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BONNET PLUME PROPERTY

Summary of Environmental Programs Completed in 1981,
and an Outline of Projects Planned for 1982

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Bonnet Plume Property

Summary of Environmental Programs Completed in 1981 and an Outline of Projects Planned for 1982

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1. Introduction

This report is intended to provide a description and summary of results from the environmental programs related to the Bonnet Plume Project. In 1980, five environmental programs were undertaken, one short term project and four longer term ones, as follows:

- a) An environmental consultant, LGL Limited, completed an initial overview of the fisheries, wildlife and vegetation of the property which included recommendations for a variety of future studies.
- b) The Yukon Territorial Government (YTG) began a three year study of the caribou of the Wernecke Mountains, and included the Bonnet Plume licence area within their study region.
- c) The Department of Indian Affairs and Northern Development (DIAND) installed a recording water level meter on Illyd Creek.
- d) Pan Ocean set up a weather station at Kiwi Lake.
- e) Pan Ocean started a water quality sampling program on Illyd Creek and the Wind and Peel Rivers.

The first project was completed in 1980. Projects b and c were continued during 1981 and the other two continued with some modifications. The weather station was moved and modified for better winter operation and the sampling program modified for greater representation of sites near the Illyd coal deposit.

2. Regulatory Framework and Government Policy

The Bonnet Plume Basin by virtue of its coal development potential, has recently come under increased environmental scrutiny by both DIAND and YTG. Primary responsibility for ensuring that the environmental impacts of the pre-operational, operational, and abandonment phases of mine development are adequately assessed, is vested in the Federal Government through DIAND by means of the Environmental Assessment and Review Process, (EARP). This legislation applies not only to potential impacts upon biological ecosystems, but also addresses the physical/chemical environment, aesthetics, and the socio-economic aspects of the projects. Although the Federal Government has retained its lead role in the assessment, DIAND has delegated responsibility for socio-economic matters to YTG. The first formal step in

initiating EARP is the formation of an Environmental Review Committee (ERC). Even prior to that committee's formation, however, DIAND expects that the proponent will undertake studies to document the physical and biological baseline conditions on the property on his own initiative. We have been working toward that end for some time, as documented in the remainder of this report.

The Environmental Review Committee was established in late December 1981 with the initial responsibility of screening the proposed development at Bonnet Plume for environmental impacts. They have recently requested Pan Ocean to provide information pertaining to the orebody, mine processes, construction schedule, etc., both for the mine and mine facilities themselves, and for any associated linear facilities related to the mine. A response is in preparation.

3. Results of Field Work and Data Analysis

A. Physical Environment

a) Hydrology

The water level recorder on Illtyd Creek has been in operation for two years. However, the 1980 record is sporadic, with reliable data recorded only for the latter part of June, July and the first week in August. A continuous record of water levels exists for 1981 from later May to early October. Daily discharges computed from the rating curve range from 2.31 cu. metres/sec to 32.86 cu. metres/sec. However, actual flows particularly during periods of peak runoff, may differ substantially from their calculated values since the rating curve is unreliable beyond discharges of about 10.0 cu metres/sec. More detailed measurement is also required for low flows.

b) Water Quality

Water samples were taken in June, September and November of 1981. The results of chemical analysis show them to be similar to those taken earlier. The water chemistry of Illtyd Creek and of Wind River is quite similar during the summer months, although

differences may exist in other seasons. Both have hard waters that are slightly alkaline. They have low levels of nutrients and dissolved metals and appear to have a moderate buffering capacity. The streams draining the region of the Iltyd coal deposit and the lakes in that area are more neutral.

c) Meteorology

Weather data had been gathered at Pan Ocean's Kiwi Lake base camp prior to the 1981 season. Those records are only marginally useful partly because Kiwi Lake is not fully representative of weather conditions at the proposed site of the thermal power plant, and partly because data reduction from the chart recorder is labour intensive and costly. Both of these shortcomings were remedied in 1981. The station was moved to the proposed site of the thermal power station and digital recording equipment was installed with the chart recorder retained as a back up system. The station is powered by a propane driven thermo-electric generator, which provides electricity to the data acquisition system as well as heat to the shelter in which it is installed. Seven meteorological parameters, viz. wind speed, wind direction, temperature, relative humidity, precipitation, solar radiation, and barometric pressure, are recorded on cassette. The system computes and records the hourly, mean, maximum and minimum values for each parameter, except wind direction, precipitation and solar radiation, where hourly averages only, are computed. Station servicing, which is limited by the cassette duration, is at two month intervals. The cassettes are interfaced with a hard computer disc in Calgary and analysis and plotting routines will be developed to provide the data in a format suitable for reports.

