Express Pipeline Project

Report

of the

Joint Review Panel

May 1996

National Energy Board

Canadian Environmental Assessment Agency

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10 May 1996

The Honourable Sergio Marchi, P.C., M.P.
Minister of the Environment
Terrasses de la Chaudière
28th Floor, 10 Wellington Street
Hull, Quebec K1A OH3

Dear Minister:

Express Pipeline Project - Report of the Joint Review Panel

In accordance with the Terms of Reference contained in the "Agreement Between the National Energy Board and the Minister of the Environment Concerning the Joint Establishment of a Review Panel for the Express Pipeline Project", dated 13 September 1995, a review of this project has been completed. I am pleased to submit the Report of the Joint Review Panel.

The Joint Review Panel has set out its findings, conclusions and recommendations based on its examination of the environmental effects likely to result from the construction and operation of the Express Pipeline Project, including mitigation measures and the need for a follow-up program.

Yours sincerely,

R. Priddle
Chairman
Express Pipeline Project Joint Review Panel

Enclosure

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Abbreviations

AAFC	Agriculture and Agri-Food Canada
AEP	Alberta Environmental Protection
AFGA	Alberta Fish and Game Association
Agreement	Agreement Between the National Energy Board and the Minister of the Environment Concerning Joint Establishment of a Review Panel for the Express Pipeline Project
Applicant	Express Pipeline Ltd.
AWA	Alberta Wilderness Association
Axys	Axys Environmental Consulting Ltd.
Board	National Energy Board
BPD	barrels per day
CAPP	Canadian Association of Petroleum Producers
CCG	Canadian Coast Guard
CCME	Canadian Council of Ministers of the Environment
CEAA	*Canadian Environmental Assessment Act*
CFB Suffield	Canadian Forces Base Suffield
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPR	Canadian Pacific Railway
CR	Concentration Ratio
CSA	Canadian Standards Association
dBA	decibels (A-weighted sound level)
DFO	Department of Fisheries and Oceans

EARP Guidelines	*Environmental Assessment and Review Process Guidelines Order*
EPN	Early Public Notification
ERCB	Alberta Energy Resources Conservation Board (now Alberta Energy and Utilities Board)
ERP	Emergency Response Plan
ESA	Environmentally Significant Area
EUB	Alberta Energy and Utilities Board (formerly Alberta Energy Resources Conservation Board)
Express	Express Pipeline Ltd.
FAN	Federation of Alberta Naturalists
FEAR0	Federal Environmental Assessment and Review Office (now the Canadian Environmental Assessment Agency)
Foothills	Foothills Pipe Lines (Alta.) Ltd.
GHG'	greenhouse gas
Gibson	Gibson Petroleum Company Limited
Guidelines	National Energy Board's *Guidelines for Filing Requirements (22* February 1995)
GWP	global warming potential
ha	hectare(s)
HDD	horizontal directional drilling
HLRG	Hydrocarbon Leak Response Guidelines
HRIA	Historical Resources Impact Assessment
H_2S	hydrogen sulphide
Husky	Husky Oil Operations Ltd.
ID	Interim Directive
IPL	Interprovincial Pipe Line Inc.
ISCST3	Industrial Source Complex-Short Term Dispersion Model, Version 3

IUCN	International Union for the Conservation of Nature and Natural Resources
kg/yr	kilogram(s) per year
km	kilometre(s)
kt/yr	kilotonne per year
L_{eq}	energy-equivalent sound level
m	metre(s)
m^3	cubic metre(s)
m^3/yr	cubic metre(s) per year
M.D.	Municipal District
Minister	Minister of the Environment
mm	millimetre(s)
Mt	megatonne(s)
NEB	National Energy Board
NEBA	*National Energy Board Act*
NGTL	NOVA Gas Transmission Ltd.
NO*	nitrogen dioxide
NO_x	oxides of nitrogen
N_2O	nitrous oxide
PADD	Petroleum Administration for Defense District
Panel	Joint Review Panel
Project	Express Pipeline Project
Public Lands	Alberta Public Lands
RMEC	Rocky Mountain Ecosystem Coalition
SCADA	Supervisory Control and Data Acquisition
SO_2	sulphur dioxide

Station 1	Hardisty Terminal/Pump Station
Station 3	Youngstown Pump Station
Station 5	Ralston Pump Station
Station 7	Wild Horse Pump Station
THC	total hydrocarbons
t/yr	tonne(s) per year
U.S.	United States
U.S. EPA	United States Environmental Protection Agency
VCR	Voluntary Challenge and Registry
VEC	Valued Ecosystem Component
v o c	volatile organic compounds

Overview

(Note: This overview is provided for the convenience of the reader and does not constitute part of this Joint Review Panel Report, to which readers are referred for details.)

This report conveys the findings, conclusions and recommendations of the Joint Review Panel ("the Panel") examination of the environmental effects of a proposal by Express Pipeline Limited ("Express"). The proposed Express Pipeline Project ("the Project") consists of the construction and operation of an oil pipeline from terminal facilities at Hardisty, Alberta to the Canada-United States border, near Wild Horse, Alberta.

Consultation with the public began with Express's Early Public Notification program in April 1995. The formal review commenced with Express's 8 June 1995 application to the National Energy Board, pursuant to Parts III and IV of the *National Energy Board Act,* for a certificate of public convenience and necessity to authorize the construction and operation of a crude oil transmission line, and for certain orders respecting toll methodology and tariffs, respectively. The application fell under the *Comprehensive Study Regulations* of the *Canadian Environmental Assessment Act. The* National Energy Board, pursuant to its authority under the *Canadian Environmental Assessment Act,* referred the Project to the Minister of the Environment, in order to harmonize environmental assessment requirements and avoid duplication of public review processes.

The Joint Review Panel was established through an Agreement concluded between the National Energy Board and the Minister of the Environment. The Agreement also set out the manner in which the review was to be undertaken pursuant to both the *Canadian Environmental Assessment Act* and the *National Energy Board Act. The* public hearing was to be conducted in accordance with the National Energy Board *Rules of Practice and Procedure (1995).* Funding was provided for two eligible environmental intervenors through the Canadian Environmental Assessment Agency's Participant Funding Program. The public hearing was held in Calgary, Alberta from 15 January to 7 March 1996. Intervenors cross-examined Express on its evidence, entered evidence on the environmental effects of the Project and argued their positions before the Panel.

The Panel recommended that Express should comply with the proposed August to November construction schedule. The Panel, having considered alternative means of carrying out the Project, found the applied-for route acceptable. Minor re-routes may be identified, prior to construction, to address concerns such as those related to northern fescue. The Panel is of the view that the project is not likely to cause significant adverse environmental effects in regard to vegetation, including effects of loss of rare/endangered plant species. The Panel, taking into account mitigation measures, was satisfied that the potential adverse environmental effects of the open-cut crossing of the South Saskatchewan River would be insignificant. The Panel was generally satisfied with the proposed mitigation measures in regard to wildlife issues but recommended a number of additional measures. The Panel was of the view that with the implementation of the mitigation measures for wildlife and those for soils and vegetation, any habitat fragmentation associated with the proposed pipeline is not likely to result in significant adverse environmental effects on wildlife. The Project's contribution to provincial and Canadian greenhouse gas emissions was found to be negligible. The siting, construction and operation of associated facilities such as construction camps, terminal and station facilities, and mainline valves were acceptable, in the view of the Panel, with the application of the

proposed mitigation measures and the Panel's recommendations. The Panel examined the cumulative effects and found that the proposed Project is not likely to result in significant adverse cumulative environmental effects. The Panel concluded that the commitment of Express to construct facilities to stringent up-to-date standards, as well as the use of modem materials and state-of-the-art techniques, will provide the best mitigation measures for the prevention of spills. The Panel was satisfied with the National Energy Board's reporting requirements, pursuant to the *Onshore Pipeline Regulations,* as a follow-up program within the meaning of the CEAA for this application. The Panel noted that no renewable resources are likely to be significantly affected by the Project.

Having considered all of the evidence and information relevant to section 16 of the CEAA, Express's proposed mitigation measures and the Panel's conclusions, and with the incorporation of the Panel's recommendations, the Panel is of the view that the proposed Express Pipeline Project is not likely to cause significant adverse environmental effects.

A dissenting opinion was reached by Dr. Glennis Lewis on the Panel's view that the proposed Express Pipeline Project is not likely to cause significant adverse environmental effects. This opinion was based on the failure by Express to provide adequate evidence in regard to effects on vegetation and wildlife, and cumulative effects, from both a legal and scientific perspective. According to Dr. Lewis, Express placed so much faith in mitigation and reclamation measures that a thorough analysis of both the environmental effects and the cumulative effects of the project was not undertaken. Express did not carry out an environmental assessment that would have put sufficient information before this Panel to enable it to fully consider what the environmental effects of the Project would be. Also, Dr. Lewis stated that Express has failed to meet the ultimate burden of proof or burden of persuasion, nor has it submitted evidence to meet the evidentiary burden imposed upon it by law. The assessment provided by the Applicant in regard to vegetation, wildlife and cumulative effects did not provide a basis for this Panel to make a decision on scientifically-defendable information nor did it allow the Panel to factor knowledge uncertainty into the decision making process. Therefore, Dr. Lewis considered that it would be wrong at law to recommend that the Project proceed. In the absence of the critical evidence necessary to consider the environmental effects of the pipeline and the significance of those effects as required by the CEAA, Dr. Lewis recommends that the Project not proceed. The details of the dissenting view are contained in Chapter 5.

Chapter 1

Project and Review Perspective

1.1 Project Proposal

Express Pipeline Ltd. ("Express", "the Applicant"), owned 50% by Alberta Energy Company Ltd. and 50% by TransCanada PipeLines Limited, submitted an application to the National Energy Board ("the Board", "the NEB"), on 8 June 1995, pursuant to Part III of the *National Energy Board Act* ("the NEBA") for a certificate of public convenience and necessity to authorize the construction and operation of a crude oil transmission line, originating at terminal facilities at Hardisty, Alberta and continuing south to the international border near Wild Horse, Alberta, (see Figure l-l) and pursuant to Part IV of the NEBA for certain orders respecting toll methodology and tariffs. The system will be capable of transporting a variety of types of crude oils and will have an initial capacity of approximately 27 400 cubic metres ("m^3") per day (172,000 barrels per day ("BPD")). The pipeline would connect with a related pipeline project which would continue to an interconnection near Casper, Wyoming. In 1993, Express had filed the Express Pipeline Application for a similar project but that application was withdrawn in October 1993.

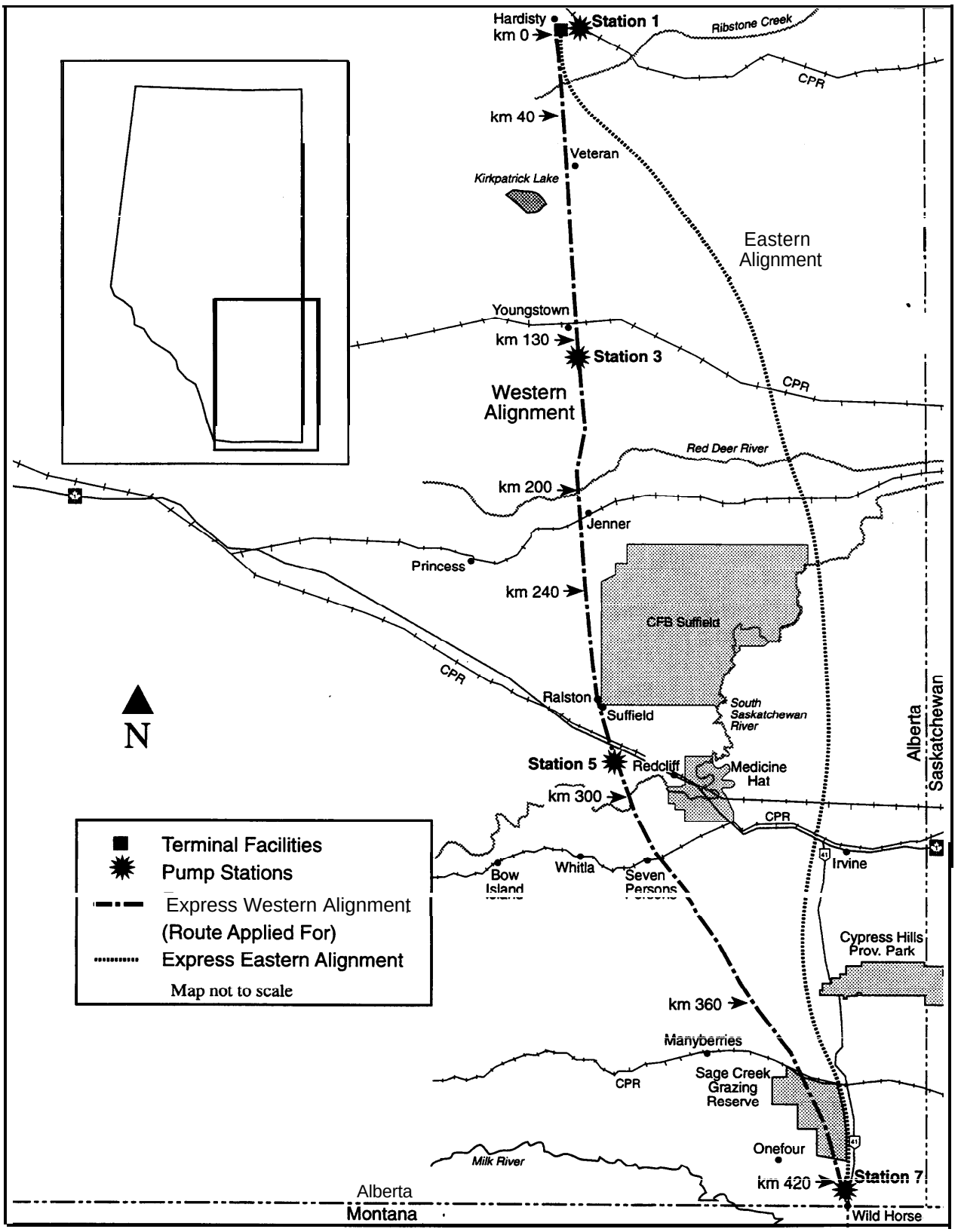
The Express Pipeline Project ("the Project") consists of the construction and operation of approximately 435 kilometres ("km") of 610 millimetre ("mm") outside diameter pipeline from Hardisty to Wild Horse, Alberta; terminal facilities at Hardisty; four pump stations; mainline valves; power supply facilities; construction camps; storage and work areas; access roads; and the upstream facilities that would need to be constructed to enable the Project to proceed.

Station 1, the Hardisty Terminal/Pump Station includes support buildings; a meter station; three electrically driven pumps; four approximately 24 000 m^3 (150,000-barrel) storage tanks; and a scraper trap. Pump Station 3 near Youngstown, and Pump Station 5 near Ralston, would each have support buildings and two electrically driven pumps. Pump Station 7 near Wild Horse would have two fuel-driven pumps and a scraper trap. There would be 12 mainline valves along the proposed line and various temporary construction camps and storage/work areas.

Power supply facilities for Station 1 consist of an overhead powerline and a new substation and transformer adjacent to the pump station. The associated power facilities for the stations include overhead powerlines; new substations; an upgraded transformer and capacitor bank at Station 3; and a new transformer at Station 5. New access roads to Stations 1, 3, and 7 would be built.

Upstream facilities, namely the Hardisty Lateral, would consist of measurement and meter proving facilities; piping to connect meter facilities to existing headers: and piping to connect to the Interprovincial Pipe Line Inc. ("IPL"), Husky Oil Operations Ltd. ("Husky") and Gibson Petroleum Company Limited ("Gibson") custody transfer points with Express. Additionally, booster pumping facilities would be required at the Husky and Gibson facilities and additional piping to existing tankage at the Gibson facility.

Figure l-l
Express Pipeline Project
General Area & Proposed Routing Alternatives



1.2 Environmental Assessment Process

1.2.1 Background

The application for the Express Pipeline Project met the criteria for a comprehensive study under the *Comprehensive Study List Regulations* pursuant to the *Canadian Environmental Assessment Act* ("the CEAA"). The Board, pursuant to its authority under the CEAA, referred the Project to the Minister of the Environment ("the Minister"), in order to harmonize the environmental assessment requirements and to avoid unnecessary duplication of public review processes. To this end, the Board and the Minister concluded an "Agreement Between the National Energy Board and the Minister of the Environment Concerning Joint Establishment of a Review Panel for the Express Pipeline Project" ("the Agreement") (Appendix I) under the CEAA, and to establish the manner in which the review of the Project would be undertaken pursuant to the CEAA and the NEBA.

The Board, upon receipt of the application, notified other federal authorities in order to identify any other possible responsible authorities, or those in possession of specialist advice in relation to the Project. The Canadian Coast Guard ("CCG") indicated that it would have a regulatory responsibility in respect of the Project and therefore would be a responsible authority. The Department of Fisheries and Oceans ("DFO") was not able to confirm its possible role as a responsible authority but indicated that it wanted to provide specialist advice regarding fish and fish habitat in accordance with the CEAA. Environment Canada indicated that it would be prepared to provide advice on the environmental effects of the Project. Health Canada indicated that it could provide specialist advice, if any health issues arise.

1.2.2 The Process for the Joint Review Panel

A Joint Review Panel ("the Panel") was struck, consisting of a Panel Chairman appointed by the Chairman of the NEB and approved by the Minister, a permanent member of the NEB, and two temporary NEB members, who were also appointed by the Minister. The details of the constitution and powers of the Panel are contained in the Agreement, as are the procedures for the Panel. (Appendix I).

The Agreement provided that the public hearing would be conducted in accordance with the NEB *Rules of Practice and Procedure (1995)* and that a Panel report would be prepared and submitted to all responsible authorities and the Minister. Thereafter, the Panel would release the report to the public.

1.2.3 The Mandate of the Joint Review Panel

The Terms of Reference outlined in Schedule I of the Agreement require the Panel to examine the environmental effects likely to result from the proposed construction and operation of the Express Pipeline Project and to prepare a report setting out its findings, conclusions and recommendations.

1.2.4 Members of the Joint Review Panel

The Panel is chaired by Roland Priddle, with Mme Anita Côté-Verhaaf, Dr. Glennis Lewis and Dr. Richard Revel as members. Biographies of the members have been provided in Appendix II.

1.2.5 Public Hearing

The Board issued Hearing Order, OH-l -95 dated 22 June 1995, setting out the Directions on Procedure for the public hearing to be conducted in respect of the Express Pipeline Project. This Hearing Order subsequently formed Schedule II of the Agreement. The Board conducted an oral public hearing in Calgary, Alberta from 15 January to 7 March 1996.

1.2.6 Scope of the Environmental Assessment

Scope of Project

The scope of the Express Pipeline Project was determined by the Minister, in consultation with the Board, under section 15 of the CEAA. The scope of the Project was set out in an attachment to a letter from the Minister to the Board dated 13 September 1995 (Appendix III).

The principal project is the Project applied for by Express. Accessory physical works consist of the construction and operation of power supply facilities for the terminal and stations; access roads; and any upstream facilities that would need to be constructed to enable the principal project to proceed. "Accessory physical works" and "upstream facilities" were interpreted by the Panel in a ruling (Appendix IV) on 17 January 1996 based on the relevant sections of the CEAA. The Panel concluded that accessory physical works in the context of the Minister's correspondence, are physical works, more minor in nature than the principal project, that are in addition to the principal project and assist in its construction or operation. Upstream facilities were found to be, in the context of accessory physical works, any new upstream physical works that are required to be built to make possible the commencement of operation of the principal project. They would be minor in nature and be interdependent with it.

Environmental Assessment Factors

The factors to be considered in the environmental assessment of the Project were set out in Schedule III of the Agreement. ***They*** include, in summary form: the description and purpose of the Project; alternative means of carrying out the Project; a description of the environment; the environmental effects of the Project including cumulative effects, and the significance of those effects; mitigation measures; the capacity of renewable resources that are likely to be significantly affected to meet the needs of present and of the future; and comments from the public and government agencies. The criteria for determining the scope of the cumulative environmental effects to be assessed were also set down in the 17 January 1996 Panel ruling.

For the purposes of assessing effects on renewable resources, the Panel considered agriculture, including ranching, as well as fishing and hunting.

1.3 Regional Setting

Pursuant to the Board's ***Guidelines for Filing Requirements*** ("Guidelines"), the Applicant submitted a description of the existing environment which might be affected by the Project. The following is a general description of the project area from the Express application.

The project area falls within three ecoregions: the Aspen Parkland, Mixed Grass and Dry Mixed Grass ecoregions of Alberta. The general topography for the area is level to undulating plain with gentle slopes (3-15%), although more rolling terrain is present locally and in association with the Cypress Hills. Steeper pitches occur on approach slopes to the Red Deer and South Saskatchewan rivers where slopes range between 46-70% and 31-45%, respectively.

The Aspen Parkland Ecoregion occurs at the northern 80 km (ie. approximately north of Township 34) of the project area. The topography is level to undulating (3-5% slope) with areas of hummocky and rolling morainal plain (6-15% slope). There is a higher moisture regime in the Aspen Parkland than in the other two ecoregions, and the total annual precipitation averages 412 mm/yr. Vegetation is characterized by a mixture of rough fescue grassland and aspen communities on a mosaic of dark brown and black chemozemic soils.

