Technical Report WF/89/3

MRP Report 100

Molybdenum mineralisation near Chapel of Garioch, Inverurie, Aberdeenshire

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BRITISH GEOLOGICAL SURVEY

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Mineral Resources Series

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A report prepared for the Department of Trade and Industry

Bibliographical reference

Colman, T B, Beer, K E, Cameron, D G, and Kimbell, G S. 1989. Molybdenum mineralisation near Chapel of Garioch, Inverurie, Aberdeenshire. Mineral Reconnaissance Programme Report 100. *British Gelogical Survey Technical Report* WF/89/3.

Mineral Reconnaissance Programme Report 100

Keyworth, Nottingham 1989

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This report relates to work carried out by the British Geological Survey on behalf of the Department of Trade and Industry. The information contained herein must not be published without reference to the Director, British Geological Survey.

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SUMMARY

Molybdenum and tungsten mineralisation hosted in quartz veins is spatially associated with the Middleton Granite, a small stock apparently rooted in the buried roof of the large Bennachie pluton. The granite is emplaced in Dalradian schist. The veins are usually encased within granite which is intensely sericitised (greisenised?); the alteration and mineralisation are believed to be coeval.

Exposure is poor and wall boulders were used for prospecting. Power augering was employed to obtain base of drift samples over those parts of the suspected mineralised area which were readily accessible. Further samples were taken from a gas pipeline trench being dug across part of the area. All samples were analysed by X-ray fluorescence spectrometry (XRF) for a range of trace elements, including tungsten, molybdenum and the main base metals.

Geophysical surveys were used to define the granite stock, an epidiorite body (a sill?) which caps the hill and a late (Tertiary?) E-W basic dyke.

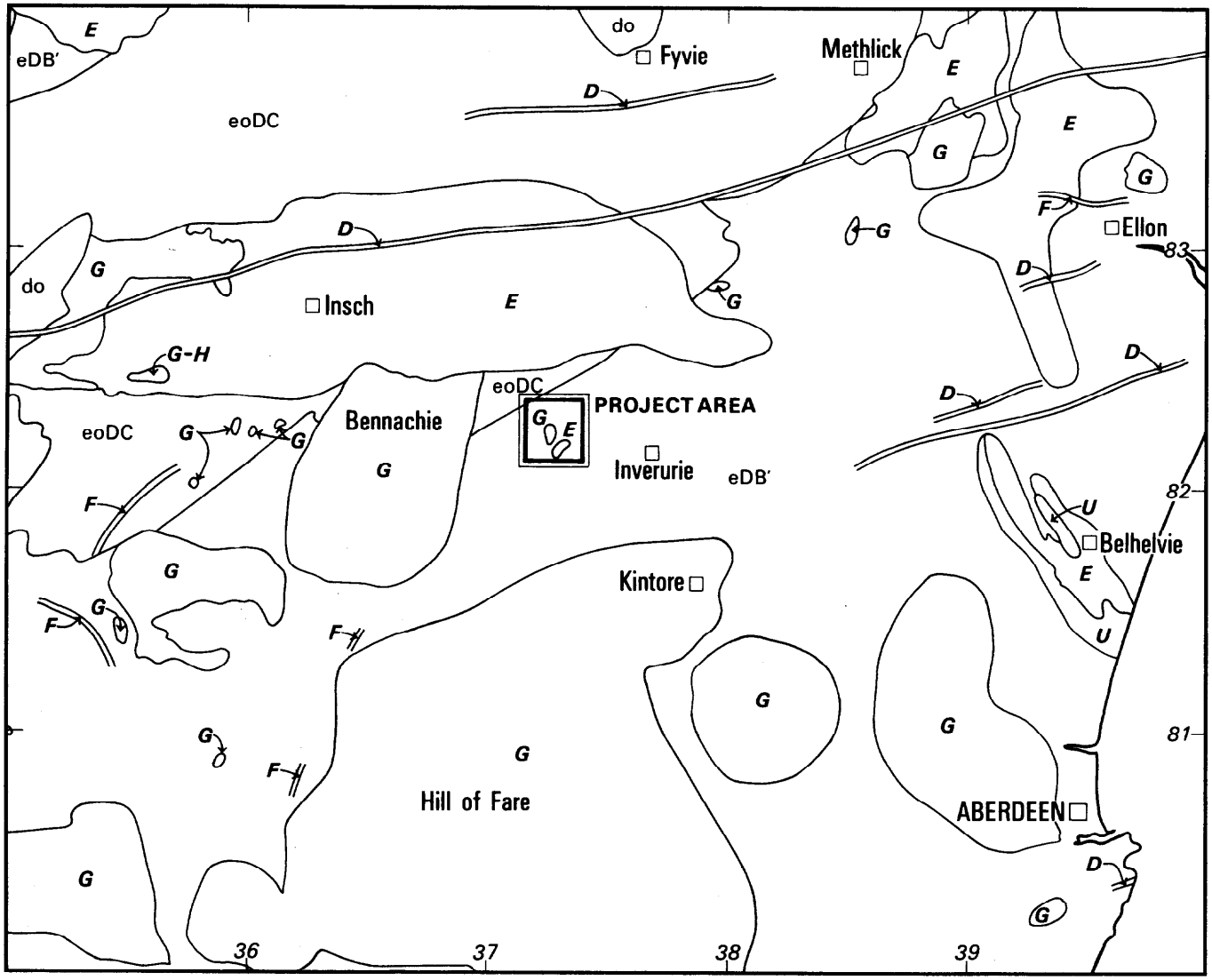
In an attempt to examine the distribution of mineral veining, four short inclined boreholes were drilled in the Dalradian schists to the east of the granite stock and three into the granite itself. A total of 334m were drilled with about 70% recovery. Six holes were sampled for XRF analysis. The drilling intersected minor quartz-molybdenite mineralisation in both schist and granite.

INTRODUCTION

Molybdenite was first recorded from this area by Heddle (1901) in his "Mineralogy of Scotland", the locality being defined as Middleton of Balquhain. This farm, now named only as Middleton, lies at National Grid Reference NJ 7388.2231 and is some 3km south-east of the village of Chapel of Garioch and 5km west of Inverurie (Fig. 1). Care is needed when seeking this location as there are two properties named as Middleton on the Ordnance Survey maps, these separated by only 850m, together with an Upper Middleton NJ 7293.2195; all three adjoin each other.

The land tends to rise gently in a series of undulations from the Rivers Don and Urie, at Inverurie, to the foot of Bennachie hill, and around Chapel of Garioch lies at about 155m OD. The mineralised area is drained by a few narrow, generally sluggish streams most of which have been diverted and straightened for agricultural convenience. A good network of rather narrow minor roads connects to the main road and railhead at Inverurie for routes southwards via Aberdeen.

Those farms of immediate mineral interest are owner occupied and it appears that their mineral titles have not been



SEDIMENTARY

do	Old Red Sandstone	Devonian

IGNEOUS

F	Fine-grained	Acid
G	Coarse-grained	
H	Coarse-grained	Intermediate
D	Fine-grained	Basic
E	Coarse-grained	
U		Ultrabasic

METAMORPHIC

eoDC		Southern Highland (Upper Dalradian)
eDB'	Tayvallich/ Crinan	Argyll (Middle Dalradian)

Figure 1 Location map.

separated from the land. In recent years several field hedges have been removed to permit increased mechanisation of agriculture and some of the farmsteads in the region, Upper Middleton for instance, are no longer inhabited. Above the Middletons the conifer plantation around Knockinglews NJ 7335.2182 is maintained by the Forestry Commission. A high tension electricity grid line passes NNW-SSE across the eastern end of this plantation and the fields to the north.

NATURE OF THE MINERALISATION

Heddle (1901) records his molybdenite as being in Dalradian schists and most probably from the quarry NJ 7340.2245 close to Middleton. Careful search here and farther east at Dubston quarry NJ 7494.2200 revealed only rare flakes of molybdenite on joint surfaces and no mineralisation within the quartz-schists. Similar occurrences of trace quantities of molybdenite have been identified throughout a wider area, nearly always in metamorphic schists close to the granite margins and only rarely in the granites themselves.

It appears that Heddle did not know about the quartz-molybdenite veining which is seen as large stones in the field hedges and smaller fragments in field brash, particularly on the slopes above Middleton. From this material it can be readily deduced that the sulphide ore occurs most commonly at the margins of pure white quartz veins which are usually devoid of minerals other than very small amounts of fine white mica (sericite) and fine-grained pyrite. Some specimens show fractures with irregular coatings of a yellow secondary mineral which proved to be an iron-rich form of molybdite. Some clusters of molybdenite rosettes are particularly large and in spectacular examples the individual plates may attain sizes of 10mm diameter. Two other types of vein quartz are found in close assocation: one is well banded, the bands marked by slight variations in either texture or colour (sometimes both), the other is distinctly ferruginous and often displays a box-work structure. Neither of these carries any molybdenite.

Where both contacts are visible in wall boulders the mineralised quartz veins are most commonly about 10 to 20cm wide, but this may merely reflect the size of fragment utilised for walls. One outstanding example was at least a metre wide!

The vein walls are always of granite and this is intensely sericitised. A thin selvage of white sericite, its flakes usually arranged normal to the vein margin, separates the granite from quartz vein. In some specimens the alteration becomes less intense away from the vein contact and then the granite is seen to be medium-grained and equigranular. Rarely the sulphide mineralisation extends into the wall rocks and then is seen as a dark smudge of fine-grained molybdenite, usually with pyrite. A small quarry in greisened granite near Upper Middleton at NJ 7296.2202, now almost filled with rubbish, shows abundant small bunches of molybdenite on its west side. The mineralised localities are shown in Fig 2.

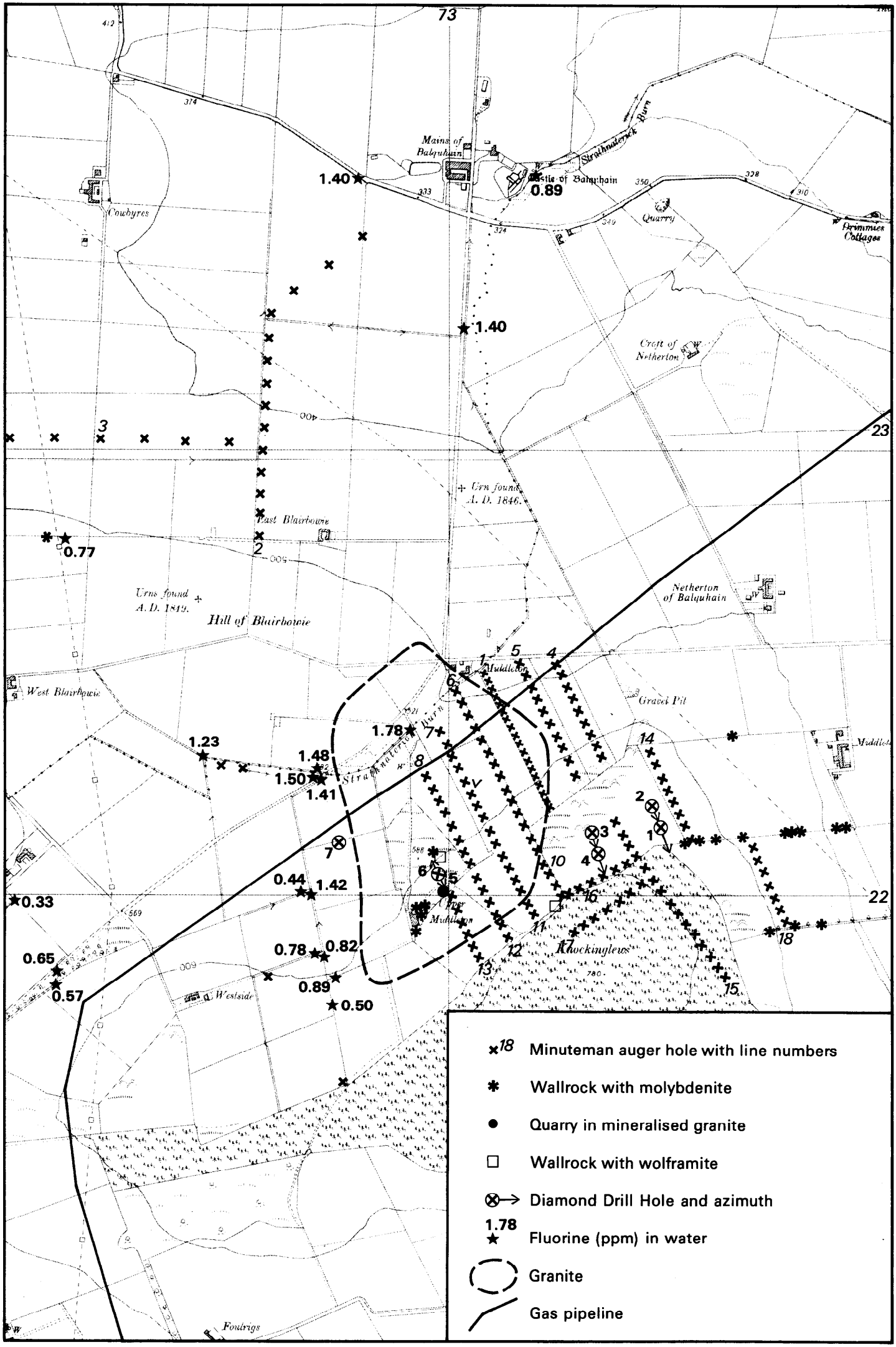


Figure 2 Mineralisation, soil sampling and drill hole locations in Chapel of Garioch.

Only one quartz-molybdenite vein is seen in outcrop, and that is a very small and rather unsatisfactory exposure. The vein appears to have a N-S strike and to be almost vertical; it is about 12cm wide and from its location is presumed to be emplaced in granite, though the wall rocks are not preserved.

Small diggings on outcrops along the northern edge of the Knockinglews Plantation yielded a specimen of vein quartz with a crystal of slightly iron-stained flesh coloured beryl and another of white vein quartz with one blade of wolframite which is partly pseudomorphed by iron oxide. This is the only specimen of iron tungstate seen in this area, all the other occurrences of tungsten relate to scheelite. The latter mineral was found, sometimes abundantly, in vein quartz material from the gas pipeline trench being excavated parallel to, and some 70m south-east of, the track between Middleton NJ 7304.2249 and Mill of Braco NJ 7130.2154 (Fig. 2). The attitude of these veins is not known; from the limited evidence available they would seem to be small structures.

Nowhere are the tungsten and molybdenum minerals seen in juxtaposition or in the same structure and, in consequence, their mutual relationship is uncertain. But, it seems improbable that there are two high-temperature mineralisation phases of markedly different age represented here. Deposition of scheelite may have been controlled by the proximity of slightly calcic granite.

SURFACE GEOCHEMISTRY

In the late 1960's Exploration Ventures Ltd (EVL), at that time prospecting for copper and nickel over much of the Grampian Region, investigated several occurrences of anomalous levels of molybdenum in soils noted in the Soil Survey Memoir 'Soils around Aberdeen, Inverurie and Fraserburgh' (Glentworth and Muir, 1963). Follow up work by EVL located molybdenite bearing vein quartz float at Middleton, Balquinhadachy, Souter Head and Quilquox. Molybdenite mineralisation was also found at Kinmundy in joints and 'quartz mica' (?greisen) filled fractures in granite float and at Cushnie in 'granite crush rock'. A molybdenum soil anomaly was found at Rathen. These localities are shown on Fig 3.

Broadly spaced regional soil traverses by EVL confirmed a widespread scatter of molybdenum in areas marginal to the Bennachie and Hill of Fare granites. EVL later collected closely spaced samples from an area south-east of Upper Middleton farm buildings and undertook limited trenching through the richest locations. Results were disappointing, the only molybdenum mineral found was a single specimen of powellite, a secondary calcium molybdate. Additional shallow soil sampling located anomalous molybdenum, with up to 300ppm Mo, in a flat area to the south of Mains of Balquahain.

All the anomalies in the Middleton area were ascribed to hydromorphic concentrations of molybdenum from an unknown, but probably weakly mineralised source. Further details of these

occurrences and the exploration carried out over them can be found in the relevant Open File reports of The Mineral Exploration and Investment Grants Act 1972 which are held in the National Geoscience Data Centre Archives of BGS at Keyworth and Edinburgh. Copies may also be inspected at the BGS Information Point in London. The reports are Strichen - Crimond AE13, Alford AE16, Kemnay AE17 and Balquinhadachy AE36. The Kemnay data also contains a separate report entitled 'A report on exploration for molybdenum in Aberdeenshire'.

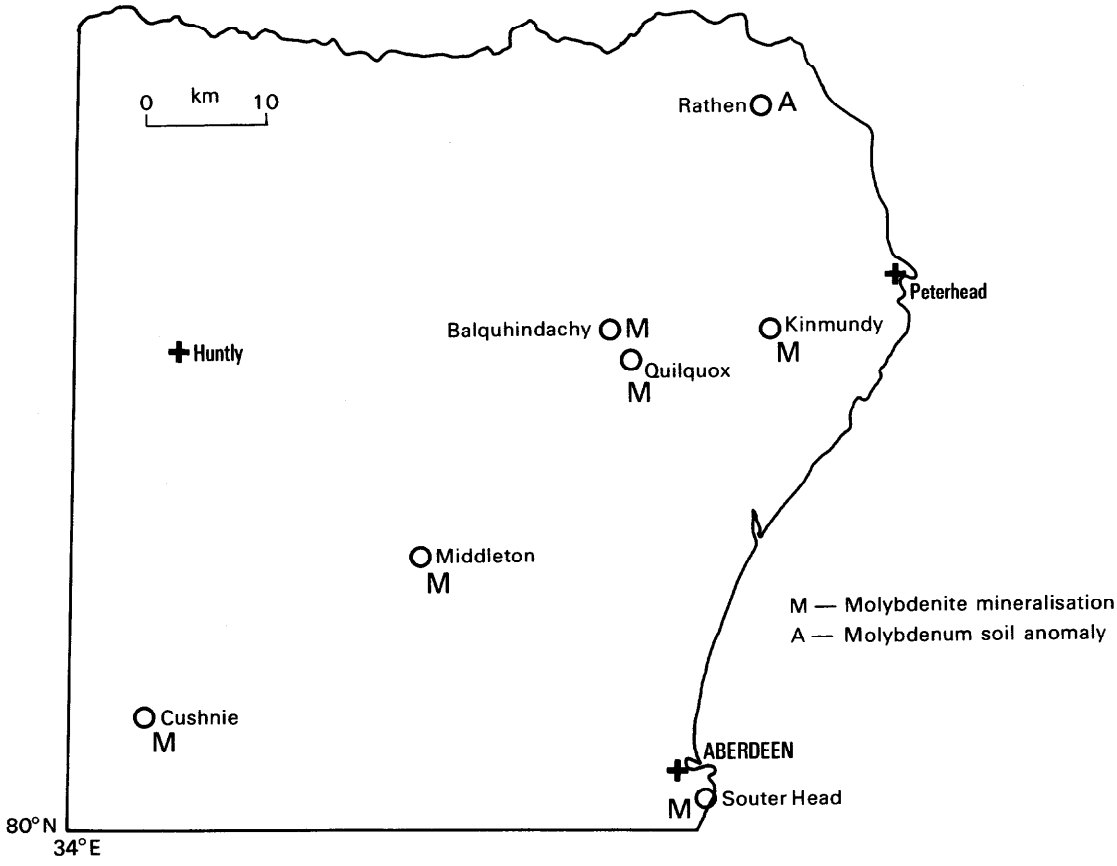


Figure 3 Molybdenum mineralisation in Grampian Region.

Stream sediment multi-element geochemistry over the Moray-Buchan 1:250000 mapsheet, part of the Geochemical Survey Programme (GSP) carried out on behalf of the Department of Trade and Industry by the British Geological Survey, identified anomalous molybdenum values at various scattered locations in Grampian including a single site in the Chapel of Garioch area in the Strathnaterick Burn.

The current survey used a Minuteman auger drill to collect overburden samples from two main areas. The first was over the anomalous EVL area to the south of the Mains of Balquhain. Molybdenum was determined by rapid field analysis using the method of Peachey and others (1985). Subsamples were carefully washed and gently panned to look for flakes of molybdenite; none was found. The rapid Mo analysis, and later XRF analysis for Mo and other elements, showed that most of the samples

contained only small amounts of Mo, the contents tending to decrease with depth. This is demonstrated by Line 2 (Fig. 4) which extends south from the Mains of Balquhain. It is probably caused by secondary Mo carried in or on hydrated iron oxides, or in organic matter. Thus the stream sediment Mo values are indicative only of hydromorphic distribution, and provide little evidence as to the primary source, except that it should be at some higher altitude.

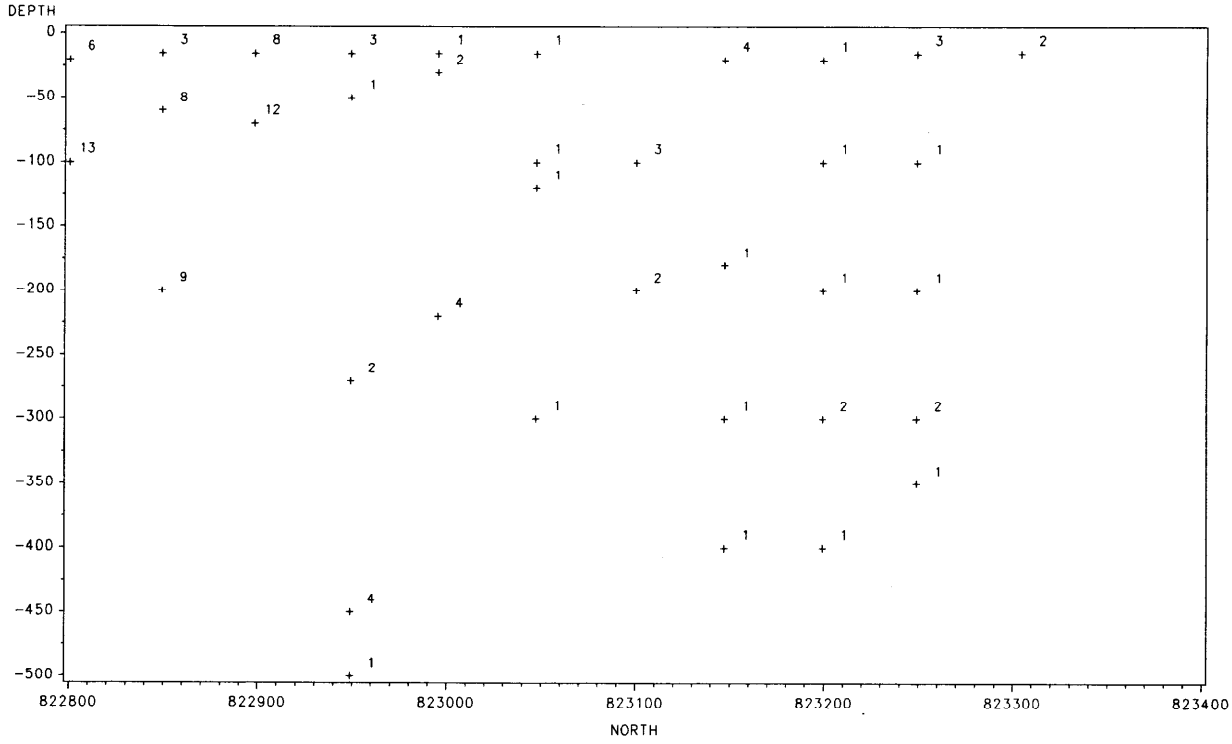


Figure 4 Overburden drill samples (Line 2) showing variation of molybdenum with depth.

The second area was east and north of Upper Middleton, over the main area of mineralised float. The traverses in the forestry plantation on Knockinglews were sampled using a lighter, hand-held Cobra drill. Access was along the clearing beneath power transmission lines and along a firebreak. These samples were also analysed by XRF for a number of elements. The sample points are shown on Fig. 2 and hole numbers are shown in the Appendix.

Fluorine in water samples were also taken as some molybdenite localities to the south of Bennachie are associated with minor fluorite veining. The specific ion electrode technique of analysis is simple and rapid. The sample locations and results are shown on Fig. 2. One grain of purple fluorite was found during wallrock prospecting.

The gas pipeline shown in Fig. 2 had not been excavated at the time of sampling. Weathered and fresh rock samples were subsequently collected from the pipeline trench by a geologist from Cluff Minerals who was examining the prospect. A

representative selection of these was made available to the BGS for analysis. Descriptions for these samples indicate that they represent the marginal zone of the granite stock, perhaps even partial cover over the top of the intrusion. Much of the granite is in vein form, penetrating the schists and anastomosing within them. Textures are rather variable with much of the granite described as fine-grained, almost aplitic. Indeed, it is not easy to define the granite margin from this information. Some samples contained visible scheelite, but analyses only showed a maximum of 122ppm tungsten.

Processing of the variety of data confirms that the EVL trenches were sited too far downslope to examine the best of the molybdenum anomalies as defined by the base of drift geochemistry. This seems adequately to explain the poor results obtained, though some small presence of molybdenite mineralisation might have been expected. The analyses of the overburden samples demonstrate the hydromorphic nature of the molybdenum distribution. Mo values range up to 345ppm with a mean of 34ppm. The Mo*depth plot of all the values (Fig. 5) shows that no samples deeper than 200cm are above the mean. The Mo*depth plot of lines 6 and 10 shows the near-surface nature of the anomalous Mo values (Fig. 6). There is little correlation between molybdenum and tungsten (Fig. 7). These results are similar to those obtained by the EVL trench sampling. Base metal (Cu and Zn) content was generally low.

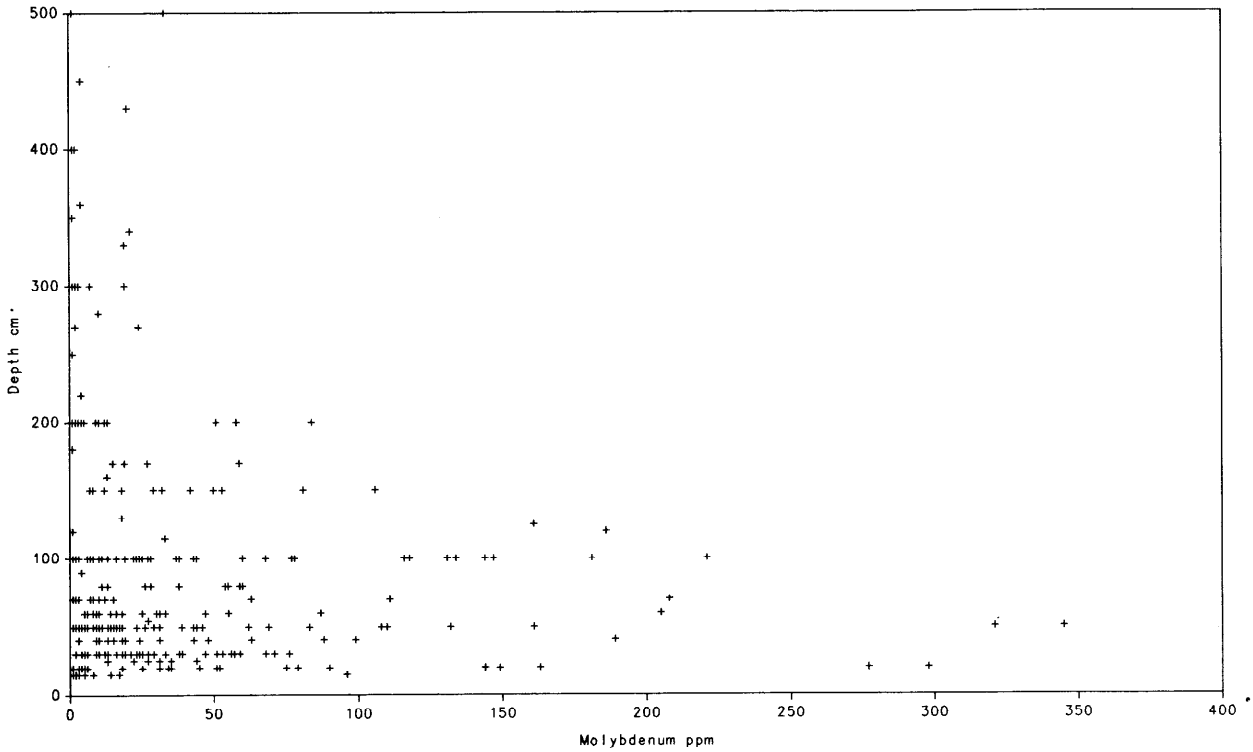


Figure 5 Molybdenum versus depth plot for overburden drill samples.

