-4	445	High-Mg basalt	19992	8.30	97.83	78.63	80	45	13	41	6	6	3.2	6.8
73-4	635	Picritic basalt	19993	8.85	98.93	77.68	101	6	7	43	7	6	6.1	7.2
74-4	205	Basaltic andesite	19986	1.45	100.46	87.51	198	61	32	125	7	6	3.9	20.8
74-4	645	Basaltic andesite	19999	3.80	99.23	87.80	156	170	25	144	18	8	5.8	18.0
74-4	720	Basaltic andesite	19998	6.80	99.45	82.35	127	805	18	149	8	7	8.3	21.3
74-4	755	Basaltic andesite	19987	3.85	98.76	84.71	331	80	25	116	20	6	4.6	19.3
74-4	765	Basaltic andesite	19997	1.75	100.14	88.49	173	150	25	154	16	9	6.2	17.1
74-4	830	Basaltic andesite	19988	3.50	100.21	84.81	144	62	20	122	4	7	6.1	17.4
74-5	235	Basaltic andesite	19990	2.05	99.76	90.14	200	98	20	114	12	5	5.7	22.8
74-5	905	High-Mg basalt	19989	6.60	99.58	82.18	87	2	18	48	2	3	2.7	16.0
74-5	965	Basaltic andesite	20000	2.85	99.57	87.10	249	180	29	155	12	10	5.3	15.5
74-6	265	Basaltic andesite	19981	4.80	98.24	87.14	142	142	16	129	13	7	8.1	18.4
74-6	340	Basaltic andesite	19982	2.15	100.33	90.34	307	214	16	125	28	6	7.8	20.8
74-6	440	High-Mg basalt	19983	3.05	99.45	84.50	282	34	18	50	19	1	2.8	50.0
74-6	540	Carb? basalt?	19984	18.90	99.63	74.93	95	57	8	36	3	3	4.5	12.0
74-6	590	High-Mg basalt	19985	4.85	100.22	82.67	83	7	6	43	6	4	7.2	10.8

Table 2. Chemical Composition of Volcanic Rocks in Reid Township & Vicinity (Pyke, 1989)

Hole	Depth (ft)	No.	Co.*	SiO2 %	Al2O3 %	TiO2 %	Fe2O3 %	MnO %	CaO %	MgO %	K2O %	Na2O %	P2O5 %	LOI %	Sum %
Reid Township															
R-80-C-7	227.5	5501	Gulf	79.0	10.2	0.15	1.73	0.01	0.83	0.88	2.46	2.16	0.02	1.77	99.21
R-80-C-7	303.8	5502	Gulf	79.0	11.0	0.14	1.56	0.01	0.35	0.78	2.06	3.70	0.02	1.39	100.01
R-80-C-7	402.5	5504	Gulf	81.9	8.78	0.13	1.45	0.01	0.76	1.50	2.93	0.42	0.02	2.31	100.21
R-80-C-7	476.5	5507	Gulf	62.3	17.5	0.23	5.69	0.01	0.09	3.65	6.45	0.30	0.02	3.70	99.94
R-80-C-7	480.0	5508	Gulf	83.5	9.27	0.14	0.52	0.01	0.26	0.24	0.89	4.80	0.02	0.77	100.42
R-80-C-5	244.0	5511	Gulf	65.1	10.8	0.33	6.40	0.26	4.02	1.34	2.77	0.83	0.05	7.85	99.75
R-80-C-5	299.5	5512	Gulf	79.2	11.8	0.09	1.10	0.01	0.69	0.51	3.16	0.35	0.01	2.93	99.85
R-80-C-5	451.0	5520	Gulf	76.3	12.4	0.16	1.53	0.01	1.13	0.58	2.72	1.64	0.03	3.39	99.89
R-80-D-13	575.0	5521	Gulf	54.7	15.8	0.84	8.72	0.17	9.58	3.38	0.24	2.34	0.14	4.23	100.14
R-80-D-6	153.0	5522	Gulf	74.9	12.9	0.15	2.46	0.08	0.82	0.45	3.70	3.29	0.02	1.16	99.93
R-80-D-6	509.5	5523	Gulf	58.2	13.7	1.32	6.47	0.14	7.17	1.86	1.14	4.06	0.22	5.62	99.90
R-80-D-6	679.5	5524	Gulf	61.3	16.5	0.92	7.19	0.12	4.33	1.61	0.13	5.80	0.24	1.77	99.91
R-80-D-8	452.5	5530	Gulf	70.9	14.9	0.19	2.79	0.01	0.71	1.29	3.38	3.20	0.03	2.85	100.25
R-80-D-8	370.5	5531	Gulf	73.9	13.6	0.17	2.74	0.06	0.60	0.91	1.89	4.33	0.03	1.85	100.08
R-80-D-8	168.5	5532	Gulf	77.1	8.70	0.12	1.59	0.06	2.63	1.17	0.47	4.78	0.02	3.77	100.41
R-80-D-7	378.0	5533	Gulf	77.1	12.0	0.15	1.41	0.08	0.45	0.27	3.71	3.45	0.02	1.47	100.11
R-80-D-7	256.5	5534	Gulf	72.5	15.3	0.19	1.36	0.01	0.48	0.83	3.16	4.13	0.03	2.00	99.99
R-80-D-10	293.5	5536	Gulf	77.0	12.7	0.16	1.85	0.01	0.27	0.22	3.63	2.89	0.02	1.39	100.14
R-80-D-10	312.0	5537	Gulf	76.4	12.6	0.16	1.91	0.01	0.78	0.16	3.83	2.34	0.02	1.85	100.06
R-80-D-4	268.0	5541	Gulf	81.3	9.74	0.12	0.89	0.01	1.42	0.31	0.65	4.42	0.05	1.16	100.07
R-80-D-4	346.5	5543	Gulf	50.4	15.0	1.32	10.60	0.30	7.40	5.61	0.06	3.72	0.12	4.70	99.23
R-80-D-5	186.0	5546	Gulf	82.4	9.26	0.13	0.85	0.01	1.15	0.17	0.41	5.05	0.02	0.47	99.92
R-80-D-5	233.0	5547	Gulf	80.0	10.8	0.15	1.08	0.01	1.07	0.14	0.98	5.09	0.02	0.77	100.11
B.B U. 4	348.1	5552	Black Bay	79.2	9.92	0.14	1.01	0.01	1.55	0.57	4.72	0.17	0.02	2.77	100.08
B.B.U. 5	74.1	5559	Black Bay	80.5	9.99	0.14	1.73	0.01	1.09	0.42	2.75	0.71	0.02	2.77	100.13
R-1	380.0	5560	Chance	78.7	12.4	0.20	0.93	0.01	0.62	0.22	3.80	1.08	0.03	2.00	99.99
S. Reid	outcrop	P62-89	D. Pyke	77.6	11.7	0.16	1.73	0.01	0.52	0.37	2.75	3.70	0.02	1.39	99.95
S. Reid	outcrop	P63-89	D. Pyke	78.3	12.0	0.17	0.73	0.01	0.25	0.68	0.90	6.44	0.02	0.70	100.20

* Companies: Gulf = Gulf Minerals, Black Bay = Black Bay Uranium, Chance = Chance Mining & Exploration, D. Pyke = sampled by D. Pyke.