Within the pipeline routing corridor (Western Alignment, Figure l-l), the Mixed Grass Ecoregion appears as a relatively narrow transitional zone (approximately 15-25 km) occurring at approximately Townships 43 and 33, between the Aspen Parkland and Dry Mixed Grass ecoregions. The mixed Grass Ecoregion also occurs as a circular belt which surrounds the Cypress Hills in the vicinity of Townships 9 - 5 along the pipeline routing corridor. This area of the Mixed Grass Ecoregion represents a transitional zone between the cooler and moister Montane Ecoregion associated with the elevated Cypress Hills landscape and the lower-lying, warmer and drier Dry Mixed Grass Ecoregion. The Mixed Grass Ecoregion is influenced by a prairie climate, where total annual precipitation of 326 mm is sufficient only for the development of grassland vegetation. Vegetation communities are dominated by needle and wheat grasses on a mosaic of dark brown chemozemic soils.

The majority of the project area (approximately 302 km in length) lies within the Dry Mixed Grass Ecoregion, approximately traversed by the pipeline route corridor between Townships 32 - 9 and 5 - 1. This ecoregion is controlled by a semi-arid climate and receives the least amount of precipitation in the province (272 mm/yr). It is suitable only for the development of grassland vegetation and is characterized by needle and grama grasses on a mosaic of brown chemozemic soils. The Red Deer and South Saskatchewan river valley systems occur within this ecoregion and represent a more diverse assemblage of landforms, soil and vegetation conditions in association with valley slope and coulee complexes, and riparian zones.

The project area is intersected by a large number of small to moderate-sized creeks and numerous prairie potholes in addition to the Red Deer and South Saskatchewan rivers, while in the southern half, drainage is predominantly into the South Saskatchewan River and Pakowki Lake. Watercourses crossed at the extreme south end of the line flow south into the Missouri River system in Montana.

The proposed pipeline route traverses several Environmentally Significant Areas ("ESAs") in southeastern Alberta. Regionally significant ESAs are those that contain vegetation features of limited distribution, or that are best examples of a feature in a Municipal District or County. Provincially significant ESAs contain vegetation features of limited distribution at the provincial level, or that are best examples of features in Alberta. These are further described in Chapter 3, in the routing section.

The majority of the route (57%) encounters Land Capability Class 3 lands and is characterized by only slight limitations to the production of ungulates. Land capability for production of waterfowl along the route is much lower than for ungulates, with only 17% of the project area falling within Class 1 to Class 3 lands. Most (79%) of the route encounters Class 6 lands with severe limitations for the

production of waterfowl. Thirty-two wildlife species of special management concern, including eight species of mammals, fifteen species of birds, and nine species of herptiles can be found in the project area.

Chapter 2

Public Consultation, Land Matters, and Specialist Advice

2.1 Applicant's Early Public Consultation Process

In accordance with the Board's Guidelines, Express developed a public consultation program for the Project. Express commenced its Early Public Notification ("EPN") for the Express Pipeline Project in April 1995. The EPN consisted of:

- Project information packages and fact sheets distributed to parties;
- a 24 hour collect call telephone inquiry line;
- notification materials to landowners within the proposed (1.6 km) corridor, elected officials, federal and provincial government departments, media, interest groups, and the general public;
- notices in 12 community papers during April 1995;
- five open houses in selected communities along the proposed pipeline during May 1995; and
- consultations with environmental groups.

Express contacted potentially affected landowners and occupants, identified concerns, and provided a discussion of how these concerns have been addressed. Express also contacted 16 First Nation groups about the Project and the associated Historical Resources Impact Assessment ("HRIA") and is in the process of meeting with representatives of these groups. Express noted that, once sites for construction camps and storage/work areas have been selected, public notification of the sites would be provided.

Express submitted that an extensive consultation process has been ongoing since April 1995 with interested stakeholders, including the Alberta Wilderness Association ("AWA") and the Federation of Alberta Naturalists ("FAN"). Express noted that the design of its reclamation plan is the result of ongoing discussions among experts, public officials, and interested environmental groups.

Views of the Panel

The Panel is satisfied that Express has contacted private landowners and occupants that would be affected by the Project in a timely and satisfactory manner.

The Panel notes that, though there is evidence that Express has contacted provincial agencies and interest groups, the record is unclear as to the nature and the extent of

these contacts. The Panel notes that a more thorough consultation with these parties, particularly for the southern portion of the route, could possibly have identified concerns in a more timely manner and would have resulted in more efficient use of the review process.

2.2 Land Matters

Express stated in its submission of 11 September 1995 that it was seeking approval of a specific route, pending the completion of on-going studies. A permanent 20 metre ("m") right-of-way would be needed and an additional 10 m of temporary working space would be required at selected areas. The actual ditch line would be located 9 m from the eastern edge of the right-of-way.

Express noted that additional temporary workspace would be required to accommodate construction at road, railroad, and other linear infrastructure crossings, as well as at steep slopes and major water crossings. Typically, a 15 by 50 m block of temporary workspace would be established on either side of the right-of-way at road, railroad and other crossings of linear infrastructure. Comparable areas would also be required at crossings of creeks with a channel less than 10 m wide. Express noted that at major water crossings, such as the Red Deer and South Saskatchewan rivers, an approximately 40 by 300 m block of temporary workspace would be required on both sides of the crossing.

Express noted that the closest community is 1.3 km from the proposed pipeline and the closest dwelling would be 85 m from the pipeline.

Express stated that notices, pursuant to section 87 of the NEBA, have been served and that as of 15 December 1995, 93% of the land for the Express Main Pipeline and 20% of the land for the Hardisty Lateral had been optioned.

Express stated that it would undertake to serve written notifications identifying the requirements of section 112 of the NEBA and the Board's ***Pipeline Crossing Regulations*** on all persons affected prior to finalizing land acquisition, and prior to service and publication of notice pursuant to paragraphs 34(l)(a) and (b) of the NEBA. Section 112 of the NEBA pertains to activities within 30 m of the pipeline for which leave of the Board is required.

Express noted two landowners had raised concerns with respect to visibility of facilities and the right-of-way of the Hardisty Terminal and the Red Deer River. Landowners have also raised concerns with reclamation and revegetation of the native prairie at several locations including the Red Deer River Crossing.

In respect of surface installations, Express noted that with the exception of Crown Lands, the freehold document has a provision for the acquisition of land for the installation of above-ground facilities. This provision requires that Express and the landowner or occupant execute a separate agreement for any surface installations including mainline block valve sites and associated roads.

In respect of temporary workspace, Express noted that it does not anticipate acquiring temporary workspace from landowners and occupants whose lands are not traversed by a permanent right-of-way. Express stated that, should such a situation arise, the landowner and occupant would be notified of the

temporary workspace requirements and a notice, pursuant to section 87 of the NEBA, would be served.

Express noted that the land requirements for Stations 1, 3, 5, and 7 would be 17.6, 1.6, 1.6, and 1.63 hectares ("ha"), respectively. Each mainline valve site would be a fenced area on the right-of-way of approximately 18 x 20 m.

Views of the Panel

The Panel notes that because of the potential effects on landowners and occupants, the nature and extent of the interest in lands which an applicant requires is of concern to the Panel. With respect to the land requirements identified for the Express Pipeline Project, the Panel is of the view that these are reasonable.

2.3 Public Comments

Alberta Environmental Protection ("AEP"), in an internal memorandum, a copy of which was provided to Express, raised concerns that at the 30 November 1995 meeting, the Project went from "nothing carved in stone yet" to "the route is surveyed in place" with 94% of the lands optioned. It was also noted that detailed discussions with government and some non-government organizations had not yet occurred. The Land Reclamation Division of AEP, in its 9 January 1996 letter, noted that it supported the selection of the Western Alignment over the Eastern Alignment (Figure l-l). AEP Fish and Wildlife Services noted in its 16 January 1996 letter that the alignment may conflict with sensitive habitats such as native prairie and riparian habitats. It was noted that the alignment should be placed in closer proximity to existing man-made structures (right-of-ways, roadways, power transmission lines, ditches, etc.) to reduce the disturbance factor.

Alberta Public Lands ("Public Lands") noted at Express's 30 November 1995 Reclamation Planning Process Consultative Meeting that it was unfortunate that there was not earlier consultation during the route selection process. Public Lands further noted that its first choice, when it comes to native prairie, is avoidance. Public Lands noted in its letter of 13 December 1995 that Express's submission that Public Lands were "consulted extensively" is of concern. Public Lands noted that field staff may have been contacted several times regarding the alignment for certain segments on the Express Pipeline but satisfactory alignment agreements were not reached (eg. Sage Creek Grazing Reserve). Accordingly Public Lands submitted that only half of the consultation process was achieved. Public Lands noted that insufficient detailed information was provided on which to base its response until November 1995. Public Lands noted that while it did not reach agreement with Express on the suggested re-routes, it realized that it is too late to make such changes.

AWA/FAN submitted that had Express screened more routes and talked to AWAIFAN at the beginning, not after the route was selected, Express would have found a better route on which it could do a detailed analysis. AWA/FAN noted that Express's consultation process provided it with an opportunity to have important input into the general reclamation procedures on the bulk of the route. However, AWA/FAN noted that it was somewhat dismayed at the lack of consultation regarding the route and the fact that a route outside of the area south of Cypress Hills was not considered,

Gibson objected to the proposed routing of the Hardisty Lateral on its property on the basis that the proposed route would restrict Gibson at a later date should it require this land for additional pipelines into its terminal and that the routing would require the dismantling of a major dike surrounding a tank structure.

The Rocky Mountain Ecosystem Coalition ("RMEC") acknowledged that Express had been involved in an ongoing consultative process with stakeholders who chose to participate. RMEC noted that it chose to participate in the hearing, and not in Express's consultative process, since it did not believe that the Project should be approved.

The Municipal District ("M.D.") of Cypress No. 1, the Council of County of Paintearth No. 18, the Council of the County of Forty Mile No. 8, and the Special Areas Board (local municipal authority and public land manager in the Jenner, Youngstown, and Veteran areas) advised the Board of their support for the Express Pipeline Project.

2.4 Environmental Intervenors

Following the issuance of the Agreement and Hearing Order OH-l-95, the Board received a number of interventions; those relating to environmental matters included that of Gibson, RMEC and a joint intervention by AWA/FAN. Gibson, in its written information requests to Express, posed questions regarding the Environmental Assessment conducted in respect of the Hardisty Terminal/Pump Station. Gibson did not pursue these questions during examination of Express's witnesses. RMEC's submission raised concerns with upstream and downstream effects. It identified specific issues associated with those impacts, including wildlife, fisheries, and air emissions. RMEC further requested that the Board deny the application due to a number of deficiencies including the failure to have regard to the American component and to the full Project life-cycle.

AWA/FAN's submission raised a number of specific concerns in regard to plants and wildlife and expressed concerns with routing through the northern fescue grasslands and the Sage Creek Grazing area. In its original submission, AWAfFAN made a number of recommendations and stated that with the implementation of these recommendations, it believed that federal policies and laws with respect to biodiversity maintenance will be satisfied and that the Project can proceed. These recommendations related to re-routing in the Sage Creek Grazing Area and fescue grasslands, avoiding 'wetlands, use of native seed mix, and using an appropriate monitoring program. In final argument, AWAfFAN indicated that the bulk of the pipeline is not.of concern, however it stated that it opposes the approval of this Project because of the concerns with respect to routing through the area south of Cypress Hills. The concerns raised by RMEC and AWAfFAN, as well as the recommendations proposed by AWA/FAN, are further detailed, on an issue-by-issue basis, in Chapter 3.

2.5 Specialist Advice

The Board requested specialist advice, pursuant to subsection 13(3) of the CEAA, from CCG, Environment Canada, and DFO. Specialist advice was provided by Environment Canada and DFO. Their comments are incorporated in the relevant sections of Chapter 3.

Chapter 3

Factors, Potential Effects and Mitigation Measures

3.1 Purpose

The purpose of the proposed Express Pipeline Project is to transport 27 400 m^3 per day (172,000 BPD) of crude oil produced in the Western Canadian Sedimentary Basin, from a receipt point near Hardisty, Alberta, to the international border near Wild Horse, Alberta, to connect with a related pipeline project in the United States.

Express submitted that its market assessment indicated that an opportunity exists for incremental volumes of Canadian crude to access new markets in Petroleum Administration Defense District ("PADD") IV and southern PADD II. The combination of available crude oil supply and market demand would provide Express with the ability to generate benefits for parties at both ends of the pipeline.

With respect to PADD IV, Express noted that production has declined and that the region needs a significant new source of crude oil to offset experienced and projected crude declines and meet the existing refining requirements. Express further noted that Canadian crude types fit the range of crudes needed by PADD IV refiners for them to remain viable. Express also noted that declines in the rate of crude oil production in the United States affects crude supply to PADD II and presents a further market opportunity for Canadian crude.

3.2 Construction Schedule

3.2.1 Express's Proposal

Express initially applied, in its June 1995 application, for construction of the pipeline and ancillary facilities during a construction period from 1 May to 3 1 August 1996. Express retained Axys Environmental Consulting Ltd. ("Axys") to complete an environmental assessment and mitigation plan, including cumulative effects matters, for the proposed Project. Axys, in conducting its assessment and surveys, retained a number of specialized consulting services.

With this construction schedule, Express indicated that species, which reside in the construction area, will experience an intense period of sensory disturbance during spring and summer, and will likely demonstrate some displacement away from the right-of-way. It also indicated that the potential exists for direct mortality to avian young of the year in nests which are physically encountered or closely approached by construction activities as well as the likely abandonment of nests immediately adjacent to the right-of-way. With the spring-summer construction schedule, there are few means of identifying and avoiding, either through routing or scheduling modifications, all ground nests of those species that nest throughout the native prairie and parkland areas.

In December 1995, Express indicated that the following schedule of events is more likely:

- Pipeline construction would occur in the period from the beginning of August through to the end of November 1996. Final reclamation would be completed in the spring of 1997.

- The construction of the interconnect facilities from IPL, Gibson and Husky would occur in the period from the beginning of August 1996 through to the end of November 1996.

- The construction of the pump stations would occur in the period from the beginning of July 1996 through to the end of November 1996.

- For storage facilities, site grading would begin in July 1996; tank foundation work would begin in August 1996; and tank erection would take place following the site grading, for commissioning in December 1996.

Express subsequently advised all parties potentially affected by the Project, through its Express Pipeline UPDATE (newsletter) dated 4 January 1996, that due to the timing of the regulatory review process and project logistics, construction is anticipated to commence in late summer of 1996, and conclude at year's end. Express further advised that final reclamation would be completed in the spring and summer of 1997. Express testified that to comply with Environment Canada's recommendations for construction timing, specifically through the migratory bird areas, it would be constructing in those areas in August after the birds have finished nesting and the young have fledged.

With respect to the environmental implications of a late summer-fall construction schedule, Express indicated that generally impacts to the biophysical resources encountered along the line would be reduced compared to those for spring-summer construction. Examples included concerns associated with cryptic ground nesters, such as the Mountain Plover and the Sharp-tailed Grouse, as nests would not be physically encountered by construction activities during that construction period.

With respect to wildlife habitat features of concern that were identified through its surveys and through those identified by Environment Canada, Express indicated that it was not necessary to re-route the pipeline to avoid all of those features because construction was rescheduled to occur after the nesting period. Express submitted that, if the construction timing were to change, it would still comply with the timing restrictions identified in its application, timing restrictions identified by Environment Canada, and would also comply with the instream construction windows for fisheries. Express testified that there are definitely disadvantages to the spring period because of the routing modifications that would have to be done to comply with the timing restrictions.

With respect to the possibility of winter construction, Express indicated that Pronghom Antelope generally use the winter ranges from early December through until March. Express submitted that it does not expect an overlap between the use of the winter ranges by antelope and the updated construction schedule.

Express, in final argument, stated that it would be opposed to any condition restricting construction to the 1 August to 31 November period. If construction should be delayed, Express submitted that it would most likely continue construction into the winter and then reclamation would be necessitated during the spring. Express stated that the possibility of returning to a spring construction schedule is

dependent upon a timely issuance of a certificate to construct enabling Express to meet its present construction schedule.

3.2.2 Public Comments

In regard to timing restrictions, AWA/FAN indicated that there appears to be significantly more conflicts for species with the spring-summer schedule than would be encountered in late summer and fall. AWA/FAN further indicated that late summer and fall tend to have drier ground conditions, thereby reducing rutting and the inadvertent widening of the area of impact related to wet ground conditions in the spring.

AWA/FAN also expressed a concern with the wintering areas for the Pronghom Antelope, stating that Express has not provided a contingency as to how it would deal with this species if the construction were extended into the winter.

Environment Canada expressed concerns with the spring construction schedule, indicating that potential impacts on migratory birds in upland and wetland habitats can be most effectively addressed if construction does not occur between 15 April and 15 July in areas where migratory birds may be nesting. Environment Canada pointed out that the Environmental Impact Statement for the U.S. portion of the Express Pipeline (Wild Horse to Casper, Wyoming) has a construction timetable from July through October. Environment Canada submitted that the dates for the U.S. portion were chosen as a result of wildlife and water quality concerns.

Initially, AEP, in a letter to Express, in relation to a spring construction schedule, stated: "the timing... could not be worse". However, in a subsequent letter to Express, AEP advised Express to disregard its previous correspondence since the timing concerns have been addressed and met by the adoption of the August to November construction schedule.

3.2.3 Views of the Panel

With respect to Express's position that it may revert back to a spring-summer construction schedule (May to August), the Panel has evaluated the evidence and finds that Express has not adequately addressed the concerns associated with such a schedule. In the Panel's view, Express's updated construction schedule (August to November) serves as a significant mitigation measure which appropriately addresses the potential adverse environmental effects for most wildlife species in the area. The Panel notes that Express also used this updated construction schedule to alleviate previously expressed concerns in regard to spring and summer construction.

Therefore, the Panel recommends that, unless otherwise allowed by the Board, Express be required to comply with the 1 August to 31 November construction schedule for pipeline construction, as provided in its construction schedule update. With respect to the ancillary facilities, the Panel also recommends that, unless otherwise allowed by the Board, Express comply with the updated schedule of events as set out in Section 3.2.1. The Panel acknowledges that Express may not be able to complete final clean-up activities in the fall of the construction year and these activities may have to be undertaken, for some areas, in the spring and summer of the year following construction. Final clean-up activities are addressed in the following issue sections.

As a result of the Panel's recommendation that, unless otherwise allowed by the Board, pipeline construction should adhere to the updated schedule as provided by Express, the Panel notes that the remaining sections address only those issues associated with that updated schedule.

3.3 Pipeline

3.3.1 Routing and Alternative Means

3.3.1.1 Route Selection

Express noted that it had examined routes commencing at Edmonton, Alberta or Regina, Saskatchewan, and ending at Guernsey, Wyoming. Express submitted that the Hardisty, Alberta to Casper, Wyoming route would make the best use of existing pipelines and terminal facilities and would allow for the best matchup of Canadian supply with access to new markets. Express furthei submitted that routes other than Hardisty to Casper would likely increase potential environmental impacts.

Express noted that the selection of alternatives involved plotting the short-line distances between the end points of the Canadian portion of the line. The Canadian Forces Base Suffield ("CFB Suffleld") was the most immediate land use constraint influencing the selection, since the pipeline would have to skirt either the western or eastern boundary of the CFB Suffleld. Express submitted that, based on the CFB Suffleld constraint, two alternatives, namely the Western and Eastern Alignments, as denoted in Figure l-l, were developed. In addition to the endpoints and the CFB Suffield, Express also identified the major river crossings as control points along the pipeline. Express noted that, after flying an area of three km along each river, it had sought out the most appropriate river crossings at both the Red Deer and South Saskatchewan rivers from a geotechnical, environmental and engineering perspective, and sited these crossings prior to defining the corridors.

For the purposes of route selection Express submitted that an elliptical study area approximately 434 km long and 70 km wide at its mid-point, as defined by the Western and Eastern Alignments was considered with Hardisty, Wild Horse, CFB Suffield, and the major river crossings as the constraints.

Express evaluated the two alternatives based on air photo interpretation, a preliminary review of existing biophysical/cultural information, and two helicopter reconnaissance flights during August 1993. It examined key wildlife area maps, general topographical features with respect to water crossings, and historical resource information. Express noted that it had reviewed some of the Environmentally Significant Area documents but that the literature files searched were primarily of a historical resource nature.

Express noted that the following criteria were used in its comparative evaluation of the two alternatives:

- construction/operational criteria including pipeline length, access, and future system expansion;
- biophysical criteria including fish, wildlife, and areas of high environmental sensitivity; and

- land use criteria such as the existing land use, historical and archeological resources, and existing corridors.

With respect to the selection of the route, Express indicated that it has attempted to avoid disturbance to native vegetation communities by routing through cultivated land or improved pasture where practical. However, Express submitted that the majority of the native grassland communities encountered by the route are broad landscape features with no practical options for avoidance.

Express stated that the Western Alignment was selected over the Eastern Alignment as the preferred option. In spite of its slightly longer length, the Western Alignment received an overall preferred rating from a construction, biophysical, and land use perspective, relative to the Eastern Alignment for the following reasons:

- the Western Alignment would parallel more of the existing or proposed pipeline routes, including approximately 150 km of Foothills Pipe Lines (Alta.) Ltd.'s unbuilt Wild Horse Pipeline;
- there would be less impact on present land use;
- historic and archaeological concerns would be fewer;
- the Western Alignment has better soil quality, which would result in easier handling and reclamation;
- there would be less impact on special status wildlife;
- waterfowl and ungulates would be less affected; and
- the route would have a lower construction cost.

Express noted that, based on the Western Alignment, it had selected a 1.6 km wide corridor and that within that corridor the routing was dictated by environmental concerns, landowner preferences, municipal offset requirements, engineering and other matters. Express advised that the corridor was presented at the open houses conducted in May 1995.

