

25 April 1991

**Sulphurets Area, B.C.**  
**Project Plan**

- Title:** Sulphurets Area, B.C. - a joint GSC-led, integrated mineral deposit research study (built on, and expanded from, joint Sulphurets project of R.V. Kirkham, S.B. Ballantyne, and D.C. Harris 1986-1990).
- Principal Researchers:** (and principal activities)
- R.V. Kirkham (mineral deposit studies, regional geology, co-ordinator)
  - J.R. Henderson (structural geology, vein studies, regional geology)
  - M.N. Henderson (structural geology, vein studies, regional geology)
  - T.O. Wright (U.S. National Science Foundation)(structural geology, sedimentology, regional geology)
- Associated Researchers:** (and principal activities)
- S.B. Ballantyne (geochemistry, mineral deposit studies)
  - D.C. Harris (mineralogy, mineral deposit studies)
  - J.K. Mortensen (geochronology)
  - J. Margolis(Ph.D. study University of Oregon)(mineral deposit studies Mitchell Glacier region and other parts of Newhawk joint venture property) (details still in planning)
  - D.J. Bridge (M.Sc. study UBC)(mineral deposit study Kerr property)
  - R.G. Anderson (1:250 000-scale Iskut River map sheet)
  - D.J. Alldrick and J.M. Britton (BCGSB)(1:50 000-scale map sheets, mineral deposit studies)
- Possible Additional Researchers:**
- J.F.H. Thompson (UBC-MDRU)(Treaty Gossan study)
  - A.J. MacDonald (UBC-MDRU)(selected studies Sulphurets-Brucejack area (e.g. fluid inclusion studies(?))
  - B.E. Taylor (stable isotope studies of deposits in region to document relative involvement of magmatic-hydrothermal, meteoric, seawater, and/or metamorphic fluids - would require separate funding to support as many as 3 postdoctoral fellows, analytical costs, and field work)
- GSC Project Numbers**
- RVK and MNH (700059), JRH (890021), SBB (790003), and DCH (680023)
- Duration of Project**
- 1991-1994
- Budget**
- Uncertain
- Location**
- parts of NTS 104B/5, 7, 8, 9, 10, 12 - attached sketch map shows the limits of the area to be emphasized in 1991-1992 (in 1993-1994 expansion of the study area to the east, north, and south is contemplated)

- Liaison** - GSC - R.G. Anderson, C.A. Evenchick, C.J. Greig (Ph.D. student, University of Arizona), D.A. Walker.
- BCGSB - D.J. Aldrick, J.M. Britton, D.V. Lefebure, W.J. McMillan
  - UBC-MDRU - J.F.H. Thompson, A.J. MacDonald
  - Newhawk Gold Mines Ltd. - F.G. Hewett, B. Way
  - Placer Dome Inc. - J. Kowalchuk, E.T. Kimura
  - Corona Corporation - A. Ransom, J. Bellamy, J. Stewart
  - Prime Equities Inc. - C. Idziszek, D. Mallow
  - Granges Inc. - F. Felder, A.J. O'Donnell, J. Hardy
  - Noranda Exploration Co. Ltd. -R. Baerg, R. Kemp
  - American Fibre Corp. - ?
  - Orequest Consultants Ltd. - J. Chapman, W. Raven
  - Keewatin Engineering Inc. - R.F. Nichols
  - Millar Western Engineering Limited - J.F.V. Millar
  - Rebagliati Geological Consulting Ltd. - M. Rebagliati

**Project Statement** - The Sulphurets region contains a large, deformed Early Jurassic porphyry copper, molybdenum, precious metal system; Eskay Creek a major epithermal volcanic exhalative precious and base metal deposit; Treaty Gossan an advanced argillic epithermal alteration zone with precious metal potential; and several other mineral occurrences are present in the area. Over the past few years the area has been the focus of intensive exploration and the Eskay deposit is moving towards the development stage. Since 1986 the GSC (RVK, SBB, and DCH) has had a project in the Sulphurets region emphasizing ore geology, geochemistry, and mineralogy. Extensive work under this project has been done but now we intend, in collaboration with other GSC workers, corporate geologists, BCGSB geologists, and UBC-MDRU staff to expand the scope and area of coverage of the GSC project.

