

GEOPROCESS FILE SUMMARY REPORT

LA BICHE RIVER MAP AREA N.T.S. 95C

INTRODUCTION

The GEOPROCESS FILE is a compilation of information and knowledge on geological processes and terrain hazards, including mass movement processes, permafrost, flooding risks, faults, seismic activity and recent volcanism, etc. Please refer to the GEOPROCESS FILE Introduction and User's Guide for more in-depth information on how the maps were developed, which other GEOPROCESS FILE maps are available, how to utilize this inventory and how to interpret the legend. Special interest should be taken in the detailed description of the terrain hazard map units. Appendices in the User's Guide include summary papers on the geological framework, permafrost distribution, and Quaternary geology in Yukon and a list of comprehensive GEOPROCESS FILE references.

This report includes a brief discussion of the scope and limitations of the GEOPROCESS FILE compilation maps and summaries followed by summaries of the bedrock geology, surficial geology and terrain hazards for this N.T.S. map area, and a list of references.

Geological Processes and Terrain Hazard Compilation Maps

The GEOPROCESS FILE map units were drafted on the 1:250,000 topographic base maps through interpretation from bedrock geology maps, surficial geology maps and in some cases terrain hazard maps at various scales. The compilation maps have a confidence level reflecting the original source material. All materials used to produce the maps are listed in the references attached to each map. A file containing the documentation used to construct these maps is available at the Indian and Northern Affairs library in Whitehorse, Yukon. Areas for which no surficial geology or terrain hazard information is published were left blank. Summary reports on surficial geology and terrain hazards for these map sheets were written by extrapolating the data from adjacent map sheets or smaller scale maps. Information from small scale (e.g. 1:1,000,000) maps was used for the summary reports, but not redrafted onto the 1:250,000 GEOPROCESS FILE maps.

The GEOPROCESS FILE compilation maps are intended as a first cut planning tool; the legend on the maps describes the general aspects of terrain hazards (also see below) and associated geological processes. **These maps should never replace individual site investigations for planning of site specific features, such as buildings, roads, pits, etc.**

Bedrock Geology Summaries

Each 1:250,000 N.T.S. map area is described according to morphogeological belts and terranes defined by Gabrielse *et al.* (1991) and Wheeler *et al.* (1991). Bedrock geology (including structure) and mineral occurrences are briefly described and taken largely from the referenced, most recent 1:250,000 geological map with additional contributions from Wheeler and McFeely (1991), and Yukon MINFILE (1993). A summary paper ("A Geological Framework for Yukon") in Appendix A of the Introduction and User's Guide provides a framework and context for each of the bedrock summaries.

The level of knowledge and understanding of Yukon geology is constantly evolving with more detailed mapping and development of geological models. Names, ages and terrane affinities of rock units on the most

recent 1:250,000 geological maps may, in some cases, now be considered incorrect. Thus information contained within some of the bedrock geology summaries may be out of date. Although much of the information reflects the knowledge at the time that the source map was published, additional information has been inserted whenever possible to assist the user in merging the information with current geological maps, concepts and understanding. The age ranges for similar packages of rocks may also vary between map areas since the actual rocks, or at least the constraints on their age, may vary between map areas.

BEDROCK GEOLOGY

The La Biche River map area is contained entirely within the Foreland Belt. The map area is characterized by long, linear north-south trending mountain ranges in the east and the Beaver River valley in the southwest. North-south trending thrust faults, the Beaver fault and the north-south trending Fantasque syncline, and La Biche and Kotaneelee Anticline are prominent geological features, the latter two of particular importance for gas deposits.

The oldest rocks are in the west portion of the map area, south of the Beaver Fault. They include Ordovician to Devonian (360 to 500 million year old) shale and carbonate in addition to argillites of possible Helikian age (1 to 1.75 billion year old). The sedimentary package gets younger towards the eastern portion of the map area. Mesozoic (66 to 245 million year old) sedimentary rocks are interbedded and folded with Permian to Devonian (245 to 400 million year old) limestone, shale, siltstone and sandstone. The only intrusive rocks in the area are a Cretaceous (100 million year old) syenite pluton intruded along the Beaver River Thrust fault in the southwest part of the map area, and four small, scattered trachyte bodies also in the southwest portion.

Mineral Deposits and Occurrences

Yukon MINFILE lists eleven mineral prospects of which six host known mineralization. Two of the occurrences are barite veins and lenses. Other deposit types include rare-earth elements and lead, zinc or copper veins. The La Biche map area has been explored for its oil and gas potential, especially in the southern portion. This area boasts the Canada's northernmost and Yukon's only producing field, the Kotaneelee Field. This field has the highest volume producing capacity of natural gas from several wells.

SURFICIAL GEOLOGY

The La Biche River map area in southeastern Yukon is within the limits of the McConnell glaciation. The map area is characterized by moderate to high elevations with a general increase in relief towards the east with the La Biche and Kotaneelee Ranges. At the time of preparation of this report, there were no quaternary geology or soil survey maps and very little information on terrain hazards for this area. General information on glacial history and permafrost is available in the Introduction and User's Guide of the Geoprocess File.

TERRAIN HAZARDS

The Geological Survey of Canada's Pacific Geoscience Center in Victoria provided the seismic information.

Permafrost

The La Biche River map area is located in the widespread permafrost zone (Brown, 1978). According to the recent compilation by Heginbottom (1995), the map area is in the zone of Extensive Discontinuous Permafrost (50-90%) with the occurrence of sparse ice wedges, and low (<10%) ground ice content in the upper 10-20 m. Ground temperatures range from -2 to +2 degrees Celsius.

Seismicity

There are three recorded seismic events within the map area. All of the recorded events are 2.0 to 3.999 or

less in magnitude.

