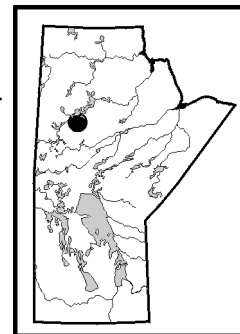


DETERMINING RESIDUAL MINERAL POTENTIAL USING EUROPIUM ANOMALIES IN THE RUTTAN AND LYNN LAKE AREAS, MANITOBA

by G.H. Gale and S.H. McClenaghan¹

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SUMMARY

Drill cores from regional exploration programs in the Ruttan and Lynn Lake areas were examined in 2002 for evidence of stratiform sulphide mineralization. In the Ruttan region, these included drill cores that targeted electromagnetic conductors outside the Ruttan mine property. In the Lynn Lake area, only those cores housed in the Lynn Lake Core Library were examined. Cores containing chert, barren sulphides and sulphidic sedimentary rocks were sampled, provided they did not contain significant (>1%) visible base-metal concentrations. Collected samples will be analyzed for major, trace and rare earth elements (REE) to determine if any are spatially associated with more significant base-metal VMS-type mineralization.

INTRODUCTION

Geochemical studies indicate that REE data may be an effective tool to vector base-metal exploration along exhalative sulphide strata (Gale et al., 1997a, b). Unpublished results from studies by the first author indicate that volcanogenic massive sulphide (VMS) vent activity can be readily detected in rocks that contain only background base-metal values at distances of up to 1000 m from known VMS mineralization. In addition, sulphide facies iron formations originating from lower temperature and higher pH fluids than those that produce VMS deposits have distinctly different REE profiles with negative Eu anomalies (Gale et al., 1997a, b).

This program is designed to investigate drill cores from previous, unsuccessful drill programs, to establish if they contain geochemical signatures that may indicate the presence of high-temperature, low-pH vent sites typical of those that produce VMS deposits. Contrasting REE signatures of VMS-related and barren sulphide zones are shown in Figure GS-23-1.

RUTTAN AREA

Drill cores from regional exploration programs conducted outside the immediate Ruttan mine property (Fig. GS-23-2) were examined for evidence of distal exhalite, mineralized sedimentary rocks and footwall alteration mineral assemblages typically associated with VMS mineralization in this area (Gale et al., 1980). In addition, associated host rocks were noted in order to establish the overall geological setting of material sampled.

In general, a number of drill cores intersected volcanosedimentary rocks similar to those identified in cores from the Ruttan mine and the Darrol Lake deposit (Gale and McClenaghan, GS-22, this volume). These volcanosedimentary rocks are characterized by a thick sequence(s) of interlayered, felsic-volcanic-derived sandstone and greywacke containing variable amounts of coarser volcanoclastic rocks, which are together interpreted to be debris flow deposits. In some instances, sulphide mineralization, in places including graphite, occurs in felsic to intermediate volcanosedimentary rocks interlayered with psammitic and semipelitic rocks derived from felsic volcanic source rocks.

Although felsic-volcanic-derived fragmental rocks were intersected in a number of drill cores, flows and autoclastic breccia are rare and felsic agglomerate is not present in any of the cores examined. Of particular interest is the presence of angular fragments of felsic volcanic rocks in a polymictic fragmental rock that resembles 'mill rock' (Fig. GS-23-3). This breccia occurs in a thick sequence of bedded conglomeratic rocks that (?)overlies bedded sulphidic mudstone and felsic volcanic sandstone.

LYNN LAKE AREA

Drill core stored at the Mines Branch core storage facility in Lynn Lake were examined and sampled. A number of cores in this facility contain rocks that resemble exhalite. In addition, several drill cores contain crosscutting alteration veins and trace amounts of base-metal mineralization that signify the presence of VMS-type alteration systems. Samples collected from these cores will be used to determine if the sulphide-producing systems and the magmas generating felsic volcanic rocks were capable of producing base-metal-rich VMS-type fluids.

