BONNET PLUME COAL PROJECT

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ECONOMIC,

ENVIRONMENTAL &

SOCIO-ECONOMIC CONSIDERATIONS

by

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B O N N E T P L U M E C O A L P R O J E C T

ECONOMIC CONSIDERATIONS

Recent discussions of major power developments in the Yukon Territory have centered around the construction of a 350-500 megawatt hydro facility to be operational by the mid-to-late 1990's. However, recent studies by the Northern Economic Planning Branch of the Department of Indian Affairs and Northern Development, as well as the Department of Energy, Mines and Resources and the Yukon Territorial Government, have indicated that at least five base and precious metal deposits should be prepared to commence production within the next ten years. These properties include the Tom and Jason lead-zinc deposits and Mactung tungsten deposit in the MacMillan Pass area, the Howard's Pass lead-zinc deposit, and the Venus gold deposit south of Carcross. Development of these mining properties would contribute significantly towards the economic self-sufficiency of the Yukon. However, the lack of available power is a major constraint which may delay production from several or all of these deposits until the late 1990's.

The present electrical power generating capacity of the Yukon totals 95 megawatts. This includes approximately 63 megawatts from hydro sites and 32 megawatts from diesel generators. However, the proposed mining developments described above may require an additional generating capacity of 30 to 40 megawatts, which raises the question of how the Yukon's expanding power demands will be met over the next fifteen years. There are three options: diesel generators, small-scale hydro sites and coal-fired thermal plants.

Diesel-generated electrical power is very costly and the rapidly rising price of such power is tied directly to the world-wide rise in petroleum prices. Small scale hydroelectric power is generally costly because of the high capital cost, and it is an economically inefficient means of generating small amounts of electrical power.

Even local hydro projects have significant environmental impacts which are disproportionate to the amount of electricity generated. Furthermore, relatively small hydro sites require longer lead times to bring on stream than other power generation facilities, and it is usually very difficult to expand hydro plants beyond their initial design capacity.

Small scale, coal-fired thermal plants offer the advantages of short lead time, relatively low cost, and incremental expansion. A thermal plant utilizing a closed-circuit water cooling system and deriving its coal supply from underground mining imposes minimal impact on the environment. This method of power generation provides the added feature of being far more labour intensive than those alternatives described above. In the Yukon, this would be considered a major benefit to the economy. The present work force of the Yukon numbers approximately 9,000 of a total population of 24,500. Of these figures, approximately 1,200 are directly employed by the mining industry. A 200 megawatt capacity thermal power plant and associated coal mine producing 850,000 tonnes of coal per year, as is proposed in the Bonnet Plume Basin, would directly employ at least 300 workers.

There are many other attractive features or direct benefits which would result from the development of the Bonnet Plume coal deposits.

Exploratory work to date indicates that the Bonnet Plume coal reserves should be capable of fueling a significantly larger generating facility. This would enable the Yukon to export electrical power, via direct current transmission lines to Alaska, British Columbia and the MacKenzie Delta, with obvious taxation and balance of payments benefits to the Yukon. It is interesting to note that B.C. Hydro is contemplating the installation of an initial 975 megawatt hydro plant and to be expanded perhaps to 4,000 megawatts on the Liard River in northern British Columbia. This massive project, to come on stream about 1998, would flood significant portions of the southern Yukon.

Recent advances in coal-handling technology suggest that export of coal via slurry pipeline to tidewater will be economically feasible in the near future. Coal gasification and liquification are also alternatives which are gaining technical and economic acceptance. The Snake River-Crest iron ore deposit, located just west of the Bonnet Plume, is another candidate for export via pipeline.

Other proposed industrial developments which could benefit from the installation of a power generation facility in the 1980's include a lead-zinc smelter requiring an estimated 122 megawatts generating capacity to service the ores from Cypress Anvil and the MacMillan Pass, and the Foothills Natural Gas Pipeline which, if electrified, would demand approximately 150 megawatts generating capacity.