The present study is an integrated research project designed to obtain detailed information on the settings, geneses, and deformational histories of mineral deposits in the area. In addition to current emphasis on mineral deposit, lithochemical, and mineralogical studies; structural and stratigraphic studies will also be emphasized, as well as possible additional work on stable isotopes and fluid inclusions (as indicated above).

**Reports and Maps  
in Preparation**

- GSC paper on work to date (RVK, SBB, DCH)
- GSC Open File - 1:20 000-scale preliminary geology map Mitchell - Sulphurets region; 1:5 000-scale preliminary geology map Brucejack Lake area; 1:20 000-scale maps Mitchell-Sulphurets region - lithochemical sample locations and Cu, Mo, Au, Ag, As, and Sb element distribution maps (SBB, RVK, and DCH)(ore mineral distribution map will follow later)

- Expected Results** - about 5 to 10 (?) 1:20 000-scale preliminary geology maps for area (about 2-4(?) as a result of 1987 to 1991 mapping in addition to 1:20 000-scale Mitchell-Sulphurets map in progress indicated above)
- additional ore and silicate lithochemical data for mineral deposits and altered and unaltered rocks in the area (no funds available for this work at present)
  - additional systematic mineralogical data for deposits and occurrences in area
  - more rigorous stratigraphic, sedimentological, and lithofacies analysis (especially within Mount Dilworth and Salmon River formations)
  - analysis of regional- to microscopic-scale structures, analysis (as much as possible) of the structural settings of ore deposition, documentation of postore deposit deformational histories, and evaluation of selected syntectonic quartz-carbonate (-feldspar-barite) vein and sulphide-rich brittle-ductile shear zone deposits
  - further documentation of regional zoning of metals and minerals
  - attempted reconstruction of geological history and ore genesis (in collaboration with others) in the area
  - this work should contribute to R.G. Anderson's 1:250 000-scale map sheet; D.J. Aldrick's and J.M. Britton's 1:50 000-scale maps and mineral deposit studies in the area; C.A. Evenchick's structural cross-section across the Bowser Basin; adjoin C.J. Greig's mapping in the Snowslide Range to the east; provide a detailed foundation for this part of UBC-MDRU's Iskut region metallogenic project
  - more mineral occurrences should be discovered similar to the many already identified during the course of work in the existing GSC Sulphurets project area

**Objectives** - More complete geological documentation of this complex, economically important area, directed towards aiding exploration in this area and, less well-exposed and-explored similar mineral systems in this part of British Columbia, and development of general concepts that can be applied elsewhere are the main objectives of this project.

**Plan for fiscal year 1991-1992** - About 4 to 6 weeks (mainly August) will be spent by R.V. Kirkham, J.R. Henderson, M.N. Henderson, and T.O. Wright geological mapping and studying mineral occurrences. Where feasible (access and availability of base maps) mapping (emphasizing stratigraphic and structural relationships) will be done at 1:5 000 to 1:10 000 scale. Compilation is planned at 1:20 000 scale. As much as possible we would like to work on the scale of base maps and enlarged aerial photographs used by exploration companies working the area. Even though budgets for analyses are not available yet, samples will be collected for lithochemical, mineralogical, and petrographic studies. Every attempt will be made to co-ordinate this work with that of exploration companies active in the area, UBC-MDRU studies, other GSC projects, and BCGSB activities.

S.B. Ballantyne's and D.C. Harris' field activities in this area for 1991 have not been established yet but they will continue their lithogeochemical and mineralogical studies as part of this expanded GSC Sulphurets project.

Although we do not plan to map west of the Unuk River, we do hope to collaborate extensively with others (company geologists, UBC-MDRU staff, and BCGSB geologists) working in that area. One of the main objectives of the 1991 work will be to connect Sulphurets-Treaty geology with that of Eskay Creek. Included in this activity will be documentation of lithofacies variations within the Mount Dilworth and Salmon River formations.