Table 2. Chemical Composition of Volcanic Rocks in Reid Township & Vicinity (Pyke, 1989)

Hole	Depth (ft)	No.	Co.*	Sr ppm	Y ppm	Zr ppm	Rb ppm	Nb ppm	Zr/Y	Zr/Nb	Ba ppm	Sc ppm	Cr ppm	Co ppm	Ni ppm
Reid Township															
R-80-C-7	227.5	5501	Gulf	36	95	227	97	21	2.4	10.8		5.2	160	0.5	5
R-80-C-7	303.8	5502	Gulf	45	101	226	82	36	2.2	6.3		4.8	140	2	5
R-80-C-7	402.5	5504	Gulf	15	77	174	105	22	2.3	7.9		4.5	130	0.1	5
R-80-C-7	476.5	5507	Gulf	<10	88	401	223	43	4.6	9.3		9.0	73	3	3
R-80-C-7	480.0	5508	Gulf	23	59	210	37	27	3.6	7.8		3.9	230	0.5	5
R-80-C-5	244.0	5511	Gulf	102	113	497	83	50	4.4	9.9		7.8	80	0.5	4
R-80-C-5	299.5	5512	Gulf	72	141	166	101	30	1.2	5.5		0.7	110	1	4
R-80-C-5	451.0	5520	Gulf	55	102	290	77	47	2.8	6.2		6.3	120	0.5	5
R-80-D-13	575.0	5521	Gulf	266	17	107	15	11	6.3	9.7		36.0	210	39	76
R-80-D-6	153.0	5522	Gulf	105	169	260	115	29	1.5	9.0		1.9	140	1	5
R-80-D-6	509.5	5523	Gulf	93	33	93	43	23	2.8	4.0		49.3	240	57	52
R-80-D-6	679.5	5524	Gulf	159	14	166	<10	19	11.9	8.7		19.4	130	17	9
R-80-D-8	452.5	5530	Gulf	58	40	321	115	22	8.0	14.6		7.5	77	1	5
R-80-D-8	370.5	5531	Gulf	73	69	303	78	16	4.4	18.9		7.1	120	0.5	4
R-80-D-8	168.5	5532	Gulf	160	45	153	23	22	3.4	7.0		5.0	240	0.5	6
R-80-D-7	378.0	5533	Gulf	28	36	226	90	11	6.3	20.5		4.5	190	0.5	4
R-80-D-7	256.5	5534	Gulf	77	30	300	101	20	10.0	15.0		7.5	89	0.5	5
R-80-D-10	293.5	5536	Gulf	66	65	267	144	28	4.1	9.5		6.1	130	2	6
R-80-D-10	312.0	5537	Gulf	74	40	267	150	21	6.7	12.7		5.6	11	2	4
R-80-D-4	268.0	5541	Gulf	84	13	94	30	18	7.2	5.2		1.3	230	2	6
R-80-D-4	346.5	5543	Gulf	127	24	84	<10	20	3.5	4.2		64.4	200	56	62
R-80-D-5	186.0	5546	Gulf	135	45	203	12	<10	4.5	>20		4.5	290	2	7
R-80-D-5	233.0	5547	Gulf	140	42	234	34	26	5.6	9.0		3.4	230	0.5	7
B.B.U. 4	348.1	5552	Black Bay	62	49	163	107	21	3.3	7.8		2.7	220	0.5	6
B.B.U. 5	74.1	5559	Black Bay	58	96	186	99	11	1.9	16.9		5.0	160	1	6
R-1	380.0	5560	Chance	75	57	260	69	<10	4.6	>26		8.3	130	1	4
S. Reid	outcrop	P62-89	D. Pyke	36	110	274	94	26	2.5	10.5		5.6	180	1	4
S. Reid	outcrop	P63-89	D. Pyke	36	137	263	11	24	1.9	11.0		4.7	110	3	7

* Companies: Gulf = Gulf Minerals, Black Bay = Black Bay Uranium, Chance = Chance Mining & Exploration, D. Pyke = sampled by D. Pyke.

Table 2. Chemical Composition of Volcanic Rocks in Reid Township & Vicinity (Pyke, 1989)