Finally, the creation of transporation and energy corridors, linking the Bonnet Plume to load centers along the Yukon River and in the minerals districts of Faro and the MacMillan Pass, would be of significant benefit to the Yukon Territory. These corridors would encourage and accelerate the exploration and development of the vast natural resource potential of northwestern Canada.

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Pan Ocean Oil Ltd.

B O N N E T P L U M E C O A L P R O J E C T

ENVIRONMENTAL & SOCIO-ECONOMIC CONSIDERATIONS

Introduction

The following will briefly outline environmental matters that may be of concern to the Bonnet Plume coal project. An Appendix is attached which suggests further environmental work that may be needed to assess the impact implications of this project along with a proposed timetable.

Background - General

In the Yukon Territory, resource development projects that involve Federal lands and which may have significant environmental impact are required to be submitted to an Environmental Assessment Panel before the issuance of the necessary authorities to proceed. This process requires the proponent to prepare an Environmental Impact Statement for public and technical review by the Panel. A subsequent report on the review is submitted to the Minister of the Environment.

. - The Bonnet Plume Project

All environmental studies on the Bonnet Plume coal project would be directed specifically towards fulfilling the requirements of an Environmental Impact Statement. These studies will identify and describe all environmental impacts likely to arise from this project. The basic structures and activities of the project will be outlined, as well as the environmental features of the area including resource uses. Predicted interactions between these project and environmental features will be described, and Pan Ocean will then propose measures to avoid, mitigate or counteract any undersirable affects. Further comments will identify and quantify residual impacts remaining after all mitigative measures have been followed, and will assess the significance of these impacts.

It should be noted that an Environmental Impact Statement must encompass an entire project, which in the case of the Bonnet Plume coal project and thermal power generating facility, would include the access corridor, construction and operation phase of both the mine and power station, and

the transmission corridor. With this in mind, Pan Ocean feels that there must be immediate and close co-operation between Pan Ocean, the Northern Canada Power Commission and other offices of both the Federal and Territorial governments.

There are separate requirements under authority of the Yukon Water Board which, for a project as large as the Bonnet Plume, would possibly be incorporated within the Environmental Assessment Review Process. Similarly, concerns such as air pollution could also be addressed more efficiently and expeditiously under one umbrella review process, and Pan Ocean submits that such an arrangement be seriously considered by all regulatory agencies involved.

The Yukon Territorial Government has responsibility for wildlife, but thus far no special regulations exist that provide guidelines to resource development projects. The Game Ordinance which regulates normal interactions between humans and wildlife would apply. Pan Ocean would expect that representative of the Territorial Government will sit on the Assessment Panel, and their concerns for wildlife, as well as socio-economic matters, will be expressed through that forum.

ENVIRONMENTAL AND SOCIO-ECONOMIC CONSIDERATIONS

Pan Ocean expects to initiate its studies with a total description of the area including climate, terrain, hydrology, vegetation, fish and wildlife; and in the socio-economic area, land and resource use (hunting and trapping, etc.), demography and social setting (attitudes and infra-structures, etc.) and in-migration.

Special and immediate attention should be given to hydrology, and furthermore perhaps the most significant issue will be the impact on the Porcupine caribou herd. These matters are addressed in the Appendix.

There may be some important moose wintering ranges along the access route, but mitigative measures through slight route alteration would be easily enacted. Similarly, impact on grizzly bear and other carnivores will occur, but installation of proper incineration and disposal practices for garbage and strict rules governing employee's activities will minimize the effect significantly.

One further impact should be recognized and that is the secondary impact corrected only by strict human management. The Bonnet Plume Basin coal project would be the first in that area, resulting in significantly increased access to what is essentially a wilderness area. As in most such cases, this involves a little good and a little bad, the result depending not on the proponent's activities, but the control and regulations that government will place on people visiting the area. Increased access could be a benefit for recreational hunting and fishing, aesthetic purposes, and commercial trapping. Increased access not carefully planned, monitored and controlled, could quickly destroy or greatly reduce wildlife populations and aesthetic qualities. This project will be the catalyst creating the possiblity of impact, and government is charged with establishing parameters for human activity that will prevent adverse impact. Co-operation is essential.