The plotted results, however, did not show a pattern which could be readily interpreted in terms of vein distribution or of direct relationship to the granite outline. In consequence the siting of the exploratory boreholes could not be closely controlled by the geochemical results, though all four holes

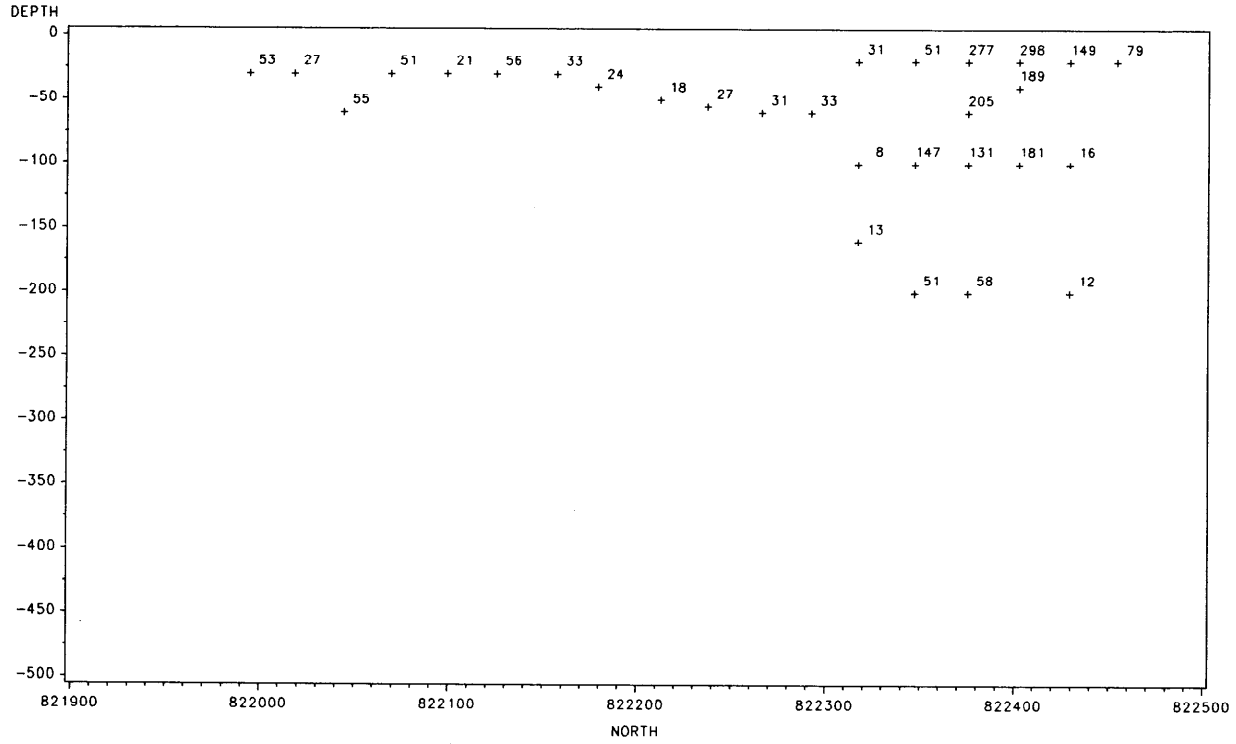


Figure 6 Overburden drill samples (Lines 6 and 10) showing variation of molybdenum with depth.

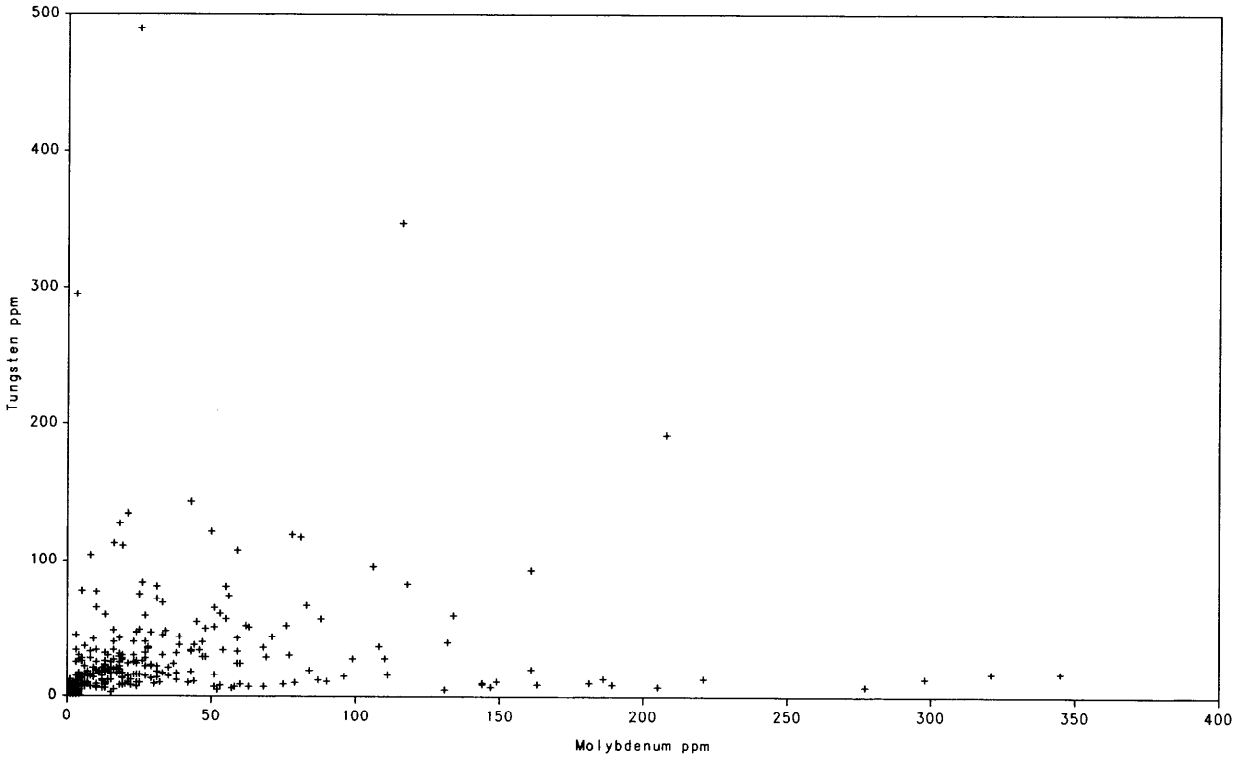


Figure 7 Molybdenum versus tungsten plot for overburden drill samples.

outside the granite contact were placed fairly close together in an area of apparent molybdenum significance upslope from a number of mineralised wall boulders.

Complete analytical results of the overburden (XMT series) and gas pipeline trench (XMR series) samples, including summary statistics, are listed in the Appendix.

GEOPHYSICAL INVESTIGATIONS

A gravity survey was carried out in the Chapel of Garioch area to investigate the Middleton Granite and to determine whether other similar bodies exist in the vicinity. A total of approximately 520 gravity stations were established over an area extending between National Grid lines 368 East to 380 East and 814 North to 826 North. A detailed survey area of 8 sq. km. was covered at a station density of about 30 per sq. km., while the station density over the remainder averaged about 2 per sq. km.

The resulting Bouguer gravity anomaly map (Fig.8) reveals steep regional gravity gradients due to the density contrasts between the Dalradian country rocks and the denser Insch basic igneous mass to the north, and the less dense Bennachie and Hill of Fare granites to the west and south respectively. Surface fitting techniques were used to approximate the regional field, which was then subtracted from the observed anomalies to produce residual maps on which local features are more easily discerned.

A third order residual Bouguer anomaly low (Fig. 9) identifies the position of the Middleton Granite; the granite may extend to the west and south of its previously mapped limits. There is no clear evidence of any comparable structures elsewhere in the area, although some minor features east of the exposed Bennachie Granite might merit further investigation.

The gravity results were used in selecting drilling sites from which to investigate the granite.

Three magnetic traverses were also measured, delineating an east-west basic (dolerite) dyke which cuts across all other structures in the district.

Neither method was employed with a view to direct examination of the mineralisation and neither contributed such positive information. Electrical measurements, which might have been appropriate to the type of mineralisation expected, were ruled out by the power lines which run through the area. Further information on the geophysical investigations is given in a separate report (Kimbell, 1989 (in press)).

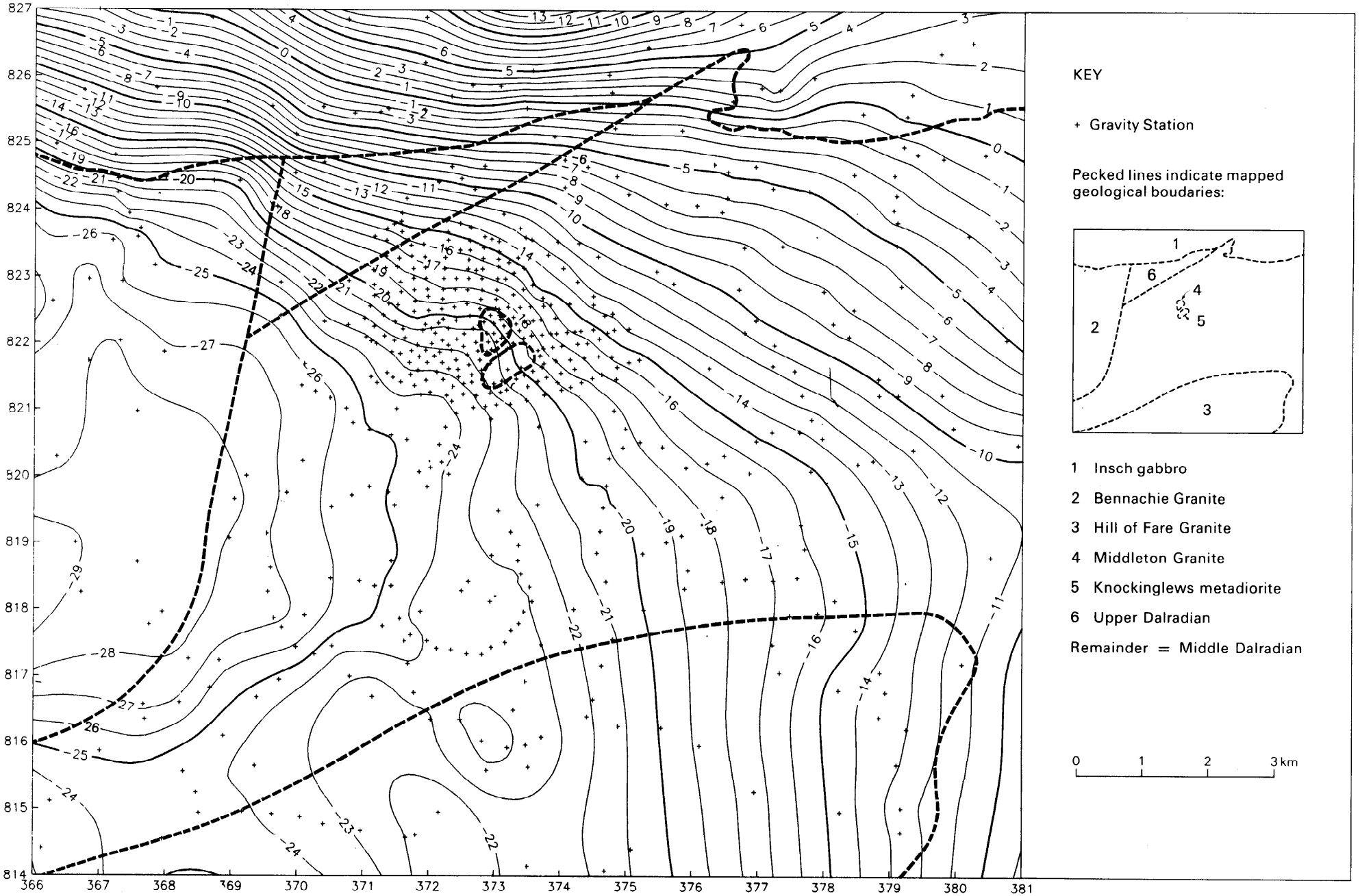


Figure 8 Bouguer gravity anomaly map.

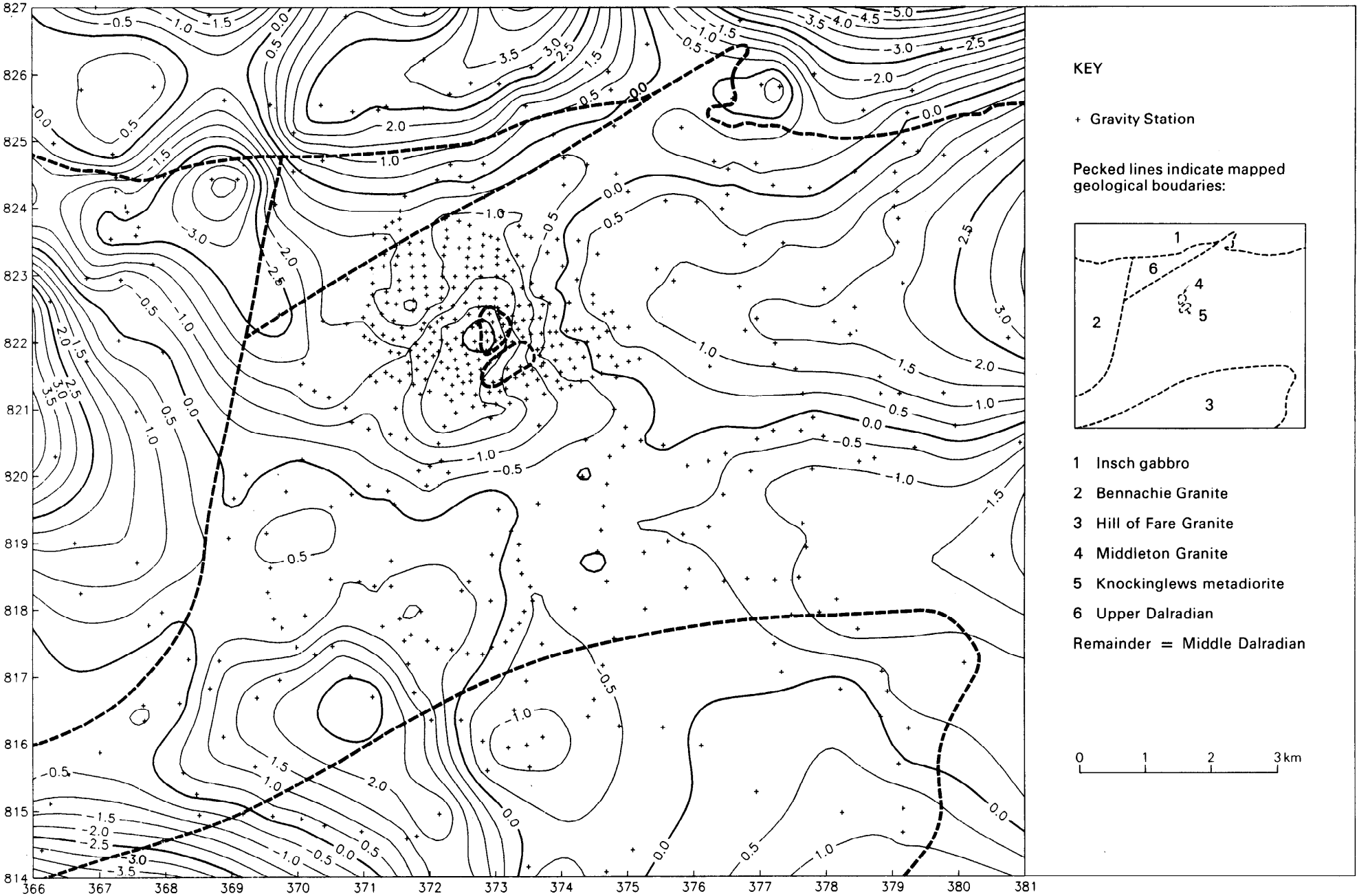


Figure 9 Third order residual Bouguer gravity anomalies.

DRILLING

Seven boreholes were drilled in all, four in the Dalradian schists to the east of the Middleton Granite outcrop, and three in the granite itself. All bar the last hole in the granite were inclined; this last hole was the deepest at 67m. The locations of the holes are shown in Fig 2.

It was expected that the holes outside the granite, in Dalradian schist, would almost certainly encounter material similar to the greisen-enclosed quartz-molybdenite veins seen in the nearby field walls. The holes, CG1-4, were all drilled south-south-east, approximately normal to the strike of the schistocity and lithology. CG2 was the only hole to intersect minor molybdenum mineralisation in thin quartz veins associated with granite dykes. CG4 intersected several basic dykes or sills up to 12m wide. The core was examined with an ultra-violet lamp for the presence of scheelite. This was detected mainly within schists at the margins of the greisen veins, but nowhere is it particularly abundant.

With the knowledge of one mineral vein cropping out within the granite margin, it seemed sensible to drill within the stock to check whether others existed. Two holes were drilled from the same location close to the former small quarry in an attempt to intersect the northern continuation of the exposed mineralisation. The first (CG5) was drilled south-south-east and intersected several thin (<1cm), quartz veins with molybdenite as elongate grains and sheaves of acicular crystals. The veins were bordered by greisened granite. Molybdenite formed up to 10% of some of the veins. The second hole (CG6) was drilled north and intersected quartz veins up to 25cm wide with greisened borders, but without molybdenite. Minor pyrite and baryte mineralisation was seen in a dolerite dyke. The last hole (CG7) was drilled vertically into the centre of the gravity anomaly. Several thin barren quartz veins up to 70cm wide were intersected.

The most significant feature of the granite in these cores was its almost universally high degree of alteration. For the most part it was a moderately fine-grained facies, originally of a light grey colour, but stained from buff yellow to brown by abundant free iron oxides. A large part of the feldspar content appears to have been argillised and there is an abundance of fine flakes of sericite. The alteration is highly reminiscent of the granite enclosing mineralised quartz veins in the hedging stones.

Examination of the fluid inclusions in granitic, mineralised and non-mineralised vein quartz by Dr T.J. Shepherd (Appendix 1) showed that the quartz veining is probably linked genetically with the Caledonian Middleton granite as the fluids are typical of a high temperature magmatic hydrothermal system. This argues against molybdenum mineralisation at a much later date (Permo-Carboniferous or Tertiary, for instance). Temporal relationships between molybdenum and tungsten mineralisation are uncertain due to the lack of suitable

wolframite or scheelite material, although they are probably roughly coeval.

Only selected lengths of core material were submitted for geochemical analysis for four major and 12 trace elements and in general these contained quartz veining. Borehole CG4 was not analysed. None of the samples returned values of either molybdenum or tungsten of direct economic interest. There is no correlation between molybdenum and tungsten or tin and tungsten in the core samples. However, molybdenum and tin do show some correlation in the granite core samples. Drill core logs and graphic logs showing the geochemistry and lithology are included in the Appendix.

An attempt to confirm the relationship of the Middleton Granite to the nearby Bennachie and Hill of Fare masses was made by isotopic Rb-Sr dating (Darbyshire and Beer, 1988). Though not conclusive, this showed that these rocks are substantially of the same age and that the alteration has not seriously upset their comparability. In the Bennachie mass, alteration similar to that in the Middleton stock is locally developed but no mineralisation seems to be associated with it. The lithogeochemistry obviously reflects this alteration and suggests that it is a form of greisenisation.

The Middleton area was one of a number of sites selected for an investigation of tungsten mineralisation associated with granite cusps (Beer and others, 1987). Samples of granite were taken from the gas pipeline trench and the drill holes; samples of Dalradian schist were taken from surface exposures at irregular intervals from 20m to 1.8km from the granite. The samples were analysed for 10 major and 23 trace elements. The high levels of potassium and rubidium, and low levels of barium, in the Middleton granite are similar to those of the SW England granites. Both areas are tin and tungsten specialised (after Tischendorf, 1974) and are also within the 'Pneumatolytic Hydrothermal Trend' of Shaw (1968). The Dalradian rocks, mainly mica-schists and quartz-mica-schists with some psammites and thin calc-silicates, show little physical or chemical evidence of metamorphism by the granite. For completeness the raw data are listed in the Appendix.

CONCLUSIONS

Surface debris shows that some of the quartz veins carry substantial quantities of molybdenite, and the gas pipeline trench samples suggest that wolframite might also be present. This close association between molybdenum and tungsten offers potential for a two-metal deposit.

Neither base of drift geochemistry nor the limited drilling have indicated where the most significant mineralisation is located. It is associated with the Middleton Granite and is commonly found in quartz veins encased in relatively narrow bodies (sill or dykes?) of greisenised granite cutting the Dalradian schists. Some of these may be concealed beneath the epidiorite which caps the hill of Knockinglews.

At this stage of examination it is not possible to comment in any meaningful way on the prospects of a porphyry style deposit here. Widespread argillic alteration of the feldspars within the Middleton Granite may, however, be a pointer in this direction. Additional drilling is required to establish the local distribution of mineralised veins around and within the granite.

ACKNOWLEDGEMENTS

Our thanks are due to Mr C. Mackie and Mr P. Murison, owners respectively at Middleton of Balquhain and Upper Middleton for their assistance and patience during our sampling and drilling programmes. We are also grateful to other landowners in the vicinity and to the Scottish Forestry Commission for access to their properties. We are indebted to Dr M. Munro of Aberdeen University and to Mr Rick Parker of Cluff Minerals Ltd. for geological information and samples from the gas pipe trench. Our field activities were ably assisted by Messrs M. Shaw, M. McGlashan and M. McCormac. The Analytical Chemistry Unit of BGS provided the XRF analyses of soils and rocks; the XRF analyses of core samples was carried out by MESA Laboratories (B.P. Atkin and P.K. Harvey, analysts). Mrs D.P.F. Darbyshire carried out the Rb-Sr isotopic dating, and Dr T.J. Shepherd the fluid inclusion studies.

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APPENDIX 1

FLUID INCLUSIONS IN QUARTZ VEINS ASSOCIATED WITH MOLYBDENUM MINERALISATION AT CHAPEL OF GARIOCH

T J SHEPHERD

FLUID INCLUSIONS

A total of 20 vein quartz samples were collected from five boreholes and one float block and prepared for fluid inclusion examination as doubly polished 500μm wafers. Optical examination showed that the majority of samples had suffered significant deformation and recrystallisation due to tectonic reactivation of the veins during or after mineral deposition. In some cases the deformation has completely destroyed the pre-existing inclusions, whilst in others sufficient evidence remains to classify the original inclusions related to the mineralising events. Three main types of inclusion were identified.

Type I Two phase (liquid + vapour) aqueous inclusions with high vapour:liquid ratios consistent with fluid temperatures in excess of 340°C. Some samples contain Type 1 inclusions with lower vapour:liquid ratios indicating cooler conditions; generally in the range 200 - 340°C. Fluid salinities are estimated to be less than 20 wt% NaCl equivalents.

Type II Three phase (liquid + vapour + solid) aqueous inclusions containing a cubic daughter crystal presumed to be NaCl; indicative of highly saline, high temperature brines.

Type III Three phase (liquid + liquid + vapour) carbonic inclusions containing liquid CO_2, an aqueous liquid and a CO_2 vapour phase at room temperature.

The results are shown in Table A overleaf.

Though there are differences between individual samples, the intimate association between type I and II inclusions is typical of magmatic hydrothermal fluids reported for several major North American molybdenum deposits (e.g. Henderson: White and others (1981); Questa: Westra and Keith (1981); Climax: Hall, Friedman and Nash (1974). The development of inclusions enriched in CO_2 is unusual but comparable to the molybdenum-rich fluids associated with the Central City porphyry molybdenum system (Rice, Harmon and Shepherd, 1985). While it is possible to infer the interaction and mixing of several fluids, the diversity of inclusions can be explained much more simply in terms of fluid immiscibility and unmixing in the system H_2O-CO_2-NaCl in response to changes in pressure and dilution by cooler groundwaters. However, the development of type III inclusions in rutilated quartz and the absence of types I and II (sample M18) is exceptional. Since the rutilated samples are from borehole CG1, which is furthest from the granite contact, it is suggested that such fluids represent the outer fringe of a hydrothermal system. This is similar to the pattern described for the Coed-y-Brenin porphyry copper deposit in North Wales where CO_2-rich fluids in the peripheral hydrothermal zones are ascribed to the oxidation of trace graphite in the host sediments (Allen and others, 1979).

