888135

February 15, 1991

Dear Tom:

Enclosed is a draft of the proposed Sullivan-Aldridge project that Bob Turner, John Lydon, Craig Leitch and I have put together. We have had a number of visits with personnel of Cominco and have trimmed a somewhat more ambitious proposal down to this package. In particular, Cominco staff were very concerned about the amount of time these projects would have on mine staff and the rather academic aspect of a number of the proposals. I now believe that Cominco does support the project, although they are somewhat dubious about the long-range benefits. We have had to promise minimal disruption of their working schedules by limiting the number of geologists that are expected to have access to Cominco data, core, etc. This will be achieved by integrating the projects and by only have certain geologists collect data and samples for everyone.

The specific projects that I am coordinating and getting directly involved in include 2a, paleotectonics, sedimentation and alteration in the Sullivan mine area (as distinct from the mine itself) and 3b, tectonic history of the Aldridge basin. I have proposed to spend up to three weeks in the field this summer as we begin project 2a. An important component of 3b involves regional 1:50 000 mapping of the two sheets along the U.S. border, in the area that has been receiving much of the recent exploration (Kokanee, etc.). Of all the proposed aspects of the Sullivan project, the regional mapping will probably receive the most interest by the exploration community.

Many thanks for your comments on the VMS short course notes. They are currently being updated for presentation in Vancouver next week and for publication as a paper.

Best wishes,

Trygve Hoy

Who is it from?

Trygve Hoy?

LOG NO: FEB 1 1991 VAN 4
ACTION:
TOS → Compliments
mine 'closures' data gathering?
FILE NO: SULLIVAN

INTEGRATED GEOSCIENTIFIC RESEARCH ON THE SULLIVAN DEPOSIT AND ITS GEOLOGICAL ENVIRONMENT.

Executive Summary.

PURPOSE AND RATIONALE.

The Sullivan deposit is widely acknowledged as the classic example of the SEDEX mineral deposit type, from which a major proportion of the world's zinc and lead resources are obtained. Both the Geological Survey of Canada and the British Columbia Geological Survey perceive a scientific responsibility to help ensure that as much geoscientific information as is possible on the Sullivan deposit and its geological environment be documented in an easily accessible format. The proposed documentation and research topics are most practicable while Cominco's staff, records and sample collections are still centralized in the Kimberley-Cranbrook area, ~~and the timing of any~~ benefits to the mining and exploration industry ~~to be gained~~ from the proposed research ~~are~~ can be best realised while there is still an active mining and exploration interest in the area.

SCOPE OF SCIENTIFIC RESEARCH.

A total of fourteen specific projects proposed by fifteen senior research scientists from the GSC, BCGS, USGS and universities, have been detailed in a full proposal previously submitted to Cominco. In light of comments and suggestions by Cominco, and the current status of mining operations, the structuring and emphasis of some of these projects have been modified. The intent of the projects are to build upon, and not duplicate, that knowledge already gained by previous investigations in the area, especially those by Cominco. Emphasis of the projects so far formulated is on specialized geological and geochemical studies to give deeper understanding of the ore forming environment and to define any cryptic expressions of the ore-forming process that will add to exploration criteria.

RESEARCH PERSONNEL AND STRUCTURING.

Personnel.

To date, the following research scientists have been identified as participants in the Sullivan Research Project:

GSC : Wayne Goodfellow, Craig Leitch, John Lydon, Bruce Taylor, Robert Turner.

BCGS : Tryggve Hoy (and others to be named).

USGS : Wayne Shanks, John Slack, Martin Palmer.

Others: David Shaw (presently Petrocanada); Eva Schandl, Don Davis, Tom Krough (Royal Ontario Museum), Gordon Goles (Univ.Oregon).

Structuring.

The proposed research can be considered to be structured into six main thrusts that are outlined below. For each thrust, there has been designated a Scientist Responsible for directly interfacing on scientific matters with Cominco personnel and who will also be responsible for arranging access to data and sample materials supplied by Cominco for other participants.