Present land use in the area involves trapping and big game hunting. Provided that access is controlled and regulations are promulgated to guide harvest patterns, impact can be minimized and even some benefits derived from providing better access to those licensed for business in the area.

Finally, the socio-economic considerations may be questioned. Most of those issues are the responsibility of the Yukon government who regulate municipal affairs, health, education, etc. The "fly-in, fly-out" or "bus-in, bus-out" procedure from an established community has much support. Not only does it eliminate the need for costly new infrastructures, it strengthens current under-utilized and withering settlements. Training and manpower considerations are important. Policies that encourage untrained and unemployed Yukon residents to obtain gainful employment are essential.

Finally, one could look at the heat loss from a thermal plant and see whether it could be used for green-house agricultural pursuits. Dawson City and Fairbanks both grow marvelous vegetable crops limited in potential only by the short frost-free season. Waste heat from the thermal plant might resolve that problem.

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APPENDIX

1. "Environmental setting" requirements for an Environmental Impact Statement (EIS) of the Bonnet Plume coal project.

1.1 Climate

Climate is an environmental feature included in most EIS. However, most components of climate would seem to be well outside and immune from impact from a development project. The one area of possible impact is temperature inversion, fog, smoke, haze or other emittants which affect air quality. Baseline information on monthly and seasonal temperature patterns, precipitation, windspeed and direction, could cover, snow fall and accumulation are required for project design, construction and operation.

Regional charts are all generalized extrapolations from weather stations spread widely across northern Canada and Alaska. Site specific information should be collected over several consecutive years to place limits of confidence on the data base. A truism is that the weather in any particular year is always the exception rather than the rule. A data collection program shall be initiated early in January, 1980.

1.2 Terrain

Terrain description is necessary since certain areas are far less stable than others due to soil type, water content, vegetative cover, permafrost, slope and aspect. Zoltai and Pettapiece, in 1973, published general information on the area as part of a study for the Environmental-Social Program, Northern Pipelines. The project site was grouped in their Region 2, characterized by fenlands without permafrost. Permafrost-free areas greatly reduce problems related to terrain disturbance. However, discontinuous permafrost can greatly complicate the issue because no standardized techniques can be utilized to prevent surface disturbance. Site specific information must be

gathered, but emphasis should initially be placed on the access corridor and air strip sites. Before site selection for mill, camp, thermal plant or other facilities occurs, careful study of land form will be required. This information can be gathered in a short, single field season and timing will depend upon the speed of project development. Early identification of alternative sources for material suitable for borrow is recommended, as often these sites conflict with other environmental features.

1.3 Hydrology

Impact on water quality through contamination by chemical or silt pollutants or heat dissipation is important. Water samples to measure natural water quality features should be collected during 1980 and continued through all seasons for several years. The question of water quantity, stream flow, seasonal run-off can be directed to the Water Survey of Canada who monitor stream flow in most parts of Yukon. Information on both water quantity and quality is necessary to evaluate potential impact on fishes when their distribution and abundance in the area is determined.

1.4 Vegetation

Generalized biogeoclimatic information exists for the region and will be documented in detail in the general overview report recommended as the immediate priority. Identification of deficiencies in the data base will permit design of more detailed studies to enumerate plant communities important as habitat and food, areas having special fire hazard features, and possible unique, rare or otherwise special ecological sites.

1.5 Fish and Wildlife

An overview prepared from a review of information currently published and from discussions with appropriate government officials is the first priority. On the basis of this report, deficiencies in the data base can be identified and field studies designed to correct them.

An Environmental Impact Statement must eventually consider almost all species since guidelines dictate that any animal be considered that is of significance with respect to recreational, commercial, scientific, ecological, aesthetic, subsistence or domestic use value. This broad guideline will require focus on resource use such as trapping, hunting, fishing, etc. Information is available on current and past use in the area but is scattered through files in government offices.