Express stated that modifications were made to avoid land use conflicts and residential dwellings and that the route followed straight farm trails and well-site roads when possible. Express noted that two modifications to the originally designated alignment had been made, namely, shifting the alignment approximately 300 m west to avoid productive emergent growth at Rush Lake in SW 1/4, Sec. 32, Twp. 8, Rge. 5, W4M and a re-route to avoid Milk River Lake and a designated Natural Area (Alberta Parks) in N 1/2, Sec. 12, Twp. 1, Rge. 3, W4M.

With regard to facility configuration, Express evaluated a 508 mm outside diameter line with six pump stations and a 610 mm outside diameter line with four pump stations. Express found that the 6 10 mm design provided the most flexible, cost efficient design, while minimizing adverse environmental impacts.

With respect to final access requirements for pipeline construction, Express indicated these will be developed by the contractor. Express indicated that, due to the nature of the area, the requirement for

new access will be minimal. However, should new access be required, a number of restrictions would apply including: no development of new roads in native prairie; avoidance of important plant communities and wildlife habitats; and all roads (with the exception of those to pump stations) to be constructed for temporary access only.

Express asked the Board to consider a 1.6 km wide corridor centred on the designated alignment for application purposes. In response to the Board's request for additional information, Express advised the Board on 11 September 1995 that it was seeking approval of a specific route rather than a corridor.

Express noted that Public Lands was notified of the specific route through service of a notice, pursuant to subsection 87(1) of the NEBA, on the Sage Creek Grazing Manager on 19 May 1995. AEP was advised of the specific route through service of a notice, pursuant to subsection 87(1) of the NEBA, on the Industrial Land Administration Branch on 24 August 1995, and a representative of AEP Fish and Wildlife Division was verbally advised at a 30 November 1995 reclamation meeting. Express noted that Agriculture and Agri-Food Canada ("AAFC") were not formally notified of the specific route since AAFC's station and Experimental Farm are located outside of the pipeline corridor.

3.3.1.2 Environmentally Significant **Areas**

Express indicated that the proposed route traverses a number of ESAs, including Bullshead Creek (Twp. 10-11, Rge. 5-7, W4M), Red Deer River-Jenner (Twp. 21-22, Rge. 9-10, W4M), Jenner Moraine (Twp. 21-23, Rge. 6-10, W4M), Manyberries Creek Badlands (Twp. 4-5, Rge. 3-5, W4M), Sage Creek (Twp. l-5, Rge. l-5, W4M), Outer Rainy Hills (Twp. 15-18, Rge. 9-10, W4M), Peace Butte Creek (Twp. 9-10, Rge. 6-7, W4M), Eagle Butte (Twp. 6-9, Rge. 3-6, W4M), and South Saskatchewan River-Medicine Hat West (Twp. 1 l-l 3, Rge. 6-l 3, W4M). These ESAs were identified by a study commissioned by the Alberta Government and most of these areas are large tracts of land supporting native prairie and/or badland features of high quality. Express submitted that the protection of the special features would be addressed by the Express Environmental Protection Plan, and avoidance was not considered necessary.

Express testified that there are currently no provincial, municipal or county land use policies which exclude development in these ESAs. Express also testified that ESA designations are quite subjective and they have not been developed or endorsed by provincial agencies but have primarily been made by independent consultants. Express went on to say that there are no protection measures that have been identified for these areas and no land use restrictions of which it is aware.

Express stated that, although the proposed route traverses several ESAs, pipeline development is not considered harmful to the overall integrity of these ESAs. ESAs tend to cover expansive areas, thus precluding the feasibility of re-routing to avoid them entirely. Express indicated that of principal concern are threats to: sites containing rare species; species with limited provincial distributions; and unique or otherwise significant plant communities. Express further indicated that construction could locally eliminate a variety of plants along the proposed route; however, impacts to vegetation should be minimized by the fact that all the major landscape features encountered in the proposed pipeline right-of-way also occur elsewhere in the ESAs.

The proposed Express Pipeline would traverse 42.5 km of the Sage Creek ESA. The area is described as extensive mixed grasslands and ephemeral saline wetlands, with minor badlands and riparian shrub communities. Habitat has been identified in this ESA for several rare plants and for several rare or

endangered species such as Mountain Plover, Baird's Sparrow, Ferruginous Hawk, Burrowing Owl, Loggerhead Shrike and Swift Fox. Express submitted that the area has been given provincial significance, and possibly has national significance.

In regard to the classification of the Sage Creek area as an ESA, Express testified that there are features within the Sage Creek area that warrant that kind of status. However, Express further testified that the area has been subjected to grazing pressures that are entirely different from the pre-European regime of grazing under which the plants have evolved. Express indicated that the Sage Creek ESA does not have a lot of roads; however, there are approximately 160 km of fenceline enclosing 15 or 20 pastures.

With respect to the Nature Conservancy's Great Plains Project, Express indicated that currently there are no parcels of land in the region transected by the proposed Express Pipeline that are either owned or cooperatively managed by the Nature Conservancy.

3.3.1.3 Alternatives

During the hearing, Express was examined by RMEC and AWA/FAN as to whether alternative routes had been considered for the proposed Express Pipeline.

Express submitted that the intent of section 16 of the CEAA is to require proponents to consider different or alternative ways of carrying out the Project. For example, in the context of Express, different routes, different designs, alternate river crossing methods, alternative power sources, alternate reclamation methods to protect the native prairie are all alternative means of carrying out the construction and operation of the pipeline. Express further submitted that it has considered all of these. Express noted that, in its view, in order for an option to be considered a feasible alternative to Express, it must provide similar access to the new markets for Western Canadian crude oil.

Express submitted that its alternative consideration was undertaken at a corridor scale. Once Express had determined that the Western Alignment was reasonable, and preferred over the Eastern Alignment, it was refined as a 1.6 km wide corridor. Express noted that corridor still allowed some flexibility in terms of assessing creek and river crossings. Express submitted that unless there were obvious advantages to moving to different areas or different corridors along the route, it did not specifically do so.

Express stated that, when it started its open houses and public consultation in early May 1995, the route was still a corridor, with the ability to have some deviations within that corridor. Express submitted that, to its knowledge, the route had met with no opposition to date. Express submitted that it was very late in the proceedings when any suggestion of a re-route arose. By this time it had completed considerable detailed environmental work on its proposed route.

Express noted that it was somewhat confused over concerns raised by individuals at Public Lands and Alberta Fish and Wildlife regarding the route. Express understood from its consultation process that there was no indication of a Public Lands departmental policy regarding the Express route. Express noted that the Grazing Reserve Manager has provided Consent of Occupant, but that as recently as October 1995, differing opinions had been expressed by individuals who work in the area with Public Lands on the need for re-routes. Express noted that re-routes proposed by individuals at Public Lands would route the pipeline through a much more extensive section of the Cressday Wetland Complex

and would also reintroduce a crossing of Milk River Lake. In respect of Fish and Wildlife, Express noted that the re-route proposed would encounter some of the most rugged topography north of Sage Creek. In response to a query by AWA/FAN as to whether Express had contacted either agency to clarify their respective positions, Express noted that it has met with a variety of individuals but has not been able to resolve this confusion.

Express submitted that it was both prudent and reasonable to follow the Wild Horse right-of-way that had been approved in a public process less than six months before the Express Application was filed. Express further submitted that it did not just adopt the Foothills corridor as its own. Express noted that it was aware of several of the concerns that intervenors in this proceeding had with respect to the route, and as a result, re-routed the pipeline around Milk River Lake and Rush Lake. Express stated that it was, and continues to be proactive when dealing with environmental concerns.

Express stated that it evaluated a number of pipeline-related considerations for the route and it felt that the proposed route did not pose any construction or serious environmental constraints.

3.3.1.4 **Use of Existing Disturbances for Routing**

With respect to the proposed route, Express was also examined by the RMEC and AWA/FAN as to why Express had not routed the pipeline along, or within, existing disturbances created by highways, secondary roads, and railways. Express noted that, in general, pipeline and roadway developments in the same right-of-way are considered only in extremely rare occasions, such as going through a rock-cut, where there is a major obstacle to other routing alternatives. Express further noted that in corridor study work conducted in Alberta, pipelines and roadways are the second least compatible combination of linear facilities, with railways being the least compatible.

Express indicated that for safety reasons, the pipeline would be 50 to 60 m away from the road and that routing in proximity to roads would not necessarily result in less environmental impact in native prairie settings. Express submitted that this is because setback requirements would place the actual right-of-way in native prairie and not in previously disturbed land associated with the road development.

Express stated that based on discussions with the Planning Division of Alberta Transportation and Utilities, it is desirable to have an offset of 70 m between the centre line of the highway and the ditch line or the centre line of the pipeline. Express noted that a permit, and permission from the Minister of Highways, is required if a pipeline is to be located parallel to, and within 30 m of an existing highway right-of-way. It was Express's understanding that in the case of secondary highways and local roads, 60 and 40 m setbacks are a requirement under the M.D. of Cypress's land use by-law.

Express submitted that it viewed using an abandoned railroad right-of-way that runs southeasterly by Manyberries, as unacceptable in terms of all the disturbance associated with hauling the ballast material away, and the cost. Express noted that a railroad is a bermed right-of-way and would not leave enough physical space for placing a pipeline in the berm. Express further noted that it would be necessary to grade the berm to provide a safe working surface for the contractor. Express submitted that more surface damage would result from trying to remove berm material. Removal of the berm would involve different types of equipment, more equipment, and probably a greater temporary work space to deal with the volume of material. Express noted that another consideration is the potential for encountering oil, grease, creosote, and other residual contaminants from the operations of the railroad.

With respect to the abandoned railway, Express noted that in addition to the above-noted considerations, the railway route runs across the north end of Sage Creek and directly crosses through the centre of the Cressday Wetland Complex where rare plant species were found.

3.3.1.5 Re-route **to Avoid Sage Creek Grazing Reserve**

Express was requested by the Board to provide an evaluation of routing alternatives that would avoid or minimize the routing through the Sage Creek Grazing Reserve. Express indicated that it reviewed existing mapped information and literature and discussed two alternatives, routed east and west of the alignment through the Sage Creek Grazing Reserve, with several potentially affected parties. Express submitted that the environmental impacts of the proposed route and the alternatives are not significantly different. Express indicated that the overall effect of adding length to the pipeline is to decrease the capacity of the pipeline. In summation, Express stated that, based on the potential impacts of the alternatives, and the impacts on Express, it is Express's view that neither of the re-routes east or west of the Sage Creek Grazing Reserve offers a clear advantage over the proposed route. Express further stated that it does not believe that either re-route is preferable from an environmental standpoint.

3.3.1.6 Route Information

Express filed with the Board the photomosaics identifying the proposed right-of-way. Express indicated that biophysical and cultural information that had been previously submitted to the Board in the form of Express's reports relating to the-environment, wildlife, fisheries, vegetation, soils and cultural resources is in the process of being added to these sheets. Express indicated that it will submit subsequent revisions of the photomosaics to the Board once the information has been added to these drawings. Express has also undertaken to break out the specific land uses in the final photomosaics, to be filed with the Board 15 days prior to construction.

Express also advised that there may be minor re-routes resulting from the ongoing review of consultants' reports, detailed design, and results of further environmental work to be conducted in the spring of 1996.

3.3.1.7 Public Comments

AAFC, in its 14 January 1996 letter to Express, expressed disappointment with the routing of the pipeline through the Sage Creek Grazing Reserve.

AEP, in its letters to Express dated 2 and 16 January 1996, expressed concerns with the route alignment and suggested that to reduce disturbances, the pipeline should be routed in closer proximity to existing man-made structures.

AWA/FAN indicated that the Big Sagebrush Natural Area is not in the study area of the Express Pipeline Project as indicated in the application. Also, AWA/FAN indicated that the Silver Heights and Ribstone ESAs in the County of Paintearth have been omitted. Some areas have been misdrawn or omitted in the M.D. of Cypress, namely the Outer Rainy Hills and South Saskatchewan River-Medicine Hat West ESAs.

AWA/FAN also submitted that there is no indication that the proponent is willing to avoid rare species or vegetation sites if they are encountered and there is no acknowledgement of the fragmentation of healthy native grasslands and the impact of construction activity disturbances and non-native plant invasion.

AWA/FAN said that they are not convinced that the assessment, therefore the routing, adequately recognizes nationally and provincially significant ESAs and the detrimental effect of the Express Pipeline Project. AWA/FAN submitted that there should be an undertaking by the proponent to avoid portions of provincially and nationally significant ESAs and to take special precautions in regionally significant ES As.

AWA/FAN indicated that the information from the M.D. of Cypress No. 1 (Sage Creek ESA) has been entered into the provincial government computerized database. AWA/FAN testified that the provincial government uses this information on a day-to-day basis for planning purposes and for Special Places 2000 planning purposes. AWA/FAN submitted that the area south of Cypress Hills contains ESAs and, in its view, these are an important consideration in assessing the significance of the area. AWA/FAN stated that the ESAs should be a red flag when looking at development.

AWA/FAN did not agree with Express's position that there had been no opposition to the proposed route until late in the process and noted that it had raised concerns in respect of the Wild Horse Pipeline route in its 3 February 1995 letter to the Board. AWA/FAN, in its 12 July 1995 letter of intervention also identified concerns regarding industrial intrusion into the area south of Cypress Hills.

AWA/FAN submitted that Express picked the corridor before doing an assessment. AWA/FAN questioned paralleling the Wild Horse Pipeline and noted that an environmental assessment of the magnitude performed for Express was not done on the Wild Horse Pipeline. AWA/FAN noted that the Wild Horse pipeline has been approved subject to a number of conditions being met and understands that none of this information has been submitted. Therefore, AWA/FAN submitted that this is a hypothetical pipeline that may not go ahead, and if not, the advantage of using that right-of-way is lost. AWA/FAN also noted that Express's approach supports its concern that one development begets another. AWA/FAN submitted that Express studied only one route at a detailed level. AWA/FAN further submitted that had Express screened more routes and talked to AWA/FAN at the beginning, not after the route was picked, Express would have found a better route on which it could do a detailed analysis.

AWA/FAN noted that Express did not look at avoiding the area south of Cypress Hills and that Express never looked at the possibility of following another route to the U.S.

AWA/FAN submitted that Express, in evaluating routing alternatives, gave insufficient attention to the importance of non-fragmented grasslands for a variety of representative and rare, threatened and endangered species. AWA/FAN noted that rare plant, and plant community, information does not appear to have been used in selecting the final route. AWA/FAN further noted that the studies provided by Express acknowledge the significance of the various areas that would be traversed by the route but that the impact of the pipeline corridor is downplayed and the routing has not been modified.

With respect to the two re-routes presented by Express to avoid the Sage Creek Grazing Reserve, AWA/FAN submitted that it did not see any advantage over any of the routes as similar concerns are raised by each of the routes. However, AWA/FAN noted that it believes that there are other options

that have not been explored such as routing through existing disturbances along highway right-of-ways and railroads. In support of routing within existing disturbances, AWA/FAN submitted that if a development is located outside of an existing disturbance it may result in the same impacts as the original disturbance. AWA/FAN further submitted that routing the pipeline along the Wild Horse Pipeline, if built, would involve the creation of a new additional disturbance unless it was possible to locate both pipelines within the same trench. AWA/FAN stated that it was its position that the southern portion of the Express Pipeline should be re-routed. AWA/FAN noted that a development located within 100 or 200 m of an existing disturbance would result in additional impacts and impacts of concern, however, these impacts would not be of the same magnitude as locating the disturbance within the centre of an undisturbed area. AWA/FAN noted that the reasons for this are that exotic species could establish in previously uncontaminated areas and predation patterns may change in an area which is utilized by species requiring large blocks of habitat.

AWA/FAN noted that it had concerns about areas of northern fescue that the pipeline route would encounter but noted that, once identified, these areas could be avoided by re-routing.

AWA/FAN stated that the "coarse filter" approach is looking at the big picture and that Express has clearly used a "fine filter" approach, but in a very piecemeal manner. It also stated that whenever it suggested that Express look at ESAs, ecosystems, or the important valued ecosystem components, Express either trivialized or dismissed those comments or concerns.

AWA/FAN stated that placing the pipeline through the area south of Cypress Hills would have adverse environmental impacts. AWA/FAN stated that this area is nationally important and is the best grassland left along the route. It is AWA/FAN's view that it is unacceptable to sacrifice endangered or threatened ecosystems, or species within those ecosystems, when there are viable alternatives. AWA/FAN further noted that in its view the uncertainty and risks associated with the Project outweigh any assurance or evidence that Express has provided. AWA/FAN submitted that it sees no way of addressing adverse effects through conditions attached to an approval. Accordingly AWA/FAN requested that the Panel submit a report under section 34 of the CEAA recommending that the Application not be approved.

During the hearing, RMEC submitted a Road Density Map. RMEC suggested that the map could be used to indicate the health of the ecosystem. RMEC further suggested that Express has ignored a great body of literature that should have been used in selecting its route.

RMEC submitted that the onus is on Express to meet the requirements of the CEAA, and the Panel has the obligation to ensure that they have done so. Express must establish that the environmental impacts are acceptable and that the alternatives have been properly considered. RMEC further submitted that Express has not met this obligation, and therefore, in the RMEC's view, the Panel can neither give an approval nor a recommendation for approval.

RMEC submitted that if the Panel finds that there are other alternative routes, it follows that the Panel must fmd that there is not sufficient information to decide which of the alternative routes should be used. RMEC recommended that the application be dismissed and that at an appropriate time in the future, Express resubmit an application with a proper routing and proper analysis that would comply with the CEAA. RMEC stated that it is very clear on the record that the proposed route is not the best route and that its position is that there should be a re-route. It was RMEC's view, however, that the Panel could not consider a re-route as it does not have the information necessary.

Gibson objected to the proposed routing of the Hardisty Lateral on its property on the basis that the proposed route would restrict Gibson at a later date should it require this land for additional pipelines into its terminal and that the routing would require the dismantling of a major dike surrounding a tank structure. Gibson noted that in the event the Express Application for a Certificate is granted, and Gibson and Express have not at that point resolved the issue of the right-of-way, the matter will then be dealt with in the context of a detailed route hearing.

3.3.1.8 Proposed Mitigation Measures

Express indicated that with the combination of routing modifications, timing restrictions, and reclamation measures, the anticipated impacts on key features known to occur within ESAs are considered to be neutral to negative, of short-to long-term and to have local to subregional impacts of low magnitude. Express noted that, during discussions with regional Public Lands officials, concerns were raised over the routing of the pipeline through the Sage Creek ESA (particularly the Sage Creek Grazing Reserve) because of the relatively undisturbed nature of the native grasslands in the area. Express further noted that no other provincial agency has expressed concerns over pipeline development in ESAs.

Express's rare plant surveys indicated that, because portions of the pipeline route fall within ESAs of regional and provincial significance in the grassland zone, construction should only be carried out in such areas with appropriate routing to avoid significant features, and with adequate sod/soil conservation and restoration strategies.

In regard to any planned or future re-routes to avoid plant species or communities, Express undertook to file, prior to construction, for any re-routes of less than 50 m, an environmental statement addressing soils, wildlife, vegetation and archaeological information, including references to mitigation measures, where they have already been provided in the evidence adduced during this hearing process, or additional mitigation measures, where those measures have not been provided.

Express does not anticipate that any re-routes of greater than 50 m will be required. However, Express testified that it would file the same environmental information as for the re-routes of less than 50 m. It also testified that, if landownership changes as a result of the re-route, it would undertake a public consultation process.

3.3.1.9 **Views of the Panel**

The Panel notes that considerable time was spent during the hearing in examining alternative means of carrying out the Express Pipeline Project. Paragraph 16(2)(b) of the CEAA provides that an assessment by a review panel shall include a consideration of the "alternative means of carrying out the Project that are technically and economically feasible and the environmental effects of any such alternative means". The Panel, in its 24 January 19.96 ruling, found that "it has been empowered to consider alternative means of carrying out the Express Project and the related environmental effects, which alternative means are matters within the control of the applicant, such as alternative routes for the pipeline". The Applicant was required to put evidence before the Panel on alternative means to carry out the Project. This does not mean that the Applicant must provide alternatives to the proposed route. It can provide information on alternative means related to reclamation, mitigation techniques or a variety of matters. Express, in its Application, chose to provide information regarding alternative routes. In respect of this application, the Panel is satisfied with the. adequacy of the information

provided by Express regarding alternative routes and is of the view that the requirement that there be evidence on alternative means of carrying out the Project has been met.

The Panel finds that Express's approach to route selection was acceptable. Minor reroutes may be identified, prior to construction, to address concerns such as those related to northern fescue. The need for re-routes, as an avoidance measure, is discussed in more detail in the following issue sections. In regard to potential re-routes (less than or greater than 50 m) as an avoidance measure, the Panel is generally satisfied with the type of information that Express intends to file. However, the Panel recommends that, as a condition to any approval, Express be required to file with the Board, for approval, any modifications that require a deviation from the proposed specific route as described in the application. Each filing shall include: the results of public consultation (where appropriate); the identity of any affected landowner(s) and the status of land acquisition (where appropriate); an air photo (where the modification is greater than 50 m); an environmental issues list identifying all relevant effects of the re-routes on e.g. vegetation, wildlife, hydrology and archaeological information; and the associated mitigation measures to render those environmental effects insignificant. In regard to the timing of the filing of this information, the Panel recommends that such filings be required prior to the filing of the plan, profile and book of reference pursuant to section 33 of the NEBA.

The Panel finds that it was reasonable for Express to identify a route that, for its southern portion, would parallel the certificated Wild Horse Pipeline. The Panel notes that this is consistent with the criteria set forth by Express regarding route selection.

The Panel also notes that it is not clear from the record that Express had communicated to all parties its intention to pursue a specific route rather than a corridor. Had Express clearly communicated such an intention to pursue a specific route, parties' concerns on the need for re-routes may have been raised and addressed in a more timely manner.