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TABLE A

Sample No.	Borehole No.	Deformation	Type I High V:L	Type I Low V:L	Type II	Type III	Rutilation
M 1	CG 5		*		minor		
M 2	CG 5		*			*	
M 3	CG 5	Severe	*				
M 4	CG 5			*			
M 5	CG 5	Severe	*				
M 6	CG 5		*				
M 7	CG 5	V. severe					
M 9	CG 5			*		*	
M 10	CG 5		*	*	*		
M 11	CG 5			*			
M 12	CG 5	Severe		*		*	
M 13	CG 5	Severe		*		minor	
M 14	CG 7	V. severe					
M 15	CG 6	Severe				*	
M 16	CG 1	Severe					Yes
M 17	CG 1	Severe					Yes
M 18	CG 1	Severe				*	Yes
M 19	CG 2	Severe		*			
M 21	CG 2	V. severe		*			

APPENDIX 2

CHAPEL OF GARIOCH

DRILLCORE LOGS FOR DIAMOND DRILL HOLES CG1-7

DIAMOND DRILL HOLE LOG

PROJECT CHAPEL OF GARIOCH — MAP SHEET NO. NJ72SW

HOLE NO. CG1

COORDINATES NGR 373475 E 822145 N — BEARING 161° — DIP 50°S — ELEVATION 203m

FINAL DEPTH 50.90m — DATE October 1982 — LOGGED BY K.E. BEER

From	To	Length	GEOLOGY	Sample No XMD	From	To
0.00	1.52	1.52	OVERBURDEN Soil, subsoil and stones. Not cored.			
1.52	1.67	0.15	Fragments of gabbro.	60	0.0	2.0
1.67	2.42	0.75	QUARTZ BIOTITE SCHIST Broken recovery of quartz biotite schist with small pods of white-grey vein quartz. Locally somewhat autobrecciated. Schistocity at 70° to the core axis.	61	2.0	3.0
2.42	2.95	0.53	PSAMMITIC SCHIST Mainly quartz, grey to buff in colour, with little mica and some feldspar.			
2.95	3.06	0.11	QUARTZ VEIN Grey-white massive vein quartz at 80-85° to CA. Very clean cut contacts. No sign of mineralisation.			
3.06	4.64	1.58	INJECTION ZONE Apparently mainly psammitic schist but now intricately veined and replaced by greyish quartz and fine grained pegmatitic granite; locally intensely greisenised. Some parts of the complex are extremly vuggy, especially in the greisenised section. The granite feldspars are generally white to buff in colour and pellucid due to argillic alteration.	62 63	3.0 4.0	4.0 5.0
4.64	4.81	0.17	QUARTZ BIOTITE SCHIST Quartz biotite schist with thin inter-folia quartz veining.			
4.81	5.89	1.08	PSAMMITIC SCHIST Psammitic schist, well jointed, with occasional pods of quartz and one thin vein of white quartz. Micaceous in basal 2cm.	64	5.0	6.0
5.89	5.97	0.08	QUARTZ BIOTITE SCHIST Quartz biotite schist with thin inter-folia quartz veining.			
5.97	11.95	5.98	PSAMMITIC SCHIST Mainly psammitic schist but with zones of complex quartz - granite injection. Zone from 6.10-6.36 is relatively fresh but zones from 6.90-8.25 and 8.85-11.10 are locally very soft, with iron staining	65 66 67	6.0 7.0 8.0	7.0 8.0 9.0

		and alteration to clay causing considerable core loss. Below 11.10 the schists are heavily fractured with poor core recovery.	68	9.0	10.0
			69	10.0	11.0
			70	11.0	12.0
11.95	12.15	0.20 QUARTZ VEIN Grey, broken quartz vein. No mineralisation.			
12.15	15.37	3.12 QUARTZ BIOTITE SCHIST / PSAMMITIC SCHIST Alternating thin layers (about 10cm) of biotite quartz schist and psammitic schist, the former tending to be soft, somewhat altered and sometimes ferruginous. Grey quartz vein from 14.18-14.23. Vein to core axis = 80°.	71	12.0	13.0
			72	13.0	14.0
			73	14.0	15.0
15.27	30.30	15.03 QUARTZ BIOTITE SCHIST Dark grey quartz biotite schist, locally slightly ferruginous due to alteration. Rare thin quartz veins parallel to schistocity. Schistocity to core axis at 70-80° . Granite injections from 18.87-19.06. Locally some silicification and chloritisation. Thicker quartz veins at 20.54-20.63, 22.86-22.94, 23.29-23.37. More granitic quartz veins at 23.55, 25.20-25.28, 26.10, 26.34, 28.64 29.21, 29.69-30.00. No sign of mineralisation.	74	15.0	16.0
			75	16.0	17.0
			76	17.0	18.0
			77	18.0	19.0
			78	19.0	20.0
			79	20.0	21.0
			80	21.0	22.0
			81	22.0	23.0
			82	23.0	24.0
			83	24.0	25.0
			84	25.0	26.0
			85	26.0	27.0
			86	27.0	28.0
			87	28.0	29.0
			88	29.0	30.0
30.30	31.30	1.00 QUARTZ VEIN Very fine grained grey to flesh coloured vein quartz with thin screens of altered schist still remaining. Contacts not cleanly cored but vein appears to be within the schistocity, here at 75° to core axis.	89	30.0	31.0
31.30	41.59	10.29 QUARTZ BIOTITE SCHIST Darkish grey quartz biotite schist, well broken and ferruginous just below the quartz layers. Fine grained greyish vein quartz at 31.58-31.68 (parallel to the schistocity) and 32.06-32.19. Whiter vein quartz at 32.53-32.61. Rather brecciated vein quartz zone at 32.75-33.14. Thin quartz veins at 33.60 and 34.60 (banded at 20° to the core axis). Some pyrite on joints at 36.65. Some infrequent thin psammite layers. The schists are generally tougher below 35.50 with a hornfelsed appearance and though still well foliated they are not readily fissile. Coarse grained granite injection at 38.19-38.56 with very irregular margins and some associated quartz. Infolded psammites around 38.75. Ferruginous staining at 39.15-39.60. The schistocity is disturbed for about 1.5m below the granite injection before returning to its normal attitude of about 70° to the core axis.	90	31.0	32.0
			91	32.0	33.0
			92	33.0	34.0
			93	34.0	35.0
			94	35.0	36.0
			95	36.0	37.0
			96	37.0	38.0
			97	38.0	39.0
			98	39.0	40.0
			99	40.0	41.0
41.59	44.81	3.22 QUARTZ BIOTITE SCHIST Dark grey quartz biotite and semi-pelite schist with frequent streaks and veinlets of quartz. Some development of biotite schlieren and parts of the core are quite dense. Quartz vein at 43.32-43.74 with top brecciated and recemented by later quartz and accompanying	100	41.0	42.0
			101	42.0	43.0
			102	43.0	44.0
			103	44.0	45.0

biotite. Zone of intense silicification from 43.74-44.13 with development of a greenish to purplish colour (looks almost like a calc-silicate). The rock is tough and dense with spots of pyrite and veinlets of coarsely spotty arsenopyrite. Very fine grained quartz vein at 44.67-44.77. Disturbed foliation through the whole zone.

44.81	47.41	2.80	QUARTZ BIOTITE SCHIST Tough, well jointed but non-fissile quartz biotite schist of semi-pelitic type. Occasional quartz veinlets up to 4cm thick. The rock has a somewhat hornfelsed appearance in parts but is locally altered and ironstained around the joints.	104 105 106	45.0 46.0 47.0	46.0 47.0 48.0
47.41	47.93	0.52	QUARTZ VEIN Quartz vein almost concordant with the foliation. Mainly brecciated with some granitic patches. A few small vugs with good quartz crystal terminations. No sign of any mineralisation.			
47.93	50.45	2.52	QUARTZ BIOTITE SCHIST Mainly quartz biotite schist of semi-pelitic type. Occasional quartz veins up to 7cm thick and concordant with the foliation. Some parts of the core are more psammitic with less biotite. A thicker quartz vein, partly brecciated, at 49.16-49.40 shows almost granitic texture at the top. The foliation is generally at 80° to the core axis.	107 108 109	48.0 49.0 50.0	49.0 50.0 50.9
50.45	50.90	0.45	PSAMMITIC SCHIST Generally more psammitic schist with few biotite layers. Well jointed and with small, irregular quartz veinlets and steaks.			

END OF HOLE 50.90M

RECOVERY 72%

DIAMOND DRILL HOLE LOG

PROJECT CHAPEL OF GARIOCH — MAP SHEET NO. NJ72SW

HOLE NO. CG2

COORDINATES NGR 373455 E 822200 N — BEARING 162° — DIP 50°S — ELEVATION 198m

FINAL DEPTH 42.50m — DATE October - November 1982 — LOGGED BY T.B. COLMAN & D.G. CAMERON

From	To	Length	GEOLOGY	Sample No	From XMD	To
0.00	1.52	1.52	OVERBURDEN Soil and subsoil. Not cored.			
1.52	2.00	0.48	Granite pebbles and weathered schist.			
2.00	3.50	1.50	SCHIST Weathered schist with occasional quartz veinlets and sulphide specks.	22 23	0.0 2.5	2.5 5.0
3.50	3.65	0.15	QUARTZ VEIN Light grey, brecciated quartz vein with some chlorite and a 'granitic' texture.			
3.65	3.99	0.34	SCHIST Poorly foliated, light grey weathered schist. Quartz / granite veinlet at 3.98.			
3.99	4.50	0.51	PSAMMITE Hard, dark grey psammite. Core badly broken with much core loss. Green-cream quartz vein parallel to the foliation at 4.05.			
4.50	5.00	0.50	QUARTZ BIOTITE SCHIST Coarse grained light grey quartz biotite schist. 4cm light grey massive quartz vein at 4.70 (contacts not seen). Core very broken with some loss.			
5.00	6.00	1.00	PSAMMITE Dark grey green psammite. Irregular 1cm quartz vein at 5.20 sub-parallel to the foliation at 60° to the core axis. White quartz vein at 5.25.	24	5.0	6.0
6.00	6.75	0.75	QUARTZ SCHIST Dark grey, very fine grained, hard quartz schist with minor greenish chlorite streaks. Small lens of granular pyrite at 6.05. Thin quartz vein at 6.10 at 30° to the core axis. Creamy brown, brecciated 3cm quartz vein at 6.30. Minor pyrite on fracture surfaces at 6.50 and 6.60. Medium grey brown, medium grained foliated granite at 6.70-6.75.	25	6.0	7.0
6.75	7.00	0.25	QUARTZ BIOTITE SCHIST Well foliated quartz biotite schist with creamy brown injection quartz at 6.75-6.85 in foliation. Schistocity at 60° to the core axis.			

7.00	8.20	1.20	QUARTZ SCHIST Dark grey, very fine grained, hard quartz schist as before. Same schistocity at 60° to the core axis. Minor pyrite lenses and grains picked out along the foliation. Coarse grained quartz biotite schist at 7.60 with foliation at 90° to the core axis. White quartz vein parallel to the foliation at 7.65.	26	7.0	8.0
8.20	11.40	3.20	GRANITE Medium grained, grey brown porphyritic granite. Vaguely foliated at 90° to the core axis. Upper contact slightly wavy but at 80° to the core axis. Coarser grained in the top 30cm. Quartz phenocrysts to 3mm. Light brown sugary quartz vein at 20° to the core axis at 10.60. Core very broken around 9.20-10.00. Three flakes of molybdenite at 11m on joint faces at 90° to the core axis. Bottom contact not seen.	27 28 29	8.0 9.0 10.0	9.0 10.0 11.0
11.40	16.25	4.85	QUARTZ BIOTITE SCHIST Dark grey, hard quartz biotite schist with dark green chlorite lenses and wisps. Minor pyrite throughout in small disseminations and larger aggregates. Occasional thin, light grey, sugary, barren quartz veins conformable with foliation. Very poor recovery from 12.00- to 15.00. Distinctive creamy brown unit 1-2cm thick at 12.40, 14.80 and 15.60-15.80. Looks like fault infilling with fine grained quartz and chlorite. Yellow-green ?powellite at 15.70.	30 31 32	11.0 12.0 15.0	12.0 15.0 16.0
16.25	16.70	0.45	GRANITE Light grey, coarse grained granite. Pale yellow green at upper contact with minor pyrite and slight alteration of feldspars. Almost a greisen.	33	16.0	17.0
16.70	18.00	1.30	QUARTZ SCHIST Light grey, very fine grained, very hard quartz schist with some biotite and pyrite. White quartz vein at 16.94-16.98 with thin pyrite bands and a trace of molybdenite. Thin quartz veinlet with molybdenite at 17.54. Vein at 50° to core axis.	34	17.0	18.0
18.00	29.50	11.50	GRANITE Light to dark grey, coarse grained granite grading into bands of dark grey to black finer grained granite. Bands at 60° to core axis. 21.4-21.6 3cm wide massive white quartz vein with a trace of molybdenite at both contacts. Vein at 10° to core axis. At 22.9 1cm brecciated quartz vein parallel to the core axis. At 24.1 2cm coarse grained white brecciated quartz vein. No mineralisation. At 24.7 Thin light grey fine and coarse grained quartz vein with upper contact at 80° to the core axis. 24.7-27.6 Slightly finer and more even grained 27.6-28.2 Coarser grained. 28.8-28.9 Finer grained, pale yellow green, slightly greisened granite. Smear of molybdenite on joint face. 29.3-29.5 Finer grained towards contact. 5cm coarser grained granite and 1cm brecciated white quartz vein with pyrite at the contact. Contact is irregular at 40° to the core axis	35 36 37 38 39 40 41 42 43 44 45	18.0 19.0 20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0	19.0 20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0
29.50	30.70	1.20	QUARTZ BIOTITE SCHIST Medium grey, medium grained quartz biotite schist. Well banded with light and dark grey bands at 30.00-30.30 at 90° to the core	46 47	29.0 30.0	30.0 31.0

	axis. Massive white quartz veins at 30.15 (1cm) and 30.25 (2cm). Veins at 50° to core axis. Irregular contact at about 30° to the core axis with 10cm pale yellow green greisen at 30.50-30.60 with bunches of molybdenite rosettes to 2-3mm scattered on the margins of a thin quartz vein at 45° to the core axis.		
30.70 32.25 1.55	GRANITE Light grey, coarse grained granite. Finer grained and altered from 30.70-31.40 grading into fresh granite. 5cm section at 32.0 has a brecciated and recrystallised texture. 1cm massive grey quartz vein at 32.20. Vein at 80° to core axis.	48	31.0 32.0
32.25 34.20 1.95	QUARTZ SCHIST Yellow brown to medium grey, poorly foliated, hard quartz schist with granite veins at 32.50 and 32.70-33.10. Hard, creamy white very fine grained, structureless zone over 10cm at 32.00	49 50	32.0 33.0 33.0 34.0
34.20 35.30 1.10	GRANITE Light to medium grey, coarse grained granite as before. Fractures iron stained.	51	34.0 35.0
35.30 42.50 7.20	QUARTZ SCHIST / QUARTZ BIOTITE SCHIST Medium grey, fine grained, very hard quartz rock. Grades in and out of quartz biotite schist. Slightly denser from 35.3-35.6 and more magnetic (10 to 50 x background). Scattered fine grained pyrite. 10cm granite veins at 36.0, 36.30-36.50 and 38.50 (contact at 90° to the core axis). Quartz biotite schist below 39.50. Schistocity at 80° to core axis at 41.0m. Core broken at 36.50-37.00 and 38.00 with poor recovery.	52 53 54 55 56 57 58 59	35.0 36.0 36.0 37.0 37.0 38.0 38.0 39.0 39.0 40.0 40.0 41.0 41.0 42.0 42.0 42.5

END OF HOLE AT 42.50M

RECOVERY 70%

DIAMOND DRILL HOLE LOG

PROJECT CHAPEL OF GARIOCH — MAP SHEET NO. NJ72SW

HOLE NO. CG3

COORDINATES NGR 373365 E 822155 N — BEARING 161° — DIP 50°S — ELEVATION 203m

FINAL DEPTH 24.40m — DATE November 1982 — LOGGED BY T.B. COLMAN & D.G. CAMERON

From	To	Length	GEOLOGY	Sample No XMD	From	To
0.00	3.60	3.60	OVERBURDEN Fragments of quartz biotite schist, quartz, gabbro and granite. More continuous sections of light grey, coarse grained, weakly foliated granite and light grey, coarse grained quartz biotite schist with some very biotite rich sections.			
3.60	4.30	0.70	QUARTZ BIOTITE SCHIST Light grey, coarse grained quartz biotite schist. Dark grey brown and soft from 4.10-4.20. Schistocity at 70° to core axis.	1	4.0	5.0
4.30	6.00	1.70	QUARTZ SCHIST Light grey green, fine grained quartz schist. Complexly foliated zone at 4.80. Folded around 5.50-5.60 with schistocity at 0-20° to the core axis. 1cm fine grained quartz vein at 5.30. Vein at 70° to the core axis (conformable with the schistocity).	2	5.0	6.0
6.00	8.80	2.80	QUARTZ BIOTITE SCHIST Light to dark grey, fine grained quartz biotite schist. Schistocity varies from 30-40° to 80° to the core axis. Core very broken from 6.60-7.50 with only 30% recovery. Rounded, red brown garnet porphyroblasts to 3mm at 6.70-6.90. 1cm massive, white quartz vein at 7.50 at 30° to the core axis.	3 4 5	6.0 7.0 8.0	7.0 8.0 9.0
8.80	9.10	0.30	QUARTZ FELDSPAR HORNBLENDE SCHIST Dark grey green, fine grained quartz feldspar hornblende schist with a trace of pyrite.			
9.10	10.10	1.00	QUARTZ SCHIST Light grey green, fine grained quartz schist with a trace of fine grained pyrite.	6	9.0	10.0
10.10	10.50	0.40	QUARTZ FELDSPAR SCHIST Medium grey, coarse grained quartz feldspar schist.	7	10.0	11.0
10.50	10.70	0.20	GRANITE Medium grey, coarse grained, weakly foliated granite.			
10.70	11.50	0.80	QUARTZ SCHIST Mainly light grey, very fine grained quartz schist with minimal schistocity. A few bands to 3cm of dark green medium grained hornblende	8	11.0	12.0

schist with contacts normal to the core axis. Breccia at 11.10 with elongate clasts of dark green hornblende schist in a quartz matrix.

11.50	13.30	1.80	FAULT ZONE Core very broken and iron stained with a little clay gouge. 30% recovery. Mainly quartz biotite schist clasts but also some green basic clasts. Dark grey basic rock at 11.80. Hard, fine grained quartz feldspar schist from 12.80-13.30. 2cm massive white quartz vein at 12.80.	9	12.0	13.0
13.30	15.00	1.70	HORNBLENDE FELDSPAR SCHIST. Dark green, medium grained schist with schistocity at 70° to the core axis. Top and bottom contacts broken. 5mm coarse grained white greisen vein at 13.80.	10 11	13.0 14.0	14.0 15.0
15.00	17.10	2.10	QUARTZ SCHIST. Medium grey green, very fine grained quartz schist with varying amounts of feldspar and biotite. Dark grey green with epidote rich bands and a trace of pyrite at 15.30-15.60. Coarse grained granite vein at 15.80-16.0 with irregular contacts at 30-60° to the core axis. Well banded from 16.30-16.60 with light and dark grey bands.	12 13	15.0 16.0	16.0 17.0
17.10	17.60	0.50	QUARTZ SCHIST Light grey, massive, fine grained quartz schist with medium green streaky patches of chlorite.	14	17.0	18.0
17.60	23.00	5.40	QUARTZ BIOTITE SCHIST Dark grey green, fine grained quartz biotite schist. More biotite from 19.05-21.00. Coarse grained with biotite to 2cm at 21.00-21.30. 2 cm fine grained, white quartz vein at 22.00. Well banded from 22.60-22.70.	15 16 17 18 19	18.0 19.0 20.0 21.0 22.0	19.0 20.0 21.0 22.0 23.0
23.00	23.85	0.85	GRANITE Coarse grained, weakly foliated hornblende granite. Gradual contact to:-	20	23.0	24.0
23.85	24.00	0.15	GARNET MICA SCHIST Dark grey, medium grained quartz garnet mica schist with red brown garnets to 3mm. Lower contact at 60° to the core axis.			
24.00	24.40	0.40	QUARTZ BIOTITE SCHIST Dark grey green, fine grained quartz biotite schist.	21	24.0	24.4

Broken bit at 24.40 - impossible to recover.

END OF HOLE 24.40M
Recovery 67%

DIAMOND DRILL HOLE LOG

PROJECT CHAPEL OF GARIOCH — MAP SHEET NO. NJ72SW

HOLE NO. CG4

COORDINATES NGR 373380 E 822110 N — BEARING 161° — DIP 50°S — ELEVATION 207m

FINAL DEPTH 49.07m — DATE November 1982 — LOGGED BY K.E. BEER

From	To	Length	GEOLOGY	Sample No From To XMD
0.00	2.44	2.44	OVERBURDEN No recovery to 2.14. Fragments of dolerite from 2.14.	Not sampled
2.44	3.55	1.11	QUARTZ BIOTITE SCHIST Mainly light grey psammitic quartz biotite schist but with some darker semi-pelitic layers richer in biotite and with a few garnets developed. Some feldspathic patches with a semi-granitic texture. Fine grained siliceous and chloritic zone around 3.20.	
3.55	3.94	0.39	BASALT Very fine grained, black, fresh basaltic dyke. Neither contact is cored, but dyke is clearly not at a very low angle to the core axis.	
3.94	5.64	1.70	MICA SCHIST Dark grey to greenish, black, rotted pelitic mica schist with occasional horizons of light grey quartz schist and very thin quartzo-feldspathic layers. Foliation at 70-80° to the core axis.	
5.64	9.87	4.23	QUARTZ BIOTITE SCHIST Mainly light grey, psammitic quartz biotite schist but with scattered thin zones of more micaceous semi-pelitic nature. Some quartzo-feldspathic zones with a vaguely granitic texture and one narrow horizon at 8.43 which appears cherty.	
9.87	10.16	0.29	BASALT Very fine grained, well jointed, black basaltic dyke rock. Upper contact at about 45-50° to the core axis but is irregular and sinuous, being defined mainly by a fracture. Lower contact not cored.	
10.16	11.58	1.42	GABBRO Fine grained, greenish grey, altered igneous rock composed almost entirely of feldspar and hornblende with minor biotite. Abrupt change of texture but no contact or gradation seen. Vague foliation at about 60° to the core axis.	
11.58	12.48	0.90	QUARTZ BIOTITE SCHIST Light grey, psammitic quartz biotite schist. Very broken, with poor core recovery.	

12.48 12.57 0.09 BASALT
Very fine grained, black basalt dyke. Contacts not cored. Top is altered and ferruginous but remainder is quite fresh.

12.57 13.81 1.24 QUARTZ BIOTITE SCHIST
Psammitic quartz biotite schist with some zones of quartzo-feldspathic development and interfoliated quartz veining. Core very broken. Very thin quartz vein at 14.33. Locally iron stained.

13.81 15.70 1.89 BASALT
Very fine grained, fresh, black basalt dyke. Upper contact is irregular and follows suitable fractures but is generally at about 40° to the core axis. Slightly coarser and soft from 15.22 to 15.39 with pronounced hornblende veining. Irregular bottom contact at 70° to the core axis with a chilled margin.

15.70 19.77 4.07 QUARTZ BIOTITE SCHIST
Light grey quartz biotite schist of psammitic to semi-pelitic type with foliation at about 80° to the core axis. There is considerable irregular feldspathisation leading in parts to a near granitic appearence. Milky white to cream, massive quartz vein at 17.02-17.23. Contacts not cored and no sign of mineralisation.

19.77 31.95 12.18 DOLERITE
Bluish grey to black, fresh, fine grained dolerite dyke. Very fine grained chilled margin for 20cm from the irregular contact. Generally well jointed, hard and tough. Occasional small clots of feldspar and quartz with hornblende. Finer grained towards the base.

31.95 33.40 1.45 QUARTZ BIOTITE SCHIST
Complex zone of admixed metamorphics and dyke rock. Mainly semi-psammitic quartz biotite schist, much disturbed, cut by narrow veinlets of very fine grained black basalt dyke rock. The whole zone is very broken with very poor core recovery.

33.40 35.35 1.95 FAULT ZONE
The upper part of this section comprises very fragmentary recovery of very fine grained basalt dyke with occasional fragments of rather coarse schist, verging on granite. Most of the dyke material is reasonably fresh but the schist is altered and ferruginous. The rock is altered to a dark grey clay from 34.42 to 34.95 and below 34.95 is a red brown, ferruginous clayey and sandy mixture.

35.35 36.70 1.35 METAMORPHIC
Soft, argillised metamorphic rock. Probably mainly metapelite but with considerable granitic style feldspathisation. Quartz vein at 35.47, haematite veining at 36.25 and a narrow layer of psammitic quartz schist at 36.35.

36.70 37.90 1.20 QUARTZ BIOTITE SCHIST
Medium to light grey quartz biotite schist of semipelite to psammitic type. Foliation generally at 60-70° to the core axis but some local variation suggestive of disturbance and generally accompanied by sweats of quartz. Very thin quartz veinlets, concordant with the foliation.

37.90 44.31 6.41 QUARTZ SCHIST
Light grey to cream quartz schist of psammitic type with a few thin

biotitic horizons. In parts it is difficult to distinguish between schist and quartz veining, the foliation often being subdued. Some thin zones of granite-like feldspathisation. Poor core recovery, especially towards the base.

44.31 49.07 4.76 QUARTZ BIOTITE SCHIST

Medium grey quartz biotite schist. Rotted and ferruginous from 44.31-44.63, followed by a narrow zone with an odd green colouration. Similar zones at 44.88 and 45.48. Pyrrhotite and pyrite flakes on many of the joint faces. Rare thin quartz veinlets parallel to the foliation which is at 80° to the core axis.

END OF HOLE 49.07M

DIAMOND DRILL HOLE LOG

PROJECT CHAPEL OF GARIOCH MAP SHEET NO. NJ72SW

HOLE NO. CG5

COORDINATES NGR 372975 E 822045 N BEARING 162° DIP 50°S ELEVATION 186m

FINAL DEPTH 51.50m DATE November 1982 LOGGED BY T.B. COLMAN & D.G.CAMERON

From	To	Length	GEOLOGY	Sample No XMD	From	To
0.00	7.30	7.30	GRANITE Light grey to grey brown, fine grained, altered granite. Brecciated quartz veins with zoned quartz crystals to 1cm from 1.75-2.25. Yellow powdery coating on quartz in places. Contact gradational but rapid over 2cm to:-	110 111	1.7 2.3	2.3 3.3
7.30	11.65	4.35	GRANITE Red brown, medium grained, altered granite. 1cm quartz vein at 7.95, at 60-70° to the core axis, with unaltered margin. Brecciated quartz vein from 8.10 to 8.40 with zoned, white, rounded to euhedral quartz crystals to 3mm. Vein at 45° to the core axis. Colourless, fine grained, sugary texture, silicified greisen at 8.40-8.45 with a little muscovite. Iron stained at top with manganese dendrites. Fine grained, silicified greisen at 8.85-8.90 with thin quartz vein in the centre at 80° to the core axis. 5mm quartz vein at 9.60 surrounded by iron staining and silicification over 2cm. Light grey, medium grained, siliceous greisen at 10.15-10.35. 1cm massive, white quartz vein near the top at 60° to the core axis. Light grey, medium grained, siliceous greisen at 10.75-10.85 with a little muscovite and minor pyrite.	112	10.7	11.2
11.65	13.00	1.35	QUARTZ VEIN WITH GREISEN Massive, white, fine grained quartz vein over 80cm with yellow green quartz muscovite greisen borders 30cm above the vein and 20cm below it. Thin quartz veins with scattered molybdenite grains in the upper greisen.	113 114 115	11.6 12.2 12.9	12.2 12.9 13.3
13.00	15.35	2.35	GRANITE Red brown, medium grained two mica granite with scattered pyrite grains to 2mm and yellow brown feldspars. 2mm quartz vein at 14.00 at 30° to the core axis. Feldspars more altered around 14.5.			
15.35	15.70	0.35	GREISEN WITH QUARTZ VEINS 16cm of fine grained, medium grey greisen with 2% pyrite in scattered grains followed by 3cm massive, white quartz vein at 60° to the core axis with cavities up to 1cm lined with red brown iron oxides, 8cm coarse grained, soft muscovite rich greisen, 2cm massive, colourless quartz vein and 6cm fine grained, medium grey greisen. No sign of mineralisation.	116	15.35	15.7
15.70	26.70	11.00	GRANITE Yellow brown, fine grained granite with very little biotite. Trace of disseminated pyrite. 1cm colourless, massive quartz vein at 17.05	133	18.0	18.4

with scattered molybdenite grains to 2mm. Molybdenite is entirely within the quartz vein as elongate grains in fractures, as more rounded grains and as sheaves of acicular crystals growing out from the vein margins. 5mm similar quartz vein at 17.75 with traces of molybdenite grains on the vein margins. Vein at 50° to the core axis. 10cm massive, white, barren quartz vein at 19.00 with no greisen borders. 15mm massive, colourless, barren quartz vein at 24.25 at 50° to the core axis. The granite remains much the same to this point being more or less weathered. The grain size varies slightly as does the amount of biotite. The colour varies from yellow brown to light grey.

117 22.5 23.5

26.70 27.00 0.30 GREISEN WITH QUARTZ VEINS
20cm hard, quartz greisen with about 20% muscovite and 2 thin massive pyrite veins, followed by 3cm massive, colourless quartz vein at 50° to the core axis with cavities to 5mm and 7cm soft, pale green muscovite greisen. All contacts quite sharp.

27.00 27.15 0.15 GRANITE
Granite as before.

27.15 27.25 0.10 GREISEN WITH QUARTZ VEIN
Pale green, soft muscovite greisen with 15mm colourless, barren quartz vein at 50° to the core axis.

27.25 33.20 5.95 GRANITE
Pale pink to grey, finer grained granite. 2mm quartz vein at 27.75 with pyrite grains to 10x1mm and 2 small molybdenite grains. Vein at 30° to the core axis. 15cm massive, white quartz vein at 28.05-28.20 at 60° to the core axis. Bottom contact slightly sheared.

33.20 33.40 0.20 QUARTZ VEIN
1cm colourless, quartz vein at 10° to the core axis, with abundant molybdenite. Molybdenite forms 10% of the vein in rosettes up to 5mm in and at the margins of the vein. A few small grains occur in the altered margin of the granite which extends for 5mm on either side of the vein. 1 grain of chalcopyrite seen in the vein, adjacent to molybdenite. Some pyrite occurs in the altered granite margins.

33.40 38.50 5.10 GRANITE
Pale pink to grey, finer grained granite as before. Irregular patch of muscovite and biotite (10x1mm) at 37.30.

38.50 38.70 0.20 QUARTZ VEIN
20cm massive, white, barren quartz vein. Slightly altered, silicified granite with muscovite above. More altered greisen with quartz and muscovite for 10cm below.

38.70 50.30 11.60 GRANITE
Pale pink to grey, finer grained granite as before.

134 41.0 41.4
118 42.7 43.7
135 49.4 49.6

50.30 50.50 0.20 GREISEN WITH QUARTZ VEIN
10cm massive, colourless, barren quartz vein at 50° to the core axis. 10cm altered silicified granite above and 10cm pale yellow green greisen below.