The Porcupine Caribou herd is the resource with most public attention and demands greatest consideration in preparation of an Environmental Impact Statement. Surrendi and DeBock (1976) review the literature on the Porcupine Herd for 1971-75 and report extensive use of the Bonnet Plume-Wind area in 1970-71, 1971-72, and 1973-74, although the timing varies from late November in 1973 to mid-March in 1971. In 1978-79, the herd stayed mainly north of the Peel River and thus far this year, reports indicate a similar pattern. However, there is a chance to survey the Bonnet Plume Basin in early 1980 and it is recommended that this be done to document use or otherwise of the area, numbers, timing, and local movements and habitat utilization. One survey every two weeks commencing early in 1980 would be sufficient to detect presence of animals. Once they are located in the area, the flights should be increased to one per week until they move out.

Many authors have correlated snow depth and conditions with winter distribution of caribou. There is argument as to whether snow depth or ice crust or food supply is the most significant feature. However, a record of snow conditions in and around the project area would be valuable and this information should be gathered during the 1979-80 winter to correlate with data on caribou distribution and movements.

The Yukon Territorial Wildlife Branch have done preliminary surveys of raptorial birds on the low reaches of the Wind and Bonnet Plume Rivers. Indications are that the wide, braided rivers are important feeding areas for the peregrine falcon. A breeding population of Canada Geese occurs in the area, the significance of which is little known. Further work is planned in the area by the government authorities in 1980. Consideration

should be given to negotiating a co-operative data collection program to get maximum return for expenditures.

Considering the access route and project site, nine registered trapping areas including the Northwest Territories Group trapping area could be affected. In the 1979-80 season, seven of the areas are being actively trapped. Ironically, two of these are being used for the first time in several years which has resulted from the fact that a camp (Pan Ocean's) has been established in the area. Increased access thus has enabled better utilization of the fur resource with no detrimental effect, to this time. The entire area has excellent potential for fur harvest with marten populations some of the best in northern Canada. A detailed documentation of use and potential should be included in the overview reports which would indicate whether further studies will be required.

Big game outfitting areas #4 and #5 encompass the access route and project site. The Wind River Trial is an access and hunting trail for both outfitters, and several hunting camps are located within a few miles of this route. Increased access into the area will definitely have an adverse impact on both hunting success, as wildlife is pushed back away from the road, and on the wilderness experience so important to non-resident hunters paying two hundred and fifty dollars ($250.00) per day and more to escape the stress of modern civilization.

In 1978, the last year for which data is available, thirty-four (34) non-resident hunters invaded the area. At an average of about thirty-five hundred dollars ($35000.00) per hunt, this represents annual revenue of about one hundred and twenty thousand dollars ($120,000.00). The four main big game species, sheep, moose, grizzly bear, and caribou are taken with good success in the areas. Conflicts between resource development and outfitters have been escalating and expanding in scope. A case in point is the threat of an outfitter to sue the Foothills company for millions of dollars if a route for the pipeline was selected that would encroach upon a wildlife area important to his business. This question or proprietory rights of outfitters is one that the government is currently addressing and is their responsibility as is the entire question

of regulation of harvest levels. The overview report would review all historical information which should suffice for EIS requirements without further field work on this aspect.

2. Preliminary study schedule for environmental and socio-economic matters for Bonnet Plume Basin Coal Project.

2.1 Overview report reviewing all information currently available on all components of an EIS. Published material will form the basis for the report although this will be supplemented by information obtained from unpublished government files, personal interviews with individuals familiar with the area, and personal knowledge and experience of the author.

The project could be commenced by mid-January 1980 and would take three to four (3-4) months to complete.