On matters of general project policy, planning and practice, communications to and from Cominco will be via Dr.J.M.Duke, Director, Mineral Resources Division, Geological Survey of Canada.

RESEARCH OBJECTIVES AND METHODOLOGY.

1. SULLIVAN ORE-BODY

A. Vent Complex (Western part of the ore-body and alteration zone).
Scientist Responsible: Robert Turner, GSC, Vancouver.
The main objective is to document the history of hydrothermal activity in the main vent complex and to understand the evolution of events in a major ore-forming system. Important aspects are: the geochemical and isotopic signatures of alteration/metasomatism associated with successive hydrothermal episodes (in order to distinguish those specifically associated with base metal sulphide deposition); processes of zone refinement which lead to the mobilization and concentration of major and minor metalliferous components; geochronology of hydrothermal events.
Methods:
Core-logging, limited u/g mapping and sampling: Turner, Leitch.
Petrography, mineralogy, geochemistry : Turner, Leitch, Shaw, Slack
Fluid Inclusions: Leitch.
Geochronology: Schandl, Krogh.
Stable isotopes (S, O, H, C, B): Shanks, Taylor, Palmer.
REE Geochemistry: Schandl, Davis

delete? Goodfellow?

B. Bedded Ores (Eastern part of the ore-body and distal fringe).
Scientist Responsible: John Lydon, GSC, Ottawa
The main objective is to determine those factors which control the accumulation of the bedded ores and influence their stratigraphic and lateral compositional variations. An emphasis will be assessing the importance of hydrothermal supply versus local seafloor or bottom conditions in allowing the accumulation and preservation of base metal sulphides, and the processes of dispersal of hydrothermal products away from the vent complex, to better define the factors necessary for the formation of sedimented ores and the conditions governing the extent and nature of geochemical dispersal halos.
Methods.
Core logging and photography, limited u/g sampling, Cominco logs and assay data: Lydon. Goodfellow?
SEM and Image Analysis, mineralogy, geochemistry: Lydon.
Stable isotopes (S, C, O, H): Taylor

SULLIVAN MINE DISTRICT

2. ~~MINE CONCESSION.~~

A. Palaeotectonics, sedimentology and alteration.
Scientist Responsible: Trygve Hoy, BCGS, Victoria
The main objective is to document the seafloor environment surrounding the Sullivan hydrothermal centre and to distinguish those contemporaneous phenomena and processes which may be indicative of proximity to the hydrothermal centre. Initial emphasis will be the characterization of the North Star Hill alteration ~~zones~~ and breccia zones, and the stratigraphic evidence for tectonic controls to local sedimentation and seafloor topography.
Methods.
Mapping, core-logging, Cominco documentation: Hoy, Turner.
Petrography, geochemistry: Hoy, Turner, Leitch, Slack
Fluid inclusions, mineralogy: Leitch.
Stable Isotopes (C, O, H, S, B, Sr): Shanks, Palmer, Taylor, Sheppard
REE Geochemistry: Schandl, Davis.
Geochronology: Schandl, Krogh.

B. Structural Analysis.
Scientist Responsible: To be identified.
In response to the suggestion by Cominco, a priority is being given to establishing a structural component to the overall project that will concentrate on a structural analysis of the Sullivan Mine ~~Concession area~~, with particular emphasis on the history of movements on significant faults and thrusts.

3. REGIONAL.

A. Stratigraphic geochemistry of Aldridge Basin.
Scientist Responsible: Wayne Goodfellow, GSC, Ottawa
The objective is to determine secular and transient variations and signatures of the Aldridge stratigraphy that may aid stratigraphical correlation or have significance to recognizing changes in the water column that prognosticate ore-forming events. Emphasis will be placed on sulphur and carbon isotopes to determine periods of anoxia (considered favourable for the formation of SEDEX deposits); major element chemistry and mineralogy to determine variations in sediment provenance and transportation patterns; trace elements to detect dispersal from transient hydrothermal activity.
Methods.
Core-logging and sampling: Goodfellow.
Geochemistry, mineralogy, sedimentology: Goodfellow.
Stable Isotopes (S, C, O): Shanks.
REE Geochemistry: Schandl, Davis.