Hole	Depth (ft)	No.	Co.*	La ppm	Ce ppm	Nd ppm	Sm ppm	Eu ppm	(Gd) ppm	Tb ppm	Yb ppm	Lu ppm	Hf ppm	Th ppm	U ppm	Lan/Ybn
Reid Township																
R-80-C-7	227.5	5501	Gulf	65.0	140	68	14.9	0.9		3.0	10.9	1.68	10	7.1	1.4	4.02
R-80-C-7	303.8	5502	Gulf	60.7	131	62	14.6	1.1		2.9	10.1	1.50	9	6.4	1.7	4.05
R-80-C-7	402.5	5504	Gulf	51.1	118	49	10.6	0.6		2.1	9.5	1.45	9	6.1	1.3	3.62
R-80-C-7	476.5	5507	Gulf	84.1	190	82	18.7	1.0		3.1	11.1	1.65	18	13.0	3.2	5.10
R-80-C-7	480.0	5508	Gulf	47.1	107	46	12.5	1.4		2.3	7.5	1.13	8	6.8	1.2	4.23
R-80-C-5	244.0	5511	Gulf	55.9	181	65	17.8	3.1		4.0	15.7	2.46	21	4.2	1.2	2.40
R-80-C-5	299.5	5512	Gulf	34.2	110	57	18.6	1.6		4.4	20.4	3.02	12	7.6	2.4	1.13
R-80-C-5	451.0	5520	Gulf	69.6	164	65	16.8	1.5		3.1	13.4	1.98	12	7.8	1.3	3.50
R-80-D-13	575.0	5521	Gulf	17.1	37	16	4.0	1.5		0.3	3.0	0.45	4	1.3	0.7	3.84
R-80-D-6	153.0	5522	Gulf	88.1	193	83	19.5	2.6		3.5	19.4	2.96	10	8.9	2.0	3.06
R-80-D-6	509.5	5523	Gulf	9.3	28	15	4.1	1.2		0.7	4.4	0.71	2	0.3	0.3	1.42
R-80-D-6	679.5	5524	Gulf	20.6	44	21	4.9	1.3		0.3	3.8	0.55	5	1.1	0.3	3.65
R-80-D-8	452.5	5530	Gulf	70.3	150	64	13.6	1.3		2.0	6.1	0.97	12	9.8	2.1	7.76
R-80-D-8	370.5	5531	Gulf	63.6	122	54	11.8	1.6		1.5	9.2	1.42	10	8.1	2.0	4.66
R-80-D-8	168.5	5532	Gulf	41.9	90	36	8.2	1.9		0.6	5.8	0.90	6	5.0	1.2	4.87
R-80-D-7	378.0	5533	Gulf	52.0	111	55	9.8	1.5		1.3	6.7	1.07	9	7.1	1.7	5.23
R-80-D-7	256.5	5534	Gulf	57.5	118	47	11.4	1.8		1.4	4.3	0.68	12	9.2	3.0	9.01
R-80-D-10	293.5	5536	Gulf	44.3	103	40	9.4	1.1		1.9	9.8	1.56	10	8.4	1.6	3.04
R-80-D-10	312.0	5537	Gulf	45.5	101	44	8.6	1.2		1.5	7.3	1.18	9	7.3	1.4	4.20
R-80-D-4	268.0	5541	Gulf	10.8	29	9	1.8	0.2		0.3	1.3	0.23	3	1.7	0.9	5.59
R-80-D-4	346.5	5543	Gulf	7.4	19	13	3.3	0.9		0.6	3.4	0.51	2	0.6	0.3	1.47
R-80-D-5	186.0	5546	Gulf	41.1	91	35	7.7	1.3		1.4	7.2	1.11	6	5.4	1.7	3.84
R-80-D-5	233.0	5547	Gulf	47.2	96	38	8.7	1.2		1.3	5.0	0.84	8	6.3	1.6	6.36
B.B.U. 4	348.1	5552	Black Bay	56.8	128	58	12.4	0.7		2.2	7.1	1.00	8	6.9	0.5	5.39
B.B.U. 5	74.1	5559	Black Bay	63.4	147	63	14.7	1.1		3.1	12.9	1.98	10	7.3	1.2	3.31
R-1	380.0	5560	Chance	50.7	136	50	8.9	0.7		1.4	7.7	1.21	10	6.2	1.3	4.43
S. Reid	outcrop	P62-89	D. Pyke	72.6	164	69	16.6	1.4		3.2	13.6	2.07	11	7.6	2.5	3.60
S. Reid	outcrop	P63-89	D. Pyke	46.3	97	59	14.1	1.8		2.6	9.8	1.72	5	6.5	0.9	3.18

* Companies: Gulf = Gulf Minerals, Black Bay = Black Bay Uranium, Chance = Chance Mining & Exploration, D. Pyke = sampled by D. Pyke.

Table 2. Chemical Composition of Volcanic Rocks in Reid Township & Vicinity (Pyke, 1989)

Hole	Depth (ft)	No.	Co.*	SiO2 %	Al2O3 %	TiO2 %	Fe2O3 %	MnO %	CaO %	MgO %	K2O %	Na2O %	P2O5 %	LOI %	Sum %
Reid Township															
AE-R-90-3	49.0-50.5	8293	Agnico	74.71	11.56	0.10	2.36	0.08	2.08	0.34	3.18	2.90	0.04	2.05	99.40
AE-R-90-3	55.0-56.5	8297	Agnico	75.48	12.04	0.11	2.55	0.05	1.45	0.31	3.60	2.22	0.01	1.39	99.21
AE-R-90-3	61.0-62.5	8301	Agnico	74.88	12.37	0.11	2.38	0.04	0.99	0.36	3.06	2.92	0.01	1.51	98.63
AE-R-90-3	68.5-69.9	8172	Agnico	74.87	11.60	0.13	1.83	0.03	1.88	0.32	3.60	0.79	0.04	2.92	98.01
AE-R-90-3	75.7-77.0	8305	Agnico	71.28	12.92	0.26	3.32	0.06	1.93	0.30	4.78	2.38	0.06	1.38	98.67
AE-R-90-3	81.5-83.0	8309	Agnico	73.85	12.53	0.27	3.12	0.06	2.36	0.19	3.28	2.49	0.06	1.21	99.42
AE-R-90-5	127.3-129.8	8282	Agnico	70.89	12.79	0.34	2.89	0.06	2.19	1.17	2.66	2.90	0.06	3.24	99.19
AE-R-90-5	145.6-147.2	8285	Agnico	76.33	11.05	0.13	1.27	0.05	1.78	0.49	2.36	2.22	0.01	2.91	98.60
Thorburn Township															
LT-13	304.1	5553	Mespi	43.4	15.4	1.17	10.20	0.21	8.98	2.01	1.07	3.11	0.17	14.70	100.42
LT-13	401.0	5554	Mespi	68.7	13.0	0.49	5.13	0.15	2.00	1.41	2.14	1.14	0.13	6.08	100.37
LT-13	283.1	5555	Mespi	45.9	17.5	1.32	10.10	0.23	5.76	1.93	3.63	1.92	0.19	11.80	100.28
LT-11	425.0	5557	Mespi	51.1	15.3	0.74	8.09	0.09	4.24	5.15	1.11	3.55	0.13	9.70	99.20
LT-11	337.0	5558	Mespi	49.7	16.7	0.80	8.57	0.14	5.60	2.56	2.55	1.61	0.13	12.20	100.56
Mahaffey Township															
Mahaffey	outcrop	P77-89	D. Pyke	58.7	14.0	1.20	9.92	0.19	7.32	3.59	0.89	3.29	0.21	0.85	100.16
Mahaffey	outcrop	P88-89	D. Pyke	59.2	16.2	1.11	7.43	0.14	7.81	2.47	1.62	1.37	0.43	2.23	100.01
Mahaffey	outcrop	P93-89	D. Pyke	79.2	11.8	0.42	0.62	0.01	1.07	0.25	1.67	4.12	0.09	0.77	100.02
U.P. 3	unknown	5550	Un. Porc.	74.6	13.3	0.21	2.66	0.06	0.59	2.19	2.53	1.01	0.03	2.85	100.03
UR-80-5	405.1	5556	Utah/Ros.	85.4	7.05	0.11	0.84	0.01	0.67	0.31	0.62	3.52	0.02	1.31	99.86

* Companies: Agnico = Agnico-Eagle Mines, Mespi = Mespi Mines (Thorburn Twp), D. Pyke = sampled by D. Pyke, Un. Porc. = United Porcupine Mines, Utah/Ros. = Utah Mines / Rosario Resources.