2.2 Survey of winter distribution and abundance of Porcupine caribou herd if animals move into the area of possible impact from the project. Thus far in the 1979-80 winter, the herd has remained far to the north of the Peel River. Information regarding regional distribution may be obtainable from government biologists studying the herd. Otherwise, biweekly reconnaissance flights over the project area may be necessary commencing early in 1980, to detect the presence of animals. If concentrations move into the area, weekly surveys should be flown until the animals depart.

2.3 A meteorological station is being established close to the site. A second station higher on one of the surrounding hills would be useful but could wait to be established during the 1980 summer season.

2.4 Hydrological studies to commence in the summer of 1980. A stream flow meter has been in place on the Snake River for about four (4) years and general hydrographical features would parallel those of the Wind and Bonnet Plume. These data will be included in the overview report (2.1). Monitoring the streams important to the Coal Project will be expensive. Stations cost forty thousand dollars ($40,000.00) each to install and a further six to seven thousand dollars (6-7000.00) per year to monitor. Shared cost programs with DIAND, Environment, and EMR may be possible.

2.5 Various field studies on distribution and abundance of fish and wildlife identified as deficiencies from the overview report (2.1). Because of the importance of longer term information in studies of animals, some work should commence in the summer of 1980. The extend and subsequent cost of these studies cannot be predicted until the overview report is prepared.

2.6 Field studies on vegetation and terrain. Deficiencies in the data base will be similarly identified from the overview report. Unless to support specific project activities, e.g. landing strip, upgrade of access road, transmission line route alignment, these studies should be able to be safely deferred until 1981 or beyond.

2.7 Studies on land and resource use, demography and social patterns, local labour availability and settlement patterns to identify areas where impact may conflict with established or traditional land use and ways of life or may affect the livelihood or viability of segments of the human populations.

Impacts may be adverse or beneficial and baseline information on the current status is necessary to predict the effect of various develoment alternatives.

Since consideration of alternative development scenarios occurs fairly early in project development, serious consideration should be given to commencing data accumulation immediately following review of the overview report (2.1).

2.8 A co-operative survey of raptors and waterfowl should be considered for the summer of 1980. The Yukon Territorial Government will be working in the area and have funds to do general survey work. With a minimum expenditure for helicopter time, considerable baseline information could be otained.

CANADA

Department of Energy, Mines and Resources, Surveys and Mapping Branch
Ministère de l'Énergie, des Mines et des Ressources, Direction des Levés et de la Cartographie

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LEGEND - LÉGENDE

- RAILWAY - CHEMIN DE FER
- MOTOR ROAD - CHEMIN POUR VÉHICULE À MOTEUR
- WINTER ROAD - CHEMIN D'HIVER
- HIGHWAY NUMBER - NUMÉRO DE LA ROUTE (28)
- FERRY - TRAVERSIER Fy
- SHIPPING SERVICE - SERVICE DE MESSAGERIE
- AIRPORT - AÉROPORT
- AIRFIELD - CHAMP D'ATTERRISSAGE
- SEAPLANE ANCHORAGE - MOUILLAGE D'HYDRAVIONS

AIR DISTANCES BETWEEN MAIN CENTRES (in statute miles)
DISTANCES AÉRIENNES ENTRE CENTRES PRINCIPAUX (en milles terrestres)

Edmonton (Intl) - Fort McMurray	249	Edmonton (Intl) - Grande Prairie	250
Fort McMurray - Fort Smith	234	Grande Prairie - Fort St John	103
Fort Smith - Hay River	142	Fort St John - Fort Nelson	192
Hay River - Fort Simpson	192	Fort Nelson - Watson Lake	236
Fort Simpson - Wrigley	122	Watson Lake - Whitehorse	217
Wrigley - Norman Wells	175	Whitehorse - Dawson	264
Norman Wells - Inuvik	277		
		Grande Prairie - Prince George	176
Fort Smith - Fort Resolution	99	Prince George - Smithers	193
Fort Resolution - Yellowknife	93	Smithers - Terrace	61
Yellowknife - Cambridge Bay	528	Terrace - Prince Rupert	76

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