B. Thermo-tectonic history of Aldridge Basin.
Scientist Responsible: Tryggve Hoy, BCGS
The objective is to better understand the evolution of the Purcell Belt-Basin, particularly with regards to the tectonic control on sedimentation and basinal configuration. A major focus will be on the role of the Moyie Sills in controlling synsedimentary hydrothermal activity within the Basin. 1:50000 scale mapping of areas of exploration interest (e.g. Yahk area, 82G-4, 82F-1) is contemplated for the project period.
Detailed mapping and core-logging: Hoy or delegate.
1:50000 Mapping: BCGS delegate.
Mapping alteration zones: Slack, Turner
Stable isotopes (C, O, H, S, B, Sr): Shanks, Palmer.
Geochronology: Schandl, Krogh
REE geochemistry: Schandl, Davis.
Pb isotopes, geochemistry: Goles.

TIMING AND DURATION.

1991-1994	Scientific investigations.
1994-1995	Preparation of final manuscripts.
1996	Publication of Sullivan Volume(s).

INTERIM PUBLICATION.
Publication of annual progress reports in GSC Current research and BCGS Geological Fieldwork. All manuscripts containing information derived from Cominco's data or properties will be submitted to Cominco for their comments prior to approval for publication. Investigators will be required to report on all samples supplied by Cominco within the previous year.

INTEGRATION AND COORDINATION.
To integrate logistics of field work and generally facilitate the integration and flow of scientific study, activities will be cordinated by a committee of:

John Lydon	GSC	Ottawa
Robert Turner	GSC	Vancouver
Tryggve Hoy	BCGS	Victoria.

SULLIVAN PROJECT

SUMMARY OF WORK PLAN FOR 1991.

All field work associated with the project will be carried out between mid-June and late July 1991. It is proposed that access to the mine office and Cominco's drill cores will be limited to a three week period from mid June to early July.

Field Workshop - mid-June

Most researchers have expressed the necessity of holding an initial field workshop in order to co-ordinate activities, research priorities, sample requirements, and to generally communicate on the details of scientific objectives and methodologies. The workshop will be arranged so not to impose upon Cominco facilities, but represenatatives of Cominco are very welcome to participate. If at some time during the course of the three day or so workshop, Cominco deems it possible to give an office and/or underground to a selection of participants, the invitation would be most enthusiastically received.

Field work.

All participants at the workshop are expected to extend their stay in Kimberley to carry out orientational or preliminary field studies and sample collection. The majority will be involved in work away from the mine area. The following requests access the mine site for the purposes stated:

Project 1A: Turner and Leitch: Logging of core from the western part of the mine. Limited spot sampling for petrography and fluid inclusion work. (Two weeks)

Turner: Access to underground to map and sample in the high grade upper portions of the western ore body (up to five days).

Hoy, Turner, Leitch: Logging of cores from North Star Hill.

Lydon: Logging and photography of selected drill core from the south-eastern part of the bedded ores (one week).

Lydon: Access to the south-east fringe to collect a continuous section through the "B-triplets" or equivalent (one or two half-days).

Lydon: Access to Cominco reports to prepare summaries of the scope of previous work to other investigators. Access to selected drill logs and assay data. (two weeks).

Goodfellow: Logging and sampling of a regional core (1 week)

Goodfellow,Lydon: Logging and spot sampling of selected drill core from Concentrator Hill (1 week).

The drill core will be sampled in a responsible manner as directed by Cominco personnel. Sampling by longitudinal cutting with a diamond saw is the preferred method to leave duplicate portions in the core box is the suggested method. Cominco will be suplied with a complete list of samples collected.