Table 2. Chemical Composition of Volcanic Rocks in Reid Township & Vicinity (Pyke, 1989)

Hole	Depth (ft)	No.	Co.*	Sr ppm	Y ppm	Zr ppm	Rb ppm	Nb ppm	Zr/Y	Zr/Nb	Ba ppm	Sc ppm	Cr ppm	Co ppm	Ni ppm
Reid Township															
AE-R-90-3	49.0-50.5	8293	Agnico	78	114	196			1.7		707	2			
AE-R-90-3	55.0-56.5	8297	Agnico	93	117	187			1.6		741	1			
AE-R-90-3	61.0-62.5	8301	Agnico	90	113	205			1.8		599	1			
AE-R-90-3	68.5-69.9	8172	Agnico	49	97	194			2.0		377	2			
AE-R-90-3	75.7-77.0	8305	Agnico	122	77	326			4.2		660	6			
AE-R-90-3	81.5-83.0	8309	Agnico	125	87	418			4.8		737	6			
AE-R-90-5	127.3-129.8	8282	Agnico	89	41	223			5.4		254	6			
AE-R-90-5	145.6-147.2	8285	Agnico	56	55	230			4.2		427	3			
Thorburn Township															
LT-13	304.1	5553	Mespi	215	18	100	38	31	5.6	3.2		36.0	100	36	46
LT-13	401.0	5554	Mespi	184	33	195	61	13	5.9	15.0		17.6	110	15	16
LT-13	283.1	5555	Mespi	162	35	121	88	<10	3.5	>12		40.1	110	22	28
LT-11	425.0	5557	Mespi	163	<10	87	50	16	>8.7	5.4		29.4	170	36	89
LT-11	337.0	5558	Mespi	259	16	107	77	23	6.7	4.7		31.6	190	22	69
Mahaffey Township															
Mahaffey	outcrop	P77-89	D. Pyke	377	12	105	43	<10	8.8	>10		43.2	140	33	14
Mahaffey	outcrop	P88-89	D. Pyke	452	46	178	58	19	3.9	9.4		27.7	110	10	4
Mahaffey	outcrop	P93-89	D. Pyke	101	<10	250	62	23	>25	10.9		6.7	130	2	5
U.P. 3	unknown	5550	Un. Porc.	39	54	244	143	<10	4.5	>24		6.8	73	1	4
UR-80-5	405.1	5556	Utah/Ros.	77	25	148	29	<10	5.9	>15		3.0	270	2	7

* Companies: Agnico = Agnico-Eagle Mines, Mespi = Mespi Mines (Thorburn Twp), D. Pyke = sampled by D. Pyke, Un. Porc. = United Porcupine Mines, Utah/Ros. = Utah Mines / Rosario Resources.

Table 2. Chemical Composition of Volcanic Rocks in Reid Township & Vicinity (Pyke, 1989)

Hole	Depth (ft)	No.	Co.*	La ppm	Ce ppm	Nd ppm	Sm ppm	Eu ppm	(Gd) ppm	Tb ppm	Yb ppm	Lu ppm	Hf ppm	Th ppm	U ppm	Lan/Ybn
Reid Township																
AE-R-90-3	49.0-50.5	8293	Agnico													
AE-R-90-3	55.0-56.5	8297	Agnico													
AE-R-90-3	61.0-62.5	8301	Agnico													
AE-R-90-3	68.5-69.9	8172	Agnico													
AE-R-90-3	75.7-77.0	8305	Agnico													
AE-R-90-3	81.5-83.0	8309	Agnico													
AE-R-90-5	127.3-129.8	8282	Agnico													
AE-R-90-5	145.6-147.2	8285	Agnico													
Thorburn Township																
LT-13	304.1	5553	Mespi	16.4	38	16	4.4	1.1		0.5	3.1	0.47	3	0.7	0.3	3.56
LT-13	401.0	5554	Mespi	28.8	63	31	5.6	1.1		1.1	5.2	0.87	5	2.9	0.6	3.73
LT-13	283.1	5555	Mespi	17.0	45	21	4.7	1.2		0.8	3.3	0.50	4	1.4	0.5	3.47
LT-11	425.0	5557	Mespi	16.8	37	16	3.7	1.1		0.5	2.6	0.40	3	1.3	0.3	4.35
LT-11	337.0	5558	Mespi	12.8	36	16	3.5	0.6		0.3	2.4	0.36	3	1.4	0.3	3.59
Mahaffey Township																
Mahaffey	outcrop	P77-89	D. Pyke	18.0	43	20	4.6	1.4		0.9	2.7	0.38	2	1.7	0.5	4.49
Mahaffey	outcrop	P88-89	D. Pyke	40.7	83	40	8.8	2.1		0.7	4.2	0.67	5	3.4	0.9	6.53
Mahaffey	outcrop	P93-89	D. Pyke	27.0	53	24	4.5	0.9		0.3	2.6	0.48	6	4.1	1.3	6.99
U.P. 3	unknown	5550	Un. Porc.	61.6	138	54	11.0	1.5		2.0	8.1	1.25	11	8.7	2.3	5.12
UR-80-5	405.1	5556	Utah/Ros.	32.6	69	32	6.4	1.2		1.2	5.5	0.83	5	4.4	1.2	3.99

* Companies: Agnico = Agnico-Eagle Mines, Mespi = Mespi Mines (Thorburn Twp), D. Pyke = sampled by D. Pyke, Un. Porc. = United Porcupine Mines, Utah/Ros. = Utah Mines / Rosario Resources.