The Panel notes that concerns raised by individuals at Public Lands and Alberta Environmental Protection, Alberta Fish and Wildlife Division have not been resolved. The Panel further notes that Public Lands, in its 20 December 1995 letter, stated that, although it did not reach agreement with Express on suggested re-routes, it realized that it was too late to make such changes, and Public Lands welcomed Express's offer to place additional emphasis on mitigation for these areas.

The Panel therefore recommends that Express be required to acquire all rights for Crown Lands necessary for the pipeline prior to the Board's approving the plan, profile and book of reference for the pipeline pursuant to section 36 of the NEBA.

With respect to the ESAs that would be encountered by the Express Pipeline, the Panel notes that there is currently no restriction that would prohibit the routing of a pipeline within these areas. The Panel is of the view that effects on key features known to occur within the ESAs would be satisfactorily addressed through the combination of routing modifications, timing restrictions on construction, and reclamation measures proposed by Express.

Having considered alternative means of carrying out the Project, including alternative routes, the Panel is of the view that the applied-for route is acceptable.

3.3.2 Soils and Agriculture

3.3.2.1 Identification of Potential Effects and Their Significance

The potential environmental effects associated with soils include mixing and soil fertility, compaction and rutting, increased stoniness, and erosion. In addition, Express intends to dispose of the excess drilling fluid and drilled spoil, from the directional drill operations at the Red Deer River, by land farming.

Approximately 32% of the proposed route encounters lands under cultivation to canola, wheat, hay and other forages, with the remainder of the route largely falling within improved pasture with some residual native species, native rangeland or unimproved bushland. Express indicated that some project-related disruption to local agricultural activities can be anticipated.

Express indicated that baseline soils information has been generated from existing soils surveys and from a soil survey conducted in the project area by Can-Ag Enterprises Ltd. Soils information which was updated to cover the minor re-routes at Rush Lake and Milk River Lake is included on the alignment sheets in the Application. Topsoil depths and characteristics vary depending on site-specific conditions, such as terrain, vegetation cover, parent materials, and micro-climate. It also indicated that, in the project area, the colour differentiation between topsoil and subsoil or parent material horizons is generally poor.

Express submitted that mixing of soil horizons may contribute to reduced soil capability which can occur during soil stripping/reclamation, grading (cut and fill operations), trenching and backfilling, and clean-up operations. Since mixing of soil horizons during construction is often the principal impact to soil quality caused by the development, mitigation measures typically focus on protecting and salvaging the topsoil resource for reclamation.

Express submitted that compacted soils have a reduction in pore spaces and, hence, the soils' ability to absorb and to retain water is reduced. Compacted soils frequently result in surface water ponding and reduced throughflow and/or reduction in soil productivity. In addition, soils which are wet are more susceptible to compaction and rutting than are dry soils. Express stated, however, that most soils occurring in the project area are not considered highly susceptible to compaction, as they are typically well drained and are not characterized by heavy, clay-rich profiles.

Express indicated that disturbance of the soil materials during reclamation typically results in a settling of fines, leaving a higher proportion of surface stones than in predisturbance conditions. Express submitted that this has particular consequences in agricultural areas where increased surface stoniness may significantly affect the use of agricultural equipment.

In regard to erosion, Express indicated that potentially erosive soils have been identified. Light-textured soils on sandy fluvial and aeolian parent materials are most susceptible to wind erosion. Express indicated that, due to the general low-relief slopes occurring in the project area (typically <10%), the risk of water erosion is expected to be low except in association with specific landscapes (i.e. river valleys, coulee slopes).

Express submitted that pipeline construction performed during frozen and winter conditions with subsequent final spring clean-up is common practice in Alberta. Express further submitted that no

significant environmental effects have been demonstrated as a result of deferred topsoil replacement provided the topsoil is stabilized to prevent erosion, provisions are made for the control of weeds, and the activities are considered in relation to the potential sensory disturbances to wildlife in specific areas.

For land farming, Express submitted that some possible effects of applying drilling slurries over a parcel of land are: surface sealing limiting water infiltration, decreased soil porosity, changes to original soil texture and alteration of soil pH. Express stated that if applied to land at proper application rates, drilling slurries will have no measurable adverse effects. Express submitted that excess material will be evenly distributed over an open area and mechanically incorporated into the soil. Express stated that it will undertake to do a chemical analysis of the excess drilling fluid and drilled spoil.

3.3.2.2 **Public Comments**

AWA/FAN raised a concern with fences being used during reclamation in the Sage Creek Grazing area. AWA/FAN submitted that there are low density fences there now and this will only increase the impacts of those fences.

3.3.2.3 **Proposed Mitigation Measures**

Soil Handling Procedures

Express provided a number of soil handling procedures for pipeline construction across the range of soil, terrain, vegetation and land use conditions encountered by the project area, as outlined in Table 3-l.

Soil handling procedures have been identified on the alignment sheets provided by Express. Express submitted that any proposed changes to handling procedures shown on the alignment sheets will be reflected on the final construction alignment sheets, which will be prepared and filed with the Board prior to construction.

To reduce damage to native prairie, Express proposes specific topsoil handling methods for these areas. Topsoil stripping through native prairie will be restricted to an area slightly wider than the ditch wherever possible, using a modified bucket wheel ditcher or a hydraulic step blade. With respect to compaction, Express indicated that, in stripped areas, the compacted subsoil will be loosened as required, preferably with a parabolic soil ripper. In the Draft Reclamation Plan, Express indicated that it would relieve compaction on unstripped native range if it has been determined through testing that sufficient compaction in the subsoil exists to inhibit normal root growth. Express submitted that it would use the paratiller whereby compaction in the subsoil is relieved by gently lifting the soil and allowing it to fracture along its natural planes of weakness.

Table 3-l
Soil Handling Procedures and Criteria For Their Use

Soil Handling Procedure	Criteria For Use
trenchline stripping	- for hay, improved pasture or native range lands where sod development is sufficient to support traffic on the work side of the right-of-way without soil pulverization. - sod development will be determined by visual qualitative assessment of vegetative cover as a percentage of the surface area to be impacted, root development based on shallow test hole excavation, and response of sod layer to initial construction vehicles.
trenchline and work side stripping	- for hay, improved pasture or native range lands where sod development is insufficient to withstand traffic use on the work side of the right-of-way.
trenchline and spoil side stripping	- for cultivated lands where clear separation of topsoil and subsoil is required.
full right-of-way stripping	- to be implemented on unimproved bushland or rough native grasslands where the full right-of-way may have to be graded to facilitate operation of equipment, particularly on steep slopes; and wet areas with clay-rich soil horizons. Express estimated, based on topographic classes, that full right-of-way stripping would be undertaken for at least 34 km of the route in native grassland or pasture with some residual native species.
three-lift stripping	- for soils which have significantly differing chemical (i.e. salinity/sodicity) or textural (coarse fragment) conditions which require that the upper subsoil and lower subsoil be salvaged as separate horizons. However, with respect to native prairie soils with salinity/sodicity differences, Express intends to overstrip topsoil rather than three-lift prairie soils. Express submitted that such a procedure will reduce stripping widths and the amount of surface disturbance in most areas.
full width/extra workspace stripping	- full right-of-way stripping, and often stripping of temporary workspace, will be required at major utility and watercourse crossings to facilitate equipment movements and construction activities.

Source: Express's Application and additional evidence adduced during the hearing process.

Express undertook, in unstripped areas, to suspend right-of-way travel when rutting depths approach 25 mm of the B horizon. In consultation with the contractor, it may elect to strip sod/topsoil from the workside of the right-of-way to reduce impacts from rutting during wet conditions. However, with respect to native prairie areas, Express indicated that it will suspend operations where wet conditions result in unacceptable rutting of the soil.

In regard to the possibility of increased stoniness, Express indicated that stone picking, the physical removal of excess stones from the right-of-way, would be completed prior to topsoil replacement and after topsoil replacement. Express stated that removed stones would be disposed of at a location approved by the landowner or Public Lands.

With respect to wind erosion, a number of soil erosion control measures will be implemented by Express depending upon various circumstances. These generally include the application of a light mulch and tackifier to the topsoil windrow, and a straw mulch and tackifier on the workside, during construction activities. Express submitted that after construction, a crimped straw mulch will be applied to soils in various texture classes (sandy, sandy loam or loamy-sand) in exposed areas of the pipeline route.

In its Draft Reclamation Plan, Express indicated that it would reclaim pulverized, unstripped sod in native range when it is suspected that the disturbance will not infill naturally in a reasonable time frame, or when it is felt that there is a risk that an unacceptably high level of erosion may occur. Express submitted that the disturbance will be lightly cultivated with a spike cultivator across the disturbance in two directions to pull the topsoil and sod back into the tracks. Express further submitted that the disturbed area will then be lightly harrowed to redistribute the sod.

Express stated that mitigation to reduce the risk of water erosion in and around development sites would include: limiting cut and fill slopes to no steeper than 2:1 during construction and 3: 1 after construction is complete; contouring and berming sites to control drainage; horizontally roughening surface slopes; using soil stabilization methods (mulches, mats, netting, and tackifiers) as needed; and revegetating exposed soils as soon as possible following construction.

Express provided a number of protective measures to stabilize steep slope areas on the right-of-way such as: sediment and erosion control plans to mitigate storm water drainage; spoil storage and recontouring plans; engineered erosion control structures including drains, ditch plugs and surface berms; and prompt revegetation and associated enhancement techniques. Express submitted that, in isolated locations, such as some watercourse crossings, gullies or other rough broken features along the route, it may not be feasible to recreate the original contours of the landscape due to inherent instability of native soils at the original contours following pipe installation. Express also submitted that it will install a filter-fabric silt fence at the toe of slopes below the construction zone and above natural waterbodies, when sheet or rill erosion exceeds a specified rate.

With the implementation of the protection measures, Express submitted that project-related effects to soils along the right-of-way should be localized to subregional, neutral to slightly negative, low magnitude impacts. Express also submitted that, although changes to actual soil structure from ditching would be defined as a long-term impact, the productivity of the soil should be restored to near pre-construction conditions by implementing the recommended soil handling and reclamation procedures.

With respect to final clean-up activities, Express indicated that all work that can practically be undertaken in the fall will be completed. In order to stabilize the topsoil to prevent losses due to erosion, the topsoil stockpiles will be sprayed with tackifiers at a rate and concentration that will provide control until the following spring. The condition of the tackified topsoil will be assessed at least twice after spring thaw, and prior to final clean-up. Express indicated that, if necessary, the topsoil piles will be re-tackified to restore full stabilization. In areas where topsoil is not replaced, Express submitted that the right-of-way will be left in a stable and safe condition that will not pose any restriction to agricultural operations.

Land Farming

With respect to the land farming of the drilling fluid and drilled spoil, Express indicated that it has initiated consultation with a landowner, and the details of the site will be submitted to the Board once an agreement has been reached. Express indicated that small quantities of whole fluid will dissipate with little or no tilling. If large quantities of fluid or wet spoil are involved, a significant tilling effort will be applied to ensure that the waste will not form a dry crust and remain in a semi-solid state over an extended period of time. Express submitted that the final condition of the land farming site will be governed by standard construction clean-up and site restoration specifications. Express indicated that it will comply with the Alberta Energy and Utilities Board's ("EUB's") requirements as described in "Guide G-50 - Drilling Waste Management." To ensure restoration, Express stated that the land farming site will be monitored as part of Express's Reclamation Monitoring Program.

Agricultural Operations

With respect to disruptions to agricultural operations, Express indicated that landowners and livestock operators will be given at least two weeks' notice prior to the commencement of construction to enable them to modify their activities and to enable animals to be moved away from construction. It indicated that breaks will be provided in strung and set-up pipe, spoil/topsoil windrows and open ditches to facilitate day-to-day farming operations and animal movements. Where irrigation canals are to be crossed, the canals will either be bored, or crossed with the use of flumes or dam-and-pump systems to maintain clean water flow at all times. Where livestock are present along the right-of-way, Express indicated that it will install temporary fences and gates as required to control animal movements and reduce grazing disruption.

With respect to reclamation activities, Express indicated that it would avoid the use of fences as much as possible. Express testified that fences present other problems, such as fence trampling, and increased trampling and grazing damage along the edge of a fenceline. Express submitted that it is a site-specific call and, in some cases, it may be advantageous to both parties to perhaps defer grazing or change the grazing regime, and compensation might be less costly than fencing to both sides. Express indicated that, at the Ribstone Creek, the Red Deer River and the South Saskatchewan River, temporary fencing or deferred grazing will be used to protect the banks. Express submitted that fencing would be undertaken in consultation with the landowner.

Environmental Inspection

Express submitted that, where its Environmental Inspector identifies a situation requiring major design changes in the field, the Environmental Inspector will advise Express's Chief Inspector of the required changes. Express submitted that such changes will then be discussed with the Board surveillance

officer for the Project, the landowners and other appropriate government agencies prior to implementation. With respect to the circumstances where field changes would be utilized, Express stated that they would, in all probability, pertain to changes in topsoil salvage. Express submitted that, for example, where minimal stripping procedures are not adequately protecting the topsoil resource, the Environmental Inspector will have the authority to request an expanded stripping procedure. Express stated that most of the field changes that require flexibility will be associated with topsoil stripping activities.

In discussing the appropriateness of its request to allow field changes, given that criteria for expanded stripping have already been identified and submitted as part of the application, Express indicated that the decision to make changes to stripping width is based on conditions at the site, such as the flow of construction traffic at any point in time, the weather, soil moisture levels, sod conditions, trench stability, rutting depths, terrain, pulverization potential, backfill difficulties, spoil building factors, and the land use. Express submitted that, by necessity, it requires the flexibility to deal with such conditions by using the various mitigation options available. Express further indicated that virtually all procedures in use today come from a process of field design, and if field design is limited, the ability of Express to mitigate environmental effects is also limited.

In regard to mitigation options already presented to the Board, especially for topsoil stripping procedures, Express indicated that topsoil stripping widths are based on assumptions that follow a logical progression. Express submitted that if those do not accord with actual conditions, changes will be made to protect the environment.

Express indicated that on native grasslands, the overall objective is minimum disturbance, and on agricultural land, the overall objective is maintenance of soil capability and productivity. Express identified a number of specific objectives, such as: to control traffic flow in a way that prevents unacceptable work side disturbance and soil degradation; to stop, reschedule, re-route, or modify activities as appropriate for the weather to prevent unacceptable disturbance and soil degradation; to ensure that sod conditions will allow for the protective assumptions under the given stripping width; to anticipate and field assess the soil conditions that could lead to trench instability, and program the appropriate stripping width; and to monitor rutting depths under the conditions, and implement changes and/or contingencies before unacceptable workside disturbance or soil degradation takes place.

Express stated that it will attempt in its construction planning efforts to anticipate any situations that may require alternative mitigation considerations and incorporate these contingencies in its instructions to the selected construction contractors. Express further stated that the proposal for field changes will enhance the commitments already made to the Board.

3.3.2.4 **Views of the Panel**

The Panel finds that there is adequate environmental information provided by Express with regard to the potential adverse environmental effects on soils, agriculture and ranching, which may result from the construction of the proposed pipeline.

The Panel is generally satisfied with Express's proposed mitigation measures. The Panel acknowledges Express's commitment to minimize disturbance to native prairie through reduced stripping widths where possible. It notes the Applicant's intention to temporarily suspend construction

in native prairie areas under wet soil conditions, due to weather, in lieu of full width or workside stripping.

With respect to Express's plans for land farming of the drilling fluid and drill slurry, the Panel finds that additional measures are required to ensure that the potential adverse environmental effects will be mitigated. The Panel recommends that Express should, at least ten days prior to the commencement of the first disposal of drilling fluid components, file with the Board, for approval, a detailed disposal plan for each of the drilling fluid components. The Panel recommends that this plan should include but not be limited to:

(a) an estimate of the complete composition of the drilling fluid components including the relative volumes/quantities of water, cuttings and other material, and any additives;

(b) the chemical composition of the solid and liquid portions;

(c) sufficient evidence to demonstrate that the soil capability and texture, the current land use, and any other potential environmental issues will not be adversely affected by the disposal of drilling fluid components, on any right-of-way areas or other sites proposed by Express for disposal;

(d) documentation indicating that Express has the agreement of the landowners whose private lands will be used for the disposal;

(e) documentation indicating that Express has an agreement in place with a waste disposal facility to dispose of drilling waste components in the event that land filling is proposed;

(f) detailed procedures to dispose of drilling fluid components, including excess water, if additives are used; and

(g) an acknowledgement that disposal of drilling fluid and drill slurry will occur only on existing cultivated land.

In regard to environmental inspection, the Panel has concerns with Express's proposal to make changes in the field during construction. While the Panel is of the view that Express should not be limited in its ability to mitigate environmental effects that become apparent in the field, the Panel finds that plans should be in place prior to construction to anticipate situations requiring changes. It notes that Express has identified site conditions potentially requiring changes, as well as the objectives for soil conservation for native prairie areas and cultivated land. Therefore, the Panel recommends that Express update its criteria for determining soil handling procedures (Table 3-l) by including in those criteria differing site conditions that may be encountered, while continuing to meet its objectives already set out in the written evidence. The Panel further recommends that Express file these updated criteria for Board approval at least 15 days prior to construction, together with the final construction alignment sheets showing the related soil handling procedures.

With this recommendation to update the soil handling criteria, the Panel is of the view that Express's proposal for field changes in regard to topsoil stripping procedures would then become unnecessary

because procedures could be adjusted automatically according to the pre-approved criteria. With respect to Express's proposal for field changes in regard to matters other than soil handling, the Panel notes that this matter is addressed in Section 3.8 "Environmental Inspection, Monitoring and Follow-up Program".

The Panel has made specific recommendations on the finalization of Express's Draft Reclamation Plan. These recommendations are discussed in the "Vegetation" portion (Section 3.3.3.4) of this report under "Views of the Panel".

With respect to agricultural operations, the Panel is of the view that this Project is not likely to significantly affect the capacity of agriculture, as a renewable resource, or its ability to meet the needs of the present and those of the future.

With the mitigation measures proposed by Express and the incorporation of the above-mentioned recommendations, the Panel is of the view that the Project is not likely to cause significant adverse environmental effects in regard to soils and agriculture, including effects of mixing and soil fertility, compaction and rutting, increased stoniness, and erosion.

3.3.3 Vegetation

3.3.3.1 Identification of Potential Effects and Their Significance

The potential environmental effects associated with vegetation include disturbance/loss of native prairie, loss of rare/endangered plant species and/or significant or unique plant communities, and weed problems.

Disturbance/Loss of Native Prairie

Express stated that approximately 66% of the proposed right-of-way will encounter native vegetation or improved pasture with some residual native species, with the remainder of the line intersecting cultivated land. Based on the percentage of native vegetation and improved pasture with some residual native species and an average disturbance of 25 m, approximately 717 ha of surface disturbance can be anticipated in non-cultivated lands.

Express acknowledged that an informational letter (IL 92-12) to all oil, gas and pipeline operators from the Alberta Energy Resources Conservation Board ("ERCB") stressed the need for "an increased awareness by industry, government, and the public that native prairie grassland is a rapidly disappearing ecosystem, and that the cumulative long-term impact of all development, including oil and natural gas, can be very significant". Express indicated that some loss or alteration of native communities from pipeline construction is unavoidable, but does not feel that the right-of-way will contribute to the long-term incremental loss of prairie.

The ecoregions encountered along the Express Pipeline Project include the Dry Mixed Grassland Ecoregion, the Mixed Grass Ecoregion, and the Aspen Parkland Ecoregion. Express submitted that the proposed route encounters a large tract of native prairie under variable conditions and variable grazing pressures. Express provided general descriptions of the local vegetation communities encountered along the proposed pipeline route within these ecoregions. Express indicated that a more detailed site-specific characterization of the vegetation is not considered necessary for assessment or planning

purposes at this time, as proposed mitigation measures to be implemented to minimize disturbance to native communities (e.g. ditchline stripping, workside traffic controls, etc.) will be consistent throughout such communities.

Express indicated that fescue occurs as a minor component of prairie in the northern section of the Mixed Grassland zone, and in the Aspen Parkland zone and that no fescue-dominated grasslands were encountered along the pipeline route. However, it subsequently indicated that it is not possible to say conclusively that fescue-dominated grasslands do not occur along the pipeline route. In areas where fescue was identifiable during the rare plant survey, it was noted as only a minor component of grassland associations, with <15%, and often <5% of the total cover. Express therefore, did'not consider these areas to be good examples of native fescue grassland. Specifically these were considered as not representative of undisturbed fescue prairie. Express acknowledged that there are successional stages within these grasslands that differ. It further acknowledged that those successional plant communities, within the broad fescue grassland, are important to maintaining the diversity of plants and animals in the entire fescue grassland zone.

Loss of Rare/Endangered/Significant Plants

Express indicated that a large number of rare plant species are known or anticipated to occur in the project area (Table 3-2). These species may be restricted to local areas with particularly suitable growing conditions or may occur sparsely over a large geographical area.

Rare plant surveys completed in conjunction with Axys and J. Williams Consulting, were carried out on 2 to 10 June and 17 to 21 July 1995 with early, and late summer phases to capture the different phenologies expected for each of the three ecoregions encountered by the proposed Express pipeline. Express submitted that a total of 62 sites containing 93 sample plots were surveyed over the 434.5 km length of the proposed route. In excess of 30 plots were sampled during the 2 to 10 June period only. Areas with the highest potential for rare occurrences and high plant diversity (i.e. major river valleys, creek crossings) were re-sampled in the northern part of the route. Express also submitted that several sites sampled in June were severely altered by agricultural activities or grazing shortly after the sampling period, and did not merit re-sampling in July.