In addition to its economic importance, other reasons for choosing this area are accessibility and regional structural culminations identified in the area by D.J. Alldrick, J.M. Britton, and colleagues. Preliminary mapping of a large anticline and syncline in the McTagg area was done by J.R. and M.N. Henderson in 1990. The area to the west of the Kerr property (see attached sketch map) is intended to give more detailed documentation of metamorphic rocks identified by Alldrick and Britton (BCGSB Open File Map 1988-4).

**Products**

- Current Research Report
- possibly 1 to 3 (?) 1:20 000 preliminary geology maps (as time and availability of support staff permits)
- talks and displays GSC Minerals Colloquium and Cordilleran Roundup.

**Future Work**

- summer 1992 - no significant mapping planned
- summer 1993 - a minimum of 6 weeks for 4 mappers completing coverage indicated on attached map and areas to east, north, and south (precise location to be determined later based on discussions with D.J. Alldrick, R.G. Anderson, C.J. Greig, UBC-MDRU staff, and exploration geologists).
- summer 1994 - clean-up work necessary to prepare final publications on this integrated research project



Energy, Mines and  
Resources Canada  
Geological Survey  
of Canada Sector

Énergie, Mines et  
Ressources Canada  
Secteur de la Commission  
géologique du Canada

601 Booth Street  
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16 April 1991

Dear Corporate Colleagues:

This letter is only being sent to industry geologists and managers and John Thompson of UBC-MDRU.

I have been informed that senior GSC and BCGSB managers did not support this project under the new Canada-BC Mineral Development Agreement (MDA) (We had requested \$140 000 over four years to support four geologists). A suggestion has also been made that industry (B.C. Yukon Chamber of Mines (?)) supported GSC work elsewhere.

This project to me epitomizes an excellent example of one directed towards mineral development (i.e., employment and associated economic activity) that would be of relatively low cost and a wise expenditure of public funds.

The situation has also arisen that this project was not supported under the new MDA, yet I was requested to act as Liaison Officer for NSERC for UBC-MDRU Iskut metallogeny project into which NSERC is tentatively committing 560 000 federal dollars over four years. Perhaps you can appreciate how I feel about this ironic situation. If GSC and BCGSB projects are to suffer under competition with UBC-MDRU projects, then you can expect increasing reluctance by government geologists to support, contribute to, and participate in MDRU projects. Personally, I would like to see increased rather than less cooperation between all groups. Nevertheless, much effort and trust will be required to establish such a cooperative working environment. I have found that such cooperative efforts are best established at the working level (where compatible and incompatible personalities can be identified quickly) and only then support sought from management.

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Despite lack of MDA support for this project, my immediate managers have agreed to support this project on a "shoestring" A-base budget. This will mean no student field assistants; no office technical support to work on samples, maps, and other subprojects; and no funds for outside chemical analyses, etc. We will appreciate any support in kind that you can give us (e.g. room and board in exploration camps (much appreciated in the past), a few helicopter rides where convenient, help in expediting, and payment of some outside contract chemical analyses of interest to you (e.g. Au + 33 elements Bondar-Clegg neutron activation analyses). We would also appreciate mylar or sepia gopies of your topographic base maps, property-scale geology maps, accurate locations of mineral occurrences and fossil localities, and information on any low-level aerial photography on your properties (with permission to purchase copies of photographs from the contractor) for the planned study area.