50.50 51.50 1.00 GRANITE

Pale pink to grey, finer grained granite as before.

END OF HOLE AT 51.50M

DIAMOND DRILL HOLE LOG

PROJECT CHAPEL OF GARIOCH — MAP SHEET NO. NJ72SW

HOLE NO. CG6

COORDINATES NGR 372975 E 822045 N BEARING 341° DIP 50°N ELEVATION 186m

FINAL DEPTH 48.64m DATE December 1982 LOGGED BY T.B. COLMAN

From	To	Length	GEOLOGY	Sample No XMD	From	To
0.00	6.00	6.00	GRANITE Weathered red brown granite. Feldspars are mainly pink though weathering to white clay. Joints subparallel to the core axis.			
6.00	9.00	3.00	GREISEN Light grey-brown, fine grained silicous greisen with >10% muscovite. Core very broken to 8m with poor recovery. Occasional patches of fine grained pyrite on joint surfaces. Bottom contact at 50° to the core axis.	119 120	6.0 7.5	7.5 9.0
9.00	11.30	2.30	GRANITE Pink medium-fine grained granite, less weathered than above with muscovite and biotite.	121 122	9.0 10.3	10.3 11.3
11.30	11.40	0.10	GREISEN Yellow-green quartz muscovite greisen. Sharp contact at 30° to the core axis.			
11.40	11.65	0.25	QUARTZ VEIN Massive, white, finely crystalline, barren quartz vein. Some darker banding at 60° to the core axis.			
11.65	11.80	0.15	GREISEN Yellow-green quartz muscovite greisen. Coarse sugary texture with cavities over 2.5cm adjacent to quartz vein and a mass of muscovite grains to 2mm. Contact with quartz vein and with rest of greisen at 45° to the core axis. Rest of greisen as section from 11.30.	123	11.65	11.8
11.80	13.85	2.05	GRANITE Pink, fine grained granite as before.	124 125	11.8 12.8	12.8 13.8
13.85	14.60	0.75	GREISEN Light grey, siliceous greisen with 10% muscovite.	126	13.8	14.6
14.60	14.80	0.20	QUARTZ VEIN Massive, white, finely crystalline barren quartz vein. Top and bottom contacts at 30° to the core axis.			
14.80	14.95	0.15	GREISEN Light grey, siliceous greisen with 10% muscovite as before.			

14.95	22.50	7.55	GRANITE Pink, fine grained granite as before.		136 20.7	21.3
22.50	44.20	21.70	DOLERITE Dark grey green, medium grained dolerite. Core loss at contact but fragments of very fine grained chilled margin in broken core. Joints generally at 40-50° to the core axis with slight iron staining. 2cm vein at 37.95 at 50° to the core axis. Tabular and massive, colourless, pale yellow brown baryte crystals with clots of crystalline pyrite and elongate rounded dolerite clasts. Vein breccias at 44.10-44.20 with calcite and baryte crystals to 5mm and up to 5% pyrite extending into the dolerite. Vein breccia at 41.80 with several very fine grained, light grey, soft 'mudstone' clasts and a 1cm band at 90° to the core axis with disseminated pyrite.		Not sampled	
44.20	45.70	1.50	FAULT Soft, grey green clay fault gouge.			
45.70	48.64	2.94	DOLERITE Dolerite as before.			

END OF HOLE AT 48.64M

PROJECT CHAPEL OF GARIOCH MAP SHEET NO. NJ72SW

HOLE NO. CG7

COORDINATES NGR 372755 E 822115 N BEARING Vertical DIP 90° ELEVATION 173m

FINAL DEPTH 67.00m DATE December 1982 LOGGED BY T.B. COLMAN

From	To	Length	GEOLOGY	Sample No XMD	From	To
0.00	13.10	13.10	QUARTZ PORPHYRY Red brown, fine grained, very hard quartz porphyry with 10-15% colourless quartz crystals to 3mm. Thin (1-2mm), quartz muscovite bands at 80-90° to the core axis and 4cm massive, colourless, barren quartz vein from 0.00 to 5.50 (no core markers). Several zones up to 20cm of white crumbly altered rock from 8.0-9.0. 1cm barren quartz vein at 11.40 at 70° to the core axis.	137 127	4.0 9.0	4.3 10.0
13.10	13.80	0.70	QUARTZ VEINS Massive, white, fine grained, barren quartz veins subparallel to the core axis. Slightly broken in places and up to 10cm wide.			
13.80	19.60	5.80	QUARTZ PORPHYRY Red brown, fine grained, very hard quartz porphyry as above. 7cm light grey, very fine grained quartz muscovite greisen vein at 19.30.			
19.60	19.85	0.25	QUARTZ VEIN Massive, white, finely crystalline, barren quartz vein at 40° to the core axis. Greisen borders 5cm above and 10cm below the vein.			
19.85	22.50	2.65	QUARTZ PORPHYRY Red brown, fine grained, very hard quartz porphyry as above.	128	20.0	21.0
22.50	27.90	5.40	GRANITE Red brown, medium to coarse grained granite.			
27.90	42.60	14.70	QUARTZ PORPHYRY Red brown, fine grained, very hard quartz porphyry as above. Occasional thin (1-5mm) white, barren quartz veins normal to the core axis as at 36.7 and 41.7. Cavity at 32.7 with lost core.	129 138 130	30.0 36.6 40.0	31.0 37.2 41.0
42.60	67.00	24.40	GRANITE Red brown, medium to coarse grained granite with rounded quartz phenocrysts. 3cm quartz and soft muscovite greisen vein at 46.60 at 40° to the core axis. Massive, white, barren quartz vein at 47.55-47.70 with thin quartz muscovite greisen selvedges. Light grey quartz muscovite greisen at 48.45-48.60. Contacts at 40° to the core axis. Medium grey, finer grained, more micaceous granite at 59.40-59.90 - almost greisen like.	131 139 132	50.0 53.3 60.0	51.0 53.5 61.0

END OF HOLE AT 67.00M

APPENDIX 3

CHAPEL OF GARIOCH

GRAPHIC DRILLCORE LOGS FOR DRILL HOLES

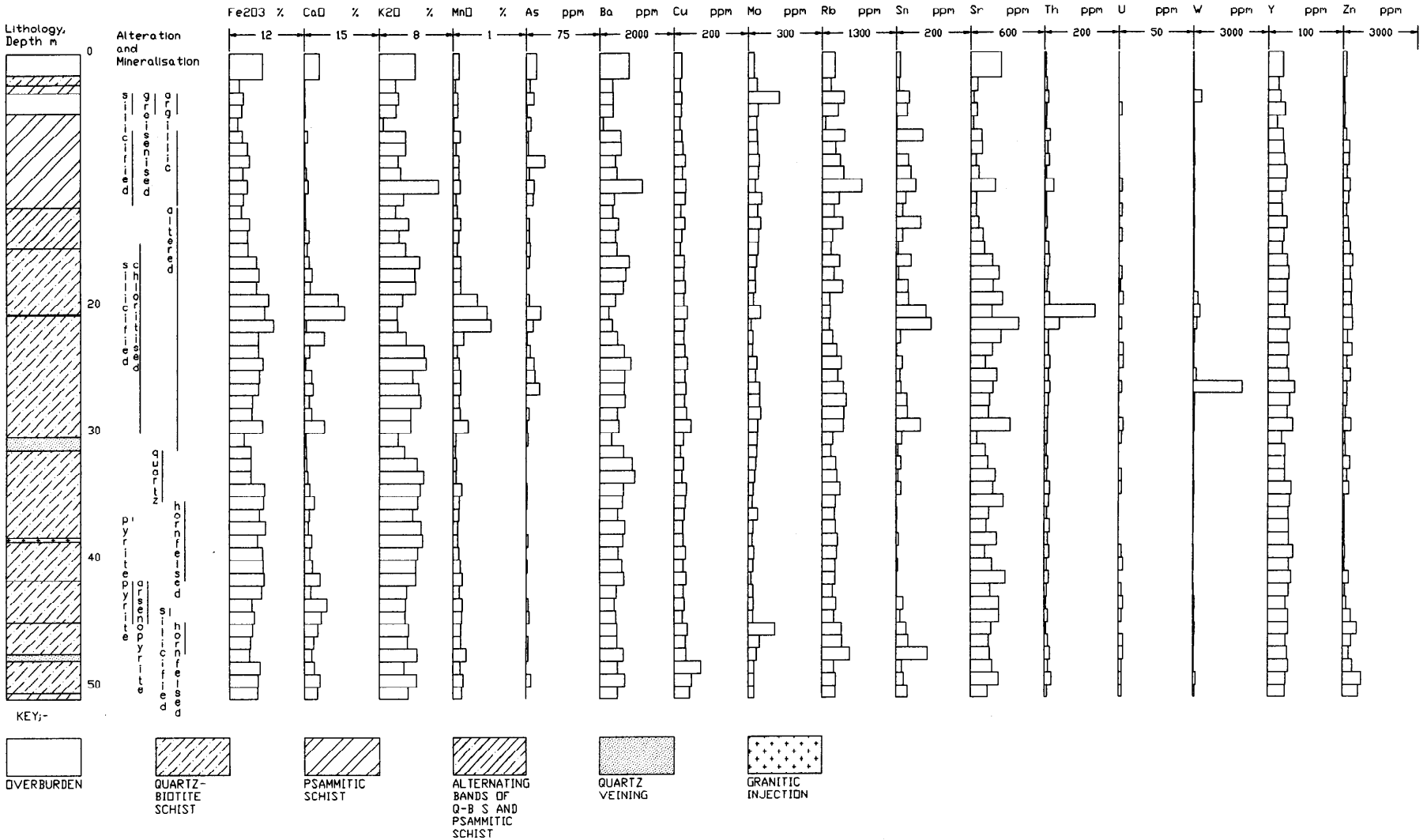
CG1-3 AND CG5-7

CHAPEL OF GARIOCH BOREHOLE NO. CG1

Location NGR 373475 E 822145 N Bearing 161° Dip 50° S Elevation 203m.

Final Depth 50.90m October 1982 Logged by K.E. Beer

Recovery 72% Drilled by H.Wilson J.K.S. 300 Drill (BGS)

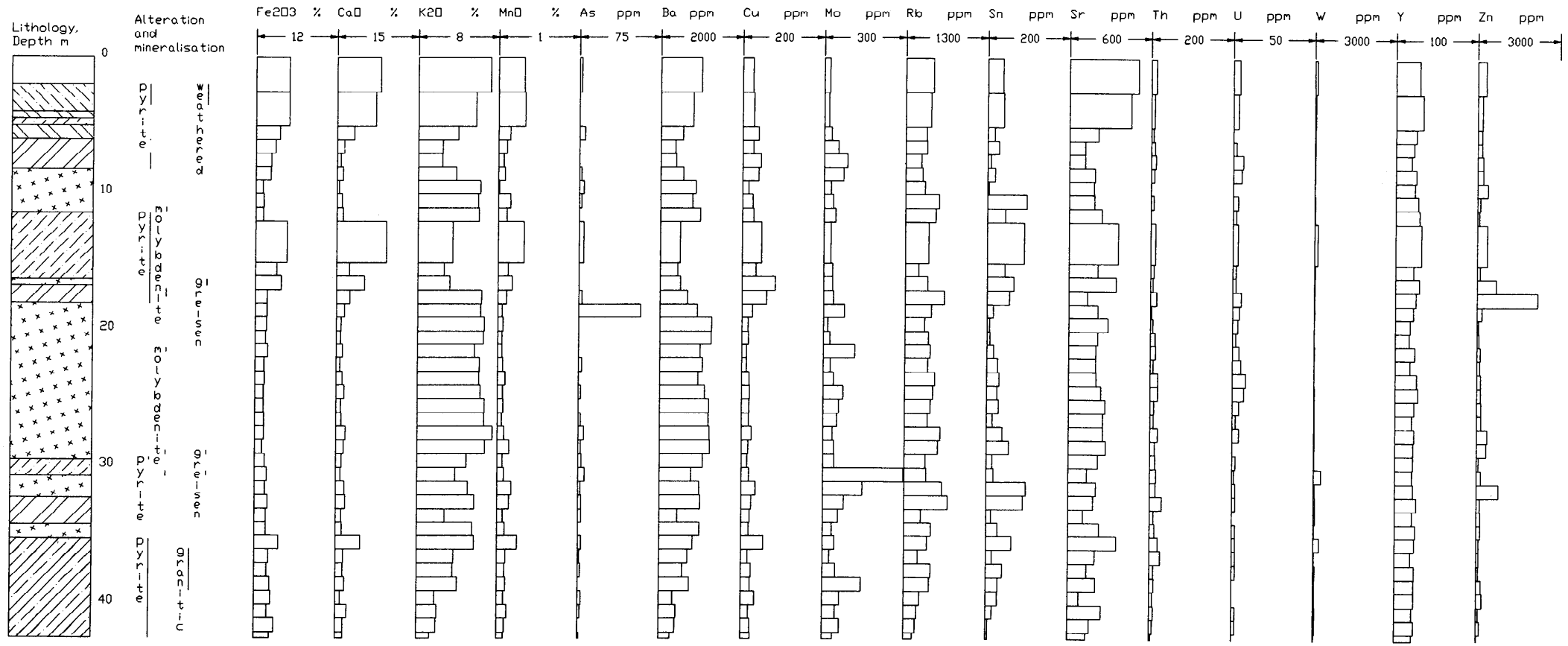


CHAPEL OF GARIOCH BOREHOLE NO. CG2

Location NGR 373455 E 822200 N Bearing 162° Dip 50° S Elevation 198m

Final Depth 42.5 m Logged by T.B. Colman & D.G. Cameron

Recovery 70% Drilled by H. Wilson, J.K.S. 300 Drill (B.G.S)



KEY:-

OVERBURDEN

QUARTZ-BIOTITE SCHIST

QUARTZ SCHIST

GRADING FROM Q-S TO Q-B-S

SCHIST

PSAMMITE

GRANITE

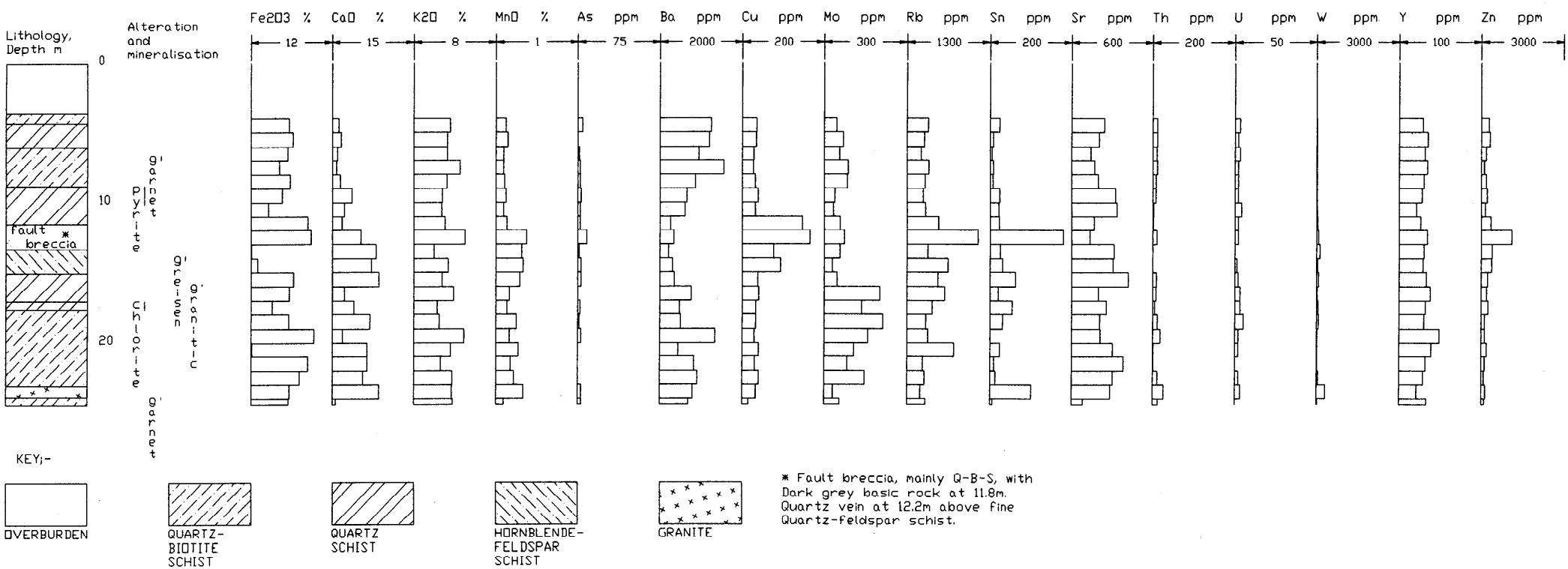
QUARTZ VEINING

CHAPEL OF GARIOCH BOREHOLE NO. CG3

Location NGR 373365 E 822155 N Bearing 161° Dip 50°S Elevation 203 m

Final Depth 24.4 m Logged by T.B. Colman & D.G. Cameron

Recovery 67% Drilled by H. Wilson, J.K.S. 300 Drill (B.G.S)



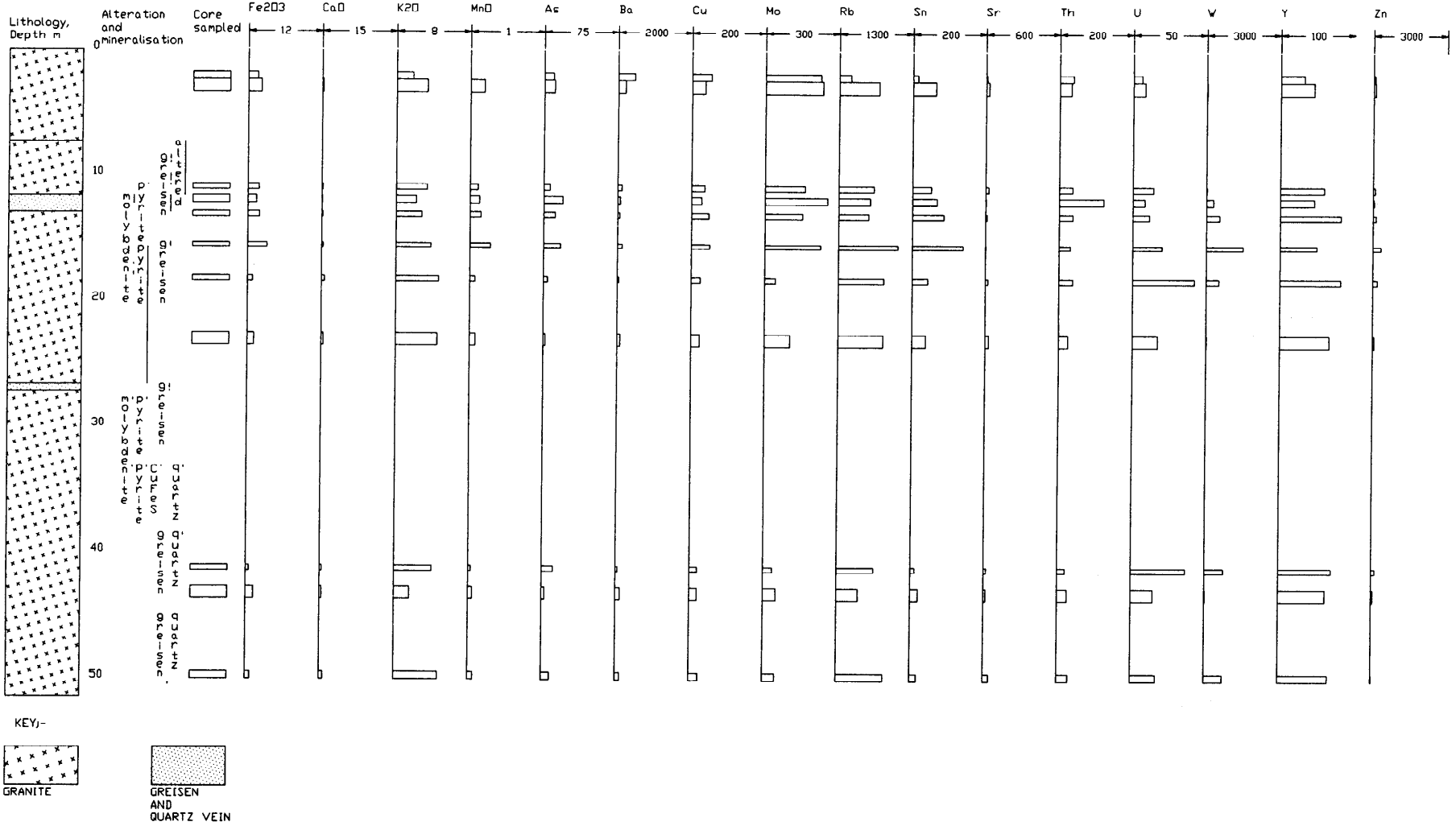
* Fault breccia, mainly Q-B-S, with Dark grey basic rock at 11.8m. Quartz vein at 12.2m above fine Quartz-feldspar schist.

CHAPEL OF GARIOCH BOREHOLE NO. CG5

Location NGR 372975 E 822045 N Bearing 162° Dip 50° S Elevation 186 m

Final Depth 51.50m Logged by T.B. Colman & D.G. Cameron

Recovery 70% Drilled by H. Wilson, J.K.S. 300 Drill (B.G.S)

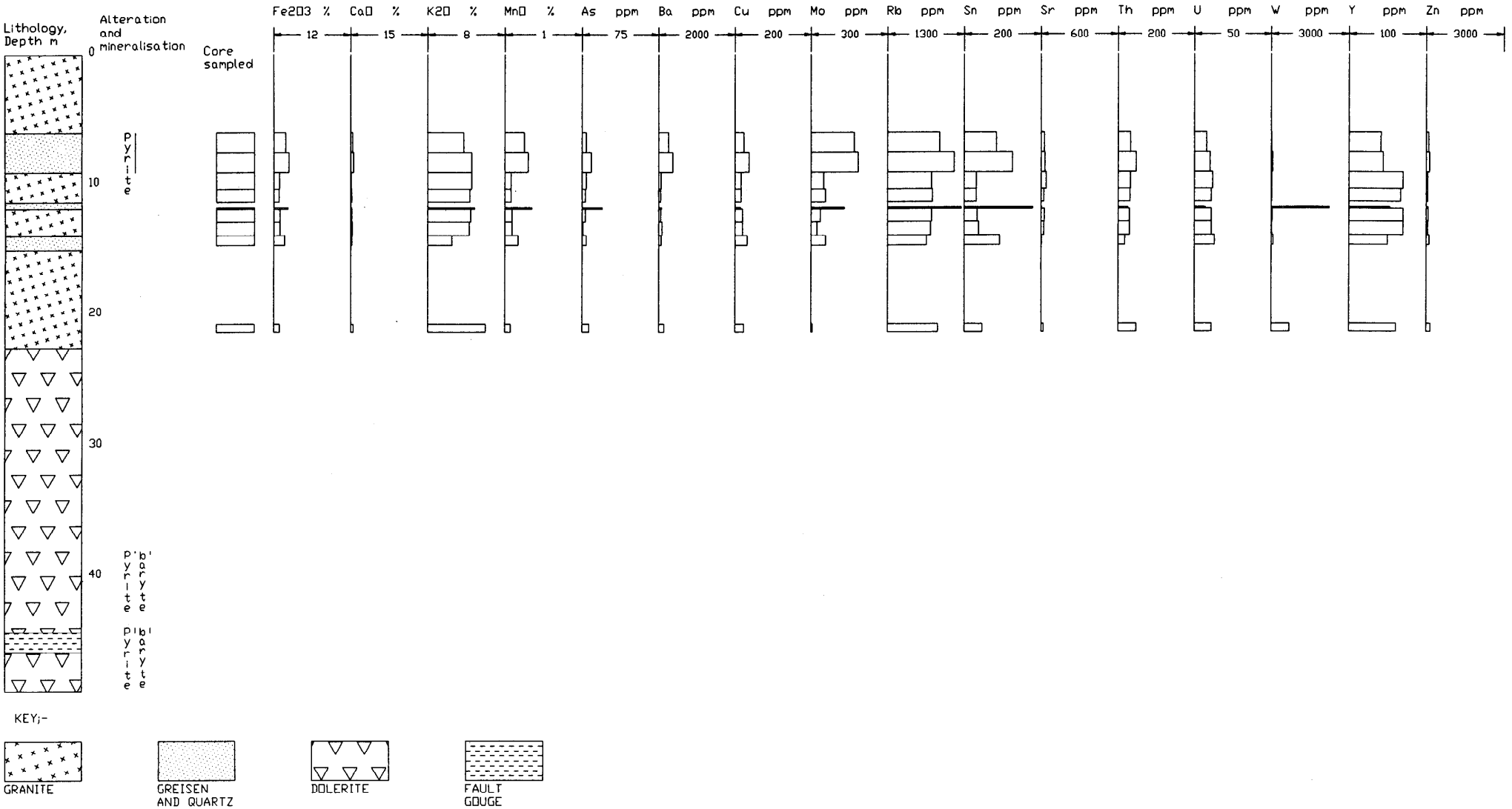


CHAPEL OF GARIOCH BOREHOLE NO. CG6

Location NGR 372975 E 822045 N Bearing 341° Dip 50°N Elevation 186m

Final Depth 48.64m Logged by T.B. Colman & D.G. Cameron

Recovery 70% Drilled by H. Wilson. J.K.S. 300 Drill (B.G.S)

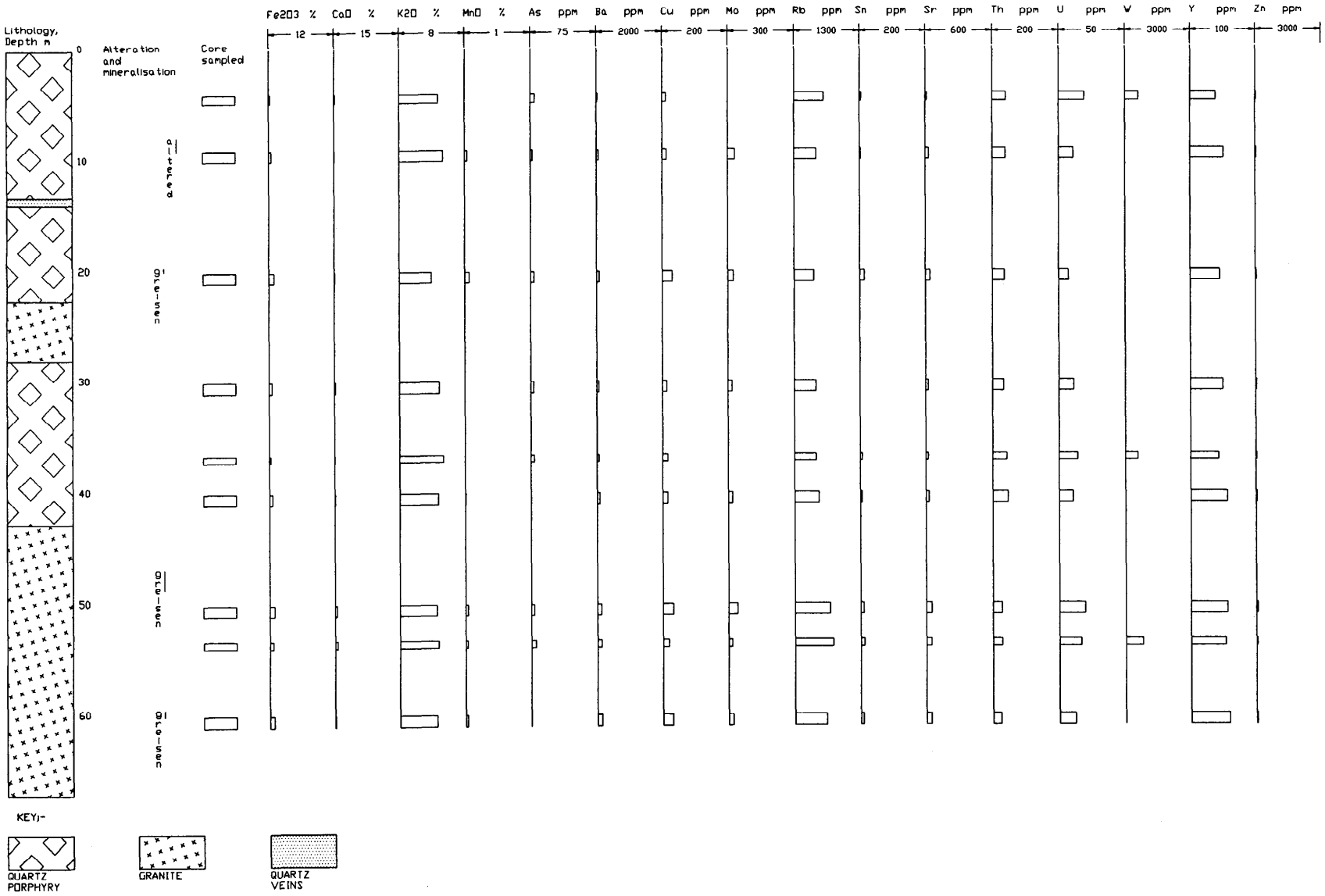


CHAPEL OF GARIOCH BOREHOLE NO. CG7

Location NGR 372755 E 822115 N Bearing Vert Dip 90° Elevation 173m

Final Depth 67.0m Logged by T.B. Colman & D.G. Cameron

Recovery 70% Drilled by H. Wilson, J.K.S. 300 Drill (B.G.S)