Express indicated that the surveyed sites were 20 m by 20 m in size and were representative of the diversity of the vegetation community types found within the 30 m wide pipeline right-of-way. Within the sample plots, intensive coverage of each strata was undertaken to the nearest five percent. Express indicated that, in a relatively homogeneous community, that size of plot provided, all of the species that could occur within that particular community in most situations. Express also indicated that this size plot was designed primarily to identify rare plant species. Express acknowledged that it may be more difficult to provide accurate cover estimates over a large 20 m by 20 m plot than a series of small half metre by one metre plots. However, Express submitted that the focus of the survey was the identification of rare plants, as opposed to a detailed listing of plant cover for each of the species present. Express indicated that the survey was not intended to provide a line list of native prairie conditions. It testified that any changes in grazing patterns could have significantly altered any line list, if it were provided. However, those communities that were thought to be unique in diversity were identified in the rare plant study.

Express indicated that eight disjunct or range extension species were found during the rare plant survey. It indicated that these are probably extensions to former known ranges and are commonly

found throughout parts of southeastern Alberta. Express stated that these species are all known from self-sustaining populations at more than ten other localities elsewhere in Alberta and none are considered rare.

With respect to significant plant communities, Express indicated that areas of particularly high vegetative diversity and productivity in the study area include the South Saskatchewan River valley, Red Deer River valley, Rattlesnake Coulee, and the south arm of Ribstone Creek. The plant survey results indicated that construction along the southern bank of the Red Deer River may heavily impact a small population of Brittle Prickly Pear. Express indicated that, with the directional drill of the Red Deer River, the Brittle Prickly Pear will be avoided. Express submitted that the current proposed crossing would also affect a diverse number of plant species along a steep portion of the Rattlesnake Coulee valley, including streambed, and seasonally flooded plant communities at the valley floor, shrublands on lower slopes, eroded badlands, and prairie vegetation on the upper slopes and plains.

Express indicated that the rare plant survey was carried out in native prairie and shrubland communities. The surveys consisted of detailed systematic observations at selected intervals along the entire pipeline route with emphasis on portions with habitats having a greater potential for the occurrence of rare plant species. Express submitted that the sample plots that were normally considered suitable for the rare plant survey work were those that had not received immediate grazing pressure or heavy grazing pressure at the time that the survey was being done. Express further submitted that the comments, regarding heavily grazed or moderately grazed, were based on incidental observations of surrounding areas as opposed to a range assessment.

As a result of the survey, Express indicated that eight significant plant species were encountered along the Express Pipeline Project corridor and environs. One species, Shadscale *(Atriplex canescens)* is recognized as provincially and nationally rare. Express indicated that the seven other species occupy restricted ranges in Alberta, with less than ten previously known locations. These species include Sandwort *(Arenaria congesta),* Linear-leaved Plantain *(Plantago elongata),* Few-flowered Rush ***(Juncus confusus)***, Eye-bright *(Sisyrhinchium septentrionale),* Clover-fern *(Marsilea vestita),* Brittle Prickly Pear *(Opuntia fragilis),* and Low Townsendia *(Townsendia exscapa).* Express indicated that, generally, species occupying restricted ranges are considered "significant populations" of rare plants, if a self-sustaining population is found, rather than a single occurrence of an individual. Express submitted that all species with restricted ranges found along the proposed route were found as populations, not as isolated individuals, and were located outside as well as within the 30 m pipeline right-of-way.

In regard to rare or endangered plant species, Express submitted that there are many rare species that do not show up every year. Surveys conducted one year could miss certain species that may show up two or three years later. Express also acknowledged that there are some undisturbed land areas that may have been missed during the survey. Express indicated that there may be localized occurrences of rare plants that might be disturbed by trenching activities, but it does not anticipate that the localized effects of a pipeline can possibly affect the population of rare plants. Express also stated that it believes that the ecological concept of a species that is so localized that it could be destroyed by a pipeline right-of-way is not a valid one.

Table 3-2
Potential rare plant species which may occur within the vicinity of the proposed Hardisty to Wild Horse Pipeline

Common Name	Scientific Name	status'	Habitat
American Pellitory	***Parietaria pensylvanica***	U	Gravelly places, disturbances
Annual Skeleton-weed	***Lygodesmia rostrata***	T/R	Dry sandy prairie
Awned Mousetail	***Myosurus aristatus***	L	Prairie mudflats, moist depressions
Awned Nut Grass	***Cyperus squarrosus***	R	Moist soil, sandy alluvium
Biscuit root	***Lomatium cous***	R	Dry open slopes, Cypress Hills Conglomerate
Blue Phlox	***Phlox alyssifolia***	*	Dry gravelly slopes
Bur-ragweed	***Franseria acanthicarpa***	*	Sand-dunes
Bur-ragweed	***Pranseria acanthicarpa***		Sandy prairie
Bushy Cinquefoil	***Potentilla paradoxa***	R	Moist flats and shores
California Oat Grass	***Danthonia californica***	*	Dry to moist open areas
Chaffweed	***Centunculus minimus***	R	Dry slough bottoms and margins
Clammyweed	***Polanisia dodecandra***	*	Gravelly or sandy soil
Creeping Whitlow Grass	***Draba reptans***	*	Dry, sandy or gravelly ground.
Crowfoot Violet	***Viola pedatifida***	*	Dry prairie grassland
Cushion Everlasting	***Antennaria dimorpha***	L	Dry prairie, sandy loam soils
Douglas Hawthorn	***Craetaegnus douglasii***	*	Open woods and rocky slopes
Downingia	***Downingia laeta***	R	Muddy, alkaline shores
Downy Paintbrush	***Castilleja sessilijlora***	R	Dry prairie grassland
Dwarf Fleabane	***Erigeron radicatus***	*	Open slopes
Fairy Candelabra	***Androsace occidentalis***	D/L/R	Dry sands and gravels
False Buffalo Grass	***Munroa squarrosa***	R	Dry plains, slopes, disturbances
Few-flowered Aster	***Aster paucijlorus***	L	Saline shores and depressions
Flowering-quillwort	***Lilaea scilloides***	R	Slough margins and mudflats
Geyer's Wild Onion	***Allium geyeri***	*	Wet meadows and streams
Goosefoot	***Chenopodium subglabrum***	R	Sandy blowouts; river banks
Green Milkweed	***Asclepias viridifilora***	*	Dry hillsides

Common Name	Scientific Name	status'	Habitat
Halimolobus	*Halimolobus virgata*	*	Dry prairies
Lance-leafed Loosestrife	*Lysimachia lanceolata*	L	Edge of ponds in thickets
Little Barley	*Hordeum pusillum*	R	Saline prairie
Little-seed Rice Grass	*Oryzopsis micrantha*	L/R	Dry open areas, rocky slopes
Long-sheathed Waterweed	*Elodea longivaginata*	*	Ponds and lakes
Low Annual Lupine	*Lupinus pusillus*	L	Sand hills, sandy shores, dry eroded slopes
Low Cinquefoil	*Potentilla planttensis*	R	Prairie grassland, dry flats
Low Milk Vetch	*Astragalus lotiflorus*	R	Dry slopes and prairie
Low Yellow Evening Primrose	*Oenothera flava*	R	Slough margins, clay flats
Meadow Aster	*Aster campestris*	*	Dry open areas
Mealy Goosefoot	*Chenopodium incanum*	R	Alkaline soils
Moquins Sea Blite	*Sueda moquinii*	R/L	Moist saline or alkaline areas
Narrow-leaved Lungwort	*Mertensia lanceolata*	*	Prairie slopes
Nebraska Sedge	*Carex nebraskensis*	*	Nebraska Sedge
Nevada Blue Grass	*Poa nevadensis*	?	Moist saline or alkaline areas
Nevada Bulrush	*Scirpus nevadensis*	L	Wet alkaline soil
Nodding Umbrella-plant	*Eriogonum cernum*	L	Badlands, valley slopes; sandy soil sandunes
Pale Bulrush	*Scirpus pallidus*	*	Marshy areas
Pennyroyal	*Hedeoma hispidum*	L	Dry open sites
Porcupine Sedge	*Carex hystricina*	*	Shaded marshes
Powell's Atriplex	*Atriplex powellii*	R	Alkaline flats and badlands
Prairie Cord Grass	*Spartina pectinata*	L	Saline shores and marshes
Prairie False Dandelion	*Nothocalais cuspidata*	U	Early-drying clay flats, moist sands, coulee margins and slopes
Prairie Lupine	*Lupinus lepidus*	*	River flats and gravelly areas
Prairie Rockstar	*Lithophragma glabrum*	*	Dry montane meadows
Prickly Milk Vetch	*Astragalus kentrophyta*	R/L	Sandy prairie, eroded soils
Pursh's Milk Vetch	*Astragalus purshii*	R/L	Dry grassland, eroded slopes, sandy soils
Red Three-awn	*Aristida longiseta*	R	Dry sandy prairie

Common Name	Scientific Name	status'	Habitat
Rush-pink	*Stephanomeria runcinata*	*	Dry hills and plains
Salt-marsh Sand Spurry	*Spergularia marina*	?/(R)	Brackish-Saline muds or sands
Sand Nut Grass	*Cyperus schweinitzii*	R	Dry sandy soil and active dunes
Sand Verbena	*Arbronia micrantha*	T	Loose alluvial sands
Scratch Grass	*Muhlenbergia asperifolia*	L	Moist alkaline soil
Shadscale	*Atriplex canescens*	R	Saline flats
Shrubby Evening Primrose	*Oenthera serrulata*	R/L	Moist depressions
Silver-leaved Psoralea	*Psoralea argophylla*	*	Prairie grassland
Six-weeks Fescue	*Vulpia octoflora*	D/L	Depleted rangeland, sterile ground
Slender Yellow Cress	*Rorippa tenerrima*	R	Moist sand soil
Small Cryptanthe	*Cryptantha minima*	R	Dry eroded slopes
Smooth Boisduvalia	*Boisduvialia glabella*	R	Dry mud flats, especially alkaline clays
Smooth Sweet Cicely	*Osmorhiza longistylis*	*	Moist woods
Tall Beggar-ticks	*Bidens frondosa*	R	Moist shores, ditches
Taraxia	*Oenothera breviflora*	R	Dry sloughs, alkaline shores
Thermal Millet	*Dichanthelium acuminatum*	*	Marsh places
Tickseed	*Thelesperma marginatum*	R	Dry open sites; eroded slopes
Tufted Hymenopappus	*Hymenopappus filifolius*	R/L	Dry, gravelly or sandy sites
Tumble Grass	*Schedonnardus paniculatus*	R	Dry plains
Umbrellawort	*Mirabilis nyctaginea*	R	Dry plains
Upland Evening Primrose	*Oenothera andina*	R	Dry slopes and flats, moist sandy soils
Water Speedwell	*Veronica catenata*	*	Marsh areas, streams, ditches
Waterwort	*Elatine triandra*	?/(R)	Muddy shores, shallow water
Watson's Goosefoot	*Chenopodium watsonii*	R	Open areas
Watson's Knotweed	*Polygonum watsonii*	?/(R)	Moist meadows and flats
Wedgescale	*Atriplex truncata*	R	Strongly alkaline soils
Western Blue Flag	*Iris missouriensis*	*	Marshy ground
Western Hawksbeard	*Crepis occidentalis*	U	Dry eroding slopes; sheltered grassy coulee slopes

Common Name	Scientific Name	status'	Habitat
Western Spiderwort	*Tradescantia occidentalis*	*	Dry grassland
Widgeon-grass	*Ruppia maritima*	L	Saline lakes and ponds
Wooly-heads	*Psilocarphus elatior*	L	Dry slough bottoms
Yellow Monkey-flower	*Mimulus guttatus*	*	Wet meadows
Yellow Paintbrush	*Castilleja cusikii*	*	*Yellow* paintbrush *(sic)*

[1] Status in Alberta (from Wallis et al. 1987):

R = rare
T = threatened
L = locally abundant
D = drop from rare plant list
? = extent unknown (suspected status)
[U - not defined by Express]

*Suggested for inclusion in the "Rare Flora of Alberta" (Alberta Native Plant Council Annual General Meeting, 1992)

Source: Express's Application, Table 17.

Weed Problems

Express indicated that pipeline construction produces a disturbed ground surface on which weeds can become established. Weed seeds can, in turn, be introduced into such areas from equipment carrying plant fragments and mud.

3.3.3.2 Public Comments

AWA/FAN raised a number of concerns in regard to effects on vegetation, especially with disturbance of fescue grasslands and rare plant species. It stated that Northern Fescue Grassland is widely recognized as a distinct natural subregion and is one of the most threatened natural systems in Canada. AWA/FAN indicated that these grasslands have been severely compromised and no surveys have been undertaken to determine if there are any good samples. AWA/FAN submitted that Express has not provided any assurances that it will route around these areas if they are encountered. AWA/FAN further indicated that its concerns would be addressed if there was a condition imposed on any approval that Express would route around areas of northern fescue, with AWA/FAN being involved in identifying those areas.

In its evidence, AWA/FAN indicated that, overall, the rare plant researchers have done a good job within the framework in which they were working. It further stated that expanded surveys must be done along the southern portion of the route, or re-routing, as well as identification and avoidance of additional rare plant communities.

AWA/FAN testified that there are additional rare plants that were not searched for in the plant survey, mainly species on the upland grasslands. It indicated that eight of the species on Express's list potentially occur in those upland grasslands but were not specifically surveyed for; however, they

could be located by a continuous survey along the route rather than the point surveys carried out by Express. With respect to the re-establishment of rare plant populations from the seed bank, AWA/FAN submitted that no evidence or research was provided that supports the view that it would be easy, or even feasible, to re-establish rare species if that population was disturbed. AWA/FAN further submitted that the only research that was provided on regeneration from the seed bank dealt with species that are not considered rare.

AWA/FAN indicated that there is a high potential to negatively impact rare plants by the pipeline traversing extensive areas of provincially and nationally significant grasslands. AWA/FAN submitted that, although rare species may be evident in some years, they can easily be overlooked in dry years. AWA/FAN stated that the precautionary principle should apply, i.e. these minimally fragmented grassland landscapes should be avoided entirely by the Project.

AWA/FAN submitted that the cumulative effects and indirect 'effects (e.g. invasion by non-native species, attraction to the site by grazing animals and ancillary effects on species of concern possibly through trampling) are not considered sufficiently important by the proponent to warrant re-routing around these nationally and provincially significant grasslands. AWA/FAN indicated that they believe that these effects are potentially significant and warrant re-routing of the pipeline to avoid these areas.

AWA/FAN testified that nobody, in evidence provided to this Hearing, or in the literature that it can find, or even the people that it talked to who are in the process of conducting these investigations for Express, has shown that they can restore what was there before. AWA/FAN further testified that, even with the best reclamation technology that is available today, we still do not know how to put the native prairie back "the way it was". AWA/FAN further submitted that, in its opinion, after five years or even 25 or 50 years, there still may not be the mix of species which was present before construction. AWA/FAN further suggest that along some parts of the right-of-way, there will never be that same mix of species. It stated that Express's "leading edge" reclamation is experimental. AWA/FAN emphasized that the area south of Cypress Hills is not an appropriate place to conduct an experiment of this magnitude.

AWA/FAN initially recommended that, if the Project were approved, that it be conditioned to require that native seed be used exclusively in the reclamation of native habitats disturbed by the Project.

3.3.3.3 **Proposed Mitigation Measures**

A Memorandum of Understanding between Express and the AWA, FAN, and the Alberta Fish and Game Association ("AFGA") was filed during the proceeding. The Memorandum stated that, as a result of ongoing discussions and consultations in respect of the Express Pipeline Project, Express and those above-noted agencies have agreed to cooperate and consult in respect of post-construction reclamation and monitoring. To help achieve that end, Express undertook to establish an Advisory Committee based on a number of understandings outlined in the Memorandum. This Memorandum also recognized that the above-noted agencies continue to have unresolved concerns about the protection of biodiversity and reclamation with respect to potential fescue grassland remnants in the extreme northern portion of the pipeline routing and in the area south of Cypress Hills.

Disturbance/Loss of Native Prairie

To minimize damage to native prairie, Express has proposed to implement specific soil handling measures. A description of these measures can be found in Section 3.3.2 "Soils and Agriculture". Express also indicated that it will use a clean-up bucket equipped with prairie protector blades (multi-layered rubber blades) to prevent sod scalping. Express submitted that these blades will be used for both retrieving spoil and topsoil stored on sod. Express indicated that consistent mitigation approaches will be implemented throughout native prairie, regardless of the current condition of the plant community, i.e. pristine *vs* non-pristine.

Express stated that, as part of the development of the final reclamation plan for the Project, an inventory of native communities intersected by the Project will be undertaken by a qualified botanical specialist in the spring to assist in the development of final reclamation specifications. Express submitted that the purpose of this inventory involves both reclamation and avoidance. However, Express indicated that it does not anticipate encountering any significant vegetation communities that would merit avoidance.

Express stated that the timing of the vegetation inventory would likely be late June or mid-July, depending on the phenological development of the region. A qualified botanical specialist would walk the line and record the dominant vegetative features. More intensive searches would take place for rare and endangered plant species, where rare species would be anticipated. Express indicated that, if extra workspace in a particular location is to be used, then the inventory would be expanded to that workspace.

Express indicated that it would use its same methodology, i.e. the 20 m by 20 m plots, at least for the rare plant portion of the inventory. For those areas that may have a high conservation value, it could go to smaller sampling plots. The details would be worked out with the Advisory Committee. Express undertook to provide a more detailed methodology prior to the vegetation inventory being carried out. Express also undertook to provide, guidelines that will be used to decide on the areas with high nature conservation value that are representative of native prairie.

With respect to the northern fescue grasslands, Express indicated that, based on the information gathered to date, there does not appear to be any reason to move the pipeline route given the relatively 'disturbed nature of these sites. With respect to the inventory of native communities to be undertaken in the spring, Express submitted that in the unlikely event that it does encounter a small remnant piece of fescue grassland that appears to be in an undisturbed condition, it will consider making a minor routing variance. Express further indicated that, if a routing variance is not possible because of other land use constraints, it would consider specialized reclamation techniques on a localized scale, including possibly some sod salvage and transplants. In determining remnant fescue grasslands, Express indicated that it will establish criteria with the Advisory Committee as to what constitutes significant remnants. Express stated that it is opposed to those conditions recommended by AWA/FAN in regard to northern fescue grasslands. Express pledged to work, in good faith, with AWA/FAN and all other stakeholders who avail themselves of the opportunity to participate in that committee.

With respect to restoring native prairie, Express indicated that, in time, the vegetation composition on the right-of-way will return and match that of off the right-of-way. With respect to research or studies regarding the re-establishment of native prairie, Express submitted that it primarily reviewed two studies dealing with reclamation within the Great Sand Hills of Saskatchewan. Express submitted that these are the most relevant studies to the Express Pipeline Project. It testified that the two environments and the two vegetation communities are different; however, it also testified that many of the plant species are the same.

Express testified that it expects that initially the species composition for the major grasses will take three to five years to establish with other species and non-vascular species taking perhaps 10 to 20 years or longer. With respect to areas in poor range condition, it testified that pasture which has been overgrazed for years tends to have a higher cover of non-vascular species and it may take longer to reach a state matching the off right-of-way. Express acknowledged that there are a number of species that could be difficult to re-establish on the right-of-way because of specific germination requirements. Express testified that there may be very specific pre-existing conditions on the right-of-way for some species and these species may never re-establish on the right-of-way. However, Express noted that it doubts that it would change the conditions on the right-of-way to the extent that a species would be excluded. Those species with difficulties re-establishing generally include Blue Grama grass, June grass, and Rough fescue. However, Express expected that species that have establishment problems because of seed dormancy will establish on the right-of-way in three to five years.

Express submitted that the effects of drought and grazing would be to reduce the cover on the right-of-way and increase the risk of wind erosion. It further submitted that, with drought conditions, it could expect a delay of several years from the currently anticipated three to five years.

With respect to the visibility of the right-of-way after construction, Express indicated that there is a potential for a slight rise above the ditchline (roach) for about 5 to 10 years. It submitted, however, that techniques have improved for dealing with the roach and it will implement measures to minimize the roach as much as possible.

Loss of Rare/Endangered/Significant Plants

Express's rare plant survey report outlined several recommendations. The first recommendation is that the pipeline route should be shifted either east or west of the Cressday wetlands to avoid sites known to contain Shadscale, and the drainage patterns which may affect these saline flats should also remain unaltered. Express stated that it will undertake a minor routing modification to avoid the Shadscale community.

With respect to the species with restricted ranges, routing modifications would be dependent on further evaluation of their current status by provincial agencies or experts in rare plant conservation. Express retained J. Williams to further investigate the relative abundance of those plant species with restricted ranges, through discussions with other botanical specialists in the province. Depending on the outcome of these discussions, minor route modifications, surface protection measures (e.g. ramping) or even sod salvage and replacement may be implemented to avoid damage to these species. Express

undertook to file the results of the further evaluations of these species at least 30 days prior to construction.

With respect to disjunct or range extension plant species, the report recommended that pipeline relocation is probably not merited for the eight disjunct or range extension species, as these are species found in self-sustaining populations at several other localities in Alberta and, based on a literature review, are not considered rare.

The report also recommended that the significant botanical association at Rattlesnake Coulee should be avoided where possible. The combination of unusual and interesting vegetation, combined with high species diversity and high wildlife habitat capability merits consideration for shifting the crossing away from its existing alignment to a distance of 50 m or more to the west. However, Express indicated that, upon further evaluation, it appears that the community in question is on the west side of the pipeline right-of-way. Express submitted that it may be potentially affected by any extra workspace, but Express believes that it can avoid the community by narrowing the amount of extra workspace in that particular site. Express indicated that the site would be fenced and marked off to ensure that additional damage would not occur.