B. Biological Environment

a) Caribou Studies

The Wildlife Branch of YTG attached radio collars to eight caribou in 1980 and another ten in 1981. The locations of the collared animals have been ascertained by aerial survey during each season, and a general pattern of animal movements has emerged. It appears that the animals in the Wernecke Mountains are separate from the Porcupine Caribou Herd and do not normally mix with them. Furthermore, the Wernecke animals may themselves be composed of several distinct breeding and calving groups, although this is yet to be verified. Overall, some Wernecke animals make limited but regular use of the Bonnet Plume Property area. However, the largest amount of caribou activity that can be expected there will be during those occasional years when the Porcupine Herd winters that far south.

4. Planned Environmental Programs for 1982

The meteorology station and water quality sampling programs will be continued in 1982. DIAND will install its water level recorder again and will try to install a staff gauge close to the Illtyd coal deposit. During 1982 we will be carrying out streamflow surveys which will permit us to confirm the stage/discharge relationship for both high and low flow periods on Illtyd Creek. The Yukon Government will complete its caribou study and submit its final report. This year we are scheduled to begin work on other large mammals - goats, sheep and bears - and to initiate documentation of predevelopment levels of precipitation acidity.

5. Summary of Environmental and Reports Prepared to Date

The listing below indicates the main environmental subject areas which are relevant to the Bonnet Plume project, shows the documentation has been prepared to date, and indicates the status of work in each subject area. The references listed represent the most current documentation prepared on the subject. A dash - indicates that information does not exist or has not yet been compiled, or that no work has yet been undertaken in that area.

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Subject

Most Current Documentation/Project Status

Physical Environment

Bedrock Geology	POOL 1980	Complete
Surficial Deposits and Soils	-	-
Permafrost	-	-
Meteorology and Climate		
Weather	-	Ongoing
Acid Precipitation	-	Ongoing
Water Resources		
Streams and Hydrology	DIAND 1982	Ongoing
Lakes	-	-
Water Quality	POOL 1982	Ongoing
Archeology	-	-

Biological Environment

Aquatic Biology		
Plankton	-	-
Benthic Biology	LGL 1981	More required
Fish	LGL 1981	More required
Terrestrial Biology		
Plants	LGL 1981	More required
Flora	LGL 1981	More required
Vegetation Types	LGL 1981	More required
Landscape Relationships	-	-
Habitat Types	-	-
Birds		
Fauna	LGL 1981	More required
Waterfowl	LGL 1981	More required
Raptors	LGL 1981	More required
Upland Birds	-	-
Mammals		
Fauna	-	-
Small Mammals	-	-
Furbearers		
Grizzly Bear	LGL 1981	More required
Ungulates		
Thinhorn Sheep	LGL 1981	More required
Moose	-	-
Caribou	YTG 1980/81	Ongoing
Fish		
Fauna	LGL 1981	More required
Fish Biology	LGL 1981	More required

Ecosystem Dynamics	-	-
<u>Predicted Environmental Consequences of Development Activities</u>	LGL 1981	More required
Programs for Monitoring and Mitigating Environmental Changes	-	-
<u>Social and Economic Issues</u>	-	More required

Environmental Reports Concerning the Bonnet Plume Property

- DIAND 1982 - Department of Indian Affairs and Northern Development 1982. Data from the Illyd Creek Recording station. Unpublished data from Inland Waters, Department of Indian and Northern Affairs, Whitehorse 3pp.
- LGL 1981 - Searing, G. and Taylor J. 1981. An Overview Study of the Vegetation, Wildlife and Fish Resources of the Bonnet Plume Lease, Northeastern Yukon Territory. Unpublished report submitted to Pan Ocean Oil Limited by LGL Limited Environmental Research Associates, Sidney. 117 pp & appendices.
- POOL 1982 - Cullingham, O. 1980. Report on Geology and Exploration of the Bonnet Plume Basin, Yukon Territory. Unpublished report No. 1-80 of Pan Ocean Oil Limited. 36pp and maps.
- POOL 1982 - Brown, G. 1982. Results of Chemical Analysis of Water Samples from the Bonnet Plume Property 1980 and 1981. Unpublished report of Pan Ocean Oil Limited (in preparation).
- YTG 1980 - Russell, D. and Farnell R. 1980. Wenecke Mountain Caribou Studies. Progress report, October 1980. Unpublished report submitted to Pan Ocean Oil Limited by the Wildlife Branch, Renewable Resources, Government of Yukon. 29pp & appendix.
- YTG 1981 - Russell, D. and Farnell R. 1980. Wenecke Mountain Caribou Studies, October 1980 - October 1981. Unpublished report submitted to Pan Ocean Oil Limited by the Wildlife Branch, Renewable Resources, Government of Yukon. Various pagination.