

4.0 PHYSICAL ENVIRONMENT

In this section, the physical environment in the proposed exploration areas is reviewed and, where possible, compared with conditions in other areas where offshore hydrocarbon exploration and development activities are taking place. The focus of this section is on the physical environment as it relates to geohazard assessment, engineering design parameters, operational and safety concerns, and environmental impact assessment. The intent is to discuss the quantity and quality of available information from the perspective of defining conditions on a regional basis, given that any exploration activities will be preceded by detailed site work by the leaseholder. Detailed technologies and engineering implications are discussed in Section 5.

4.1 Physiography

The main areas of interest for future oil and gas exploration are the Queen Charlotte and Hecate Basins as outlined in Figure 4.1 (Terra Remote Sensing Inc. 1999). The high potential zones extend roughly from the north end of Vancouver Island through Queen Charlotte Sound and the western portion of Hecate Strait, including Dixon Entrance and the west coast of the Queen Charlotte Islands out to the Queen Charlotte Fault Zone.

The entire area is part of the Hecate Depression, a continuous, low-lying region extending from Puget Sound north to Alaska (Thomson 1981). The Hecate Depression is flanked by the Coast Mountains on the mainland side to the east, and by the open Pacific and the lower mountains of the Queen Charlotte Ranges to the west. The major physiographic features of this region are described in detail elsewhere (e.g. B.C. Ministry of Environment 1983, Petro-Canada Inc. 1983).

Coastal conditions are extremely varied, ranging from dynamic beaches with extensive sand flats to steep cliffs and deep fjords. The physical and biological characteristics of the shore zone throughout British Columbia are currently being mapped using a consistent approach based on a combination of oblique aerial video imagery and selected ground-truthing. The resulting data are then compiled into standard format databases, with an effective “data scale” of roughly 1:5000 (Howes *et al.* 1997). Although the aerial videography has been completed for the entire province, the associated databases are still under development. It is expected that the databases will be completed and become available to the public in the fall or winter of 2002 (Mark Zacharias, pers. comm.).

In a related effort, the Land Use Coordination Office (LUCO) is developing coastal resource and oil spill response atlases for the coast of British Columbia. The oil spill response atlases will incorporate information on biophysical characteristics of the shoreline, sensitivity to oiling and available technologies for oil spill response and cleanup. It is expected that these products will also be completed in the fall or winter of 2002. More information on coastal mapping initiatives is available through the LUCO website at <http://www.luco.gov.bc.ca/coastal/mris/coasthm.htm>.



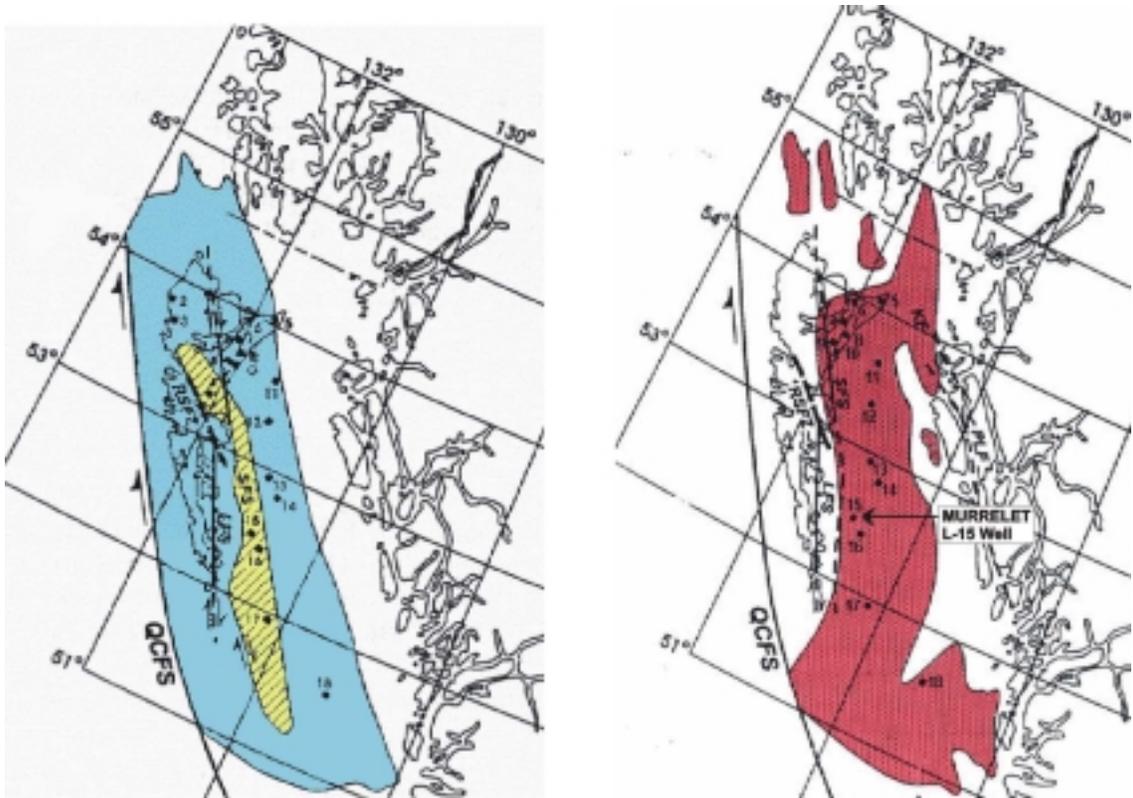


Figure 4.1 Oil and gas plays on the west coast. (Left: Cretaceous oil and gas play; yellow area is the more prospective region with moderate to high potential; Right: red area shows region of the Miocene oil and gas play. Pliocene play covers the northern portion of area north of the Murrelet L-15 well (from TRSI, 1999)).

4.1.1 Bathymetry

Queen Charlotte Sound, the southernmost waterbody under consideration in this review, includes the waters between the north end of Vancouver Island and Cape St. James at the southern tip of Moresby Island. Three major troughs, with water depths extending to 400 m, cut across the sound. Between the troughs lie the shallower waters of Cook Bank, Goose Bank and North Bank, with depths as shallow as 31 m over the eastern edge of Goose Bank (WCOEEAP 1986).

Hecate Strait lies to the north of Queen Charlotte Sound, between the mainland and the Queen Charlotte Islands. The strait narrows from about 120 km between the mainland and Cape St. James at the southern tip of the Queen Charlotte Islands, to roughly 55 km between Rose Spit and the mainland. Much of the western half of Hecate Strait consists of two shallow banks with water depths consistently less than 40 m: Dogfish Bank to the north and Laskeek Bank to the south. On the mainland side, a submarine valley deepens from 50 m in the north to 300 m in the south and continues southward and westward to the open ocean through the troughs on either side of North Bank in Queen Charlotte Sound (Figure 4.2).