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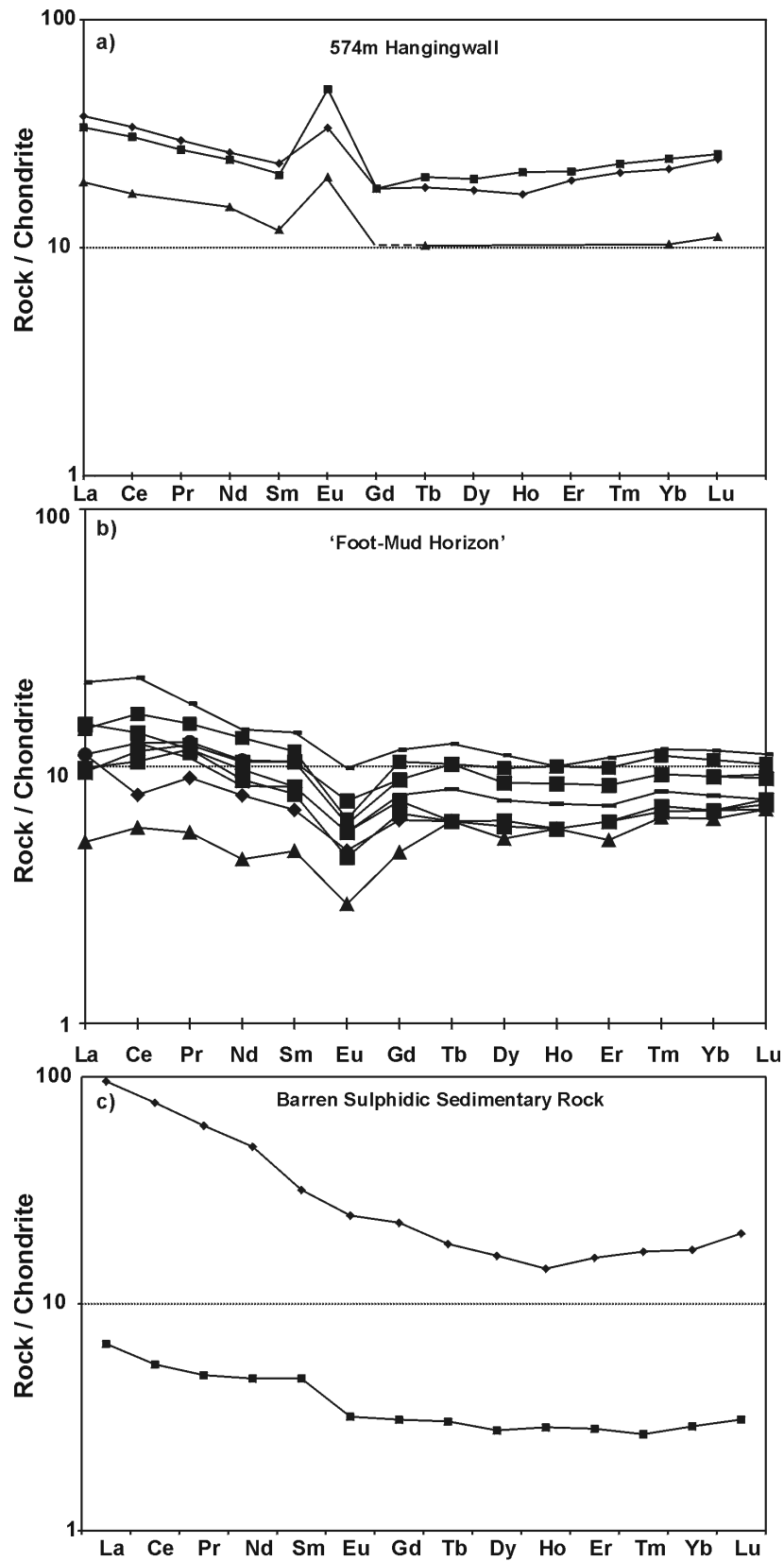


Figure GS-23-1: Rare earth element profiles for: a) a typical distal exhalite related to a massive-sulphide deposit (Spruce Point) and b), c) 'barren' (pyrite-graphite) bedded sulphides.