Table 3. Chemical Composition of Selected Volcanic Rocks Northwest of Reid Syndicate Claim Group (Falconbridge Data: Kirvanen option)

Hole	From (m)	To (m)	SiO2	Al2O3	TiO2	CaO	MgO	Na2O	K2O	Fe2O3	MnO	P2O5 *	LOI	Sum	Y	Zr	Zr/Y
MF12-02	41	44	49.40	15.0	0.90	6.85	4.41	2.01	1.84	10.20		0	8.50	99.30	30	90	3.0
MF12-02	56	59	72.70	12.8	0.23	1.50	1.36	0.43	3.91	2.69		0	4.00	99.70	70	290	4.1
MF12-02	91	94	70.50	13.1	0.28	1.74	0.89	1.60	3.85	2.83	0.08	0	3.80	98.70	70	300	4.3
MF12-02	101	104	73.30	12.0	0.19	1.80	0.75	2.23	3.11	2.37	0.06	0	3.40	99.20	70	290	4.1
MF12-02	131	134	73.50	12.4	0.16	1.98	0.75	3.71	2.37	1.38	0.07	0	3.20	99.60	60	270	4.5
MF12-02	140	143	71.60	13.0	0.18	2.16	1.07	0.15	4.43	2.80		0	4.60	100.00	70	300	4.3
MF12-02	158	161	71.60	12.3	0.16	2.81	0.96	1.83	2.95	1.81		0	4.80	99.20	60	270	4.5
MF12-02	176	179	50.00	14.4	1.09	6.87	2.82	1.42	2.41	8.93	0.16	0	10.30	98.70	20	130	6.5
MF12-02	215	218	71.80	11.9	0.17	3.56	0.72	0.65	2.56	2.28	0.08	0	5.40	99.10	60	260	4.3
MF12-02	226	229	70.70	11.2	0.15	3.62	1.69	0.66	2.35	2.58	0.08	0	6.70	99.80	60	240	4.0
MF12-02	257	260	69.20	12.2	0.19	3.51	0.55	1.25	2.86	3.64	0.10	0	5.20	98.70	60	270	4.5
MF12-02	284	287	73.00	11.7	0.16	2.40	0.84	0.36	3.07	2.85		0	4.70	99.10	70	240	3.4
MF12-02	313	316	71.70	11.6	0.16	1.76	1.17	0.40	2.60	5.06		0	4.70	99.20	70	250	3.6
MF12-02	335	338	70.80	12.0	0.16	1.57	1.39	0.53	2.76	4.72	0.14	0	5.40	99.50	50	300	6.0
MF12-02	346	349	71.70	11.4	0.15	0.66	1.44	0.40	2.65	5.49	0.16	0	5.00	99.10	60	270	4.5
MF12-02	371	374	68.00	10.2	0.14	0.21	2.77	0.45	1.75	10.30	0.17	0	6.50	100.50	70	270	3.9
MF12-02	380	383	70.10	11.0	0.16	0.09	1.79	0.68	2.20	8.11	0.16	0	5.50	99.80	40	260	6.5
MF12-02	388	391	73.60	11.1	0.15	0.17	1.52	0.41	2.57	5.52		0	4.80	99.80	60	260	4.3
MF12-02	425	428	71.70	11.7	0.22	2.09	2.57	0.48	2.67	2.93	0.08	0	5.20	99.60	60	270	4.5
MF12-02	452	455	71.70	12.5	0.18	2.48	2.02	0.36	3.02	2.10		0	5.50	99.90	60	270	4.5
MF12-02	458	461	71.50	12.8	0.17	2.59	2.13	0.36	2.96	2.40	0.11	0	4.90	100.10	73	244	3.3
MF12-02	473	476	71.10	12.5	0.17	3.25	1.72	0.45	3.01	2.37	0.12	0	5.50	100.30	76	230	3.0
MF12-02	508	511	74.10	13.5	0.18	1.63	0.88	0.67	2.92	2.43	0.06	0	3.30	99.80	86	287	3.3
MF12-02	538	541	72.80	12.5	0.16	2.87	0.87	0.79	3.09	2.24	0.07	0	4.50	100.10	84	260	3.1
MF12-02	568	571	71.50	14.5	0.21	0.32	2.44	0.33	3.61	3.04	0.14	0	4.10	100.30	77	302	3.9
MF12-02	598	601	76.10	12.1	0.19	0.16	1.78	0.41	2.50	3.89	0.07	0	2.80	100.10	61	251	4.1
MF12-02	628	631	68.80	15.9	0.23	0.16	2.44	0.67	2.99	5.30	0.06	0	3.40	100.10	72	348	4.8
MF12-02	658	661	75.50	12.7	0.20	0.13	2.76	0.46	2.31	3.53	0.05	0	2.50	100.30	69	257	3.7
MF12-02	688	691	73.30	12.7	0.20	0.91	2.57	0.28	2.64	3.69	0.18	0	3.70	100.30	70	280	4.0
MF12-02	708	711	72.20	12.0	0.14	2.20	3.12	0.27	2.66	2.42	0.08	0	5.00	100.20	126	234	1.9
MF12-02	733	736	48.60	16.1	1.19	6.02	4.96	0.37	3.33	8.02	0.27	0	10.50	99.60	41	75	1.8
MF12-02	763	767	44.90	12.7	0.93	8.78	4.98	3.14	0.44	10.70	0.31	0	13.10	100.10	30	53	1.8
MF12-02	793	796	47.20	14.6	1.14	4.74	7.34	3.52	0.06	11.00	0.26	0	9.50	99.50	13	56	4.3

* P2O5 not given in Falconbridge data set

Table 3. Chemical Composition of Selected Volcanic Rocks Northwest of Reid Syndicate Claim Group (Falconbridge Data: Kirvanen option)