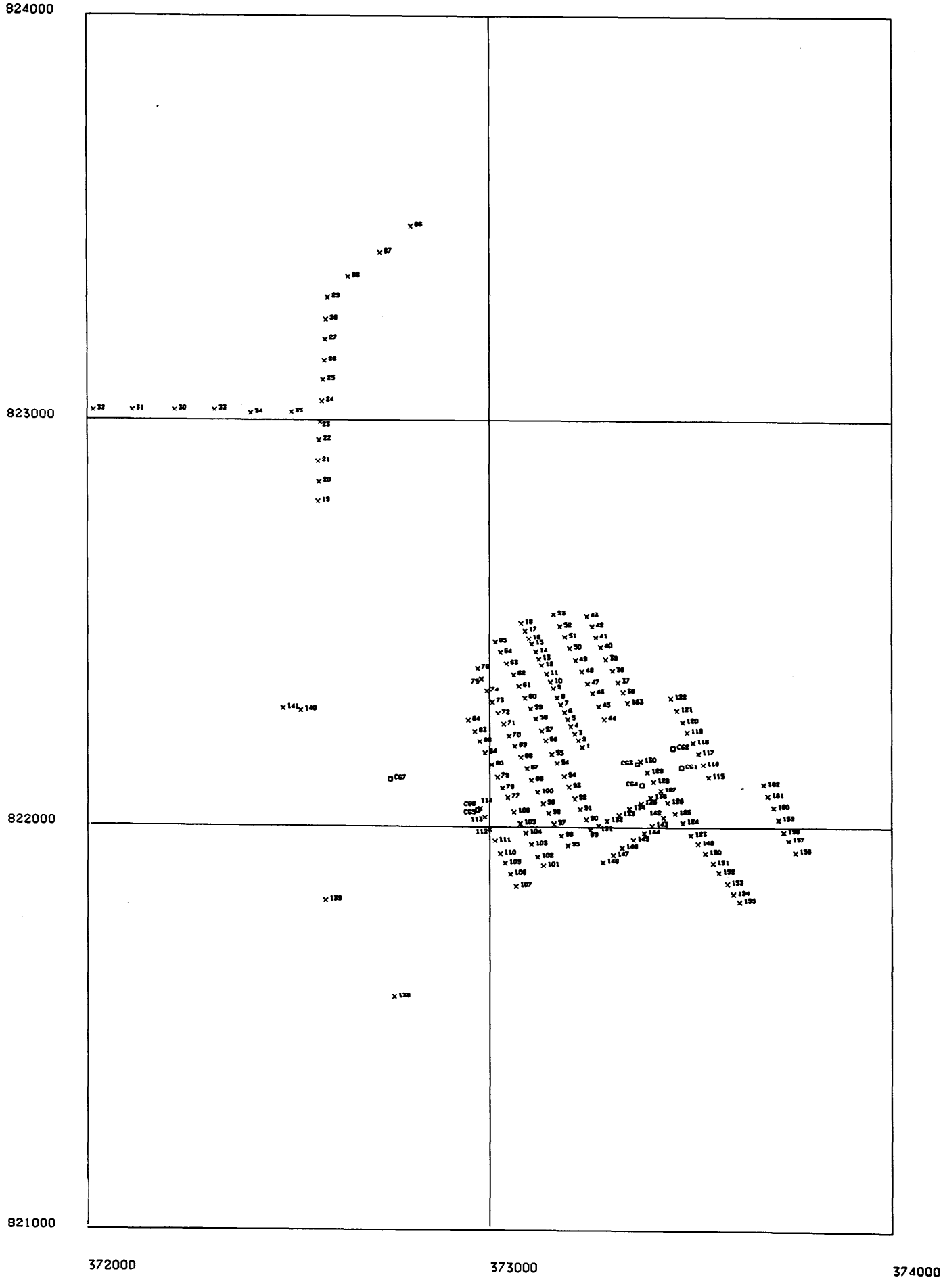


Figure 1 Location and numbering of Minutemen and Cobra drift sampling auger holes.

TABLE 1

CHAPEL OF GARIOCH

MINUTEMAN AUGER DRILL SAMPLES

SUMMARY STATISTICS AND LISTING OF XRF ANALYSES

CHAPEL OF GARIOCH
MINUTEMAN AUGER DRILL SAMPLES
Summary statistics

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE	STD ERROR OF MEAN
CA	317	16693.34	6480.60	280.00	37910.00	363.99
FE	317	98760.60	15461.12	14200.00	157960.00	868.38
MN	317	1162.78	422.81	170.00	4540.00	23.75
TI	317	11154.83	2656.43	2640.00	21750.00	149.20
AG	317	2.56	1.45	1.00	8.00	0.08
AS	317	9.41	5.87	1.00	40.00	0.33
BA	317	599.08	153.46	69.00	909.00	8.62
BI	317	6.80	14.31	1.00	188.00	0.80
CE	317	51.76	23.73	8.00	211.00	1.33
CU	317	36.89	29.61	8.00	220.00	1.66
MO	317	33.96	51.10	1.00	345.00	2.87
NB	317	14.45	5.58	3.00	54.00	0.31
NI	317	38.61	23.92	9.00	198.00	1.34
RB	317	160.36	130.74	48.00	938.00	7.34
SN	317	6.82	9.91	1.50	110.00	0.56
SR	317	186.62	47.72	21.00	336.00	2.68
TH	317	8.77	7.12	1.00	71.00	0.40
U	317	3.90	5.86	1.00	42.00	0.33
W	317	27.99	44.24	1.50	489.00	2.48
Y	317	23.87	9.04	8.00	101.00	0.51
ZN	317	203.28	146.70	50.00	1094.00	8.24
ZR	317	438.69	206.84	47.00	3126.00	11.62

CHAPEL OF GARIOCH
MINUTEMAN AUGER DRILL SAMPLES
All elements in ppm

OBS	Sample number	Hole	Line	Depth cm	East	North	Ag	As	Ba	Bi	Ca	Ce	Cu
1	XMT 1.	1	1	30	373230	822196	1	13	471	41	11930	47	39
2	XMT 2.	2	1	50	373220	822213	4	12	522	11	10940	51	30
3	XMT 3.	3	1	30	373211	822230	4	13	490	14	13810	44	33
4	XMT 4.	4	1	50	373201	822248	2	8	796	10	10890	52	64
5	XMT 5.	4	1	100	373201	822248	4	3	717	27	6790	61	138
6	XMT 6.	4	1	115	373201	822248	1	5	628	14	5990	76	110
7	XMT 7.	5	1	20	373194	822265	2	10	548	13	12130	63	47
8	XMT 8.	5	1	50	373194	822265	1	1	677	12	4980	101	104
9	XMT 9.	5	1	80	373194	822265	3	1	769	17	5650	79	123
10	XMT 10.	5	1	150	373194	822265	4	3	874	22	8160	79	107
11	XMT 11.	6	1	30	373186	822284	1	13	537	15	13210	53	47
12	XMT 12.	7	1	30	373177	822302	4	14	561	13	14050	46	43
13	XMT 13.	8	1	25	373168	822318	1	11	513	8	15000	45	26
14	XMT 14.	9	1	30	373158	822341	3	7	590	6	12810	66	39
15	XMT 15.	9	1	100	373158	822341	3	1	523	6	7080	211	72
16	XMT 307	10	1	30	373151	822357	1	14	534	6	17820	46	30
17	XMT 16.	11	1	40	373141	822376	4	9	701	5	22360	39	43
18	XMT 17.	11	1	100	373141	822376	1	4	862	94	13260	72	92
19	XMT 18.	12	1	30	373129	822398	6	9	612	9	19290	45	65
20	XMT 19.	12	1	100	373129	822398	5	3	749	5	23520	43	45
21	XMT 20.	13	1	30	373122	822414	8	11	496	27	14380	46	117

OBS	Fe	Mn	Mo	Nb	Ni	Rb	Sn	Sr	Th	Ti	U	W	Y	Zn	Zr
1	88130	1060	71	16	40	257	11	146	22	9870	2	44	24	409	424
2	88510	900	39	16	30	234	5	147	11	9860	1	38	21	280	446
3	92190	1030	39	16	27	189	11	156	14	11530	2	44	22	297	459
4	83890	1040	26	17	54	287	18	169	11	9000	3	84	24	712	354
5	73110	1070	43	20	37	392	35	179	21	5690	4	143	32	1094	350
6	77760	1080	33	18	38	428	13	145	19	7610	2	69	30	832	377
7	93070	1250	45	17	31	250	18	159	11	11190	2	55	26	437	454
8	86360	1250	62	24	40	531	21	160	22	7620	2	52	53	638	328
9	85070	1370	55	22	82	533	18	165	21	6510	6	81	56	791	207
10	79700	1440	50	18	87	551	41	253	23	6070	1	121	37	666	339
11	82900	1270	59	17	31	275	10	172	14	10540	4	43	26	476	425
12	86810	1270	47	18	32	216	5	173	8	11230	3	40	25	429	463
13	92720	1130	35	17	25	145	7	167	10	13060	1	21	22	296	487
14	93840	1240	38	24	34	268	7	194	12	12840	4	32	20	296	807
15	101430	930	43	54	37	507	2	140	40	13410	12	33	34	304	3126
16	97720	1120	25	14	28	106	2	181	6	11970	2	16	22	223	477
17	107080	1260	63	12	34	81	2	239	7	14160	6	7	29	277	484
18	97550	1930	116	18	104	297	59	249	48	6330	14	347	31	568	351
19	93800	940	59	13	33	101	3	205	9	12560	28	24	58	315	462
20	114390	1040	44	12	33	78	2	232	4	12260	6	11	32	178	423
21	79440	600	68	14	47	105	2	157	20	9710	40	36	97	674	271

CHAPEL OF GARIOCH
MINUTEMAN AUGER DRILL SAMPLES
All elements in ppm

OBS	Sample number	Hole	Line	Depth cm	East	North	Ag	As	Ba	Bi	Ca	Ce	Cu
22	XMT 21.	13	1	150	373122	822414	3	8	685	5	23310	69	32
23	XMT 22.	13	1	170	373122	822414	4	7	792	1	25140	48	33
24	XMT 23.	13	1	280	373122	822414	3	9	816	1	24700	54	32
25	XMT 24.	13	1	340	373122	822414	4	9	826	1	26030	38	33
26	XMT 25.	14	1	50	373115	822431	7	1	526	19	14260	33	103
27	XMT 26.	14	1	80	373115	822431	2	5	602	2	16430	59	34
28	XMT 27.	14	1	150	373115	822431	5	6	660	4	22580	33	37
29	XMT 28.	14	1	270	373115	822431	2	8	715	1	23910	43	33
30	XMT 29.	14	1	330	373115	822431	2	11	731	2	24150	48	32
31	XMT 30.	15	1	40	373105	822450	1	1	647	6	20300	46	51
32	XMT 31.	15	1	70	373105	822450	3	4	709	1	21050	54	36
33	XMT 32.	15	1	150	373105	822450	3	13	741	1	24460	52	29
34	XMT 33.	15	1	430	373105	822450	4	13	663	3	18900	58	37
35	XMT 34.	15	1	500	373105	822450	1	5	556	8	8770	78	48
36	XMT 35.	16	1	20	373098	822463	1	7	555	8	8900	56	45
37	XMT 36.	16	1	100	373098	822463	3	10	688	1	20570	57	30
38	XMT 37.	17	1	20	373088	822482	3	1	741	5	25080	42	26
39	XMT 38.	17	1	150	373088	822482	7	15	667	4	23170	21	25
40	XMT 39.	18	1	80	373078	822500	5	6	654	7	23940	60	32
41	XMT 40.	19	2	20	372574	822800	3	7	478	3	10200	61	33
42	XMT 41.	19	2	100	372574	822800	4	1	550	6	2980	116	87

OBS	Fe	Mn	Mo	Nb	Ni	Rb	Sn	Sr	Th	Ti	U	W	Y	Zn	Zr
22	110000	1000	32	15	32	70	2	226	9	15780	1	10	34	144	551
23	111750	1000	15	10	32	73	4	239	1	11230	1	3	23	129	413
24	110740	1260	10	12	33	75	6	248	4	10900	1	6	20	125	407
25	111770	1210	21	9	31	71	2	243	1	10990	2	10	22	127	442
26	74690	570	46	14	59	97	2	163	16	10070	31	34	101	757	356
27	77190	610	38	18	31	100	2	199	9	11390	2	17	44	212	553
28	101830	840	42	13	35	77	2	229	5	13230	4	10	34	185	490
29	117910	960	24	11	34	76	2	224	5	10730	1	7	24	135	387
30	113510	1010	19	12	35	81	5	232	5	10230	3	9	26	136	374
31	88190	750	43	14	32	78	4	221	7	12980	12	18	53	380	429
32	115340	780	15	13	34	74	2	212	5	11260	3	12	29	148	461
33	110630	950	7	9	31	68	2	237	2	11660	1	10	23	118	402
34	98240	940	20	13	35	90	2	224	5	10470	2	9	23	156	411
35	86430	1110	33	12	79	325	3	136	9	6700	4	45	21	289	304
36	83940	1110	34	11	78	325	2	139	10	6630	2	48	26	283	314
37	128550	860	24	11	36	74	2	213	4	11510	1	10	29	128	408
38	93940	1000	35	13	33	72	4	235	8	14400	6	15	34	294	413
39	121360	920	53	16	32	74	2	229	7	11320	1	8	22	123	375
40	93280	1020	60	13	36	74	4	229	8	14190	17	24	45	337	418
41	91480	1220	6	21	34	194	4	139	10	11330	3	10	24	224	392
42	113890	1810	13	30	67	343	15	77	13	11350	5	26	28	340	398

CHAPEL OF GARIOCH
MINUTEMAN AUGER DRILL SAMPLES
All elements in ppm

OBS	Sample number	Hole	Line	Depth cm	East	North	Ag	As	Ba	Bi	Ca	Ce	Cu
43	XMT 42.	20	2	15	372577	822849	1	7	611	5	9260	86	41
44	XMT 43.	20	2	60	372577	822849	5	1	668	2	5980	153	61
45	XMT 44.	20	2	200	372577	822849	2	2	606	2	6360	154	50
46	XMT 45.	21	2	15	372574	822898	5	7	659	2	15750	48	13
47	XMT 46.	21	2	70	372574	822898	3	5	608	4	5670	103	56
48	XMT 47.	22	2	15	372577	822949	2	6	658	1	21330	33	18
49	XMT 48.	22	2	50	372577	822949	5	8	816	1	19690	48	23
50	XMT 49.	22	2	270	372577	822949	1	9	697	1	12640	66	34
51	XMT 50.	22	2	450	372577	822949	4	7	692	1	8010	109	51
52	XMT 51.	22	2	500	372577	822949	2	6	571	1	10580	93	44
53	XMT 52.	23	2	15	372580	822995	1	4	646	1	19470	63	12
54	XMT 53.	23	2	30	372580	822995	2	1	697	2	19690	57	14
55	XMT 54.	23	2	220	372580	822995	4	4	804	1	23230	50	22
56	XMT 55.	24	2	15	372584	823047	1	1	711	3	18310	54	19
57	XMT 56.	24	2	100	372584	823047	1	2	694	1	20730	46	23
58	XMT 57.	24	2	120	372584	823047	1	5	778	1	20570	51	26
59	XMT 58.	24	2	300	372584	823047	2	9	733	1	20750	36	28
60	XMT 59.	25	2	100	372587	823100	3	1	714	1	17990	46	31
61	XMT 60.	25	2	200	372587	823100	3	4	714	1	21890	40	36
62	XMT 61.	26	2	20	372591	823147	1	1	791	1	15910	59	17
63	XMT 62.	26	2	180	372591	823147	3	5	708	1	21560	37	26

OBS	Fe	Mn	Mo	Nb	Ni	Rb	Sn	Sr	Th	Ti	U	W	Y	Zn	Zr
43	95090	1150	3	32	46	209	9	143	15	11970	3	25	30	207	615
44	102630	1050	8	44	60	240	14	134	17	11930	5	28	45	223	629
45	97040	1020	9	46	55	231	12	174	13	11490	5	42	49	179	650
46	106600	820	8	14	33	88	2	209	9	13030	5	7	18	115	538
47	157960	1300	12	52	86	336	16	78	17	12980	5	11	28	332	350
48	95920	910	3	14	30	70	4	225	6	12400	3	9	20	106	435
49	113240	1060	1	12	34	76	2	220	5	11780	2	7	21	104	460
50	88280	760	2	19	41	113	2	188	8	9380	1	8	23	121	421
51	105030	970	4	28	64	168	2	162	17	11300	1	11	40	167	434
52	100280	1060	1	24	159	141	2	147	10	10190	3	7	39	151	366
53	77830	890	1	19	28	70	2	215	5	17040	3	9	24	100	671
54	77360	890	2	21	29	67	2	229	5	17160	4	7	26	100	681
55	104500	900	4	13	29	65	2	221	4	12960	1	4	22	102	517
56	76920	670	1	15	27	67	3	216	6	11950	2	4	19	96	494
57	105250	800	1	12	32	65	2	215	5	11100	2	3	20	108	372
58	107320	860	1	12	33	67	2	217	7	11630	1	7	20	103	463
59	108090	860	1	13	38	74	2	209	3	11420	1	2	22	102	445
60	108400	760	3	15	33	78	2	210	6	11570	1	5	22	110	379
61	106010	820	2	13	33	69	2	224	5	12000	1	4	21	108	448
62	95560	780	4	15	27	68	5	205	7	11590	1	7	24	86	466
63	108420	860	1	11	32	65	3	219	5	10880	2	4	20	100	405

CHAPEL OF GARIOCH
MINUTEMAN AUGER DRILL SAMPLES
All elements in ppm

OBS	Sample number	Hole	Line	Depth cm	East	North	Ag	As	Ba	Bi	Ca	Ce	Cu
64	XMT 63.	26	2	300	372591	823147	4	6	758	1	20900	49	24
65	XMT 64.	26	2	400	372591	823147	1	8	721	1	16940	67	32
66	XMT 65.	27	2	20	372592	823199	2	2	660	1	19460	41	22
67	XMT 66.	27	2	100	372592	823199	2	4	669	2	20010	59	25
68	XMT 67.	27	2	200	372592	823199	1	6	701	1	21100	55	30
69	XMT 68.	27	2	300	372592	823199	6	7	696	1	16680	67	30
70	XMT 69.	27	2	400	372592	823199	2	6	722	2	13680	52	33
71	XMT 70.	28	2	15	372594	823249	1	6	660	1	18110	42	11
72	XMT 71.	28	2	100	372594	823249	1	5	640	1	18750	63	25
73	XMT 72.	28	2	200	372594	823249	3	6	760	1	18940	46	26
74	XMT 73.	28	2	300	372594	823249	1	6	714	1	12190	59	34
75	XMT 74.	28	2	350	372594	823249	1	7	724	1	10160	63	41
76	XMT 75.	29	2	15	372599	823304	1	4	624	2	18570	50	14
77	XMT 76.	30	3	15	372217	823024	1	7	713	1	17240	39	15
78	XMT 77.	30	3	100	372217	823024	2	4	798	1	16790	50	23
79	XMT 78.	30	3	200	372217	823024	2	13	713	1	14450	68	26
80	XMT 79.	30	3	300	372217	823024	3	14	708	1	13020	70	31
81	XMT 80.	31	3	20	372112	823024	4	5	639	2	19310	44	16
82	XMT 81.	31	3	100	372112	823024	3	10	754	1	17190	61	24
83	XMT 82.	31	3	200	372112	823024	1	20	847	2	13680	56	35
84	XMT 83.	31	3	300	372112	823024	2	13	738	3	13200	56	40

OBS	Fe	Mn	Mo	Nb	Ni	Rb	Sn	Sr	Th	Ti	U	W	Y	Zn	Zr
64	105900	870	1	10	30	66	4	231	5	11330	1	2	20	100	461
65	99460	810	1	14	36	86	2	201	10	10730	1	5	23	108	443
66	118200	930	1	12	28	55	2	210	4	11410	1	5	19	90	360
67	111430	940	1	9	32	64	2	212	4	10730	1	3	21	98	375
68	105440	1050	1	10	31	65	2	215	1	11270	3	8	19	99	404
69	95730	880	2	14	39	92	2	200	7	10160	1	6	26	109	429
70	89180	840	1	17	38	99	4	201	10	9300	2	7	24	112	416
71	113740	990	3	11	25	54	3	208	4	13040	3	7	19	84	477
72	104690	1340	1	15	33	72	2	203	8	11640	1	7	21	95	398
73	100140	950	1	15	33	82	2	211	5	11620	4	6	24	103	508
74	90190	760	2	20	40	109	2	189	10	9770	1	10	27	111	434
75	87170	710	1	15	45	111	2	210	9	8790	4	5	25	122	369
76	85000	960	2	17	25	57	3	204	6	16000	1	8	21	104	521
77	110470	990	3	13	23	57	2	212	1	14320	1	6	18	81	453
78	113060	860	3	16	31	73	4	221	3	13190	3	5	24	100	498
79	102700	780	2	18	36	100	4	209	7	11180	2	9	25	113	430
80	93200	690	1	15	41	106	3	201	7	9740	2	12	24	134	389
81	85860	810	6	17	23	60	2	218	2	15340	1	8	18	95	573
82	122770	810	6	13	33	72	2	210	4	11800	1	7	23	102	481
83	108060	870	10	16	38	109	3	199	7	11580	1	9	25	127	447
84	104720	860	7	17	42	118	3	188	12	10670	3	9	26	138	468

CHAPEL OF GARIOCH
MINUTEMAN AUGER DRILL SAMPLES
All elements in ppm

OBS	Sample number	Hole	Line	Depth cm	East	North	Ag	As	Ba	Bi	Ca	Ce	Cu
85	XMT 84.	32	3	20	372015	823023	3	12	628	1	17020	34	14
86	XMT 85.	32	3	100	372015	823023	2	4	767	1	19560	41	24
87	XMT 86.	32	3	200	372015	823023	5	10	819	1	20440	51	25
88	XMT 87.	32	3	250	372015	823023	5	12	744	2	18050	78	29
89	XMT 88.	33	3	15	372317	823025	3	10	776	2	16900	62	20
90	XMT 89.	33	3	100	372317	823025	2	6	804	1	18250	50	21
91	XMT 90.	33	3	200	372317	823025	4	8	825	1	20270	55	25
92	XMT 91.	34	3	15	372407	823017	2	5	706	1	16820	38	12
93	XMT 92.	34	3	100	372407	823017	2	1	712	1	21730	54	25
94	XMT 93.	35	3	15	372508	823019	1	5	742	1	18590	45	10
95	XMT 94.	35	3	100	372508	823019	2	1	755	1	22400	27	22
96	XMT 95.	35	3	200	372508	823019	2	9	796	1	19930	35	21
97	XMT 96.	35	3	300	372508	823019	3	9	778	1	19710	57	28
98	XMT 97.	36	4	50	373332	822332	4	7	504	12	15640	68	21
99	XMT 98.	37	4	40	373319	822358	3	11	554	6	13870	63	32
100	XMT 99.	38	4	50	373305	822385	3	13	515	10	11890	69	28
101	XMT 100	39	4	50	373289	822414	2	10	606	5	8340	65	26
102	XMT 101	40	4	40	373276	822443	3	13	525	4	14410	54	24
103	XMT 102	41	4	15	373264	822467	5	10	505	6	13860	50	18
104	XMT 103	41	4	150	373264	822467	2	12	367	5	10560	34	19
105	XMT 104	42	4	15	373254	822493	1	10	530	5	14370	54	17

OBS	Fe	Mn	Mo	Nb	Ni	Rb	Sn	Sr	Th	Ti	U	W	Y	Zn	Zr
85	104330	920	3	13	25	60	2	196	5	15000	1	11	19	93	533
86	107570	1370	1	15	30	67	5	229	3	12220	1	2	21	100	457
87	103420	1090	2	12	31	70	2	239	7	13670	1	8	21	99	522
88	101590	900	1	12	34	87	2	217	9	10830	1	5	23	111	422
89	112640	1620	2	11	28	61	2	215	3	13280	1	5	23	92	470
90	104710	1340	1	14	32	71	2	226	4	11990	1	7	21	100	484
91	106930	1330	1	11	33	69	2	235	2	12700	1	9	22	98	497
92	91100	1200	2	15	24	60	2	214	6	14180	1	10	20	100	539
93	98400	990	1	15	30	74	2	235	5	13000	1	10	23	107	420
94	85780	740	1	14	23	61	2	232	3	12810	1	4	20	86	557
95	107030	950	1	10	26	60	2	242	4	12600	2	6	20	103	460
96	109640	980	1	13	31	73	2	225	8	12120	1	6	22	104	471
97	101250	930	1	13	35	78	2	219	10	11310	1	6	25	106	454
98	79460	1420	16	15	18	211	15	181	16	10420	3	113	20	218	483
99	94570	1010	19	18	28	173	4	161	7	11450	2	27	20	236	512
100	88350	1060	23	18	30	213	7	138	11	10030	4	30	25	260	494
101	94940	1130	18	20	33	249	8	125	11	10530	5	29	28	167	603
102	95750	1250	13	17	23	122	6	159	7	13670	2	20	19	172	576
103	96380	1230	14	18	22	106	5	158	7	14950	4	20	19	153	661
104	80200	890	12	12	19	88	11	211	7	11120	3	15	21	153	594
105	94970	1280	17	14	21	100	2	163	5	12550	1	17	18	167	513

CHAPEL OF GARIOCH
MINUTEMAN AUGER DRILL SAMPLES
All elements in ppm

OBS	Sample number	Hole	Line	Depth cm	East	North	Ag	As	Ba	Bi	Ca	Ce	Cu
106	XMT 105	42	4	70	373254	822493	2	2	785	2	21630	57	28
107	XMT 106	42	4	100	373254	822493	4	4	771	3	21760	39	34
108	XMT 107	42	4	200	373254	822493	3	7	731	1	22170	49	27
109	XMT 108	43	4	15	373241	822518	1	7	647	2	17450	45	23
110	XMT 109	43	4	50	373241	822518	3	5	746	2	20640	45	29
111	XMT 110	43	4	100	373241	822518	1	4	723	1	21690	45	34
112	XMT 111	43	4	200	373241	822518	3	6	767	1	24690	24	28
113	XMT 112	44	5	30	373285	822265	4	11	463	13	9000	75	116
114	XMT 113	45	5	30	373271	822298	1	10	500	5	16440	62	17
115	XMT 114	46	5	30	373256	822329	1	14	494	4	13460	48	18
116	XMT 115	47	5	30	373243	822354	1	14	479	5	13800	47	17
117	XMT 116	48	5	30	373229	822383	3	15	485	5	14110	45	29
118	XMT 117	49	5	30	373213	822412	2	13	475	4	13750	36	26
119	XMT 118	50	5	50	373199	822440	2	10	547	10	12090	50	32
120	XMT 119	50	5	100	373199	822440	4	2	495	13	3020	154	75
121	XMT 120	50	5	125	373199	822440	2	1	446	15	3520	148	91
122	XMT 121	50	5	150	373199	822440	1	1	371	14	3800	108	93
123	XMT 122	51	5	15	373187	822468	3	9	636	4	18210	31	20
124	XMT 123	51	5	60	373187	822468	1	5	698	2	18740	33	26
125	XMT 124	51	5	100	373187	822468	4	7	728	1	19940	67	33
126	XMT 125	52	5	20	373174	822493	5	10	665	4	20660	47	20