In regard to the use of re-routes as an avoidance measure, Express provided details on the information that it would provide. This is outlined in Section 3.3.1. “Routing and Alternative Means”.

In regard to encountering rare plant species/communities along the pipeline route that may have been missed during the surveys, Express submitted that it will not be losing the seed bank that is supporting rare species when removing the topsoil because it would be replaced. Express also submitted that there is no reason to assume that some of the seed will not become viable and re-establish those rare plants in those locations. Express provided certain references to support its view that rare plants can be re-established from the seed bank. It acknowledged that there are many unknowns about the effectiveness of this technique. Express indicated that the maintenance of the seed bank, as a result of topsoil stripping and replacement, would represent restoration. However, Express further indicated that, if a rare plant community was encountered during construction and could not be avoided through route deviations, it would look at other measures such as sod salvage and transplants.

Express indicated that it will ensure that previously unidentified plants and habitat for wildlife, with a designated status, will be identified by retaining Environmental Inspectors who are well qualified in environmental matters and would be will trained to identify special plants, animals and areas of environmental importance.

Weed Problems

To reduce the potential for weed transfer into this area, Express indicated that all tracked equipment and wheeled vehicles (as required) working on the Project will be washed of mud and vegetative debris prior to moving onto the right-of-way. Where existing noxious weed infestations are encountered on the right-of-way, Express submitted that additional cleaning of equipment will be completed to prevent the further spreading of these weeds. Express also submitted that all seed used for revegetation purposes will be Certified Canada No. 1 seed, and Certificates of Analysis for all

grass and legume seed mixes used by Express will be available for viewing by government representatives and landowners.

Express indicated that the best approach to prevent weed problems is to establish a reclaimed right-of-way with desirable species as quickly as possible.

To address weed problems that may occur, Express will retain a vegetation management contractor to evaluate and implement weed control as required in native prairie areas. It will ensure that the contractor retains a trained grassland/revegetation ecologist to provide advice on appropriate actions.

General Reclamation

As a result of the consultative process with a select group of reclamation specialists and other appropriate government, industry and private individuals, Express developed a Draft Reclamation Plan on the basis of input from the various stakeholders. Express has provided a copy of the Draft Reclamation Plan to the Board and indicated. that it will be finalized in the spring of 1996 based on comments received from interested stakeholders. The Draft Reclamation Plan addresses each of the ecoregions encountered.

With respect to seed mixes, the Draft Reclamation Plan provided updated seed mixes for native prairie areas. However, Express indicated that the seed mixes are still subject to minor adjustments as Express is currently in the process of determining how much clean seed of each suggested species is available. Also, Express indicated that the vegetation inventory will help to refine the seed mixes and that the Advisory Committee will be involved in this process. Express indicated that native seed will be obtained locally to the extent possible. The draft plan identifies the following seed mixes: mixes for solonetzic soils and sandy soils within the Dry Mixed Grass Eco-Region;. the Dry Mixed and Mixed Grass Eco-Regions Wetland Mix; the Mixed Grass Eco-Region Mix; the Aspen Parklands/Mixed Grass Wetlands Mix; and the Aspen Parkland Mix.

With respect to seed sources, Express indicated that ecological varieties are just now being developed within the province and their availability is extremely limited. Express submitted that it may use some wild harvested needle-and-thread grass seed, but the other species will be of a cultivated variety. However, Express indicated that it will be using only native grass species in its mix. Specific seeding methods, based on site-specific conditions, are included in the draft plan.

With respect to the timing of reclamation, Express indicated that, if ground conditions are not heavily frozen, it will not make a difference whether reclamation is carried out in the fall or spring season. While there may be some overwintering loss of seed, this can be overcome by using a slightly heavier seed rate in the fall versus spring.

3.3.3.4 **Views of the Panel**

The Panel finds that adequate information has been provided by Express with regard to the potential adverse environmental effects on vegetation, which may result from the construction and operation of the proposed pipeline. The Panel makes this finding, recognizing that Express intends to carry out a more comprehensive vegetation inventory in the spring. The Panel notes that Express did provide

general descriptions of the local vegetation communities encountered along the proposed pipeline route, and the vegetation inventory is to further assist in finalizing the reclamation plan. Express also committed to survey for fescue areas and conduct additional rare plant surveys as part of the inventory.

With respect to that inventory, the Panel notes that Express intends to use the same methodology as with the rare plant survey that has already been undertaken. The Panel notes that it is not clear that this methodology is the most appropriate to provide a site-specific characterization of the vegetation. However, the Panel is satisfied that Express has undertaken to provide a detailed methodology to the Board prior to carrying out the inventory.

The Panel is generally satisfied with Express's proposed mitigation measures with the exception of Express's proposal in regard to the restoration of rare plants from the seed bank. The Panel agrees that the proposed soil handling procedures should ensure the integrity of the seed bank in native prairie areas. However, the Panel finds that there is insufficient evidence on the record to evaluate the effectiveness of this technique on its own.

The Panel finds that additional measures are warranted with respect to some of the mitigation procedures proposed by Express and therefore makes the following recommendations.

Although Express has undertaken a rare plant survey and is committed to conducting additional surveys in the spring, the Panel recommends that Express ensure, to the greatest extent possible, that it does not destroy any previously unidentified rare plants or significant plant communities during construction.

As to identifying previously unidentified plants or significant plant communities during construction, the Panel is of the view that only an individual with a botany background and previous experience would be qualified to carry out this work. Express should therefore retain a specialist with these qualifications. This specialist should be in addition to the Environmental Inspectors.

The Panel notes, with respect to the significant botanical community at Rattlesnake Coulee, that Express stated that the plant community may be potentially affected by any extra workspace, but Express believes that it can avoid the community by narrowing the amount of extra workspace at that particular site. The Panel recommends that Express be required to avoid this plant community. Therefore, Express should be required to file further details confirming that it can avoid the area by narrowing the extra workspace or file the necessary information in regard to a re-route.

In the same context, but more generally, the Panel recommends that, if any previously unidentified significant plant communities or plants with a designated status are discovered during construction, Express should, in consultation with the appropriate regulatory agencies, avoid, relocate, or restore those areas. In regard to the Panel's concern with Express's proposal to restore rare plants by only relying on regeneration from the seed bank, the Panel recommends that Express should rely additionally on the other methods provided, such as avoidance, or restoration techniques such as sod salvage and transplants, when plants with a designated status are encountered.

The Panel recommends that the inventory methodology should clearly differentiate between the two methods, one for determining general vegetation characterizations needed for the revegetation program and significant plant communities (including fescue grasslands), and the other one for determining additional rare plant species. The Panel further notes that Express committed to file this methodology prior to undertaking the inventory.

The Panel recognizes that Express has provided general measures that it intends to implement if additional significant vegetation communities or rare plants are identified as result of the vegetation survey. The Panel recommends that the information filed in regard to the vegetation inventory should include details of additional significant vegetation communities and rare plants, including Express's specific measures to address those communities/species.

With respect to the northern fescue grasslands, the Panel acknowledges that Express is including this area in the vegetation inventory. It also acknowledges that Express proposes to establish criteria in conjunction with the Advisory Committee to determine significant remnants of fescue grasslands. The Panel recommends that the criteria to determine such remnants be submitted to the Board for approval with the results of the vegetation survey and that Express provide to the Board its measures to minimize effects on any significant areas of fescue grassland anticipated to be encountered.

The Panel is concerned with the potential for noxious and invasive weeds, specifically in the Sage Creek Grazing area. Express is committed to wash all tracked equipment and wheeled vehicles to prevent the spread of weeds into native prairie communities. The Panel recommends that Express ensure that: pressure hoses are used for such cleaning to remove plant material; the equipment is cleaned each time before entering the Sage Creek Grazing area; and equipment is cleaned only in an area of previously disturbed land.

In regard to the Draft Reclamation Plan, the Panel acknowledges that Express will use only native grass species in its mixes. Express is committed to providing its final Reclamation Plan to the Board prior to construction.

The Panel recognizes that the Draft Reclamation Plan will be finalized based on the comments received from the interested stakeholders and the results of the vegetation inventory. The Panel notes that the recommendations associated with the vegetation inventory are noted above and that any measures proposed to be implemented as a result of the inventory will require approval of the Board. With respect to additional comments to be received by Express, the Panel finds that it is appropriate to obtain comments from those parties that have provided input into the Draft Reclamation Plan. Moreover, the Panel recommends that Express incorporate/address specific issues into the final Reclamation Plan. Therefore, the Panel recommends that Express should, at least 30 days prior to the commencement of construction, file with the Board for approval, the final Reclamation Plan. This plan should include and/or address the following. factors:

(a) the considerations and special measures associated with a spring clean-up, including those measures adduced during the proceedings;

(b) specific references, such as appropriate regulatory authority, reclamation officer, special areas officer, should be clearly identified (i.e. provincial or federal authority);

(c) with respect to mitigation options, the reclamation plan should incorporate the criteria adduced during the proceeding, and where criteria have not been presented, Express should provide its criteria for determining its range of mitigation options; and

(d) the final seed mixes, including a description of any changes to the seed mixes from those proposed and the reason for those changes.

The Panel further recommends that any comments received from the stakeholders involved in the review of the Draft Reclamation Plan should be attached as an appendix to the final Reclamation Plan, including whether the comments were incorporated into the Plan and, if not, the reasons why they were not included.

With respect to recovery of species composition on the right-of-way, with the implementation of the mitigation measures proposed by Express, the Reclamation Plan, the monitoring program (identified in Section 3.8 "Environmental Inspection, Monitoring and Follow-up Program"), and the Panel's recommendations, the Panel is satisfied that, in time, the right-of-way would be reclaimed to an acceptable composition of native species, similar to the off right-of-way composition.

With Express's mitigation measures and the incorporation of the above-mentioned recommendations, the Panel is of the view that the Project is not likely to cause significant adverse environmental effects in regard to vegetation, including effects of disturbance/loss of native prairie, loss of rare/endangered plant species and/or significant or unique plant communities, and weed problems.

3.3.4 Hydrology

3.3.4.1 Identification of Potential Effects and Their Significance

The potential environmental concerns associated with hydrology include effects on surface water and groundwater. The potential effects on aquatic environments and fisheries resources are discussed in Section 3.3.5 "Fisheries".

The potential concerns generally relate to 'the blockage of natural subsurface and surface drainage patterns where fill, corduroy or other materials are introduced into the wetland to support right-of-way travel. Express indicated that pipeline-related changes to surface drainage can result from blockage of surface flows by elevated backfill roach, and interception and channelling of surface flows by sections of ditchline. With respect to surface drainage, Express indicated that in some surficial materials, the backfilled ditch represents less consolidated soil conditions than those for surrounding undisturbed land, providing surface and subsurface water with a path of least resistance, leading to flows down the ditchline in some situations.

In terms of standing waterbodies or permanent waterbodies, Express indicated that it will not encounter any waterbodies, other than the narrow arm of Rush Lake which has been previously drained by the landowner. Express submitted that there are some historic basins that have been dry

for years or decades, and therefore, Express does not anticipate crossing any standing waterbodies. The exception would be the road allowance that will be developed to provide access into the terminal site at Hardisty and to one of the connector pipelines. This road will encounter a portion of a cattail marsh resulting in some loss of that cattail community and some open water.

In regard to possible blockage of groundwater drainage, Express indicated that there are several areas with potentially high water table levels encountered along the proposed route. In addition, several areas have been identified as potentially requiring blasting, although Express stated that there is a strong possibility that such rock can be ripped. With respect to these areas, Express submitted that there are no residences or water wells within 800 m of the areas.

3.3.4.2 **Public Comments**

AWA/FAN indicated that many ephemeral wetlands in the southern portion of the Project support a variety of rare plant species that would be negatively impacted by the initial construction or by a pipeline failure. AWA/FAN initially recommended that, if the Project were approved, that it be conditioned to require that, with the exception of stream crossings, the alignment avoid all wetlands, whether temporary or permanent.

3.3.4.3 **Proposed Mitigation Measures**

Express stated that, in general, standing waterbodies would be avoided during the final routing. Express submitted that the route has already-been updated to avoid Rush Lake and Milk River Lake.

In regard to high groundwater areas, specifically wet depressional areas, Express submitted that, where required, vehicle traffic will be routed around such areas on shoo-flies and ditching/pipe transport equipment will access the ditchline on portable swamp mats.

With respect to pipeline related changes to surface drainage, Express indicated that it will implement standard construction practices to reduce the potential for such drainage problems. With regard to surface blockages, Express stated that the late summer-fall construction schedule will greatly reduce the potential height of the roach, as backfill material can be more effectively returned to the ditch and compacted under thawed conditions, relative to frozen conditions. Cross right-of-way water movement will be further enhanced by creating shallow drainage channels across the ditchline in particularly wet areas with the potential for seasonal sheet water or surface flows.

Express indicated that, to prevent flows of surface and subsurface water on the ditch line, impermeable ditch plugs will be installed at strategic locations within the ditch to block flows and return the water to the surface. The locations of these plugs will largely be selected at the time of construction in consultation with the Environmental Inspector, when water tables and subtle drainage patterns can be more readily identified within the open trench. Express stated that these ditch plugs are typically installed at the crest of slopes, but can also be installed throughout high water table areas where there is the potential of altering flow patterns.

If there is any visible sign of natural drainage channels crossing the right-of-way, Express testified the roach would be levelled at that location to accommodate the natural flow patterns of water. Express

further testified that it would monitor these areas and, if there were any signs of a salinity spread as a result of water impoundment and it acting as a recharge area, it would rectify that situation.

In regard to the mainline valves, Express stated that, in determining the locations of the access roads, it would avoid any wetlands.

3.3.4.4 **Views of the Panel**

The Panel is satisfied with the adequacy of the information provided by Express with regard to the potential adverse environmental effects associated with hydrology, which may result from the construction and operation of the proposed pipeline.

With respect to AWA/FAN's recommendation, the Panel notes that Express is already committed to avoiding standing waterbodies. For temporary wetlands, the Panel notes that AWA/FAN's concerns appear to relate to rare plants associated with these wetlands. Express's commitments and the Panel's recommendation, in regard to rare plants, are outlined in Section 3.3.3 "Vegetation".

The Panel is satisfied with the measures Express plans to implement for those environmental effects associated with hydrology and makes no recommendations for any additional or supplementary mitigation measures. The Panel acknowledges Express's commitment to monitor for areas of water impoundment.

With the mitigation measures proposed by Express, the Panel is of the view that the Project is not likely to cause significant adverse environmental effects in regard to hydrology, including effects on surface water and groundwater.

3.3.5 Fisheries

3.3.5.1 Identification of Potential Effects and Their Significance

The potential environmental effects on fisheries associated with pipeline construction and hydrostatic testing, include increased sedimentation (including siltation of spawning beds), flow disruption, and direct fish mortality. There are also additional effects associated with the physical loss of important aquatic habitat components from instream trenching activities and the potential disruption of angling activities. Pipeline construction, including hydrostatic testing, also has potential effects on downstream water users and these have been included in this fisheries section.

Express indicated that, in addition to the Red Deer and South Saskatchewan rivers, the proposed pipeline route crosses Ribstone, Sounding, Blood Indian, Seven Persons, Peigan, Manyberries, and Sage creeks, and additionally 121 intermittent unnamed creeks.

Expressed submitted that several spring spawners, including Sturgeon, Walleye, Sauger, Pike, Goldeye, and a variety of suckers are present in the Red Deer and South Saskatchewan rivers, and there is the potential that they reside within the project area on a year-round basis. With respect to the Lake Sturgeon, Express submitted that Lake Sturgeon have been recorded in the Red Deer and South Saskatchewan rivers of Alberta, and deep holes in the South Saskatchewan River several kilometres

upstream of the crossing are known to support summering fish. Express testified that it was referring to the Rattlesnake Hole, which is one of the more important oversummering and overwintering sturgeon holes that has been identified in the South Saskatchewan system. Express testified that it did not include the Rattlesnake Hole in its survey because it is about 1.7 km upstream of the proposed pipeline, and Express did not anticipate that the pipeline would likely have an effect on habitat **1.7** km upstream.

Express indicated that no rare or endangered fish species are known to occur in the project area. Lake Sturgeon and Mountain Sucker were examined in 1986 and 1991 by the Committee on the Status of Endangered Wildlife in Canada ("COSEWIC") as potential candidate species for special status, but were not designated to any risk category. Express acknowledged that the Lake Sturgeon is listed as a threatened species by the 1990 International Union for the Conservation of Nature and Natural Resources ("IUCN") Red List of Threatened Animals and as threatened by the American Fishery Society; however, the Lake Sturgeon has not been listed as such in Canada. In addition, the Lake Sturgeon is a harvested sports species in Alberta, with certain management restrictions established by the Government of Alberta.

Survey Results

Express retained Pisces Environmental Consulting Services Ltd. to conduct fisheries resource evaluations at the potential water crossings on the proposed Express Pipeline route. These evaluations were carried out in July, August and September of 1995 and the results are contained in a report titled "Assessment of Fisheries Resources at Water Crossings on the Proposed Express Pipeline".

During cross-examination, Express admitted that it did not mention certain species in its application or fisheries report, including Lake Chub, Western Silvery Minnow, Brassy Minnow, Pearl Dace, Spottail Shiner, Northern Red-Belly Dace, Stone Cat, Mountain Whitefish, Rainbow Trout, Shorthead Sculpin, and Iowa Darter. With respect to the Lake Sturgeon, Express indicated that it did not specifically discuss the regional abundance or the economic or human importance of the species. Express indicated that, even though it did not provide a review of information on the relative abundance, its sampling program was designed to provide information more of a site-specific nature on the relative abundance of fish species at the crossings at the time that the pipe would be installed. Although some sampling was carried out, Express stated that, rather than considering individual fish species, it looked at stream productive capacity as the environmental feature potentially vulnerable to project-related impacts.

Express's fisheries report indicated that of the 116 probable water crossings examined on the proposed Express Pipeline, only Ribstone Creek (2 crossings), Red Deer River, South Saskatchewan River and Seven Persons Creek, supported fish. Express stated that a late summer/early fall construction period will avoid critical life-cycle phases of the fish species frequenting these waterbodies at and adjacent to the crossing sites.

Increased Sedimentation

Increased sedimentation can result in fish loss or habitat degradation. Express submitted that long-term sedimentation problems can also occur after pipeline construction where right-of-way preparation has removed stabilizing vegetative structures. With respect to the South Saskatchewan River crossing, because fluming and by-pass techniques are not possible due to the high flow volume, Express submitted that both elevated total suspended sediment levels and sediment deposition will occur downstream of the crossing.

Express stated that most of the fish species found or expected at the proposed crossings, where fish are present, are tolerant of elevated suspended sediment concentrations and some species utilize high turbidity as cover. Express further stated that brief increases in suspended sediment loads during pipeline construction should not have any direct negative effects on fish.

With respect to the South Saskatchewan River crossing, Express indicated that material being carried in suspension will temporarily alter the water quality in the form of increased turbidity and suspended solids concentrations. Express testified that it does not expect any kind of contaminant accumulations in typically a run habitat, as there is a major slow flowing hole upstream. Express acknowledged that it has no information as to whether there are any residual toxic sediments at that particular location which would be disturbed but does not expect them to occur, given the power and the amount of materials moved by the 1995 flood.

Express stated that valley walls and river banks are subject to erosion under natural conditions. Express further stated that it is expected that pipeline river crossing construction will encourage initiation of erosion, at least in the short-term. Express indicated that the contour of the south valley wall of the South Saskatchewan River is variable with undulating steep slopes caused by several severe hogsbacks, gullies and rock exposures. Express submitted that considerable grading will be required along the south slope right-of-way to provide access from the prairie level to the south river shoreline.

Express indicated that the potential adverse effects of watercourse crossings on downstream users are increased sediment deposition and increased turbidity levels downstream. Express submitted that this could impact the efficiency of water pump filters. For the rivers, sediment transport and deposition modelling completed for the Project indicate that sediment deposition in the South Saskatchewan River will extend for a maximum of 760 m downstream of the crossing.

Flow Disruption

Express indicated that pipe installation activities at most crossings will encounter a dry channel, or intermittent standing water, and will not noticeably affect downstream flows. Express submitted that, at the river crossings, any instream activities which may occur in the event of an open cut crossing would not influence downstream flow rates.

Express indicated that the potential adverse effects of hydrostatic testing on downstream users is that water levels could temporarily decrease during testing activities. However, Express submitted that,

given the anticipated flow rates in the Red Deer and South Saskatchewan rivers, it does not expect a noticeable decrease in water levels as a result of water withdrawal for hydrostatic testing.

Direct Fish Mortality

Direct fish mortality from pipeline activities generally results from instream blasting, where shock waves result in physiological damage to fish. However, Express testified that preliminary evidence suggests that it will not be blasting, but Express acknowledged the low probability that some blasting could be required.

Express submitted that it may not be possible to exclude all fish from the blast zone in a river the size of the South Saskatchewan, should blasting be required. Express indicated that, based on DFO's guidelines for the use of explosives in waters frequented by fish, the potential lethal shock wave zone would extend 15 m upstream and downstream of the blast. Express submitted that fish within this area would likely suffer lethal effects. Express further submitted that, should blasting be required, fish mortalities represent the only potential environmental effect from such an operation. Express stated that extensive experience on other projects (e.g. TransCanada PipeLines' Nipigon River crossing, August 1992) has shown that where blasting is required, it results in very limited fish mortality and can be considered to be an insignificant, short-term impact to the overall population.

With respect to the sturgeon, Express testified that the probability of sturgeon moving through the area at the time of construction is extremely low. If there was a fish within 30 m or so of the blast zone, it might suffer mortality. Express testified that, during the months of July, August and September, there is relatively little movement of the fish. Express further testified that the habitat at the crossing site is such that it is unlikely to be utilized by sturgeon.