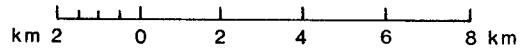
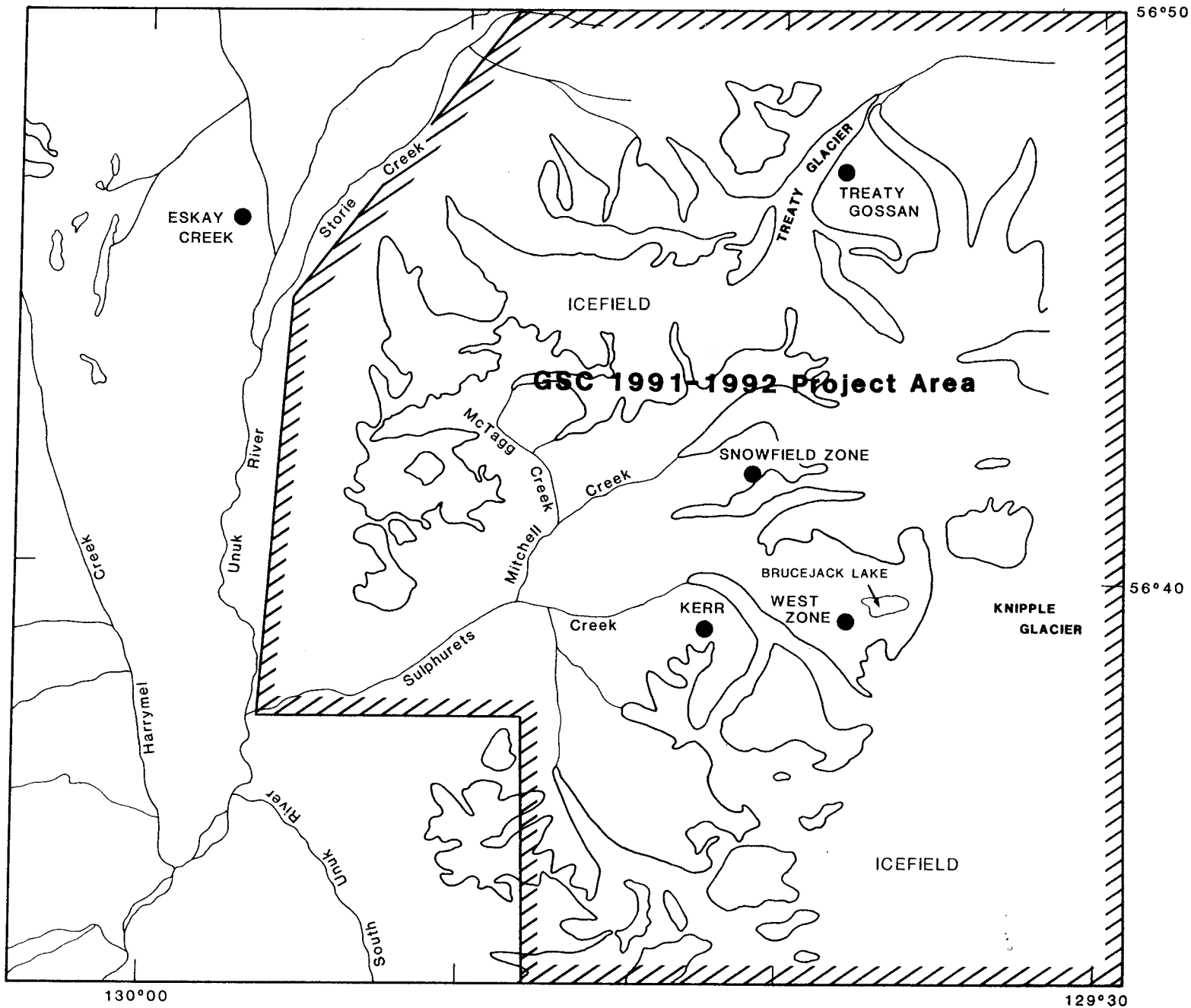
I encourage you to express your opinions about this project to me, and if you are so inclined, to respective mines ministers in Ottawa and Victoria.

Thank you for your continued support.