OBS	Fe	Mn	Mo	Nb	Ni	Rb	Sn	Sr	Th	Ti	U	W	Y	Zn	Zr
106	104030	1270	1	14	31	83	2	235	3	12820	2	6	23	110	470
107	111690	1250	3	13	34	84	4	235	5	12290	1	10	22	118	409
108	105230	1160	3	13	31	82	2	242	4	10310	3	8	23	111	405
109	101120	1190	5	16	28	86	3	196	3	13740	1	9	18	122	464
110	104680	1410	2	13	31	83	3	228	6	11350	1	8	20	110	378
111	105230	1270	1	13	34	83	2	239	8	11120	1	6	21	111	373
112	106670	1260	1	10	30	74	2	260	4	11300	1	3	19	113	377
113	115590	1330	76	17	55	280	18	115	15	12470	1	52	38	315	1309
114	91130	1040	19	17	23	124	2	172	8	12250	3	28	18	181	491
115	92300	990	29	15	22	131	3	160	8	12250	2	23	19	201	453
116	96400	940	24	13	21	121	8	152	8	11440	3	24	20	172	465
117	96620	940	29	13	24	105	2	157	6	12070	7	22	30	193	486
118	98270	950	24	13	24	98	2	153	9	11860	8	16	27	190	485
119	98500	1300	44	15	24	154	10	144	10	13520	6	38	21	205	524
120	64170	4540	118	19	25	464	25	146	18	5240	5	83	28	385	371
121	100710	3000	161	25	25	442	23	115	21	6800	7	93	33	513	434
122	99010	1160	106	22	23	439	9	86	19	6640	6	96	27	537	404
123	98590	970	96	14	26	80	9	194	7	14350	3	15	21	177	485
124	122690	940	30	14	29	81	3	207	4	11590	1	9	19	120	365
125	121620	1310	22	12	33	94	3	214	7	10540	1	8	21	128	355
126	95870	910	90	13	25	79	2	216	6	13610	6	11	25	167	554

CHAPEL OF GARIOCH
MINUTEMAN AUGER DRILL SAMPLES
All elements in ppm

OBS	Sample number	Hole	Line	Depth cm	East	North	Ag	As	Ba	Bi	Ca	Ce	Cu
127	XMT 126	53	5	20	373159	822522	2	11	673	2	21290	17	20
128	XMT 127	53	5	30	373159	822522	1	11	715	4	20120	44	23
129	XMT 128	53	5	50	373159	822522	3	9	752	1	21340	61	27
130	XMT 129	53	5	100	373159	822522	2	8	751	3	22520	44	27
131	XMT 130	53	5	200	373159	822522	3	10	719	1	21860	59	26
132	XMT 131	53	5	300	373159	822522	5	10	733	1	22370	69	27
133	XMT 132	53	5	400	373159	822522	2	13	732	2	22070	58	29
134	XMT 133	54	6	30	373168	822157	1	13	393	5	15960	58	30
135	XMT 134	55	6	40	373155	822179	3	14	480	5	17220	42	23
136	XMT 135	56	6	50	373139	822212	3	14	497	3	16050	37	23
137	XMT 136	57	6	55	373129	822237	1	16	513	4	15680	26	22
138	XMT 137	58	6	60	373115	822266	3	13	504	4	15030	41	22
139	XMT 138	59	6	60	373102	822292	1	14	497	2	16630	27	20
140	XMT 139	60	6	20	373088	822317	1	13	527	4	14840	34	30
141	XMT 140	60	6	100	373088	822317	4	14	740	2	20740	46	27
142	XMT 141	60	6	160	373088	822317	2	11	806	3	23290	48	29
143	XMT 142	61	6	20	373073	822347	2	12	552	4	15200	36	21
144	XMT 143	61	6	100	373073	822347	4	8	653	1	21330	23	23
145	XMT 144	61	6	200	373073	822347	1	12	753	1	24710	29	25
146	XMT 145	62	6	20	373060	822375	1	16	703	2	22550	58	20
147	XMT 146	62	6	60	373060	822375	3	7	686	4	22620	37	28

OBS	Fe	Mn	Mo	Nb	Ni	Rb	Sn	Sr	Th	Ti	U	W	Y	Zn	Zr
127	100590	960	75	12	26	76	2	226	4	14180	6	9	23	165	531
128	105910	930	57	12	26	71	2	223	6	13370	4	6	21	142	500
129	111360	1170	13	14	32	80	2	231	7	11200	1	6	24	120	409
130	105240	1510	6	14	31	80	2	245	5	11270	3	10	22	113	430
131	105220	1120	2	15	31	79	2	240	6	11550	3	8	21	113	411
132	104550	1130	1	13	30	84	2	241	3	11110	1	6	21	114	405
133	109010	1130	2	11	34	82	5	236	3	10370	1	9	19	124	384
134	100790	1390	33	11	66	280	10	153	7	9800	1	30	21	256	341
135	100780	1520	24	12	39	178	8	165	9	13000	4	26	18	218	419
136	97090	1380	18	18	28	133	8	164	7	13170	1	20	19	195	440
137	96690	1460	27	15	27	148	2	161	9	13890	3	28	19	209	493
138	97250	1380	31	17	24	128	2	161	4	13820	1	22	21	189	478
139	100390	1390	33	17	22	110	8	160	7	13660	3	17	20	171	511
140	101010	1580	31	15	25	99	2	169	7	13230	2	14	19	181	463
141	105280	1180	8	12	33	85	2	239	4	11020	1	15	24	132	385
142	108370	1300	13	11	33	77	4	252	4	10790	1	8	24	124	420
143	99870	1340	51	14	25	89	4	182	7	13620	6	16	21	184	468
144	117550	1260	147	9	29	69	2	231	2	12370	1	7	22	117	381
145	114600	1040	51	11	30	67	2	246	2	10890	1	7	21	112	408
146	108060	1800	277	13	25	66	4	243	5	14140	1	7	23	111	452
147	110690	1270	205	9	28	64	2	241	8	12800	3	7	23	109	393

CHAPEL OF GARIOCH
MINUTEMAN AUGER DRILL SAMPLES
All elements in ppm

OBS	Sample number	Hole	Line	Depth cm	East	North	Ag	As	Ba	Bi	Ca	Ce	Cu
148	XMT 147	62	6	100	373060	822375	5	8	760	2	25990	55	30
149	XMT 148	62	6	200	373060	822375	2	12	690	1	26770	50	27
150	XMT 149	63	6	20	373042	822402	5	12	702	5	21230	27	13
151	XMT 150	63	6	40	373042	822402	3	9	675	3	20100	32	24
152	XMT 151	63	6	100	373042	822402	4	21	654	3	21210	41	28
153	XMT 152	64	6	20	373027	822429	1	16	669	2	20850	45	15
154	XMT 153	64	6	100	373027	822429	3	12	698	2	24620	62	26
155	XMT 154	64	6	200	373027	822429	1	14	711	1	24990	61	25
156	XMT 155	65	6	20	373014	822454	2	14	588	3	18790	43	16
157	XMT 156	66	7	25	373104	822115	1	13	428	7	17920	56	27
158	XMT 157	67	7	60	373093	822143	1	13	414	4	3390	81	36
159	XMT 158	68	7	40	373078	822172	1	14	492	7	17320	39	19
160	XMT 159	69	7	20	373063	822198	4	15	490	3	15810	46	18
161	XMT 160	70	7	30	373048	822224	4	14	472	6	16910	54	23
162	XMT 161	71	7	30	373035	822252	3	12	512	3	16780	44	21
163	XMT 162	72	7	20	373021	822280	3	19	498	3	15610	27	18
164	XMT 163	72	7	50	373021	822280	1	17	590	2	18750	56	20
165	XMT 164	72	7	100	373021	822280	1	18	668	5	17330	38	28
166	XMT 165	73	7	20	373007	822307	1	18	654	2	17960	37	16
167	XMT 166	73	7	100	373007	822307	2	7	705	6	22610	46	26
168	XMT 167	73	7	120	373007	822307	4	9	668	4	23420	54	31

OBS	Fe	Mn	Mo	Nb	Ni	Rb	Sn	Sr	Th	Ti	U	W	Y	Zn	Zr
148	112050	1080	131	11	31	72	2	248	4	11890	3	5	21	116	418
149	107480	1080	58	9	29	69	2	252	8	11150	1	7	20	111	387
150	106420	1640	298	13	25	71	2	231	6	14200	9	13	24	117	503
151	116880	1240	189	11	29	67	3	224	4	12350	9	9	20	102	383
152	117240	1160	181	10	31	73	2	222	5	11420	2	10	22	111	372
153	106060	1480	149	15	26	70	3	219	7	14220	3	11	19	115	423
154	108300	1340	16	8	31	68	2	237	2	10720	2	5	23	114	380
155	115160	1200	12	11	31	75	2	248	4	9970	1	6	19	113	363
156	101810	1370	79	15	25	70	2	195	5	12980	3	10	19	142	390
157	105960	1420	27	13	58	231	8	157	4	10880	3	32	19	199	346
158	71370	760	47	19	32	648	19	58	16	6570	5	29	32	393	406
159	97270	1610	18	14	33	149	7	164	7	13640	2	22	19	194	443
160	98470	1510	18	16	27	128	2	163	5	13340	1	18	18	187	445
161	95180	1500	21	15	25	110	5	166	9	13760	2	15	19	176	464
162	97200	1410	19	12	24	100	4	173	9	13750	1	14	18	162	457
163	95180	1470	25	16	22	91	2	168	7	14680	2	10	17	164	481
164	96110	1160	18	12	28	84	4	215	5	13990	1	8	21	144	462
165	118720	1160	221	12	31	91	3	213	8	12060	11	13	23	138	406
166	107860	1100	144	12	27	70	2	206	4	12460	3	10	17	115	432
167	107610	810	144	11	31	70	2	232	8	11560	15	9	22	112	392
168	108100	830	186	10	33	79	2	235	2	10780	42	13	23	128	408

CHAPEL OF GARIOCH
MINUTEMAN AUGER DRILL SAMPLES
All elements in ppm

OBS	Sample number	Hole	Line	Depth cm	East	North	Ag	As	Ba	Bi	Ca	Ce	Cu
169	XMT 168	73	7	200	373007	822307	4	12	628	6	19290	56	34
170	XMT 169	74	7	20	372993	822334	2	4	761	2	21500	37	20
171	XMT 170	74	7	100	372993	822334	3	13	713	1	25320	48	27
172	XMT 171	74	7	200	372993	822334	1	16	693	1	26900	47	29
173	XMT 172	74	7	300	372993	822334	4	20	709	2	26530	27	27
174	XMT 173	75	7	20	372979	822364	4	11	687	3	19400	40	15
175	XMT 174	75	7	100	372979	822364	3	13	832	1	23470	37	23
176	XMT 175	75	7	200	372979	822364	4	17	743	1	25100	50	29
177	XMT 176	76	7	25	372970	822390	3	12	557	3	17530	39	14
178	XMT 177	77	8	40	373045	822071	3	13	551	3	19120	48	29
179	XMT 178	78	8	60	373032	822095	1	16	508	3	17670	31	25
180	XMT 179	79	8	40	373019	822122	3	11	500	5	11650	46	21
181	XMT 180	80	8	50	373005	822153	2	15	509	5	15570	28	20
182	XMT 181	81	8	40	372989	822182	4	17	616	1	17160	47	26
183	XMT 182	81	8	90	372989	822182	5	16	686	2	17460	33	28
184	XMT 183	82	8	30	372975	822210	1	17	497	3	14800	30	22
185	XMT 184	83	8	25	372963	822235	1	15	515	3	16670	40	20
186	XMT 185	84	8	60	372947	822262	3	9	665	1	20480	48	25
187	XMT 186	84	8	100	372947	822262	3	14	689	2	22270	40	27
188	XMT 187	84	8	170	372947	822262	5	20	723	1	24930	42	33
189	XMT 191	86	9	15	372805	823481	4	19	333	5	10870	36	12

OBS	Fe	Mn	Mo	Nb	Ni	Rb	Sn	Sr	Th	Ti	U	W	Y	Zn	Zr
169	98740	900	84	14	37	130	7	226	5	10110	25	19	29	227	426
170	121700	1800	163	11	28	54	2	239	5	11990	4	9	22	97	375
171	114630	1250	68	13	31	73	2	246	5	11190	7	7	22	119	400
172	107190	1100	12	11	32	74	2	253	5	11150	3	12	21	117	390
173	104380	1080	19	11	32	76	2	249	5	10650	1	8	22	116	396
174	99860	1170	52	13	26	72	2	220	3	12800	3	5	19	110	455
175	111630	1300	10	8	30	58	2	242	1	11320	1	7	27	109	490
176	106710	1150	13	13	35	75	4	250	7	10990	2	10	21	121	413
177	88490	1000	44	13	25	77	2	195	5	13820	5	11	18	139	451
178	98530	1350	15	16	32	116	2	185	5	13300	3	17	19	169	422
179	95170	1240	14	18	29	115	6	185	6	12360	2	12	20	182	418
180	83780	1320	31	17	30	379	6	172	7	10400	3	18	22	257	452
181	97790	1490	23	15	24	127	4	168	6	14670	2	16	19	176	491
182	104520	1090	3	14	33	88	2	191	3	12000	1	15	16	135	380
183	106490	1090	4	11	32	93	5	204	4	11240	1	16	18	127	382
184	98370	1320	19	12	25	103	4	161	9	11510	2	17	17	170	407
185	97810	1180	22	11	24	84	2	171	5	14150	5	12	18	146	464
186	109050	1040	87	14	29	76	2	225	4	12630	20	12	23	106	393
187	108380	1300	60	13	31	80	8	234	5	12160	22	9	23	118	398
188	106670	1080	19	12	33	84	10	247	4	10950	13	13	22	121	388
189	102370	910	14	14	16	100	2	118	8	12340	5	18	17	125	328

CHAPEL OF GARIOCH
MINUTEMAN AUGER DRILL SAMPLES
All elements in ppm

OBS	Sample number	Hole	Line	Depth cm	East	North	Ag	As	Ba	Bi	Ca	Ce	Cu
190	XMT 192	86	9	50	372805	823481	3	17	341	46	12830	39	30
191	XMT 193	86	9	70	372805	823481	4	1	642	1	25350	32	29
192	XMT 194	86	9	100	372805	823481	4	9	631	3	27620	22	30
193	XMT 195	86	9	200	372805	823481	5	8	669	1	28850	54	26
194	XMT 196	86	9	300	372805	823481	1	7	653	1	28320	51	28
195	XMT 197	86	9	400	372805	823481	4	6	706	1	22940	37	24
196	XMT 198	87	9	15	372729	823416	1	6	636	1	22560	55	20
197	XMT 199	87	9	50	372729	823416	1	1	694	1	22990	31	25
198	XMT 200	87	9	70	372729	823416	2	1	625	1	25490	31	23
199	XMT 201	87	9	100	372729	823416	2	6	674	1	21890	42	21
200	XMT 202	87	9	200	372729	823416	1	7	658	1	22890	45	28
201	XMT 203	87	9	300	372729	823416	3	4	669	1	23040	59	27
202	XMT 204	88	9	30	372649	823356	3	5	647	1	19860	35	16
203	XMT 205	88	9	50	372649	823356	1	3	652	1	18460	48	27
204	XMT 206	88	9	100	372649	823356	4	11	672	1	19080	59	27
205	XMT 207	88	9	200	372649	823356	3	7	713	1	20200	44	27
206	XMT 208	88	9	300	372649	823356	3	3	702	1	11720	59	40
207	XMT 209	88	9	360	372649	823356	1	3	742	1	5130	104	31
208	XMT 210	89	10	30	373250	821994	5	10	439	10	19920	35	37
209	XMT 211	90	10	30	373240	822018	3	11	380	7	23580	28	28
210	XMT 212	91	10	60	373225	822044	2	7	301	6	23170	14	33

OBS	Fe	Mn	Mo	Nb	Ni	Rb	Sn	Sr	Th	Ti	U	W	Y	Zn	Zr
190	90560	930	69	20	18	155	7	134	28	12880	6	29	26	182	385
191	117830	1150	3	11	31	48	2	220	6	14280	1	3	20	103	375
192	108590	1050	1	10	32	53	8	239	4	10950	1	3	19	104	324
193	112760	1180	4	6	31	51	2	242	2	11820	1	3	19	96	333
194	103140	1160	1	11	30	59	2	256	3	12370	1	6	20	92	372
195	99460	1100	1	16	31	71	2	238	9	12480	1	2	22	94	523
196	98870	1580	1	13	25	54	2	234	3	15560	1	6	20	99	467
197	108580	2880	1	13	31	56	2	225	6	13360	1	6	18	103	368
198	104280	2090	2	12	29	54	2	228	6	14070	1	2	17	108	362
199	103320	1350	2	14	32	69	2	221	4	11540	1	2	21	107	379
200	102930	1190	2	15	32	69	2	232	3	11030	3	4	21	102	401
201	104590	1250	2	14	33	70	2	226	4	12610	1	8	21	100	459
202	85150	960	5	14	27	54	2	213	3	15410	1	8	22	106	524
203	92110	810	1	14	33	81	9	211	7	13370	2	6	22	106	473
204	103060	980	1	17	34	80	3	206	7	11620	1	6	23	104	458
205	96370	880	2	16	36	76	6	211	6	11440	1	4	24	105	511
206	94860	670	3	14	46	133	3	184	9	8900	5	6	26	117	342
207	94340	510	4	19	64	232	3	143	12	7460	6	5	33	135	241
208	111180	1500	53	8	61	250	9	157	9	10550	1	61	19	277	272
209	104160	1520	27	13	47	161	13	178	5	11690	2	40	19	203	300
210	109090	1570	55	7	58	262	10	160	6	8990	1	57	25	259	192

CHAPEL OF GARIOCH
MINUTEMAN AUGER DRILL SAMPLES
All elements in ppm

OBS	Sample number	Hole	Line	Depth cm	East	North	Ag	As	Ba	Bi	Ca	Ce	Cu
211	XMT 213	92	10	30	373211	822069	5	12	464	17	20460	52	30
212	XMT 214	93	10	30	373197	822099	5	10	454	5	20770	39	46
213	XMT 215	94	10	30	373185	822125	2	11	364	6	16740	39	27
214	XMT 216	95	11	40	373194	821954	3	18	588	6	16570	45	24
215	XMT 217	95	11	100	373194	821954	1	1	239	4	30930	31	33
216	XMT 218	96	11	30	373178	821979	4	14	530	2	18790	27	25
217	XMT 219	96	11	100	373178	821979	2	1	356	4	37910	22	31
218	XMT 220	96	11	150	373178	821979	2	3	469	8	27170	10	45
219	XMT 221	97	11	100	373160	822007	2	15	530	4	17680	45	21
220	XMT 222	98	11	80	373147	822034	2	14	561	3	19560	41	19
221	XMT 223	99	11	60	373133	822057	1	13	571	3	18050	53	32
222	XMT 224	100	11	30	373119	822084	2	15	476	3	18780	35	24
223	XMT 225	101	12	40	373134	821904	3	18	460	7	13060	43	17
224	XMT 226	102	12	25	373119	821926	2	17	466	5	16870	48	23
225	XMT 227	103	12	50	373104	821956	1	20	393	3	16670	50	22
226	XMT 228	104	12	50	373090	821985	3	13	362	5	22180	39	39
227	XMT 229	105	12	50	373076	822008	1	15	584	2	16360	60	24
228	XMT 230	105	12	100	373076	822008	2	1	239	18	33020	12	71
229	XMT 231	106	12	50	373061	822037	2	17	592	3	16750	40	23
230	XMT 232	106	12	80	373061	822037	3	14	586	15	15050	33	27
231	XMT 233	106	12	100	373061	822037	1	1	436	16	14280	38	31

OBS	Fe	Mn	Mo	Nb	Ni	Rb	Sn	Sr	Th	Ti	U	W	Y	Zn	Zr
211	102140	1430	51	13	32	171	15	181	13	13310	1	65	17	292	401
212	109740	1590	21	14	42	116	6	175	5	14950	1	24	21	212	347
213	96020	1230	56	14	47	271	7	157	10	9950	5	74	22	250	311
214	104800	1220	10	15	37	131	2	191	8	12650	1	25	17	135	395
215	113330	1630	37	5	149	409	10	336	3	4570	1	24	16	145	52
216	107790	1280	9	12	56	122	3	166	2	11040	2	21	19	176	326
217	117180	2040	16	4	173	207	14	120	1	5220	2	40	24	212	47
218	123490	2090	29	3	198	241	11	132	3	5930	2	47	29	295	48
219	97650	1330	11	16	32	104	2	181	6	13420	1	18	18	166	446
220	86520	1070	11	14	27	103	4	209	7	10840	1	18	21	121	467
221	96120	1130	9	13	35	104	4	187	7	12170	1	16	22	141	394
222	94670	1230	12	13	29	110	2	174	4	13680	2	21	19	164	445
223	96110	1240	15	18	24	151	2	146	10	15120	3	25	19	141	498
224	97250	1330	13	17	34	140	7	168	9	12830	3	22	18	165	411
225	100100	1270	15	11	32	147	2	158	2	13080	4	21	17	153	377
226	111540	1600	14	11	54	207	3	179	5	10130	2	30	20	171	276
227	106980	1140	4	13	31	97	7	191	6	12210	1	12	17	136	410
228	123620	1900	24	6	114	352	25	198	5	6530	1	47	23	150	69
229	104100	1290	11	12	31	109	2	194	7	12800	1	17	19	154	428
230	103750	1380	13	15	53	264	11	177	9	11250	2	22	18	298	297
231	108350	1790	28	18	109	503	22	147	8	7710	1	36	20	652	97

CHAPEL OF GARIOCH
MINUTEMAN AUGER DRILL SAMPLES
All elements in ppm

OBS	Sample number	Hole	Line	Depth cm	East	North	Ag	As	Ba	Bi	Ca	Ce	Cu
232	XMT 234	106	12	150	373061	822037	1	1	372	4	8420	22	31
233	XMT 235	106	12	200	373061	822037	4	1	244	1	21560	9	29
234	XMT 236	107	13	50	373066	821854	3	27	549	5	10210	59	24
235	XMT 237	107	13	100	373066	821854	3	19	558	188	3960	62	37
236	XMT 238	108	13	80	373052	821883	1	3	429	9	10180	37	43
237	XMT 239	108	13	130	373052	821883	2	1	294	4	26590	20	61
238	XMT 240	108	13	150	373052	821883	1	2	544	4	16040	50	42
239	XMT 241	109	13	60	373039	821910	4	22	554	6	13900	44	26
240	XMT 242	110	13	60	373026	821933	1	25	612	4	13590	44	24
241	XMT 243	110	13	70	373026	821933	4	24	617	3	13860	55	27
242	XMT 244	111	13	30	373013	821965	1	18	479	3	15880	38	26
243	XMT 188	112	13	100	373000	821994	1	15	491	4	17110	31	26
244	XMT 189	113	13	20	372988	822023	1	8	869	1	21150	52	18
245	XMT 190	114	13	20	372977	822045	2	1	809	1	23490	53	24
246	XMT 245	115	14	60	373544	822124	2	12	481	4	15080	39	23
247	XMT 246	116	14	60	373531	822154	2	8	630	2	16020	40	23
248	XMT 247	117	14	60	373519	822182	2	10	695	6	7500	58	27
249	XMT 248	118	14	30	373505	822208	1	15	438	9	12910	37	18
250	XMT 249	119	14	60	373490	822235	2	1	909	9	5610	132	65
251	XMT 250	120	14	30	373479	822259	2	12	593	5	16150	40	30
252	XMT 251	121	14	50	373465	822289	4	1	881	4	9020	105	51

OBS	Fe	Mn	Mo	Nb	Ni	Rb	Sn	Sr	Th	Ti	U	W	Y	Zn	Zr
232	103810	2120	81	11	99	456	23	151	3	7560	3	117	15	397	70
233	116320	2070	51	3	121	244	9	170	3	6120	2	51	23	331	54
234	103560	1100	10	14	31	115	3	179	5	11880	2	19	17	158	427
235	93320	1320	19	13	44	613	22	121	71	7800	1	111	22	622	289
236	98010	1070	28	14	64	352	3	150	11	8910	3	35	32	218	283
237	128950	1740	18	4	114	240	4	173	1	7450	2	31	34	188	68
238	103560	1310	18	7	87	354	4	155	9	6420	3	43	36	179	208
239	98050	1320	16	13	32	138	3	168	9	13320	1	20	20	187	443
240	93630	1090	5	15	33	111	4	184	7	9860	1	15	19	155	366
241	93650	1090	7	15	31	108	2	190	8	11330	1	15	17	141	400
242	99890	1330	13	12	31	141	6	168	7	12370	4	18	16	159	395
243	102840	1460	23	15	41	205	4	159	5	12560	2	25	20	161	359
244	99050	1250	4	12	27	54	3	221	4	15640	1	2	20	101	492
245	105400	1190	3	8	29	50	4	228	6	14740	1	2	21	97	407
246	97580	1220	14	14	23	103	9	153	6	15530	1	18	18	183	500
247	90180	1030	6	14	29	113	6	194	4	11130	4	22	18	131	426
248	70120	630	10	14	19	275	11	143	15	9110	1	77	20	175	518
249	78370	940	13	13	19	152	5	137	8	12180	7	60	21	167	445
250	93220	1170	18	19	47	485	5	205	20	7270	5	127	37	374	160
251	93220	1210	10	13	27	134	7	184	10	12930	3	34	19	166	491
252	63160	900	8	23	39	395	14	213	16	5990	5	104	24	183	360

CHAPEL OF GARIOCH
MINUTEMAN AUGER DRILL SAMPLES
All elements in ppm

OBS	Sample number	Hole	Line	Depth cm	East	North	Ag	As	Ba	Bi	Ca	Ce	Cu
253	XMT 252	122	14	25	373450	822318	5	14	503	14	12240	58	89
254	XMT 253	123	15	40	373500	821981	8	40	370	8	760	56	180
255	XMT 254	124	15	60	373480	822011	1	10	458	23	1910	83	82
256	XMT 255	125	15	40	373461	822034	1	9	69	12	1130	11	30
257	XMT 256	126	15	50	373442	822061	1	5	217	4	1110	29	27
258	XMT 257	127	15	30	373425	822089	2	7	766	4	6270	54	33
259	XMT 258	128	15	60	373407	822112	2	9	551	5	13840	38	36
260	XMT 259	129	15	30	373392	822135	1	13	434	6	17800	34	24
261	XMT 260	130	15	50	373375	822163	1	11	397	12	21300	36	43
262	XMT 261	131	16	30	373271	822003	2	15	477	12	18850	30	26
263	XMT 262	132	16	100	373292	822015	2	1	222	15	23760	25	110
264	XMT 263	133	16	40	373322	822030	4	10	440	10	14590	60	47
265	XMT 264	133	16	100	373322	822030	5	1	306	2	28830	50	57
266	XMT 265	134	16	70	373348	822046	1	11	690	3	18790	47	29
267	XMT 266	134	16	100	373348	822046	1	2	599	21	33680	92	38
268	XMT 267	135	16	80	373376	822058	3	3	844	12	4160	94	86
269	XMT 268	136	16	30	373400	822072	6	12	500	25	13080	29	27
270	XMT 269	137	16	30	373425	822089	1	18	494	14	11660	45	19
271	XMT 270	138	.	20	372763	821577	1	13	539	5	12930	51	32
272	XMT 271	138	.	70	372763	821577	1	6	671	8	14790	60	38
273	XMT 272	139	.	50	372592	821816	2	11	629	6	14800	67	35

