for 6,264 of the wells drilled. About 80% were drilled in Alberta. Exploratory drilling for oil and gas on Canada Lands continued at about the same level as in 1980 and 1981, with a total of 23 wells reaching the total depth expected. Eight discoveries were made on Canada Lands, including three gas finds on the Scotian shelf, an oil discovery on the Grand Banks near Hibernia, and two gas discoveries in the Beaufort Sea. These discoveries were relatively small, and did not contribute significantly to Canada Lands reserves.

Successful delineation wells were drilled in the Hibernia and Venture structures off the East Coast, at Tarsiut in the Beaufort Sea, and on the Cisco structure in the Arctic islands.

In the Mackenzie-Beaufort Sea area seven wells were drilled to total depth in 1982, including four wildcats and three delineation wells, the latter on the Tarsiut structure. Four wells, although small, were significant.

During 1982 five wells were drilled in the Arctic islands, the same number as in 1981. Four of these were offshore wells from reinforced ice platforms in channels between the islands, while the fifth was an onshore well, a dry hole, on eastern Banks Island. Results were generally disappointing compared with 1981 when three discoveries were recorded.

In July 1982, Esso began development drilling at Norman Wells, NWT, in preparation for a water flood recovery system designed to extract oil from a large part of the field underlying the Mackenzie River. Actual production from this field was scheduled to start in 1985, after completion of a pipeline from Norman Wells to Zama in northern Alberta.

Throughout 1982 there was considerable interest in Western Canada because of significant oil discoveries in mainly previously known oil regions. This search has been encouraged by the higher price being given to new oil, and provincial incentives. As a result, the provinces of Manitoba, Saskatchewan and Alberta recorded a higher level of oil-directed activity than in the previous two years.

11.4.3 Reserves

The Canadian Petroleum Association (CPA) estimated Canada's remaining established conventional crude oil and equivalent reserves in 1982 to be 1.2 billion cubic metres. Using the 1982 conventional production of 71 million cubic metres the reserves-to-production ratio (reserves life index) at the end of 1982 was 15.7 years.

At the end of 1982 the CPA estimated the remaining established reserves of liquefied petroleum gases at 104 million cubic metres. The reserves-to-production ratio at the end of 1982, using the 1982 production level of 13 million cubic metres, was 8.1 years.

At the end of 1982 Canada's marketable natural gas reserves amounted to about 2.6 trillion cubic metres, a significant increase over the 1.7 trillion in reserves estimated in 1973. These known reserves do not include a further resource potential on Canada Lands, estimated to about 8.5 trillion cubic metres. Production during 1982 amounted to 69.3 billion cubic metres, with total sales in Canada and the US reaching $10.5 billion, an increase in value of nearly 70% since 1979. The reserves life index was estimated to be equal to 37.4 years at the end of 1982, about the same level estimated in 1981.

11.5 Oil refining

The Canadian refining industry experienced a difficult year during 1982 due to the declining domestic demand for petroleum products which resulted in surplus refining capacity. Multinational oil companies closed some refineries in Quebec, Ontario and British Columbia. Refinery capacity dropped another 2.7 million cubic metres. The remaining plants operated at about 75% capacity.

The crude oil refining capacity of all operating refineries in Canada at the end of 1981 totalled 130.0 million cubic metres, a decrease of 6.9 million since 1979. This reduction was primarily due to the closing of Gulf's Point Tupper, NS refinery. Minor increases in capacities of some refiners tended to offset slight reductions at others.

Nevertheless, there were some optimistic developments in the refining sector. Refinery expansion in Calgary and Edmonton increased Alberta capacity by almost 10%. In July 1982 a $335 million plan was announced to upgrade Suncor's skimming refinery at Sarnia. Work was concluded in the summer of 1983 on a comparable project at Ultramar's St. Romuald refinery in Quebec. Petrosar Ltd. in Sarnia, also announced its intention to install a $50 million vacuum tower to reduce its residual oil output.

In Montéal, Petro-Canada moved toward the installation of a 300 000 cubic metres-a-year residual oil hydrocracker to demonstrate, on a commercial basis, the Canada Centre for Mineral and Energy Technology's (CANMET) new heavy oil upgrading technology.

These projects will reduce heavy oil output, will mean greater production of desirable transportation fuels and petrochemicals, and will reduce the amount of crude oil feedstock needed to produce these products.

11.6 Transportation

11.6.1 Natural gas

Natural gas transmission lines serve major Canadian centres from Vancouver to Trois-Rivières and transport gas to the international border for US markets from California to New England.

Public hearings began in mid-1983 to select a builder for the Vancouver Island natural gas pipeline.