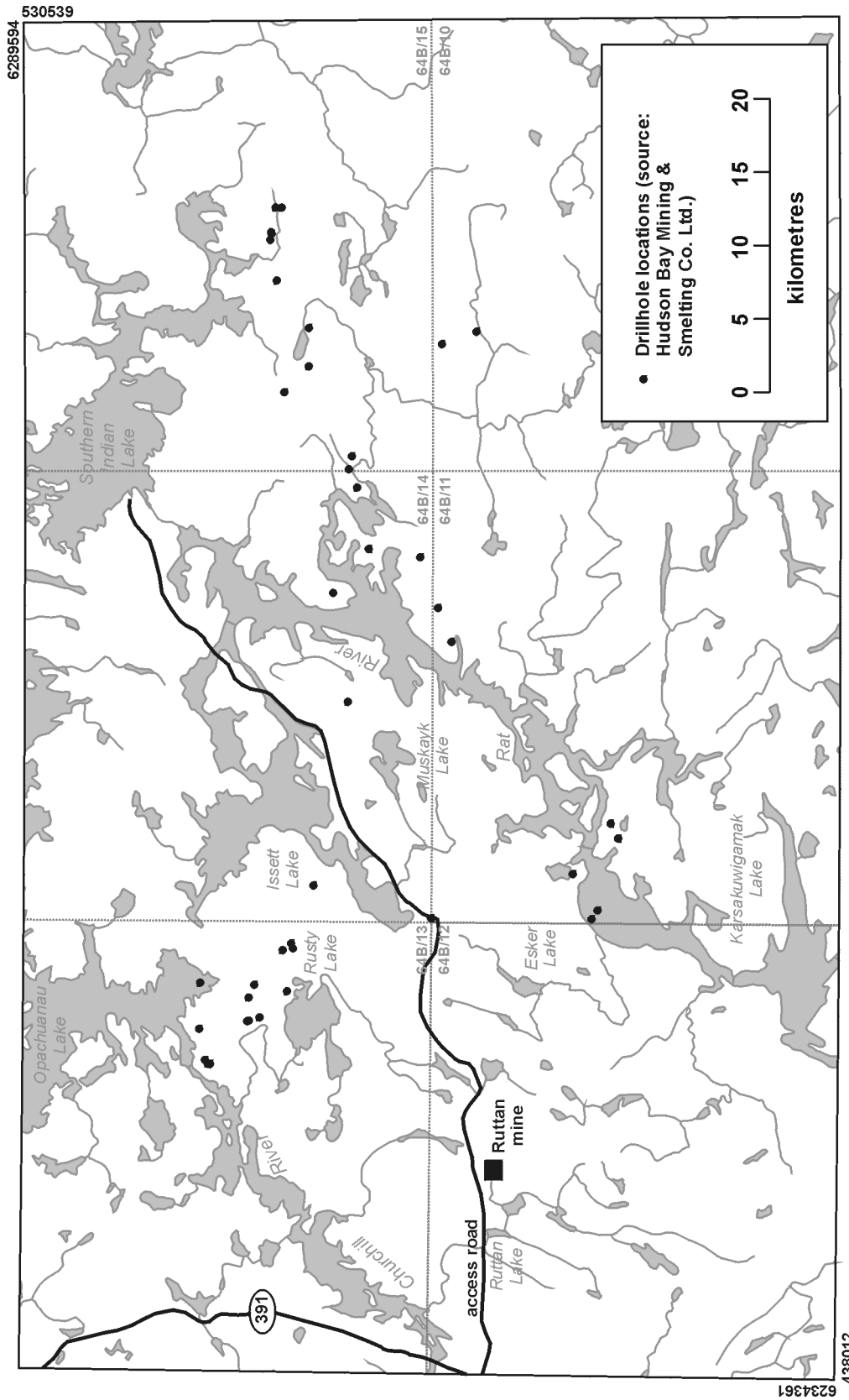


Figure GS-23-2. Location of drill cores examined and sampled in the Ruttan area.



Figure GS-23-3: Angular felsic volcanic fragments in polymictic breccia from drillhole RUT 75. Beds several metres thick are interlayered with possible debris flows.

CONCLUSION

Visual examination of drill cores from the Ruttan region indicates that volcanosedimentary rocks (derived from felsic volcanic rocks), coarse felsic volcanoclastic rocks and chemical sedimentary rocks similar to those found at the Ruttan and Darrol Lake deposits are present at several sites well beyond the known deposits. Although the 'mine strata' has not been positively identified outside the immediate vicinity of the two known deposits, it is the authors' contention that this is a result of a paucity of detailed geological data for the 'Ruttan volcanosedimentary basin'.

The presence of distal exhalite, crosscutting alteration and metalliferous sedimentary rocks in association with felsic volcanic sequences in the Lynn Lake area indicates that this area has the potential to contain additional VMS deposits.

Approximately 300 samples were collected from drill cores from the Ruttan and Lynn Lake areas. All sample information and analytical results will be made available in a database format for ease of retrieval by interested parties.

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