Yours truly,

R.V. Kirkham

# SULPHURETS AREA, B.C.



## B.C. MDA 2 PRELIMINARY VERSION OF PLAN TO BE PROPOSED

<u>Project Title</u>	<u>Number</u>	<u>Problems to be addressed</u>	<u>Proposed Activities</u>	<u>Lead GSC Division</u>	<u>GSC Project Leader</u>	<u>BCGS Contact</u>	<u>Other Participants</u>	<u>Relevant to or used by</u>	<u>To Do What</u>	<u>Related Projects</u>	<u>Mineral Deposits in area</u>	<u>Expected products and date</u>	<u>FY '90</u>	<u>'91</u>	<u>'92</u>	<u>'93</u>	<u>'94</u>	<u>Ttl</u>
Study granite-related mineral deposits	22	Detailed study of petrogenesis of selected deposits	Mapping, petrology, petrochemistry, geochron., isotopes, computer data integration processing	Mineral Resources Ottawa	R.V. Kirkham PDF or PhD	McMillan? McIntyre? Aldrick?	W.D. Sinclair J. Whalen J.K. Mortensen S.B. Ballantyne K.M. Dawson	Mineral Expl. Ore Deposit Research	New ideas for Mineral Search Ore deposit Research Help Focus Mineral Search	H.B. Mtn., Sulphurets	Several areas - Endako? Galore Cr.? Surprise Lake Batholith	Reports, publications, thesis?	30	40	40	40	30	180
Kitsault Ore Deposit Study	23	Resolve deposit genesis and document regional zoning of metals	Detailed field, microscopy, lithochemistry, isotopes, geochron.	Mineral Resources Ottawa	R.V. Kirkham PDF or PhD	Aldrick? Lefebure?	I.R. Jonasson G. Lynch? J. Mortensen C. Greig- (student)	Mineral Exploration Ore Deposit Research	New ideas for Mineral Search Ore deposit Research Help Focus Mineral Search	H.B. Mtn., Sulphurets	Dolly Varden, Northstar, Torbit, Red Point, Kitsault Lake, Homestake, Vanguard, Kinskuch	Reports, publications, thesis?	30	30	30	30	30	150
Structural Setting Ore Deposits Sulphurets area	24	Document structural setting and postmineral deformation history of deposits	Mapping, petrology, petrofabrics, petrochemistry, geochron.	Mineral Resources Ottawa	R.V. Kirkham J. Henderson M. Henderson	Aldrick Britton? Brown? Logan?	S.B. Ballantyne D.C. Harris R.G. Anderson C.A. Evenchick J.K. Mortensen C. Greig U.B.C.M.D.R.U. staff	Mineral Exploration Ore Deposit Research	New Ideas for Mineral Search Ore deposit Research Help Focus Mineral Search	Iskut Bowser Kitsault H.B. Mtn.	Brucejack, Kerr, Mitchell, Treaty, Kitsault, Eskay Creek (adjacent area)	Map reports, publications	50	50	20	20	-	140

#24 COMMENTS

- The main focus of this work would be mapping within and around the existing Sulphurets Project area of R.V. Kirkham, S.B. Ballantyne and D.C. Harris. It would extend the area to include Twin John Peaks and Bruce and Jack Glaciers to the west; the ridge near South Teigen Lake to the north; about half way down the Knipple Glacier to the east, and to the south it is limited by the accessibility of arêtes and nunataks in the high icefields. The scale of mapping will be approximately 1:5 000 to 1:10 000. Initial emphasis will be on documenting and tracing the Dilworth Formation, as it is the most reliable marker unit found in the area. Detailed structural studies will also be carried out of some Au and Ag vein deposits; a Cu-Au-bearing brittle-ductile shear zone, and of some deformed base and precious deposits within the study area. The work will provide a more rigorous foundation for the extensive lithochemical and mineralogical databases of RVK, SSB and DCH. It will also contribute to BCGSB 1:50 000 scale and R.G. Anderson's 1:250 000 scale mapping in the area; C.A. Evenchick's structural cross-section across the Bowser Basin; it will adjoin C. Greig's maps to the east; it will provide a detailed foundation for UBC MDRU's metallogenic studies in the Iskut region; it will extend James MacDonald's documentation of the Dilworth Formation in the Eskay Creek area; it should provide a very sound geological foundation for exploration in the area; it should provide insights for less well-documented and exposed similar mineral systems in northwestern British Columbia, and more mineral showings should be discovered similar to many already found during the course work in the existing GSC Sulphurets Project.
- This proposed project has been discussed with R.G. Anderson, C.A. Evenchick, C. Greig, John McDonald, James MacDonald, D. Aldrick, J. Britton, D. Brown, J. Logan and W. McMillan. It has not been discussed with companies with critical claim groups in the area.