OBS	Fe	Mn	Mo	Nb	Ni	Rb	Sn	Sr	Th	Ti	U	W	Y	Zn	Zr
253	102080	1060	31	17	56	180	9	183	12	9910	8	81	26	244	1527
254	90060	3310	48	11	24	402	32	72	7	4690	4	29	24	350	743
255	61120	390	25	18	18	417	16	81	29	7250	3	49	29	212	652
256	41220	170	48	8	9	153	11	32	10	7460	3	50	8	79	686
257	81820	370	13	15	25	255	8	33	14	6850	2	32	24	206	538
258	62180	550	19	16	29	300	13	149	14	7310	6	30	22	243	618
259	107380	1150	16	18	31	182	5	191	11	11600	1	49	24	336	537
260	98510	1470	16	14	36	131	3	169	6	13090	2	34	18	214	420
261	102140	1670	31	11	45	173	16	179	8	10560	2	72	22	292	312
262	101140	1340	27	17	31	167	13	161	13	13210	4	59	17	249	422
263	130340	1800	78	3	103	444	31	87	5	6660	4	119	26	891	76
264	104330	1480	88	10	45	336	6	141	8	9750	1	57	19	282	294
265	113530	1610	27	4	97	159	8	205	3	6110	1	22	28	232	89
266	99240	1260	10	13	41	119	10	212	7	11660	1	65	18	197	384
267	100460	2980	25	13	57	193	67	252	17	6130	2	489	24	476	311
268	80250	1560	59	22	43	465	24	155	17	8670	1	108	25	684	533
269	81920	1070	21	16	23	232	27	143	16	11270	3	134	21	300	487
270	79630	850	25	16	18	196	10	129	16	12310	2	75	21	185	589
271	89150	820	5	18	32	143	9	170	9	11270	3	26	22	153	410
272	99890	1100	3	14	40	172	3	202	10	10740	3	34	29	168	367
273	101910	1110	4	17	47	165	8	194	12	11850	2	27	23	180	411

CHAPEL OF GARIOCH
MINUTEMAN AUGER DRILL SAMPLES
All elements in ppm

OBS	Sample number	Hole	Line	Depth cm	East	North	Ag	As	Ba	Bi	Ca	Ce	Cu
274	XMT 273	139	.	100	372592	821816	3	4	880	2	9380	73	28
275	XMT 274	139	.	200	372592	821816	2	1	826	3	10140	84	38
276	XMT 275	139	.	300	372592	821816	4	2	772	13	4280	93	63
277	XMT 276	140	.	40	372531	822286	4	34	548	3	13850	60	24
278	XMT 277	140	.	100	372531	822286	2	16	653	5	18930	60	31
279	XMT 278	140	.	170	372531	822286	3	14	657	4	17820	54	31
280	XMT 279	141	.	100	372487	822290	3	14	633	7	20980	58	33
281	XMT 280	141	.	170	372487	822290	1	15	684	17	17640	57	38
282	XMT 281	142	17	50	373432	822023	5	11	198	10	1990	26	66
283	XMT 282	143	17	100	373404	822004	3	3	391	98	1190	43	133
284	XMT 283	144	17	80	373384	821986	5	5	326	12	7620	47	21
285	XMT 284	145	17	80	373357	821969	3	5	416	10	2210	39	26
286	XMT 285	146	17	70	373329	821949	2	1	127	22	280	39	21
287	XMT 286	147	17	70	373307	821931	1	5	149	14	1660	27	22
288	XMT 287	148	17	70	373282	821913	1	8	299	9	1050	81	17
289	XMT 288	149	15	50	373518	821959	1	3	406	2	2600	43	29
290	XMT 289	150	15	50	373536	821936	1	4	509	2	5960	71	19
291	XMT 290	151	15	50	373556	821911	2	5	440	1	9440	79	38
292	XMT 291	152	15	50	373570	821888	1	9	251	9	15260	23	20
293	XMT 292	153	15	50	373591	821862	1	15	81	5	14440	8	8
294	XMT 293	154	15	50	373606	821836	1	9	208	6	14440	58	31

OBS	Fe	Mn	Mo	Nb	Ni	Rb	Sn	Sr	Th	Ti	U	W	Y	Zn	Zr
274	86020	980	7	19	127	215	7	155	15	7540	3	18	23	246	354
275	78310	660	4	19	84	222	10	148	15	8090	5	30	25	210	445
276	79940	490	3	22	67	363	18	96	21	8120	2	45	33	212	542
277	89100	1400	99	12	28	96	8	186	9	8900	4	28	28	109	341
278	94410	1200	38	14	37	104	4	214	8	10860	6	12	27	131	412
279	101220	1140	27	15	38	107	2	205	9	9670	2	15	26	125	391
280	95680	860	77	15	35	101	2	231	9	12190	1	30	29	141	461
281	83580	770	59	15	34	132	5	213	15	10850	4	33	34	161	491
282	86810	830	110	9	31	237	21	37	11	5860	2	28	20	207	563
283	105310	1090	134	17	29	938	110	65	49	8140	7	60	10	327	250
284	60650	800	54	10	17	391	19	156	13	9320	3	34	11	71	769
285	27660	1390	26	8	23	487	21	104	13	4520	1	26	15	76	712
286	14200	230	111	8	9	235	9	21	14	2640	3	16	17	71	554
287	41580	400	208	11	14	327	5	92	13	6480	3	192	15	50	745
288	37900	450	63	12	19	370	7	59	12	3740	1	51	15	131	712
289	61350	550	9	12	26	231	7	67	14	5230	1	14	23	340	582
290	65220	600	5	13	29	232	4	122	13	7870	2	13	18	273	642
291	92910	740	4	19	61	158	2	149	13	8020	2	7	24	230	414
292	85990	710	5	12	22	139	11	146	10	9710	3	78	18	176	318
293	103980	510	6	5	13	73	5	86	6	12620	3	16	10	113	217
294	91760	710	4	19	32	135	2	188	12	7720	1	14	21	153	270

CHAPEL OF GARIOCH
MINUTEMAN AUGER DRILL SAMPLES
All elements in ppm

OBS	Sample number	Hole	Line	Depth cm	East	North	Ag	As	Ba	Bi	Ca	Ce	Cu
295	XMT 294	155	15	50	373621	821817	2	6	312	7	23890	36	100
296	XMT 295	156	18	30	373760	821939	3	11	597	5	19020	40	26
297	XMT 296	156	18	100	373760	821939	1	1	646	11	6750	25	192
298	XMT 297	156	18	200	373760	821939	1	2	730	7	7070	16	207
299	XMT 298	157	18	30	373743	821968	2	7	624	8	14290	42	58
300	XMT 299	157	18	100	373743	821968	5	1	459	7	11410	44	194
301	XMT 300	157	18	150	373743	821968	3	1	377	4	15570	43	220
302	XMT 301	158	18	30	373731	821989	1	11	589	2	21160	62	25
303	XMT 302	158	18	100	373731	821989	2	1	639	53	16870	84	96
304	XMT 303	159	18	70	373718	822019	7	11	550	11	10930	51	42
305	XMT 304	160	18	40	373706	822049	3	12	469	9	13110	53	32
306	XMT 305	161	18	40	373691	822076	1	15	499	6	11610	37	28
307	XMT 306	162	18	30	373681	822105	2	13	471	6	13020	43	26
308	XMT 311	200	20	50	372920	822280	4	15	688	3	24010	59	28
309	XMT 312	201	20	50	372940	822290	2	13	642	3	22890	57	31
310	XMT 313	202	20	50	372950	822300	2	14	656	7	18730	82	46
311	XMT 314	203	20	50	372970	822310	3	13	712	51	17560	60	53
312	XMT 315	204	20	50	372980	822320	1	13	641	30	17160	79	49
313	XMT 316	205	20	50	373010	822330	3	18	678	9	21610	67	40
314	XMT 317	206	20	50	372900	822270	4	21	658	7	21590	60	34
315	XMT 318	207	20	50	372880	822260	4	17	653	16	13780	83	66

OBS	Fe	Mn	Mo	Nb	Ni	Rb	Sn	Sr	Th	Ti	U	W	Y	Zn	Zr
295	103320	1360	3	11	71	154	10	192	9	10450	2	11	28	216	409
296	97110	1270	6	13	32	90	6	200	6	13910	1	15	18	177	473
297	114490	1470	6	11	70	411	12	91	8	8470	4	37	17	310	158
298	118820	1390	5	8	82	458	12	96	10	8670	2	28	20	335	117
299	95190	1280	23	18	36	184	5	180	9	14320	3	40	23	334	609
300	140990	1360	16	20	98	109	6	114	7	21340	1	27	29	586	275
301	142460	1540	8	17	111	64	4	120	8	21750	2	16	33	575	224
302	95560	1250	4	13	28	81	4	221	8	13890	1	17	20	176	514
303	93720	1630	3	17	35	201	38	197	27	8170	2	295	18	464	303
304	90570	1440	8	18	37	160	7	139	9	11060	3	33	23	374	430
305	86430	1190	9	15	26	131	5	147	9	12640	2	21	21	236	478
306	87350	1130	13	15	23	143	6	136	9	12780	4	23	21	199	484
307	84480	1140	18	15	23	131	2	150	9	13100	5	25	23	188	512
308	106100	1030	13	10	35	87	10	240	9	8560	15	9	25	139	428
309	104070	990	17	11	33	93	6	244	10	8580	13	21	31	173	441
310	100460	980	43	16	37	165	14	218	11	8460	18	34	28	254	438
311	97780	1090	83	13	42	218	18	212	22	7920	25	67	35	356	473
312	97150	950	132	18	40	214	8	213	16	8230	35	40	31	435	497
313	107930	860	161	10	38	103	8	220	7	8650	17	20	29	213	433
314	103920	930	29	13	36	103	6	231	10	8360	15	13	28	148	412
315	91030	1120	108	16	42	527	27	158	15	7770	17	37	37	253	340

CHAPEL OF GARIOCH
MINUTEMAN AUGER DRILL SAMPLES
All elements in ppm

OBS	Sample number	Hole	Line	Depth cm	East	North	Ag	As	Ba	Bi	Ca	Ce	Cu
316	XMT 319	208	20	50	372860	822240	3	12	320	18	11010	131	73
317	XMT 320	209	20	50	372840	822230	3	12	504	7	12270	71	60

OBS	Fe	Mn	Mo	Nb	Ni	Rb	Sn	Sr	Th	Ti	U	W	Y	Zn	Zr
316	78150	920	345	22	46	697	14	52	27	5870	26	17	43	325	413
317	108690	1040	321	20	42	337	12	141	20	8750	33	17	43	294	683

TABLE 2

CHAPEL OF GARIOCH

GAS PIPELINE TRENCH SAMPLES

SUMMARY STATISTICS AND LISTING OF XRF ANALYSES

CHAPEL OF GARIOCH
SAMPLES FROM GAS PIPELINE TRENCH
SUMMARY STATISTICS
All elements in ppm

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE	STD ERROR OF MEAN
TI	41	4811.22	4788.70	310.00	23260.00	747.87
FE	41	58364.14	34952.96	14130.00	173110.00	5458.74
CA	41	6749.76	9164.60	270.00	46100.00	1431.27
MN	41	1110.24	1234.70	180.00	6300.00	192.83
AG	41	1.76	1.30	1.00	6.00	0.20
AS	41	5.73	3.99	1.00	20.00	0.62
BA	41	514.59	315.39	38.00	1290.00	49.26
BI	41	7.44	17.19	1.00	86.00	2.69
CE	41	59.74	27.22	5.50	140.00	4.25
CU	41	57.49	54.89	16.00	275.00	8.57
MO	41	7.02	20.53	1.00	130.00	3.21
NB	41	13.29	9.08	5.00	51.00	1.42
NI	41	33.10	24.32	6.00	99.00	3.80
PB	41	57.68	60.49	6.00	266.00	9.45
RB	41	234.22	175.10	52.00	943.00	27.35
SB	41	2.33	1.28	1.50	6.00	0.20
SN	41	17.61	36.79	2.00	201.00	5.74
SR	41	114.10	83.27	14.00	387.00	13.01
TH	41	14.54	8.26	5.00	44.00	1.29
U	41	3.02	2.47	1.00	11.00	0.39
W	41	22.65	32.17	1.50	122.00	5.02
Y	41	25.59	10.03	9.00	47.00	1.57
ZN	41	166.22	144.40	19.00	636.00	22.55
ZR	41	430.37	200.53	41.00	945.00	31.32

CHAPEL OF GARIOCH
DALRADIAN ROCK SAMPLES
from gas pipeline trench
All elements in ppm

Sample number	East	North	Ag	As	Ba	Bi	Ca	Ce	Cu	Fe	Mn
XMR 1.	37295	82228	1	6	38	1	1380	38	47	14130	180
XMR 2.	37283	82222	1	5	718	4	3770	38	21	30040	2910
XMR 3.	37338	82264	1	20	419	29	670	35	126	49450	420
XMR 4.	37339	82265	1	5	357	8	1000	40	51	34260	670
XMR 5.	37340	82266	2	5	677	1	20150	49	23	102340	1070
XMR 6.	37341	82266	1	7	137	1	780	47	54	38700	410
XMR 7.	37344	82267	1	7	452	2	2220	65	27	45190	520
XMR 8.	37345	82268	1	7	303	3	2240	38	45	32730	890
XMR 9.	37347	82269	1	7	141	2	1510	6	38	22950	300
XMR 10.	37217	82134	1	5	86	1	530	25	26	22700	220
XMR 11.	37218	82131	1	12	627	1	1160	59	86	49280	390
XMR 12.	37218	82129	1	1	536	1	16460	97	26	55930	1520
XMR 13.	37219	82127	1	1	478	1	930	47	18	35840	400
XMR 14.	37221	82122	2	1	393	2	30450	67	17	63100	2310
XMR 15.	37222	82118	1	5	133	3	820	13	32	50980	870
XMR 16.	37223	82113	1	3	126	1	270	59	19	40040	510
XMR 17.	37294	82227	3	3	443	4	15200	56	35	56580	950
XMR 18.	37291	82225	1	6	124	67	2220	36	17	18960	860
XMR 19.	37249	82197	1	3	386	3	3280	72	43	62430	850
XMR 20.	37246	82195	2	1	1E3	1	3010	47	171	111010	1160
XMR 21.	37243	82193	1	6	227	1	1880	27	40	40690	390

Mo	Nb	Ni	Pb	Rb	Sb	Sn	Sr	Th	Ti	U	W	Y	Zn	Zr
1	48	6	75	943	4	9	14	14	310	11	5	19	19	61
130	7	16	76	424	2	18	111	10	2380	9	14	18	77	358
10	9	11	33	196	3	12	51	17	2010	1	122	14	94	447
1	13	17	200	159	2	29	46	12	3030	1	25	18	189	649
1	12	31	17	72	3	3	222	6	8690	1	2	22	106	391
5	8	13	32	100	2	4	21	9	2960	1	20	12	74	684
2	9	23	20	165	2	3	69	13	2720	3	12	33	104	454
7	5	27	19	52	2	7	40	11	2810	2	10	9	69	650
1	9	7	46	357	2	18	53	5	390	4	12	14	28	41
1	7	12	6	73	4	3	24	6	2720	1	9	12	29	710
6	10	18	43	364	5	13	137	15	4080	2	15	25	66	535
1	18	23	172	158	4	26	289	19	5910	4	24	27	175	553
1	13	35	34	224	2	3	57	9	3210	3	5	21	74	560
1	16	34	50	101	2	29	333	16	4690	4	3	17	104	410
4	6	20	239	176	2	10	20	5	1660	1	4	9	195	198
4	14	22	36	244	5	5	16	12	3920	3	11	22	89	602
13	16	30	20	448	2	4	172	11	4760	5	111	40	234	342
33	51	8	136	711	3	49	65	41	610	10	15	30	62	75
2	9	33	34	250	2	6	75	15	4110	1	10	37	124	527
2	15	63	24	153	2	9	125	9	17620	2	9	30	284	227
5	6	15	15	115	4	2	80	6	2410	1	11	15	127	449

CHAPEL OF GARIOCH
DALRADIAN ROCK SAMPLES
from gas pipeline trench
All elements in ppm

Sample number	East	North	Ag	As	Ba	Bi	Ca	Ce	Cu	Fe	Mn
XMR 22.	37240	82191	2	5	1E3	30	17360	78	66	48430	1040
XMR 23.	37237	82189	4	5	741	4	4040	71	85	46700	630
XMR 24.	37235	82188	1	3	435	1	2380	89	16	53150	570
XMR 25.	37233	82187	4	6	1E3	4	440	67	25	27880	1780
XMR 26.	37232	82186	6	3	1E3	7	20070	59	185	154740	4170
XMR 27.	37230	82185	2	7	536	1	2230	111	48	68170	630
XMR 28.	37228	82183	1	3	644	1	4270	49	43	51050	590
XMR 29.	37227	82182	1	5	342	2	6330	64	38	46690	550
XMR 30.	37225	82181	5	1	691	10	8560	54	180	173110	4260
XMR 31.	37223	82180	2	4	354	1	7000	100	38	65700	540
XMR 32.	37221	82179	1	10	382	1	6760	37	32	57230	520
XMR 33.	37219	82178	2	1	629	1	6770	140	89	91040	1210
XMR 34.	37218	82176	2	6	516	2	5990	88	41	81420	1060
XMR 35.	37217	82174	5	14	364	86	46100	99	275	144990	6300
XMR 36.	37215	82171	1	8	744	1	7260	77	49	56540	850
XMR 37.	37214	82168	1	7	1E3	1	1870	81	35	62150	710
XMR 38.	37213	82165	3	16	732	1	7010	73	59	64880	790
XMR 39.	37214	82162	1	5	419	11	6190	42	36	42480	570
XMR 40.	37214	82159	1	5	393	2	4340	37	30	38730	570
XMR 41.	37214	82156	1	5	529	1	1840	73	25	40520	380

Mo	Nb	Ni	Pb	Rb	Sb	Sn	Sr	Th	Ti	U	W	Y	Zn	Zr
16	15	77	83	469	2	201	387	32	4860	3	39	30	482	330
2	11	19	33	334	2	3	173	19	3510	3	20	31	148	350
1	9	24	31	210	4	8	88	15	3570	3	7	30	84	381
1	8	12	266	416	2	19	219	10	2660	2	22	15	87	82
1	20	98	15	68	2	7	171	9	23260	1	10	47	444	286
1	18	37	15	264	3	6	87	24	5100	4	10	45	112	519
1	10	24	14	184	4	5	81	14	3390	2	14	31	148	644
2	8	20	68	171	2	12	102	13	4290	2	8	25	158	945
7	16	99	42	125	2	17	85	9	20790	3	110	46	615	220
1	12	29	25	182	2	3	109	14	4180	1	12	37	181	570
2	10	27	31	96	2	4	127	11	3830	1	6	26	122	587
3	12	81	27	238	2	3	137	12	6230	1	24	28	155	293
1	14	53	61	206	2	4	185	13	5840	4	30	23	326	311
10	10	57	75	60	2	138	77	44	2900	8	122	32	636	274
1	16	81	22	179	2	3	119	20	4190	4	9	35	149	390
1	14	33	43	228	2	2	70	18	4570	4	3	34	132	569
1	10	51	80	157	3	3	166	15	4540	3	8	29	258	748
1	9	19	23	144	2	11	111	16	2940	1	15	17	86	502
2	8	24	26	182	6	6	73	11	2480	2	8	15	76	377
2	14	28	58	205	2	5	91	16	3130	2	3	29	93	344

TABLE 3

CHAPEL OF GARIOCH

DALRADIAN DRILL CORE SAMPLES

SUMMARY STATISTICS AND LISTING OF XRF ANALYSES

CHAPEL OF GARIOCH
DALRADIAN CORE SAMPLES
SUMMARY STATISTICS
oxides in % trace elements in ppm

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE	STD ERROR OF MEAN
FE2O3	109	3.91	2.20	1.05	11.06	0.21
CAO	109	2.39	2.53	0.03	14.38	0.24
K2O	109	3.84	1.50	0.46	7.47	0.14
MNO	109	0.13	0.09	0.01	0.52	0.01
AS	109	3.06	6.14	0.00	57.00	0.59
BA	109	667.07	295.13	91.00	1542.00	28.27
CU	109	32.30	21.63	11.00	165.00	2.07
MO	109	53.34	44.14	13.00	296.00	4.23
RB	109	334.23	150.74	58.00	1112.00	14.44
SN	109	29.00	28.73	0.00	179.00	2.75
SR	109	198.97	91.77	21.00	505.00	8.79
TH	109	10.86	13.57	0.00	136.00	1.30
U	109	1.84	1.65	0.00	8.00	0.16
W	109	54.75	193.63	0.00	1960.00	18.55
Y	109	25.67	5.51	12.00	49.00	0.53
ZN	109	240.37	255.93	24.00	2215.00	24.51

CHAPEL OF GARIOCH
DALRADIAN CORE SAMPLES
All minor elements in ppm

Sample number	Hole No CG	From m	To m	Fe2O3 %	CaO %	K2O %	MnO %
XMD 1.	3	4.00	5.00	5.66	1.29	3.55	0.12
XMD 2.	3	5.00	6.00	6.21	1.70	3.29	0.14
XMD 3.	3	6.00	7.00	5.45	0.98	3.29	0.09
XMD 4.	3	7.00	8.00	4.23	0.81	4.51	0.09
XMD 5.	3	8.00	9.00	5.84	1.49	3.25	0.10
XMD 6.	3	9.00	10.00	4.59	3.69	2.76	0.12
XMD 7.	3	10.00	11.00	2.63	2.34	2.74	0.09
XMD 8.	3	11.00	12.00	8.39	1.89	3.05	0.13
XMD 9.	3	12.00	13.00	8.90	5.34	5.02	0.37
XMD 10.	3	13.00	14.00	11.06	8.18	1.96	0.31
XMD 11.	3	14.00	15.00	10.99	7.26	3.38	0.33
XMD 12.	3	15.00	16.00	6.29	8.64	2.78	0.29
XMD 13.	3	16.00	17.00	5.64	2.26	3.89	0.16
XMD 14.	3	17.00	18.00	3.17	4.01	2.32	0.13
XMD 15.	3	18.00	19.00	5.57	6.98	2.47	0.25
XMD 16.	3	19.00	20.00	9.27	1.97	4.89	0.16
XMD 17.	3	20.00	21.00	10.14	6.50	3.62	0.27
XMD 18.	3	21.00	22.00	8.39	6.49	2.61	0.17
XMD 19.	3	22.00	23.00	7.16	5.71	3.75	0.21
XMD 20.	3	23.00	24.00	5.65	8.69	3.71	0.33
XMD 21.	3	24.00	24.40	5.56	0.63	3.79	0.09

As	Ba	Cu	Mo	Rb	Sn	Sr	Th	U	W	Y	Zn
4	1240	35	45	332	24	247	11	3	16	29	277
0	1197	34	69	275	8	207	11	2	9	35	316
1	945	28	55	223	5	146	10	3	3	31	165
2	1542	27	88	340	9	174	11	2	9	34	110
2	862	31	84	282	7	200	8	2	6	30	174
3	651	38	38	253	23	326	7	2	20	28	212
2	608	31	34	288	21	337	2	4	13	21	133
2	258	147	57	491	22	169	1	2	38	26	346
8	339	165	73	1112	179	136	10	2	72	34	1108
1	205	75	57	326	25	317	0	0	115	30	392
3	299	93	30	641	31	309	0	1	37	29	391
3	344	37	48	486	62	420	9	2	70	33	226
0	753	39	202	588	20	200	8	3	14	38	198
2	469	33	136	393	54	259	4	3	44	32	235
1	499	33	212	298	31	210	11	5	64	30	127
3	1331	29	159	327	0	214	18	2	4	49	126
0	444	40	109	732	23	304	1	2	21	39	197
0	825	30	84	242	10	385	1	0	11	32	111
0	902	40	147	272	13	305	11	2	42	29	90
3	789	33	32	202	100	289	26	3	308	21	132
3	680	15	55	292	6	85	12	0	4	33	109

CHAPEL OF GARIOCH
DALRADIAN CORE SAMPLES
All minor elements in ppm

Sample number	Hole No CG	From m	To m	Fe2O3 %	CaO %	K2O %	MnO %
XMD 22.	2	0.00	2.50	4.94	8.10	7.19	0.32
XMD 23.	2	2.50	5.00	4.95	7.16	5.75	0.33
XMD 24.	2	5.00	6.00	3.59	3.17	3.96	0.14
XMD 25.	2	6.00	7.00	2.92	1.36	2.46	0.10
XMD 26.	2	7.00	8.00	2.31	0.77	2.39	0.06
XMD 27.	2	8.00	9.00	2.22	1.19	3.78	0.08
XMD 28.	2	9.00	10.00	1.09	0.46	6.23	0.01
XMD 29.	2	10.00	11.00	1.17	1.00	5.96	0.15
XMD 30.	2	11.00	12.00	1.11	1.14	6.05	0.10
XMD 31.	2	12.00	15.00	4.69	9.23	3.45	0.32
XMD 32.	2	15.00	16.00	3.18	2.40	2.61	0.12
XMD 33.	2	16.00	17.00	3.86	5.18	3.18	0.17
XMD 34.	2	17.00	18.00	1.75	2.46	6.36	0.10
XMD 35.	2	18.00	19.00	1.79	1.51	6.26	0.05
XMD 36.	2	19.00	20.00	1.71	0.89	6.65	0.06
XMD 37.	2	20.00	21.00	1.54	0.83	6.53	0.05
XMD 38.	2	21.00	22.00	1.88	1.16	5.66	0.05
XMD 39.	2	22.00	23.00	1.35	0.74	6.18	0.06
XMD 40.	2	23.00	24.00	1.38	1.19	6.12	0.09
XMD 41.	2	24.00	25.00	1.25	1.50	6.26	0.06
XMD 42.	2	25.00	26.00	1.28	0.93	6.67	0.07

As	Ba	Cu	Mo	Rb	Sn	Sr	Th	U	W	Y	Zn
2	1001	25	21	439	37	505	12	4	85	29	309
0	803	28	17	402	40	450	7	3	23	33	168
5	545	39	28	337	18	213	5	0	10	25	150
0	357	27	53	344	28	118	9	2	11	22	160
0	378	45	86	247	9	116	11	6	12	19	205
2	562	40	71	274	19	189	7	5	11	25	208
4	870	15	27	313	4	182	0	0	0	23	382
2	793	26	35	540	97	186	6	3	8	27	107
0	977	28	44	482	45	241	0	2	6	29	75
4	484	47	27	372	91	360	11	3	123	31	365
0	424	34	33	215	43	213	7	2	26	22	96
0	494	81	33	358	65	348	5	2	14	29	702
3	677	60	36	625	55	137	14	5	8	25	2215
57	916	25	77	414	16	213	2	4	13	22	174
0	1262	15	16	311	6	286	5	3	2	18	43
0	1250	16	25	371	7	213	11	2	0	17	75
0	988	11	116	400	17	201	12	4	9	24	123
3	1046	12	26	368	27	199	6	5	0	18	107
0	943	19	39	480	30	202	18	8	2	26	141
2	1100	20	74	449	26	237	18	7	9	28	130
0	1206	18	58	406	29	270	9	4	6	23	160