Hole	From (m)	To (m)	Ba	Rb	Sr	Nb	Cu	Zn	Ni	Co	Pb	S	V	As	Sb	Hf
MF12-02	41	44	240	60	130	20										
MF12-02	56	59	320	130	30	10										
MF12-02	91	94	330	140	80	40										
MF12-02	101	104	260	110	60	20										
MF12-02	131	134	310	100	70	20										
MF12-02	140	143	460	180	60	20										
MF12-02	158	161	370	90	70	30										
MF12-02	176	179	290	120	60	10										
MF12-02	215	218	340	120	60	10										
MF12-02	226	229	360	110	80	20										
MF12-02	257	260	610	100	60	20										
MF12-02	284	287	730	100	10	10										
MF12-02	313	316	1050	80	20	10										
MF12-02	335	338	1040	80	20	20										
MF12-02	346	349	1030	80	10	20										
MF12-02	371	374	600	70		40										
MF12-02	380	383	690	70		30										
MF12-02	388	391	680	100	10	20										
MF12-02	425	428	380	110	50	10										
MF12-02	452	455	560	120	30	20										
MF12-02	458	461	612			28		159								
MF12-02	473	476	765			30		36								
MF12-02	508	511	587			18		84								
MF12-02	538	541	578			12		44								
MF12-02	568	571	638			13	17	555								
MF12-02	598	601	755			17	61	431								
MF12-02	628	631	967			30	116	136								
MF12-02	658	661	725			19	29	173								
MF12-02	688	691	494			28	49	672								
MF12-02	708	711	289			32		105								
MF12-02	733	736	566			16	40	134	71							
MF12-02	763	767	96			16	66	85	82							
MF12-02	793	796	93			22	89	113	115							

Other elements in ppm: In <1, Ga mainly <10, Be <5, Cd mainly <1, Bi mainly <0.5, Ta <1.0, W <3.0, Mo <2.0, Ag <0.5, Sn <10. Au mainly < 1 ppb.

Table 3. Chemical Composition of Selected Volcanic Rocks Northwest of Reid Syndicate Claim Group (Falconbridge Data: Kirvanen option)

Hole	From (m)	To (m)	Th	U	B	Li	Cs	La	Ce	Nd	Sm	Eu	Gd	Dy	Er	Lu
MF12-02	41	44														
MF12-02	56	59														
MF12-02	91	94														
MF12-02	101	104														
MF12-02	131	134														
MF12-02	140	143														
MF12-02	158	161														
MF12-02	176	179														
MF12-02	215	218														
MF12-02	226	229														
MF12-02	257	260														
MF12-02	284	287														
MF12-02	313	316														
MF12-02	335	338														
MF12-02	346	349														
MF12-02	371	374														
MF12-02	380	383														
MF12-02	388	391														
MF12-02	425	428														
MF12-02	452	455														
MF12-02	458	461														
MF12-02	473	476														
MF12-02	508	511														
MF12-02	538	541														
MF12-02	568	571														
MF12-02	598	601														
MF12-02	628	631														
MF12-02	658	661														
MF12-02	688	691														
MF12-02	708	711														
MF12-02	733	736														
MF12-02	763	767														
MF12-02	793	796														

Other elements in ppm: In <1, Ga mainly <10, Be <5, Cd mainly <1, Bi mainly <0.5, Ta <1.0, W <3.0, Mo <2.0, Ag <0.5, Sn <10. Au mainly < 1 ppb.

Table 3. Chemical Composition of Selected Volcanic Rocks Northwest of Reid Syndicate Claim Group (Falconbridge Data: Kirvanen option)

Hole	From (m)	To (m)	SiO2	Al2O3	TiO2	CaO	MgO	Na2O	K2O	Fe2O3	MnO	P2O5 *	LOI	Sum	Y	Zr	Zr/Y
MF12-03	33	36	75.70	12.3	0.14	0.94	0.67	0.13	5.17	1.73	0.02	0	2.90	99.80	61	250	4.1
MF12-03	73	76	73.20	12.4	0.14	1.73	0.84	1.23	4.83	1.87	0.06	0	3.50	99.90	72	253	3.5
MF12-03	108	111	78.40	11.4	0.14	0.66	0.42	2.76	2.32	1.65	0.04	0	2.30	100.20	51	246	4.8
MF12-03	143	146	61.70	13.3	0.73	6.98	0.69	0.27	3.93	4.60	0.16	0	7.90	100.60	39	180	4.6
MF12-03	156	159	63.70	14.2	0.54	3.70	0.87	0.40	3.95	5.88	0.12	0	4.70	98.30	41	223	5.4
MF12-03	163	166	68.60	13.2	0.17	3.45	1.05	0.37	3.77	3.04	0.08	0	6.40	100.30	70	253	3.6
MF12-03	198	201	50.10	16.3	1.09	5.70	3.71	3.69	2.07	7.35	0.16	0	9.80	100.30	20	110	5.5
MF12-03	248	251	58.90	13.3	0.80	6.05	1.60	1.56	1.64	5.93	0.17	0	9.80	100.10	33	189	5.7
MF12-03	298	301	66.90	12.1	0.55	4.73	0.81	1.15	1.98	4.23	0.11	0	6.20	99.10	16	164	10.2
MF12-03	348	351	74.00	10.7	0.14	3.48	0.55	0.68	2.37	2.68	0.06	0	4.40	99.10	55	212	3.9
MF12-03	371	374	58.10	11.1	0.70	7.32	1.82	0.65	2.00	8.45	0.28	0	9.80	100.50	24	162	6.8
MF12-03	398	401	53.90	15.4	0.97	5.23	3.15	5.52	0.76	7.76	0.14	0	6.80	99.90	34	97	2.9
MF12-03	418	421	45.00	16.6	1.18	5.78	4.28	3.46	1.87	11.30	0.20	0	10.20	100.20	37	138	3.7
MF12-03	448	451	53.80	15.8	1.05	5.79	3.16	6.16	0.26	7.10	0.16	0	6.00	99.50	31	84	2.7
MF12-03	498	501	49.10	15.6	0.95	7.68	3.40	1.74	1.66	7.97	0.12	0	11.80	100.30	28	106	3.8
MF12-03	554	557	45.80	13.5	0.80	9.23	1.61	2.45	1.40	11.74	0.12	0.16	5.90	92.80	20	80	4.0
MF12-03	563	566	45.80	13.2	0.82	10.85	1.24	1.44	1.84	11.35	0.15	0.12	5.80	92.60	18	80	4.4
MF12-03	573.3	576	70.60	13.2	0.23	3.52	0.72	0.56	3.36	3.11	0.07		5.10	100.40	54	280	5.2
MF12-03	581	584	67.80	11.7	0.19	4.28	1.25	0.45	3.06	3.59	0.12		7.50	100.00	60	240	4.0
MF12-03	611	614	71.60	12.4	0.22	2.36	0.62	1.88	2.78	3.59	0.06		3.70	99.10	52	250	4.8
MF12-03	629	631	71.80	11.6	0.18	2.54	1.67	1.45	2.72	4.34	0.06	0.06	4.10	100.50	64	220	3.4
MF12-03	638	641	71.00	11.1	0.14	2.75	1.82	0.37	3.12	2.33	0.06		5.60	98.20	50	220	4.4
MF12-03	668	671	73.00	11.8	0.14	1.74	2.86	0.40	2.98	1.92	0.04	0.04	5.20	100.10	56	300	5.4
MF12-03	686	689	72.60	12.3	0.17	0.66	2.13	0.43	2.98	4.09	0.08	0.06	4.70	100.20	54	260	4.8
MF12-03	708.1	711.1	26.60	14.3	0.19	7.60	9.40	0.20	1.06	19.88	0.42	0.08	18.10	97.80	56	280	5.0
MF12-03	728	731	73.40	12.2	0.21	0.75	2.55	0.43	2.48	2.78	0.03	0.06	3.40	98.30	50	250	5.0
MF12-03	743	746	74.50	11.9	0.14	1.02	3.35	0.37	2.66	2.79	0.06	0.08	3.50	100.40	80	230	2.9
MF12-03	788	791	49.80	13.0	1.09	4.46	9.68	0.34	1.14	13.67	0.13	0.2	5.90	99.40	28	90	3.2
MF12-03	803	806	46.10	13.0	1.18	6.43	7.39	0.18	1.90	10.15	0.21	0.12	12.10	98.70	28	100	3.6
MF12-07	58	61	73.80	11.2	0.14	0.55	0.25	0.61	6.53	3.08	0.08	0	2.40	98.80	57	221	3.9
MF12-07	108	111	72.80	11.5	0.17	0.29	1.56	0.01	4.21	4.11	0.09	0	4.30	99.20	30	250	8.3
MF12-07	128	131	76.50	11.9	0.15	1.02	0.18	0.52	5.47	1.02	0.03	0	2.20	99.10	45	218	4.8
MF12-07	178	181	70.70	14.7	0.66	0.86	0.67	2.34	3.75	2.33	0.03	0	2.80	99.00	50	203	4.1