Loss of Aquatic Habitat Components

Express submitted that, based on an initial assessment of flow characteristics in the project area creeks, the great majority of these creeks offer relatively poor habitat capability for fish 'for much of the year because of low flows, and do not warrant the installation of special habitat enhancement structures (e.g. instream cover, overhanging bank structure) to restore fisheries values after construction.

Disruption of Angling Activity

Express indicated that both the Red Deer and South Saskatchewan rivers and their fishable tributaries are considered to be important locally and regionally as sports tributaries. Express further indicated that the proposed construction season will undoubtedly overlap with the fishing season in the area, and project-related traffic loads, instream activities and other construction activities may influence local fishing patterns on the rivers. Express believed that the low magnitude nature of project-related impacts on fish will not have a noticeable medium or long-term effect on local fishing. It further indicated that limited short-term disruption of such activities could occur locally during the actual construction period, which is scheduled to require a total of approximately 56 working days for the South Saskatchewan River.

3.3.5.2 **Public Comments**

DFO indicated that it met with Express on 8 December 1995 to discuss fish and fish habitat issues. Express provided DFO with the updated information on fisheries, including the construction methods for the two river crossings. This updated information was also filed with the Board in early January 1996. DFO stated that Express is committed to making an application to DFO concerning all proposed crossings with the potential to harmfully affect fish and fish habitat. Based on the updated fisheries information as noted above, DFO concluded, for the purposes of providing the Board with advice pursuant to the CEAA, that the Project is not likely to cause significant adverse effects on fish and fish habitat after taking into account the mitigation measures. DFO submitted that it will specify these measures once they have completed their review. DFO cautioned that this advice is provided to satisfy the requirements of section 12(3) of the CEAA and should not be taken to imply approval of the undertaking in accordance with the habitat protection provisions of the ***Fisheries Act*** or any other federal or provincial legislation.

RMEC presented evidence dealing with the filing requirements for fish specified by the Board's Guidelines. RMEC stated that the existence of many species in the study areas was adequately recognized, but the topics of regional abundance, human importance and management/protected areas were completely ignored. RMEC submitted that crucial technical matters such as migratory patterns, critical habitats, short- and long-term adverse effects, cumulative effects, mitigation and significance were discussed only for a few species, and most of these discussions failed to deal to any extent with the topic. RMEC further submitted that conservation status for all species was dealt with by consulting the most recent COSEWIC list, but no attempt was made to verify this status with international listings or to look at the status of the particular stocks affected by the proposed pipeline.

RMEC indicated that the South Saskatchewan River holds rare assemblages of fishes and many of the species are confined to large rivers and are found nowhere else in the region. RMEC submitted that it presently supports a significant sports fishery for Walleye, Sauger, and Lake Sturgeon. With respect to migration routes, RMEC indicated that, at a minimum, Goldeye, Mooneye and Lake Sturgeon will be attempting to move past one or both of these sites during the construction period.

RMEC's concern with the South Saskatchewan River is with the proposed trenching and backfilling activities, and the amount of silt produced. RMEC is concerned that there are fish moving back and forth in the river, particularly the fall spawning species. RMEC submitted that there is a spawning area in the immediate vicinity of the pipeline, specifically within one kilometre. RMEC stated that the effect of instream construction on sturgeon is unknown because there is a lack of information due to a lack of complete sampling on the species' use of the crossing site.

RMEC submitted that these concerns could be addressed if a directional drill of the South Saskatchewan River is used. RMEC requested that horizontal directional drilling ("HDD") be a required condition for the crossing of the South Saskatchewan River.

RMEC argued that the life histories and the critical habitat types required, and locations used by most fish species in the river, are very poorly known. RMEC indicated that it is impossible to judge with any degree of reliability what the consequences of instream construction would be on the sturgeon.

RMEC argued that the Applicant has not done sufficient studies to determine whether or not there would be a no net loss or whether there would be any effect, or even what species might be affected.

3.3.5.3 **Proposed Mitigation Measures**

Express has proposed specific crossing methods for the various watercourses. Express indicated that all of the creeks crossed by the route have flows which can be easily isolated from construction activities with flume or dam-and-pump systems.

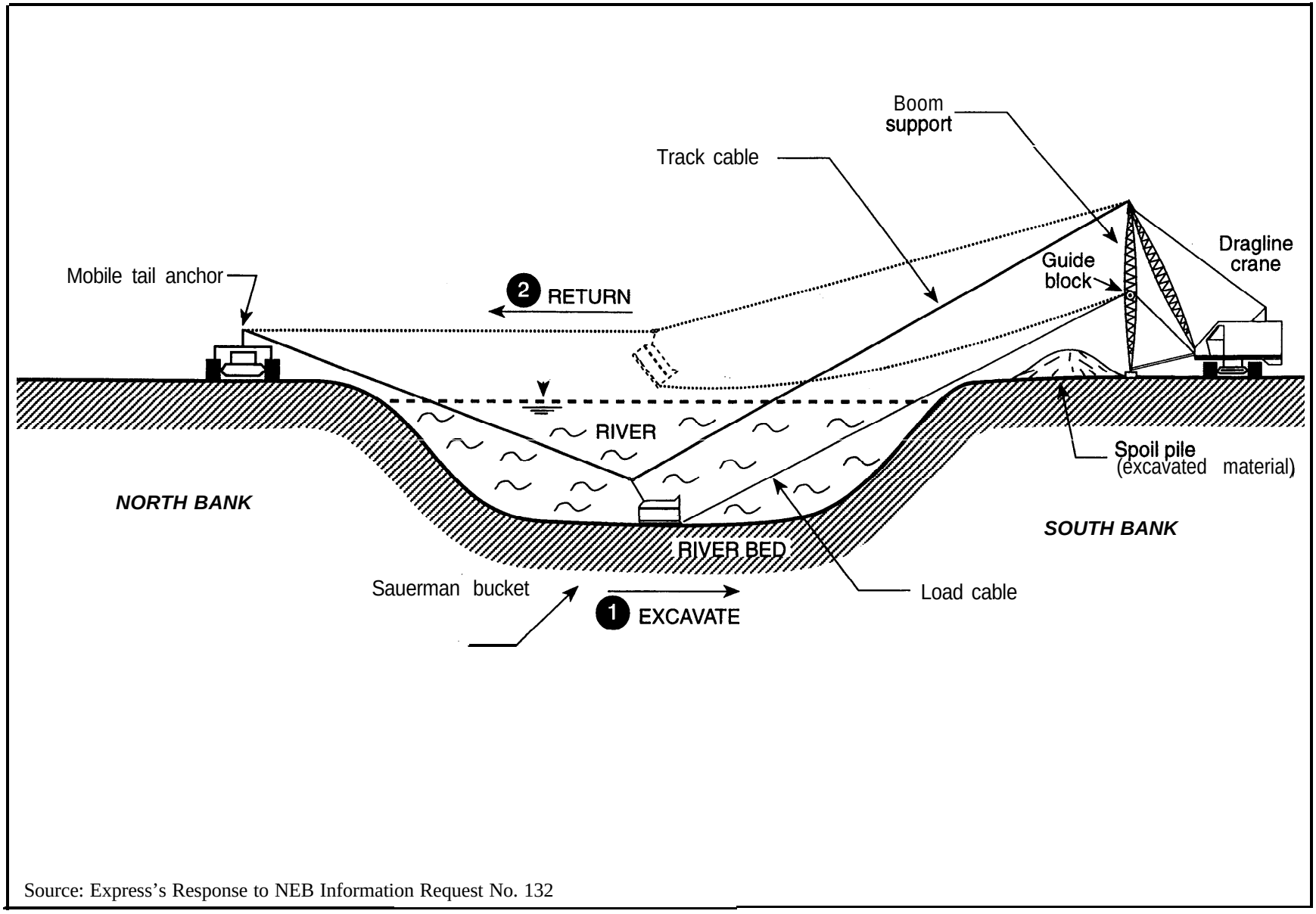
Express indicated that both the open cut and HDD methods of construction are technically feasible construction alternatives for the Red Deer River and the South Saskatchewan River crossings. With respect to the South Saskatchewan River, Express indicated that the preferred method for crossing is the open cut method. Express submitted that the presence of adverse subsurface conditions in the form of coarse granular material overlying bedrock, places the crossing at the limits of today's state of the art in directional drilling. Express further indicated that satisfactory terms and scope of work that consider the associated risk in the construction of the crossing could not be established; manageable tenders could not be obtained for this crossing. Express concluded that a directional drill of the South Saskatchewan River would not be advisable.

The open cut method for the South Saskatchewan River would involve the use of a land-based Sauerman excavator to perform the excavation and backfilling of the pipeline trench across the river (see Figure 3-l). Express submitted that, during construction, the excavated in-stream trench material, comprised primarily of silt, sand and coarse gravel, will be brought ashore by the Sauerman excavator for temporary stockpiling in designated containment areas. Following successful installation of the pipeline across the river, the stockpiled excavated material will be re-used for backfilling over and around the pipeline in the marine trench. Express has provided details of this crossing method.

With respect to the Red Deer River, Express indicated that the preferred method for crossing the river is the HDD method (see Figure 3-2). The use of the HDD technique eliminates potential excavation difficulties, allows the natural banks of the river to remain intact, and preserves the vegetation that leads to the river on the north edge. Express indicated that the subsurface soils in the directional drill path are expected to consist primarily of clays and sands containing some gravel. Express stated that experience with drilled pipeline crossings over the last 15 years indicates that these subsurface conditions are suitable for a horizontally drilled installation of the length and diameter envisioned for the proposed Red Deer River crossing. Express has provided details of the HDD method.

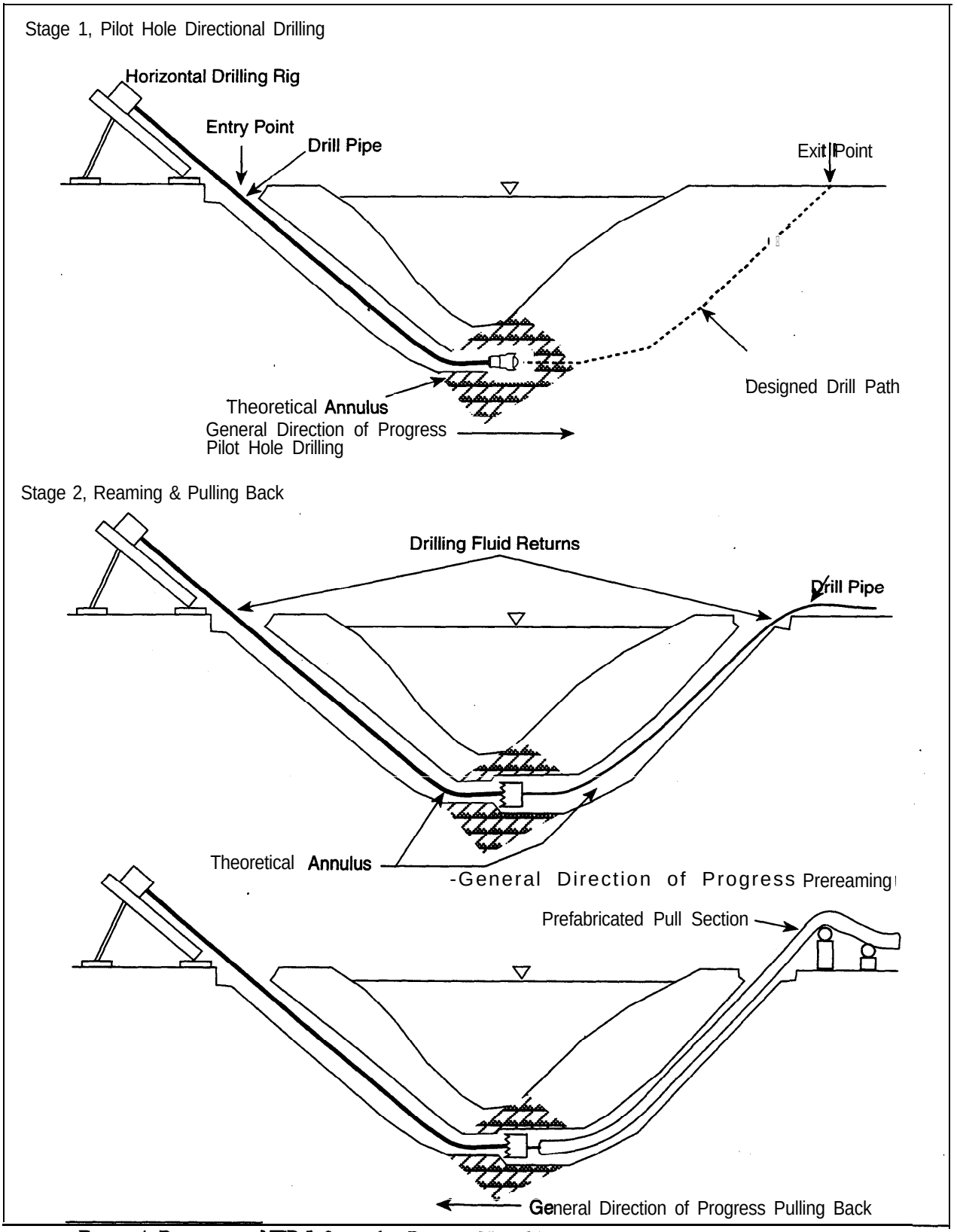
During the cross-examination by RMEC on the various fish species and their coverage or lack of coverage by Express, Express testified that this is a federally-regulated project and the implications of this project on fisheries will fall under the mandate of the DFO. Express indicated that DFO has produced two documents pertaining to its overall management approach towards fisheries which are the Policy For Management of Fish Habitat, and Habitat Conservation and Protection Guidelines. Express testified that the overall objective is fish habitat conservation and that is where DFO's "no net loss of habitat or productive capacity" comes into play. Express further testified that these documents do not refer to species-specific strategies but the concept is to maintain the biological, chemical and

Figure 3-1
Typical Sauerman Excavation



Source: Express's Response to NEB Information Request No. 132

Figure 3-2
Horizontal Directional Drilling Process



Source: Express's Response to NEB Information Request No. 132

physical characteristics of stream crossings or to improve conditions within those stream crossings to enhance habitat.

The fisheries report stated that a late summer/early fall construction period will avoid critical life-cycle phases of the fish species frequenting the four water bodies (identified as supporting fish) at and adjacent to the crossing sites. With respect to its updated construction schedule, Express indicated that crossing operations at the two rivers would have to be mobilized early in the construction period to ensure completion before the onset of important fall migratory (e.g. Goldeye) or spawning (Lake Whitefish) activities. Express specified that no instream construction is to take place in the river prior to the 15 August or after 28 September, due to fish spawning in the vicinity of the crossing. Express indicated that Alberta Fish and Wildlife stipulated the instream construction window.

Increased Sedimentation

Express stated that it will implement either the flume or dam-and-pump systems at all watercourses which have demonstrated fisheries potential and which are supporting flows at the time of the crossing. Express further stated that these systems will be installed to comply with specifications provided in the Watercourse Crossing Guidelines for the Pipeline Industry, Canadian Association of Petroleum Producers ("CAPP") 1993. In addition, Express submitted that these same streams will be equipped with a bridge span to support right-of-way traffic, if an easy route around using existing road bridges is not available.

To further reduce the potential for sedimentation, Express submitted that all grading at crossings will be directed away from the watercourse and the.trench spoil taken from the channels of the watercourse will be stored outside the channel, beyond the high water mark of the watercourse. Express indicated that sumps or bermed areas will be constructed on extra workspace to contain the saturated spoil excavated from the stream channel, wherever there is the potential for saturated spoil material to re-enter the stream channel. If ditch dewatering from the isolated stream channel is required during crossing operations, Express indicated that this water will also be held in sumps or released onto stable vegetated areas to prevent its reintroduction back into the stream.

With respect to long-term sedimentation problems, Express submitted that, during clean-up, banks will be restored to stable contours with local material and will be revegetated as soon as possible following construction. Express indicated that, with spring clean-up, the disturbed right-of-way on the approach slopes to the fish bearing streams could become a significant source of sediment introductions for the streams, resulting in reduced water quality and habitat capability. Express submitted that such slopes would have to be adequately equipped with interim erosion and run-off control measures to protect aquatic habitats from spring rain events and associated run-off.

Express submitted that the South Saskatchewan River crossing would be completed with the open cut method. Express's assessment of the potential for sediment transport at the South Saskatchewan River crossing indicated that 38% of the material released into suspension by the instream construction activities will settle within 90 m of the instream excavation. Express indicated that the material which settles within this primary deposition zone will consist mainly of sand. The material which is transported beyond the primary settling zone is expected to consist primarily of silt and clay sized

particles. Express indicated that significant deposits of this material are not expected at any one location beyond approximately 90 m, except perhaps in natural deposition areas such as lakes, ponds or along the near shore where the flow is diminished. Express submitted that the material transported beyond the primary deposition zone will consist mainly of fines and will be visually evident as turbidity.

Express indicated that it will install silt fences or catchment basins, where appropriate, on the approach slopes and adjacent flood plain areas of the rivers during construction to prevent sediment-laden run-off from the slopes from entering the rivers during rain events. With respect to the trench material excavated from the South Saskatchewan River, Express indicated that the trench spoil will be brought ashore during excavation with the Sauerman for temporary stockpiling. The trench spoil material will be relocated to the temporary spoil areas by dozer and/or backhoe. These spoil stockpiles will be situated behind containment berms and silt fencing.

Express stated that bridge spans will not likely be installed on these rivers, as all vehicles and equipment (except during pipeline installation) can be routed over the rivers on existing road bridges.

Express indicated that, where large quantities of grade material are to be removed from steeper slopes during right-of-way preparation, a slope restoration plan will be developed by a project geotechnical engineer in conjunction with the project contractor, ensuring that the slopes are not "loaded" with unstable spoil material during slope recontouring and final clean-up. With respect to valley walls and river banks, Express submitted that near pre-construction conditions will be re-established once the disturbed right-of-way is revegetated and the river banks stabilized. Express indicated that detailed design of the river crossings, and those of smaller water courses, will include measures to mitigate erosion concerns. Express submitted that, most importantly, trench breakers/surface diversion berms will be installed at the valley wall crest and at other significant breaks in slope, with additional berms constructed within the intervening slope segments, both measures intended to control surface runoff and direct it off the right-of-way. Express submitted that groundwater seepage can also encourage erosion, and will be controlled using breakers/berms or subdrains.

Express indicated that it will develop detailed sediment control plans for open-cut crossings, and that these plans will be forwarded to DFO prior to construction for comment. Express submitted that it would provide a copy of the detailed sediment control plan to the Board prior to the commencement of construction. Express further submitted that it would be possible to provide this information only five days prior to construction.

Express stated that water quality monitoring will be conducted during instream activities at the South Saskatchewan River to evaluate the severity and extent of sediment deposition downstream from the crossing site. It further stated that final sampling design will be developed in conjunction with DFO and provincial authorities.

With respect to the use of the HDD method at the Red Deer River crossing, Express indicated that the potential exists for an inadvertent drilling fluid release instream. The drilling fluid will be comprised of bentonite and water. Generally, bentonite is a plastic, colloidal clay, largely made up of the mineral sodium montmorillonite, a hydrated aluminum silicate. Express further submitted that the drilling

fluids contain environmentally benign materials and would not be an environmental hazard. The drilling properties of bentonite may be enhanced by the addition of polymers. However, Express will restrict the contractor to using polymers when absolutely necessary and only those which are environmentally benign.

Express indicated that past experience in similar soil conditions indicates that inadvertent returns are not likely to occur on the Red Deer River crossing. However, if inadvertent returns of drilling fluids occur, they will be contained with hand-placed barriers (i.e. hay bales, sand bags, silt fences, etc.) and collected using pumps to the extent practical. If the amount of returns is not great enough to allow practical collection, Express indicated that the affected area will be diluted with freshwater and the fluid will be allowed to dry and dissipate naturally. If the amount of returns exceeds that which can be contained with hand-placed barriers, Express indicated that small collection sumps (less than 6 m^3) may be used. Express further indicated that, if the amount of returns exceeds that which can be contained and collected using small sumps, drilling operations. will be suspended until surface return volumes can be brought under control.

Express submitted that hydrostatic test water is typically sampled prior to taking water at the water source to provide a baseline for water quality data; at the beginning (within first 15 minutes), in the middle, and at the end of the discharge. Express indicated that it anticipates sampling the discharged water for parameters including: oil and grease; phenols; pH; total suspended solids; dissolved oxygen content; and metals.

Express stated that it will not discharge hydrostatic test water directly into a natural waterbody. The test water will be directed at energy diffusers situated on polyethylene sheets or filter blankets on the shoreline of the waterbody. Express submitted that this technique eliminates the scour potential of the water, and aerates the water prior to its entry into the waterbody. Express committed to the use of an acceptable settling and filtering device to allow for the removal of suspended contaminants (i.e. rust, scale and silt) where a waterbody is to be used as a discharge site. Express indicated that, alternatively, the water will be discharged into stable, well vegetated upland sites approved by landowners and resource agencies.

Flow Disruption

With respect to those watercourses with a dry channel or intermittent standing water at the time of construction, Express submitted that these crossings will be installed by standard open cut techniques, without the use of flumes or darn-and-pump systems. Express submitted that these crossings will be equipped with a culvert capped with local subsoil material to serve as a vehicle crossing structure to maintain cross right-of-way flows in the event of a storm.

As already stated above, all watercourses, which have demonstrated fisheries potential and which are supporting flows at the time of the crossing will be equipped with a flume or dam-and-pump system to maintain clean downstream flows. Express stated that it will maintain flows during crossing activities in any stream with fisheries potential either at or downstream of the crossing, regardless of flow rate at the time of construction.