CHAPEL OF GARIOCH
DALRADIAN CORE SAMPLES
All minor elements in ppm

Sample number	Hole No CG	From m	To m	Fe2O3 %	CaO %	K2O %	MnO %
XMD 43.	2	26.00	27.00	1.31	0.96	6.64	0.05
XMD 44.	2	27.00	28.00	1.33	1.77	7.47	0.08
XMD 45.	2	28.00	29.00	1.05	1.39	6.74	0.14
XMD 46.	2	29.00	30.00	1.47	1.08	4.91	0.06
XMD 47.	2	30.00	31.00	1.85	0.88	3.77	0.08
XMD 48.	2	31.00	32.00	1.53	1.61	5.06	0.17
XMD 49.	2	32.00	33.00	1.98	1.74	5.70	0.14
XMD 50.	2	33.00	34.00	1.69	1.08	2.78	0.07
XMD 51.	2	34.00	35.00	1.66	1.18	5.53	0.09
XMD 52.	2	35.00	36.00	3.58	4.60	5.70	0.25
XMD 53.	2	36.00	37.00	2.08	1.46	3.66	0.10
XMD 54.	2	37.00	38.00	1.85	1.36	3.58	0.09
XMD 55.	2	38.00	39.00	2.34	1.69	4.02	0.10
XMD 56.	2	39.00	40.00	2.48	0.93	1.80	0.08
XMD 57.	2	40.00	41.00	1.93	2.11	2.02	0.12
XMD 58.	2	41.00	42.00	2.97	1.40	1.94	0.09
XMD 59.	2	42.00	42.45	2.34	1.41	1.34	0.08
XMD 60.	1	0.00	2.00	5.36	3.04	3.85	0.09
XMD 61.	1	2.00	3.00	1.62	0.10	1.77	0.03
XMD 62.	1	3.00	4.00	2.24	0.13	2.08	0.07
XMD 63.	1	4.00	5.00	2.04	0.26	1.80	0.07

As	Ba	Cu	Mo	Rb	Sn	Sr	Th	U	W	Y	Zn
2	1198	17	50	366	14	253	8	2	5	20	148
5	1216	24	35	570	39	254	18	4	9	23	375
2	1235	16	41	527	55	275	11	0	9	22	356
3	1054	14	42	336	14	219	12	2	5	22	73
6	780	18	296	345	18	136	14	1	279	21	156
2	969	35	144	599	97	202	13	2	30	22	800
3	998	24	77	692	90	182	28	2	52	26	126
3	435	21	55	265	12	108	9	0	51	21	143
0	992	19	33	425	28	227	11	2	18	25	133
3	824	54	43	365	62	354	19	2	195	24	92
1	696	16	25	219	14	196	25	2	9	19	84
2	570	24	47	424	40	137	9	2	39	24	67
0	739	22	141	404	29	202	10	0	29	23	170
3	337	34	63	252	28	80	6	0	26	23	210
2	417	18	47	202	16	245	9	2	47	21	60
0	398	22	63	184	5	158	6	2	41	23	129
1	276	23	39	140	5	134	3	0	6	21	24
11	799	22	25	222	11	250	4	0	6	20	156
4	341	18	38	159	8	57	7	0	6	14	75
8	362	22	127	383	36	26	11	0	308	17	77
1	363	20	42	276	30	55	5	2	18	23	91

CHAPEL OF GARIOCH
DALRADIAN CORE SAMPLES
All minor elements in ppm

Sample number	Hole No CG	From m	To m	Fe2O3 %	CaO %	K2O %	MnO %
XMD 64.	1	5.00	6.00	1.33	0.03	0.46	0.01
XMD 65.	1	6.00	7.00	2.06	0.75	2.83	0.10
XMD 66.	1	7.00	8.00	2.91	0.10	2.83	0.04
XMD 67.	1	8.00	9.00	3.26	0.07	2.03	0.08
XMD 68.	1	9.00	10.00	2.14	0.41	2.32	0.08
XMD 69.	1	10.00	11.00	2.89	0.80	6.42	0.10
XMD 70.	1	11.00	12.00	2.29	0.21	2.62	0.04
XMD 71.	1	12.00	13.00	1.89	0.23	1.76	0.06
XMD 72.	1	13.00	14.00	3.20	0.34	3.15	0.11
XMD 73.	1	14.00	15.00	2.93	1.05	2.16	0.08
XMD 74.	1	15.00	16.00	3.01	0.60	2.83	0.06
XMD 75.	1	16.00	17.00	4.39	1.04	4.34	0.11
XMD 76.	1	17.00	18.00	4.74	1.60	3.82	0.11
XMD 77.	1	18.00	19.00	4.34	1.23	3.94	0.11
XMD 78.	1	19.00	20.00	6.29	6.82	2.52	0.34
XMD 79.	1	20.00	21.00	5.67	8.16	1.94	0.47
XMD 80.	1	21.00	22.00	7.17	14.38	2.00	0.52
XMD 81.	1	22.00	23.00	4.71	4.05	2.89	0.15
XMD 82.	1	23.00	24.00	4.72	1.13	4.86	0.06
XMD 83.	1	24.00	25.00	5.43	0.35	5.06	0.09
XMD 84.	1	25.00	26.00	4.86	1.51	3.58	0.11

As	Ba	Cu	Mo	Rb	Sn	Sr	Th	U	W	Y	Zn
5	91	16	36	58	2	21	4	0	5	12	68
2	561	21	37	397	72	92	15	0	26	20	144
2	582	24	39	231	0	96	8	0	21	21	275
19	414	31	46	317	33	43	12	0	28	22	247
3	459	23	41	374	39	65	4	0	19	25	166
8	1152	33	30	693	53	199	24	2	28	24	293
7	394	31	55	298	26	48	4	0	19	18	237
0	348	19	40	208	18	47	4	2	22	19	147
3	498	30	52	356	67	68	7	0	24	25	207
3	410	21	44	185	17	102	3	2	15	21	225
4	457	18	42	153	6	117	10	0	12	19	298
3	799	28	35	305	41	181	13	0	9	26	387
0	697	27	29	213	7	235	9	2	15	28	293
0	631	31	31	357	33	186	6	1	17	26	361
3	419	27	24	142	34	260	13	3	165	26	338
15	233	36	51	145	81	176	136	0	260	22	369
7	333	29	13	134	95	394	40	2	128	29	401
1	467	27	22	192	12	250	11	0	42	26	185
4	661	30	19	264	2	182	11	3	10	28	375
8	831	36	38	341	18	123	14	3	18	26	167
9	666	30	31	278	11	217	11	0	106	28	305

CHAPEL OF GARIOCH
DALRADIAN CORE SAMPLES
All minor elements in ppm

Sample number	Hole No CG	From m	To m	Fe2O3 %	CaO %	K2O %	MnO %
XMD 85.	1	26.00	27.00	4.67	1.83	4.24	0.11
XMD 86.	1	27.00	28.00	3.73	0.99	4.49	0.09
XMD 87.	1	28.00	29.00	3.60	1.59	3.41	0.10
XMD 88.	1	29.00	30.00	5.38	4.05	3.38	0.21
XMD 89.	1	30.00	31.00	2.33	0.35	2.03	0.04
XMD 90.	1	31.00	32.00	3.47	0.41	2.75	0.03
XMD 91.	1	32.00	33.00	3.46	0.55	4.11	0.05
XMD 92.	1	33.00	34.00	3.45	0.72	4.79	0.04
XMD 93.	1	34.00	35.00	5.66	1.17	4.42	0.12
XMD 94.	1	35.00	36.00	5.54	2.03	4.13	0.09
XMD 95.	1	36.00	37.00	4.85	1.07	3.58	0.08
XMD 96.	1	37.00	38.00	5.81	0.85	4.54	0.07
XMD 97.	1	38.00	39.00	4.52	1.59	4.70	0.07
XMD 98.	1	39.00	40.00	5.32	1.08	4.17	0.08
XMD 99.	1	40.00	41.00	5.46	1.63	3.94	0.10
XMD100.	1	41.00	42.00	5.60	3.16	3.94	0.13
XMD101.	1	42.00	43.00	5.17	1.31	2.97	0.09
XMD102.	1	43.00	44.00	3.64	4.61	2.85	0.13
XMD103.	1	44.00	45.00	4.04	3.46	2.78	0.12
XMD104.	1	45.00	46.00	3.73	2.76	3.17	0.11
XMD105.	1	46.00	47.00	3.43	1.97	3.05	0.11

As	Ba	Cu	Mo	Rb	Sn	Sr	Th	U	W	Y	Zn
14	657	33	47	376	14	183	15	2	2E3	36	175
0	684	28	48	431	30	155	10	0	57	29	167
3	466	34	52	384	32	150	9	0	37	26	114
1	516	46	39	380	66	321	8	3	23	33	334
2	324	25	37	191	16	55	8	2	9	18	82
0	651	18	35	152	5	123	5	0	6	23	103
0	878	25	31	248	13	146	9	0	12	22	299
0	938	22	28	259	5	204	7	2	7	22	162
1	645	34	22	315	14	186	15	2	27	31	251
1	617	31	18	239	0	271	12	0	4	29	77
0	479	28	39	215	3	153	6	0	10	27	61
0	684	24	22	231	2	131	15	0	9	28	73
2	634	25	17	268	7	217	9	0	0	28	61
0	497	33	26	253	2	118	13	2	7	34	80
1	610	25	20	226	4	176	6	3	2	28	72
0	663	34	13	226	2	287	12	0	0	31	253
0	445	26	20	179	2	161	6	2	3	28	94
2	394	29	24	242	19	234	4	3	55	24	144
3	425	23	21	207	11	234	9	2	25	27	330
0	458	37	111	344	27	167	4	0	51	27	574
2	448	31	48	353	33	147	9	3	30	24	345

CHAPEL OF GARIOCH
DALRADIAN CORE SAMPLES
All minor elements in ppm

Sample number	Hole No CG	From m	To m	Fe2O3 %	CaO %	K2O %	MnO %
XMD106.	1	47.00	48.00	3.26	1.58	4.11	0.18
XMD107.	1	48.00	49.00	4.91	2.04	2.71	0.10
XMD108.	1	49.00	50.00	4.59	3.13	4.05	0.14
XMD109.	1	50.00	50.90	4.57	2.61	3.13	0.12

As	Ba	Cu	Mo	Rb	Sn	Sr	Th	U	W	Y	Zn
2	624	33	36	487	86	156	14	3	11	26	244
0	463	73	25	208	15	175	9	2	15	27	393
5	677	47	26	246	21	228	19	2	89	24	768
0	474	42	25	233	32	140	7	2	44	23	641

TABLE 4

CHAPEL OF GARIOCH

GRANITE DRILL CORE SAMPLES

SUMMARY STATISTICS AND LISTING OF XRF ANALYSES

CHAPEL OF GARIOCH
GRANITE CORE SAMPLES
SUMMARY STATISTICS
oxides in % trace elements in ppm

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE	STD ERROR OF MEAN
FE2O3	29	1.21	0.71	0.29	3.17	0.13
CAO	29	0.30	0.18	0.03	0.77	0.03
K2O	29	4.10	1.06	1.69	5.97	0.20
MNO	29	0.10	0.09	0.00	0.35	0.02
AS	29	6.24	5.26	0.00	20.00	0.98
BA	29	115.83	93.72	36.00	436.00	17.40
CU	29	25.90	11.06	12.00	53.00	2.05
MO	29	82.97	80.78	0.00	254.00	15.00
RB	29	678.41	232.20	204.00	1255.00	43.12
SN	29	43.79	44.85	0.00	178.00	8.33
SR	29	23.86	12.68	5.00	48.00	2.35
TH	29	36.07	17.91	18.00	121.00	3.33
U	29	14.07	8.01	6.00	42.00	1.49
W	22	224.45	559.30	5.00	2243.00	119.24
Y	29	56.59	12.70	32.00	82.00	2.36
ZN	29	85.66	64.77	29.00	331.00	12.03

Samples XMD 133-139 milled in Tungsten carbide Tema
Samples contaminated with tungsten
Tungsten listed as missing for summary statistics

CHAPEL OF GARIOCH
GRANITE CORE SAMPLES
All minor elements in ppm

Sample number	Hole No CG	From m	To m	Fe2O3 %	CaO %	K2O %	MnO %
XMD110.	5	1.75	2.30	1.61	0.03	1.82	0.00
XMD111.	5	2.30	3.30	2.17	0.22	3.37	0.19
XMD112.	5	10.70	11.15	1.82	0.23	3.37	0.11
XMD113.	5	11.60	12.20	1.46	0.11	2.16	0.13
XMD115.	5	12.90	13.30	1.95	0.24	2.80	0.15
XMD116.	5	15.35	15.70	3.17	0.35	3.79	0.28
XMD117.	5	22.50	23.50	1.09	0.43	4.50	0.08
XMD118.	5	42.70	43.70	1.25	0.47	1.69	0.06
XMD119.	6	6.00	7.50	1.85	0.36	3.73	0.25
XMD120.	6	7.50	9.00	2.40	0.59	4.54	0.30
XMD121.	6	9.00	10.30	0.93	0.15	4.54	0.08
XMD122.	6	10.30	11.30	0.86	0.22	4.34	0.08
XMD123.	6	11.70	11.80	2.25	0.19	4.86	0.35
XMD124.	6	11.80	12.80	0.97	0.24	4.46	0.09
XMD125.	6	12.80	13.85	0.94	0.33	4.29	0.09
XMD126.	6	13.85	14.60	1.70	0.23	2.51	0.17
XMD127.	7	9.00	10.00	0.46	0.16	5.34	0.04
XMD128.	7	20.00	21.00	0.93	0.10	3.92	0.07
XMD129.	7	30.00	31.00	0.53	0.19	4.88	0.00
XMD130.	7	40.00	41.00	0.60	0.15	4.72	0.01
XMD131.	7	50.00	51.00	0.92	0.49	4.50	0.04

As	Ba	Cu	Mo	Rb	Sn	Sr	Th	U	W	Y	Zn
9	436	53	225	204	14	7	37	6	9	32	76
10	194	36	232	699	62	24	32	8	21	45	96
6	107	36	161	619	51	24	36	14	17	59	92
19	67	27	254	561	66	5	121	8	298	46	38
11	57	47	151	535	86	12	38	11	535	82	131
17	116	50	227	1042	139	5	31	20	2E3	49	331
2	78	23	104	789	37	29	25	17	20	67	65
3	123	21	52	376	21	15	26	15	16	63	65
4	266	24	168	888	83	26	33	8	20	41	94
9	369	37	184	1134	125	31	47	10	44	44	141
4	67	17	50	746	32	40	32	12	17	70	63
3	56	17	57	764	32	23	31	11	16	67	60
20	72	15	130	1255	178	6	25	7	2E3	53	84
3	53	20	36	749	35	26	30	11	34	70	71
1	82	20	23	734	38	22	30	11	18	70	67
4	68	33	56	665	92	6	18	13	78	50	123
2	64	13	32	435	3	29	39	11	8	51	31
4	76	31	24	383	14	37	37	7	14	45	37
3	72	14	17	423	0	20	33	11	5	50	35
0	80	15	17	473	5	25	45	10	7	56	42
3	134	32	39	695	9	48	28	19	7	56	47

CHAPEL OF GARIOCH
GRANITE CORE SAMPLES
All minor elements in ppm

Sample number	Hole No CG	From m	To m	Fe2O3 %	CaO %	K2O %	MnO %
XMD132.	7	60.00	61.00	0.83	0.10	4.52	0.03
XMD133.	5	18.00	18.40	0.84	0.63	4.64	0.07
XMD134.	5	41.00	41.40	0.54	0.45	4.10	0.04
XMD135.	5	49.40	50.00	0.78	0.77	4.75	0.07
XMD136.	6	20.70	21.30	0.91	0.49	5.97	0.07
XMD137.	7	4.00	4.80	0.29	0.27	4.77	0.00
XMD138.	7	36.60	37.20	0.29	0.13	5.37	0.00
XMD139.	7	53.30	53.90	0.64	0.52	4.70	0.03

As	Ba	Cu	Mo	Rb	Sn	Sr	Th	U	W	Y	Zn
0	138	31	20	623	8	45	25	12	8	59	46
4	42	24	43	801	43	20	37	42	534	82	188
11	53	21	36	645	11	22	21	37	769	71	152
8	118	24	49	832	18	46	30	17	759	67	36
7	139	24	4	853	47	20	47	11	698	61	171
5	36	12	0	581	5	13	41	19	612	39	29
4	61	16	0	424	6	22	43	14	586	43	39
5	135	18	15	746	10	44	28	16	776	53	34

TABLE 5

CHAPEL OF GARIOCH

GRANITE CORE AND ROCK SAMPLES

From BEER and others, 1987

SUMMARY STATISTICS AND LISTING OF XRF ANALYSES

CHAPEL OF GARIOCH
GRANITE ROCK and CORE SAMPLES
SUMMARY STATISTICS
Oxides in % trace elements in ppm

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE	STD ERROR OF MEAN
SIO2	12	73.03	7.11	55.28	78.55	2.05
AL2O3	12	14.23	2.73	12.04	20.86	0.79
TIO2	12	0.20	0.25	0.03	0.81	0.07
FE2O3	12	1.86	1.91	0.28	5.96	0.55
MGO	12	0.26	0.43	0.00	1.29	0.13
CAO	12	0.72	1.00	0.17	3.84	0.29
NA2O	12	2.74	1.46	0.25	4.76	0.42
K2O	12	4.98	1.17	3.38	7.44	0.34
MNO	12	0.09	0.10	0.00	0.32	0.03
P2O5	12	0.06	0.08	0.00	0.23	0.02
AS	12	1.83	1.99	0.00	6.00	0.58
BA	12	359.17	496.22	38.00	1325.00	143.25
BI	12	37.33	53.17	0.00	177.00	15.35
CE	12	43.42	36.45	9.00	104.00	10.52
CO	12	4.50	6.61	0.00	17.00	1.91
CR	12	18.17	19.00	8.00	76.00	5.49
CU	12	26.33	20.89	5.00	68.00	6.03
GA	12	25.17	5.64	16.00	35.00	1.63
LA	12	20.58	23.36	0.00	83.00	6.74
NB	12	49.92	24.34	11.00	79.00	7.03
NI	12	15.75	27.37	3.00	101.00	7.90
PB	12	73.75	40.70	31.00	171.00	11.75
RB	12	619.42	207.08	292.00	871.00	59.78
S	12	122.75	126.86	37.00	403.00	36.62
SN	12	40.83	75.81	0.00	274.00	21.88
SR	12	87.75	120.78	10.00	403.00	34.87
TH	12	27.92	12.32	7.00	44.00	3.56
U	12	15.58	13.14	0.00	44.00	3.79
V	12	17.33	28.51	0.00	83.00	8.23
W	12	19.33	21.02	0.00	62.00	6.07
Y	12	49.50	21.15	19.00	88.00	6.10
ZN	12	118.25	135.52	13.00	499.00	39.12
ZR	12	111.42	74.12	35.00	278.00	21.40

Five samples from gas pipeline trench
Seven samples from holes CG5-7

CHAPEL OF GARIOCH
GRANITE ROCK and CORE SAMPLES
All minor elements in ppm

Sample number	Sample location	EAST	NORTH	SiO2 %	Al2O3 %	TiO2 %	Fe2O3 %
KB2161	Trench	37296	82229	75.98	12.82	0.03	1.55
KB2167	Trench	37291	82225	73.17	14.52	0.08	2.12
KB2168	Trench	37241	82191	55.28	20.86	0.81	5.96
KB2169	Trench	37237	82188	64.15	17.87	0.55	5.12
KB2170	Trench	37234	82186	67.63	16.30	0.42	3.10
KB2176	CG5 at 18m	.	.	76.51	12.74	0.06	1.02
KB2177	CG5 at 41m	.	.	78.55	12.04	0.05	0.61
KB2178	CG5 at 50m	.	.	76.03	13.03	0.10	0.82
KB2179	CG6 at 21m	.	.	77.64	12.18	0.04	0.84
KB2180	CG7 at 4m	.	.	77.23	12.91	0.08	0.31
KB2181	CG7 at 37	.	.	77.81	12.66	0.08	0.28
KB2182	CG7 at 54m	.	.	76.42	12.88	0.09	0.62

MgO %	CaO %	Na2O %	K2O %	MnO %	P2O5 %	LOI %	As	Ba	Bi	Ce	Co	Cr
0.01	0.27	4.72	3.99	0.01	0.01	0.21	4	54	0	16	4	18
0.06	0.42	4.76	3.38	0.18	0.03	0.90	3	169	87	32	5	19
1.29	3.84	0.25	6.69	0.20	0.19	4.51	3	1325	48	104	17	76
0.99	0.78	0.83	4.94	0.12	0.23	4.62	3	846	8	101	15	26
0.49	0.29	1.73	7.44	0.32	0.15	2.21	6	1298	8	99	13	11
0.08	0.54	3.18	4.47	0.06	0.00	1.35	0	43	77	28	0	10
0.00	0.44	3.49	3.94	0.03	0.01	1.18	0	61	19	9	0	11
0.07	0.67	3.36	4.71	0.06	0.02	1.43	0	125	12	17	0	10
0.00	0.46	1.39	5.83	0.04	0.01	1.69	2	147	177	13	0	8
0.03	0.31	3.83	4.49	0.00	0.02	0.85	0	38	3	49	0	8
0.08	0.17	2.30	5.27	0.01	0.01	1.18	0	58	3	25	0	12
0.06	0.47	3.07	4.61	0.03	0.01	1.00	1	146	6	28	0	9

Cu	Ga	La	Nb	Ni	Pb	Rb	S	Sn	Sr	Th	U	V	W	Y	Zn	Zr
41	33	0	46	9	55	845	116	12	13	14	9	0	0	27	13	69
16	35	13	49	12	81	615	56	61	63	27	9	8	6	36	57	68
66	25	44	15	101	59	423	56	274	403	26	5	83	45	38	499	252
68	16	83	12	22	31	292	70	8	177	17	2	57	17	39	141	278
25	18	35	11	11	171	361	50	20	223	7	0	48	20	19	77	84
18	29	10	79	7	61	806	403	41	18	37	44	0	62	88	214	88
16	25	11	69	3	72	639	279	11	20	21	36	0	9	78	108	35
19	27	7	58	6	131	847	291	18	42	32	17	0	11	69	34	82
18	28	8	69	5	82	871	40	41	18	44	12	2	50	64	171	86
5	22	20	70	3	38	577	37	2	10	44	20	3	3	39	29	104
13	22	10	66	3	35	416	37	0	24	43	14	2	4	43	40	99
11	22	6	55	7	69	741	38	2	42	23	19	5	5	54	36	92

"Trench" samples are from the gas pipeline trench

TABLE 6

CHAPEL OF GARIOCH

DALRADIAN ROCK SAMPLES

From BEER and others, 1987

SUMMARY STATISTICS AND LISTING OF XRF ANALYSES

CHAPEL OF GARIOCH
DALRADIAN ROCK SAMPLES
Oxides in % trace elements in ppm

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE	STD ERROR OF MEAN
SIO2	12	68.83	13.68	52.55	92.03	3.95
AL2O3	12	13.23	5.53	4.22	20.85	1.60
TIO2	12	0.74	0.35	0.24	1.54	0.10
FE2O3	12	6.76	3.24	1.05	12.04	0.94
MGO	12	1.77	1.70	0.18	5.81	0.49
CAO	12	1.62	1.95	0.01	6.41	0.56
NA2O	12	1.10	1.19	0.00	3.47	0.34
K2O	12	2.41	1.42	0.57	5.17	0.41
MNO	12	0.14	0.08	0.03	0.37	0.02
P2O5	12	0.13	0.09	0.00	0.31	0.02
AS	12	3.92	3.20	0.00	10.00	0.92
BA	12	669.17	330.73	96.00	1406.00	95.47
BI	12	4.83	4.20	0.00	12.00	1.21
CE	12	67.83	30.90	29.00	138.00	8.92
CO	12	21.08	16.12	0.00	60.00	4.65
CR	12	110.08	85.92	34.00	298.00	24.80
CU	12	43.08	22.26	16.00	86.00	6.43
GA	12	17.42	6.49	7.00	27.00	1.87
LA	12	30.00	14.59	7.00	55.00	4.21
NB	12	12.67	2.93	8.00	17.00	0.85
NI	12	39.50	26.40	9.00	95.00	7.62
PB	12	31.75	32.62	9.00	131.00	9.42
RB	12	152.83	72.75	50.00	310.00	21.00
S	12	77.08	40.50	48.00	200.00	11.69
SN	12	10.58	12.69	0.00	35.00	3.66
SR	12	127.92	93.51	10.00	341.00	27.00
TH	12	11.42	5.25	3.00	19.00	1.51
U	12	1.17	1.27	0.00	3.00	0.37
V	12	92.08	69.85	18.00	230.00	20.16
W	12	12.58	9.43	0.00	27.00	2.72
Y	12	25.92	9.85	10.00	42.00	2.84
ZN	12	129.75	72.38	58.00	323.00	20.89
ZR	12	366.08	111.48	147.00	508.00	32.18

Samples collected at varying distances from the granite contact

CHAPEL OF GARIOCH
DALRADIAN ROCK SAMPLES
All minor elements in ppm

Sample number	Distance from granite contact	East	North	SiO2 %	Al2O3 %	TiO2 %	Fe2O3 %
KB2185	1800m	37494	82202	56.13	14.81	1.12	10.60
KB2184	450m	37341	82245	92.03	4.22	0.24	1.05
KB2166	1000m	37220	82123	63.16	15.49	0.67	7.51
KB2165	950m	37218	82132	72.10	12.36	0.62	5.49
KB2164	530m	37345	82268	88.75	4.68	0.41	3.42
KB2163	470m	37340	82265	52.55	17.87	1.54	12.04
KB2162	460m	37339	82265	83.11	8.12	0.44	3.45
KB2175	170m	37217	82174	58.79	20.85	0.84	6.62
KB2174	150m	37219	82176	59.91	17.08	0.88	8.68
KB2173	125m	37220	82177	53.59	20.10	0.94	9.93
KB2172	85m	37223	82179	71.51	11.55	0.64	7.01
KB2171	20m	37229	82183	74.31	11.58	0.55	5.27

MgO %	CaO %	Na2O %	K2O %	MnO %	P2O5 %	LOI %	As	Ba	Bi	Ce	Co	Cr
5.81	3.24	3.47	2.17	0.15	0.12	1.45	0	583	1	29	36	254
0.18	0.01	0.01	1.10	0.03	0.00	0.98	2	96	12	30	0	298
0.42	6.41	0.00	1.84	0.37	0.16	3.66	0	480	2	108	11	69
0.77	0.22	0.84	4.62	0.07	0.09	2.34	10	738	3	74	23	59
0.21	0.44	0.00	0.57	0.18	0.06	1.59	4	460	9	43	17	34
3.43	4.00	1.82	1.45	0.17	0.31	4.73	4	902	0	62	36	121
0.46	0.17	0.39	1.47	0.13	0.03	2.19	6	442	12	59	10	35
1.87	0.35	0.35	5.17	0.12	0.10	5.21	8	1406	2	54	14	68
2.10	1.13	2.91	2.75	0.15	0.18	4.25	4	692	6	75	19	129
3.37	1.39	2.07	3.74	0.17	0.19	4.80	0	832	5	138	60	142
1.39	1.34	0.94	2.38	0.09	0.21	2.91	6	470	1	71	18	69
1.20	0.79	0.41	1.65	0.10	0.14	4.05	3	929	5	71	9	43

Cu	Ga	La	Nb	Ni	Pb	Rb	S	Sn	Sr	Th	U	V	W	Y	Zn	Zr
86	17	12	10	82	9	87	200	0	129	3	0	217	3	23	102	147
18	7	14	8	9	12	185	85	24	10	6	2	18	19	13	58	338
16	21	30	17	34	34	91	52	35	341	17	3	76	0	20	99	329
66	13	44	13	16	31	310	78	11	136	11	2	59	11	28	61	404
39	7	7	9	31	18	50	75	6	40	10	3	27	10	10	61	508
27	23	30	12	32	18	66	56	0	237	4	0	230	3	23	105	333
44	17	18	13	17	131	137	82	32	44	14	0	30	25	21	169	463
31	27	36	17	39	31	197	65	0	71	17	2	80	3	40	123	436
44	22	35	16	60	39	184	57	6	194	12	0	111	27	25	323	247
77	25	55	13	95	24	207	48	0	140	9	2	132	24	31	149	249
35	15	36	13	32	20	159	64	9	111	15	0	74	12	42	165	457
34	15	43	11	27	14	161	63	4	82	19	0	51	14	35	142	482

Samples collected at varying distance from the granite contact