* P2O5 not given in Falconbridge data set

Table 3. Chemical Composition of Selected Volcanic Rocks Northwest of Reid Syndicate Claim Group (Falconbridge Data: Kirvanen option)

Hole	From (m)	To (m)	SiO2	Al2O3	TiO2	CaO	MgO	Na2O	K2O	Fe2O3	MnO	P2O5 *	LOI	Sum	Y	Zr	Zr/Y
MF12-07	238	241	52.90	15.3	1.07	5.30	2.35	1.47	3.29	8.35	0.16	0	9.30	99.80		98	INF
MF12-07	298	301	75.50	11.4	0.16	0.91	0.48	2.59	3.45	1.97	0.04	0	2.10	98.70	58	220	3.8
MF12-07	358	361	73.80	12.0	0.14	1.46	0.38	3.58	2.67	2.45	0.05	0	2.20	98.80	70	244	3.5
MF12-07	398	401	45.50	16.2	0.94	10.40	3.14	0.97	1.91	9.03	0.19	0	11.20	99.70	27	136	5.0
MF12-07	458	461	54.20	15.9	0.84	3.58	3.83	4.83	0.59	7.78	0.11	0	7.00	98.90	26	150	5.8
MF12-07	538	541	51.90	15.9	0.83	6.35	3.43	1.89	1.08	8.33	0.09	0	10.40	100.40	20	143	7.2
MF12-07	568	571	53.90	13.8	0.72	7.38	3.06	1.99	0.77	6.48	0.11	0	12.10	100.50	13	130	10.0
MF12-07	603	606	52.30	14.1	0.70	8.83	2.68	2.66	0.81	5.58	0.11	0	12.60	100.60	25	126	5.0
MF12-07	618	621	56.90	14.6	0.68	6.75	2.36	2.79	0.95	4.56	0.10	0	10.60	100.50		117	INF
MF12-07	648	651	50.10	13.3	0.84	7.05	2.78	1.55	1.40	10.90	0.13	0	10.20	98.50	10	78	7.8
MF12-07	661	664	71.20	12.6	0.20	3.60	0.79	0.56	2.95	2.85	0.07	0	4.90	99.90	69	254	3.7
MF12-07	678	681	71.10	13.1	0.21	3.16	0.77	0.47	3.26	2.78	0.07	0	4.90	100.00	63	265	4.2
MF12-07	708	711	70.40	12.5	0.19	3.50	0.84	0.35	3.34	3.14	0.11	0	5.50	100.00	68	270	4.0
MF12-07	738	741	72.10	12.2	0.20	2.22	1.84	0.22	3.49	2.96	0.09	0	4.60	100.00	58	260	4.5
MF12-07	768	771	73.70	11.7	0.17	1.43	1.87	0.67	3.60	2.20	0.05	0	4.60	100.10	55	244	4.4
MF12-07	798	801	70.10	13.0	0.20	2.61	2.08	0.13	4.42	2.23	0.09	0	5.50	100.50	78	260	3.3
MF12-07	826	829	71.20	11.8	0.18	1.69	2.20	0.08	4.08	3.23	0.09	0	5.40	100.10	59	263	4.5
MF12-09	28	31	73.60	10.7	0.14	0.71	1.55	0.21	2.73	4.98	0.24	0	4.60	99.60	59	232	3.9
MF12-09	38	41	66.30	10.7	0.15	4.86	2.40	0.22	2.91	3.59	0.19	0	8.80	100.20	69	229	3.3
MF12-09	68	71	72.70	10.6	0.13	3.05	1.95	0.24	2.75	2.16	0.10	0	6.20	99.90	52	211	4.1
MF12-09	98	101	72.30	10.7	0.16	1.23	2.71	0.24	2.90	3.07	0.08	0	6.30	99.80	53	221	4.2
MF12-09	138	141	73.60	12.5	0.18	0.68	1.50	0.24	3.61	2.64	0.04	0	4.30	99.40	61	274	4.5
MF12-09	178	181	67.50	11.7	0.17	2.65	2.51	1.36	2.97	3.53	0.10	0	7.40	100.00	75	243	3.2
MF12-09	228	231	71.80	10.5	0.15	1.60	3.07	0.24	2.80	3.36	0.14	0	6.20	100.00	81	215	2.7
MF12-09	258	261	42.40	13.0	1.12	8.31	5.48	0.86	1.80	11.90	0.23	0	15.10	100.40	41	54	1.3 -
MF12-09	298	301	45.00	13.6	1.15	8.26	6.30	2.82	0.09	11.40	0.27	0	11.40	100.40	31	64	2.1 -
MF12-09	358	361	51.00	14.5	1.27	5.99	5.93	3.84	0.04	9.40	0.24	0	5.80	98.20	21	80	3.8 -
MF12-09	418	421	53.30	15.6	1.38	4.96	5.99	4.00	0.03	9.07	0.22	0	5.50	100.20	35	88	2.5 -
MF12-09	483	486	46.20	12.8	1.07	8.74	6.03	2.67	0.05	10.90	0.23	0	11.20	100.00	15	53	3.5 -

* P2O5 not given in Falconbridge data set

Table 3. Chemical Composition of Selected Volcanic Rocks Northwest of Reid Syndicate Claim Group
(Falconbridge Data: Kirvanen option)

Hole	From (m)	To (m)	Th	U	B	Li	Cs	La	Ce	Nd	Sm	Eu	Gd	Dy	Er	Lu
MF12-07	238	241	1		30		3	16	35	22.4	4.3	1.4	3.3	2.3	1.4	0.3
MF12-07	298	301	6	1.3	20		4	39	80	43.2	7.7	1.3	6.2	5.2	3.7	0.7
MF12-07	358	361	6	1.5	10		9	41	87	45.2	8.1	1.4	6.1	4.2	2.8	0.8
MF12-07	398	401	2		60	20	3	17	34	19.5	4.3	1.3	3.2	2.4	1.4	0.3
MF12-07	458	461	2	0.5	20	10	1	15	29	16.6	3.2	1.0	2.2	1.6	1.0	0.3
MF12-07	538	541														
MF12-07	568	571														
MF12-07	603	606														
MF12-07	618	621														
MF12-07	648	651														
MF12-07	661	664														
MF12-07	678	681														
MF12-07	708	711														
MF12-07	738	741														
MF12-07	768	771														
MF12-07	798	801														
MF12-07	826	829														
MF12-09	28	31	5	1.5	40		3	36	77	42.8	8.2	1.0	5.3	3.7	2.8	0.8
MF12-09	38	41	5	1.4	40		3	34	72	41.2	7.5	1.4	5.2	3.8	2.9	0.7
MF12-09	68	71	5	1.1	80		3	33	72	37.6	7.0	1.1	5.1	3.2	2.3	0.6
MF12-09	98	101	5	1.2	50		3	31	68	36.8	6.5	1.1	4.5	3.0	2.3	0.6
MF12-09	138	141	6	1.5	60		4	39	81	44.8	7.8	1.5	6.1	3.4	2.6	0.7
MF12-09	178	181	5	1.3	60		3	32	69	39.2	7.3	1.5	5.4	3.6	2.6	0.7
MF12-09	228	231	12	3.2	70		4	34	69	38.2	7.0	1.4	4.8	2.9	2.2	0.6
MF12-09	258	261	2	0.6	50		2	7	15	11.4	2.5	0.8	1.7	1.2	1.0	0.2
MF12-09	298	301	1		10	20		6	14	10.8	2.7	0.9	2.4	1.4	0.7	0.2
MF12-09	358	361	1	0.6	20			7	15	11.3	2.7	1.0	3.9	3.9	2.5	0.3
MF12-09	418	421	2	0.6				7	14	10.9	3.0	1.2	4.5	4.7	2.9	0.4
MF12-09	483	486	1		20			6	12	9.5	2.4	0.9	2.6	1.8	0.7	0.2

Other elements in ppm: In <1, Ga mainly <10, Be <5, Cd mainly <1, Bi mainly <0.5, Ta <1.0, W <3.0, Mo <2.0, Ag <0.5, Sn <10. Au mainly < 1 ppb.

Table 3. Chemical Composition of Selected Volcanic Rocks Northwest of Reid Syndicate Claim Group (Falconbridge Data: Kirvanen option)

Hole	From (m)	To (m)	Ba	Rb	Sr	Nb	Cu	Zn	Ni	Co	Pb	S	V	As	Sb	Hf
MF12-07	238	241	210	87	95	22	68	150	52	34			210	10		3
MF12-07	298	301	373	103	60	0	7	76	7	1	6			8	0.2	7
MF12-07	358	361	431	99	136	24	14	87	5						0.2	8
MF12-07	398	401	258	55	144	14	49	92	72	33		180	200	8	0.3	4
MF12-07	458	461	270	44	98	0	76	100	65	25			180		0.4	4
MF12-07	538	541	261			20	63	160	159							
MF12-07	568	571	252			21	45	84	97							
MF12-07	603	606	238			11	21	79	84							
MF12-07	618	621	291			21	22	68	54							
MF12-07	648	651	282			14	13	132	82							
MF12-07	661	664	386			18		78	11							
MF12-07	678	681	450			19		100	11							
MF12-07	708	711	277			13		88								
MF12-07	738	741	354			17		102								
MF12-07	768	771	466			18		90								
MF12-07	798	801	607			23		74								
MF12-07	826	829	640			19		120								
MF12-09	28	31	510	76		24	120	1700	4		12	1200		25	0.4	7
MF12-09	38	41	362	83	19	13	18	290	7	2	24			9	0.3	7
MF12-09	68	71	343	83	21	18	15	89	6	1	12	460		8	0.2	6
MF12-09	98	101	325	92		17	15	140	5	1	10			6	0.2	7
MF12-09	138	141	483	124	17	20	17	80	5	1	14	1900		19	0.6	8
MF12-09	178	181	485	111	59	17	18	130	5	2	12			9	0.2	7
MF12-09	228	231	306	98	21	17	23	150	5	3	6			8	0.3	12
MF12-09	258	261	212	38	91	13	91	110	49	96			310	68	0.4	4
MF12-09	298	301	34		78	0	96	110	53	83			350	22	0.2	3
MF12-09	358	361	49		58	0	94	110	82	128		3260	330	4	0.4	3
MF12-09	418	421	24	15	67	14	110	130	86	129			350	53	0.5	3
MF12-09	483	486	41	18	66	22	64	95	46	114		280	290	14	0.5	2

Other elements in ppm: In <1, Ga mainly <10, Be <5, Cd mainly <1, Bi mainly <0.5, Ta <1.0, W <3.0, Mo <2.0, Ag <0.5, Sn <10. Au mainly < 1 ppb.