With respect to the South Saskatchewan River crossing, Express stated that downstream flow rates will not be influenced by construction activities as ditch spoil excavated from the river channel will be stored largely outside the active channel using the Sauerman excavator as noted above. However, in the event that floating dredging equipment is utilized, Express indicated that it will provide sufficient breaks in the spoil piles to prevent any blockage of the water channel. Express indicated that floating dredging equipment may have to be employed if the river bed material should prove to be extremely dense and/or the underlying bedrock occurs within the depths of trench excavation thereby limiting the digging ability of the Sauerman excavator.

Express anticipates that the hydrostatic test water will be withdrawn from the Red Deer and South Saskatchewan rivers only. Express indicated that the final withdrawal and discharge points will be identified during development of the hydrostatic test plans and in consultation with applicable authorities and Express' s contractor(s).

Direct Fish Mortality

Based on the results of the geophysical survey, Express has assumed that the excavation of the trench, within the river, will be carried out in diggable material with no drilling and blasting of hard till or bedrock required. If the bedrock is found to be harder than initially evaluated, and not rippable, Express submitted that the option to blast the affected bedrock area has been assessed with respect to DFO requirements, and all regulations regarding the blasting will be followed.

With respect to any necessary blasting at the South Saskatchewan River, Express indicated that a blasting plan would be developed which follows DFO guidelines for instream blasting. Express submitted that the mitigation measures envisaged: reduced charge size, bubble curtains, and scare tactics, are those suggested by DFO, are used extensively in the pipeline industry and, based on industry experience, appear to be effective, although no known quantitative monitoring of their effectiveness has been undertaken.

Loss of Aquatic Habitat Components

With respect to reclaiming banks, Express indicated that, in general, abrupt, vegetated banks will be reconstructed using a vegetated geogrid structure. Express submitted that the structure not only restores a near vertical configuration to the bank, but also incorporates brush layering for overhanging vegetative cover. Express further submitted that all banks disturbed by ditching or grading activities will be restored as described for abrupt banks.

In its Draft Reclamation Plan, Express provided specific methods for revegetating the native riparian cover along the banks of Ribstone Creek. In addition to the general reclamation methods indicated above, Express submitted that the midslope position will be planted to Saskatoon and Thorny Buffaloberry using locally harvested cuttings propagated in plug form, and will be covered with a wood fibre mulch. As well, on the north facing approach slope of the upstream crossing and both banks of the downstream crossing, locally harvested willow will be used and cottonwood livestakes installed. Express indicated that all seeding will be done with native seed mixes.

With respect to the Seven Persons Creek, Express indicated in the Draft Reclamation Plan that the upland portions of the banks will be restored using locally propagated rooted cuttings of Wolf Willow and Thorny Buffaloberry and seeded to the appropriate native seed mix sufficient to control erosion and stabilize the banks.

Express stated, in its Draft Reclamation Plan, that the flood plain area of the Red Deer River will be stabilized using locally available woody plant material and seeded to the appropriate native seed mix to prevent siltation from entering the stream. Surface soils containing plant material will be salvaged and stockpiled separately on the south approach slope. Express indicated that the disturbed surface will be carefully tracked, perpendicular to the slope to control erosion and to provide microsites for native plant invasion. Drainage down the trench will be controlled through the use of ditch plugs and the rest of the right-of-way will be allowed to naturally erode consistent with the surrounding area. Express further indicated that it may be necessary to install jute netting, or other geotextiles, to cover and protect these sites.

With respect to the South Saskatchewan River, the fisheries report recommends that, if important habitats such as riffles or rapids that might be disturbed by pipeline construction are revealed as water levels recede, which may be the case along the south bank, a plan for their restoration should be prepared. In the Draft Reclamation Plan, Express indicated, with respect to the need for instream restoration of the riffle and rapid habitat along the south bank of the river, that this will be coordinated as the actual river crossing design and implementation takes place. At the South Saskatchewan River crossing, Express indicated that, following completion of trench backfilling, placement of coarse stone or rip-rap material along the river banks between the right-of-way limits has been recommended for bank stability and erosion control.

Express indicated that the flood plain will be restored using the sandbar willows and cottonwoods which line the banks. The sandy fluvial material will be retained using coir erosion control fabric, brush layers of sandbar willow and cottonwood livestakes. Express indicated that the remaining portion of the flood plain will be seeded to the appropriate native seed mix.

Disruption of Angling Activity

To minimize disruption to local anglers, Express indicated that, during construction, adequate signage warning the public of construction traffic or other potentially dangerous activities (e.g. blasting) on or adjacent to public lands will be visibly posted along the appropriate roads. Express further submitted that it will post notices of the proposed Project in local Fish and Wildlife offices prior to construction, identifying the location and time of construction activities and potential hazards to anglers.

General

Express indicated that downstream users would be advised of the general schedule prior to the start of the construction period. It stated that notification of instream activity would occur not less than 72 hours prior to construction. Express submitted that it will advise downstream water users of the potential for increased turbidity, and provide advance notice of instream construction activities to avoid peak periods of turbidity or reconfigure their intake, as appropriate. Express also submitted that, if

necessary, it will examine the feasibility of arranging for alternate water sources during instream construction activities.

With respect to the South Saskatchewan River, Express argued that, based on the location and timing of the crossing, and on the results of its surveys and subsequent analysis, no net loss in productive capacity is anticipated. Express, therefore, concluded that there will be no significant effects.

With respect to the RMEC's review of the biological functions of various fish species, Express submitted RMEC did not adduce evidence that there is likely to be a significant effect on fish. Express submitted that the evidence demonstrated that the methods it proposes will result in no net loss of productive habitat, and that there are unlikely to be any significant environmental effects.

Express testified that it contacted DFO on 5 February 1996 in regard to the Express Pipeline Project. Express testified that DFO submitted that the timing of its comments would be 30 days after the Board renders its conclusions, provided that all of the necessary information is at hand and there are no unforeseen circumstances.

3.3.5.4 **Views of the Panel**

The Panel finds that adequate information has been provided by Express with regard to the potential adverse environmental effects on fisheries, which may result from the construction of the proposed pipeline. The Panel also finds that Express's approach of consulting the COSEWIC list for species status was reasonable.

The Panel acknowledges Express's commitment to adhere to the construction timing restriction related to fisheries concerns, and notes that this commitment is an important aspect of the Panel's consideration. The Panel is satisfied with Express's proposed mitigation measures in regard to fisheries issues; however, the Panel has the following additional recommendations with respect to some of the mitigation measures proposed.

The Panel is concerned with Express's proposal to file the sediment control plan for the South Saskatchewan River only five days prior to construction. The Panel notes that this timing does not allow sufficient time for the Board's review of this information. Therefore, the Panel recommends that Express file the sediment control plan for the South Saskatchewan River along with comments from DFO on the plan, at least 10 working days prior to the commencement of construction, for Board approval.

The Panel notes that, if blasting is found to be necessary at the South Saskatchewan River crossing, a blasting plan will be developed which follows DFO guidelines. The Panel acknowledges that Express has described the general mitigation techniques that would be used. However, the Panel recommends that, if blasting is required, Express should file with the Board for approval, at least 15 working days prior to construction: the blasting plan; comments from DFO on the plan; and DFO permits as required.

In regard to the slope restoration plans, the Panel recommends, for the South Saskatchewan River, that Express file for Board approval, at least 30 days prior to the commencement of construction, the

details for channel restoration, including any habitat features, and a slope grading and restoration plan for the banks and valley walls; and comments from DFO on the above-noted plans and measures.

With respect to RMEC's request that the South Saskatchewan River be directionally drilled, the Panel accepts Express's rationale for proposing an open-cut crossing technique. With the implementation of the mitigation measures proposed by Express, the Reclamation Plan, the monitoring program (identified in Section 3.8 "Environmental Inspection, Monitoring, and Follow-up Program"), and the Panel's recommendations, the Panel is satisfied that the potential adverse environmental effects of the open-cut technique at the South Saskatchewan River crossing would be insignificant.

With respect to the Red Deer River crossing, the Panel recommends that Express file, for Board approval, at least 30 days prior to the commencement of construction, a slope grading and restoration plan for the valley walls (upslope of the directional drill area).

In regard to the proposed directional drill of the Red Deer River, the Panel recommends that Express file, prior to the commencement of any directional drill construction activities, a detailed drilling fluid plan addressing the methods of drilling fluid containment and storage, and specific methods for recycling the drilling fluids.

The Panel also recommends that Express notify the Board within 12 hours of an inadvertent mud return occurring within the instream portion of the Red Deer River, and advise the Board of the efforts that have or will be taken to seal the leaking area and any mitigation measures to address environmental concerns.

With respect to angling activities, the Panel is of the view that this Project is not likely to significantly affect the capacity of the sport fishery, a renewable resource, or its ability to meet the needs of the present and those of the future.

With the mitigation measures proposed by Express and incorporation of the above-mentioned recommendations, the Panel is of the view that the Project is not likely to cause significant adverse environmental effects in regard to fisheries, including effects of increased sedimentation, flow disruption, and direct fish mortality.

3.3.6 Wildlife

3.3.6.1 Identification of Potential Effects and Their Significance

The potential impacts on wildlife from the development of the proposed facilities may result from one or a combination of the following factors: sensory disturbance and habitat alienation; habitat loss, alteration and fragmentation; blockage of daily or seasonal movements; and project-related wildlife mortalities. In addition, there is a potential for disruption of hunting activities. As stated in Section 3.2 "Construction Schedule", this section considers those potential effects associated with a late summer-fall construction period and a spring-summer final clean-up/reclamation period.

Express stated that a broad diversity of mammals, avifauna, reptiles and amphibians have been identified as potential seasonal or year-round residents within the 1.6 km corridor. It submitted that,

for the purposes of impact assessment, emphasis has been placed on those species or species groups of particular concern to government regulators, resource managers, and scientists because of their special status, sensitivity to land-use changes, and/or high recreational value (see Table 3-3). These include those species with a provincial or federal designated status. Express provided a description of estimated impact severity and estimated residual impacts after mitigation for most of those species. For the Upland Sandpiper, Brewer's Sparrow, Western Hognosed Snake, and Western Small-footed Bat, Express indicated that there was insufficient information to attempt prediction of potential impacts. However, Express did describe the ecological requirements and critical habitat needs of these species and did provide survey information on these species with the exception of the Small-footed Bat. The rankings used by Express include direction (negative, neutral, or positive), scope (localized - within the pipeline right-of-way, sub-regional - 1.6 km corridor centred on the right-of-way, and regional - beyond the 1.6 km corridor), magnitude (low - <1% of the resource within the ecodistrict is affected, moderate - 1% to 10% and high - >10%), and duration (short-term - <1 year, medium-term - 1 to 10 years, and long-term - >10 years).

Express conducted surveys that focussed on the identification of those reproductive habitats considered to be of significance to a regional population of a special status species (e.g. Burrowing Owl colony). The survey corridor widths identified by Express were based on known species' sensitivities to development and discussions with regulatory biologists and generally included 500 m on each side of the right-of-way depending on the species being surveyed.

Survey Methodology and Results

Thirty-two species of special management concern were identified during literature review and pre-planning for field surveys.

Field surveys. **for** wildlife resources along the proposed pipeline right-of-way and surrounding area were conducted by ground-based counts during two periods, mid-May and late June 1995, by Axys. With the exception of aquatic habitats, Express stated that only non-cultivated land was surveyed, as cultivated land offers limited habitat potential for most wildlife. The width of the wildlife survey corridor extended to a maximum of 500 m on both sides of the proposed right-of-way, depending on the species. The surveyed width was based on setback guidelines for pipeline construction activity that have been developed to safeguard wildlife resources from habitat loss, disturbance and direct mortality. Express submitted that guidelines were established based on consultations with provincial and federal regulatory agencies.

Express indicated that the design of the wildlife surveys did not specifically allow for identifying several species of concern, namely three small mammals (two voles species and the Western Small-footed Bat). Express indicated that it judged that these species would not be noticeably impacted by the localized activities of pipeline construction activities, and that survey efforts were not warranted. However, Express described the ecological requirements for these species, and indicated that the effects of this Project, on the voles, are likely to be local, of low magnitude, and short-term in duration. It indicated that, for the Western Small-footed Bat, the reproductive rate is low with one young born each year and also that hibemacula for this bat in the southern area of the province, have not been identified to date. In addition, important habitats for the bat in the project area probably

Table 3-3

[1]Wildlife species of management concern in the Aspen Parkland and grassland ecoprovinces of southeastern Alberta that occur along the proposed Express Pipeline route

Wildlife Group/ Species	National Status' (COSEWIC)	Provincial status[2]
Mammals		
1. Pronghom Antelope	NIAC	Yellow
2. Bobcat	NIAC	Blue
3. Swift Fox	Extirpated	Red
4. White-tailed Jackrabbit	NIAC	Yellow
5. Nuttall's Cottontail	NIAC	Yellow
6. Sage Brush Vole	NIAC	Blue
7. Prairie Vole	NIAC	Blue
8. Western Small-footed Bat	NIAC	Blue
Birds		
1. Ferruginous Hawk	Vulnerable (1995)	Red
2. Cooper's Hawk	Vulnerable (1983)	Blue
3. Burrowing Owl	Endangered (1995)	Red
4. Prairie Falcon	NIAC	Blue
5. Peregrine Falcon	Endangered (1978)	Red
6. Sage Grouse	NIAC	Yellow
7. Sharp-tailed Grouse	NIAC	Yellow
8. Long-billed Curlew	Vulnerable (1992)	Red
9. Piping Plover	Endangered (1985)	Red
10. Mountain Plover	Endangered (1987)	Red
11. Upland Sandpiper _	NIAC	Red
12. Baird's Sparrow	Threatened (1989)	Red
13. Brewer's Sparrow	NIAC	Blue
14. Loggerhead Shrike	Threatened (1986)	Red
15. Sage Thrasher	Endangered (1992)	Undetermined
Herptiles		
1. Great Plains Toad	NIAC	Red
2. Plains Spadefoot Toad	NIAC	Blue
3. Northern Leopard Frog	NIAC	Red
4. Eastern Short-homed Lizard	Vulnerable (1992)	Red
5. Prairie Rattlesnake	NIAC	Blue
6. Western Hognosed Snake	NIAC	Red
7. Wandering Garter Snake	NIAC	Yellow
8. Bull Snake	NIAC	Yellow
9. Plains Garter Snake	NIAC	Yellow

[1] NIAC = Not in any COSEWIC category. COSEWIC definitions: **Threatened** - indigenous fauna that is likely to become endangered in Canada if the factors affecting its vulnerability do not become reversed. **Endangered** - indigenous fauna whose existence in Canada is threatened with immediate extinction throughout all or a significant portion of its range, owing to the action of man. **Vulnerable** - indigenous fauna that is particularly at risk because of low or declining numbers, occurrence at the fringe of its **range or** in restricted areas, or for some other reason, but is not a threatened species.

[2] **Red List** - species that have or will be considered endangered species; **Blue** - species at risk, but **threats are** less immediate; **Yellow List** - sensitive species, but not at risk.

Source: Report - Wildlife Surveys for the Proposed Express Pipeline Project, Table 3- 1.

occur in the river valleys and riparian habitats where trees may provide day roosts, and in the prairie coulee formations where rock outcrops and crevices may provide roosts.

Express stated that the timing of the field surveys for 1995 were not optimum for detecting Swift Fox and the two grouse species, Sharp-tailed and Sage Grouse, and that a further wildlife survey is scheduled for early 1996. It submitted that it did not undertake any nocturnal call counts for Swift Fox during its surveys, as the best time would be in March.

Express provided a description of the general distributions of wildlife within the pipeline right-of-way and surrounding areas, as well as site-specific critical resources. Express testified that although it dealt with a number of individual species in its description of the resources along the route, its approach to impact assessment and mitigation was a habitat-based approach. It identified those localized habitat features vulnerable to impacts from a linear development and conducted surveys to locate such features with the intent to implement routing and scheduling modifications to avoid conflicts with such features.

With respect to the survey results, Express indicated that potential conflicts with construction of the proposed Express Pipeline and wildlife resources of special management concern have been identified for nesting locations of the Loggerhead Shrike (one nest site approximately 230 m east of the proposed right-of-way) and the Burrowing Owl (four nesting sites for a total of six nests, ranging in distance from 60 m to 335 m from the proposed right-of-way). It was recommended by Express that minor pipeline routing modifications be undertaken for protection of the Loggerhead Shrike breeding site and the six active Burrowing Owl nests, or scheduling of construction activities to avoid breeding and rearing periods be undertaken as a strategy for minimizing or eliminating impacts.

Of the fifteen bird species of management concern identified as potentially occurring in the project area, the Piping Plover, Mountain Plover and Sage Thrasher were not observed in the proposed pipeline corridor (500 m corridor centred on the proposed right-of-way). Express submitted that, based on field surveys conducted at two time periods (late spring and early summer), it is unlikely that these species occur in the 500 m pipeline corridor. Express subsequently testified that Mountain Plovers are not going to occur in extensive numbers, considering the habitat that Mountain Plovers utilize and that the species is widely dispersed in its habitat needs.

Express stated that no specific or limited habitat resources were identified for Pronghom Antelope, Mule and White-tailed Deer, Nuttall's Cottontail, White-tailed Jackrabbit, Upland Sandpiper, Long-billed Curlew, Baird's Sparrow, and Brewer's Sparrow. With respect to Swift Fox, Express indicated that no observations were recorded in the proposed pipeline corridor; however, additional surveys will be undertaken in the spring. Express stated that a single active Ferruginous Hawk nest was identified in the pipeline corridor. Since this nest is at the limit of the recommended setback from construction activity (i.e. 500 m), a route modification is not considered necessary. Express indicated that no conflicts between the Cooper's Hawk, and the Prairie and Peregrine Falcon and the proposed pipeline right-of-way have been identified. With respect to the Sharp-tailed Grouse, Express indicated that two lekking areas were located about 300 m from the pipeline right-of-way. No information regarding possible locations of Sage Grouse lekking areas were obtained within the project area. Express committed to undertake an additional field study during the spring.

With respect to the herptiles, Express indicated that no conflicts with pipeline construction have been identified with Prairie Rattlesnake, the Wandering and Plains Garter Snake, the Bull Snake, and the

Leopard Frog. Express stated that the several hibemacula for Prairie Rattlesnakes found were not within the proposed 30 m right-of-way. No Western Hognosed Snakes were recorded during field surveys of the proposed right-of-way and Express submitted that there are no known locations for hibemacula for this snake.

In regard to waterfowl, the survey results conclude that the proposed pipeline corridor has numerous, relatively small, shallow, permanent and semi-permanent wetlands, and numerous farmland dugouts. Express indicated that no large wetlands or wetland complexes occur in the proposed pipeline corridor. Twenty wetlands within 300 m of the proposed alignment were observed with duck broods, but no individual wetland was observed with more than two broods. Express submitted that, based on low waterfowl capability in the pipeline corridor, no specific pipeline modifications have been identified, with the exception of those already identified at Rush and Milk River lakes.

Sensory Disturbance and Habitat Alienation

Express indicated that the seasonal wildlife residents will be starting their migration south during the construction period. This will therefore reduce the number of conflicts. Some of the local ungulate species rut in September, particularly Pronghom Antelope. Express submitted that since the herds are still very mobile and are not restricted to a particular range, the localized effects of a pipeline would not impact the rutting activities.

Express indicated that species which reside in the project area will experience an intense period of sensory disturbance during spring and summer, and will likely demonstrate some displacement away from the right-of-way. Express stated that, due to the localized nature of pipeline activities and the relatively homogeneous habitat conditions within the project area, most wildlife which are displaced from centres of activity will have the ability to temporarily relocate away from the right-of-way without being forced into sub-optimal habitat conditions. This potential for displacement would generally be associated with final clean-up and revegetation activities. Express indicated that it is unlikely that ground nesters would be using the disturbed right-of-way as nesting habitat; however, sensory disturbance from clean-up activities could result in nest and habitat abandonment immediately adjacent to the right-of-way.

With respect to final clean-up/reclamation activities, Express indicated that, if the winter snow pack is minimal and ground conditions are dry in early spring, clean-up activities would commence in early April and be completed in a period of approximately three to four weeks. Express further indicated that wet ground conditions would likely delay clean-up operations until June.

With respect to the Mountain Plover, Express indicated that the species is widely dispersed in its habitat needs and will be foraging over a variety of different grassland situations. Express further indicated that, if the species is not nesting, it is not dependent on a particularly localized habitat. It also indicated that the preferred habitat is heavily grazed or burnt-over grasslands.

Habitat Loss, Alteration and Fragmentation

Express stated that pipeline development will result in the loss of tree and shrub habitat in the northern portion of the Aspen Parkland Region and only in coulees throughout the remainder of the line. Based on estimates from airphoto interpretation, Express submitted that in total approximately 71 ha these habitats will be cleared.

With respect to grassland vegetation, Express indicated that right-of-way development will represent an alteration of the botanical composition of native habitat conditions (after reclamation) rather than a loss of grassland habitat. Such an alteration should not have a negative effect on most resident wildlife. During the time that it takes to successfully reclaim the right-of-way, Express submitted that even with less than complete coverage of vegetation, wildlife would not be excluded from use of that area. Express submitted that there would be some limited use or lowered use of the actual right-of-way for the recovery period and that there will be environmental effects on plants and wildlife during the period of recovery (three to five years) of the right-of-way.

Express stated that a greater concern is the potential for right-of-way preparation or ditching operations to encounter and destroy a localized habitat feature of significance to a regional population of special status species.

With respect to the Sage Thrasher, Express indicated that this species requires habitat comprised of sagebrush greater than 50 centimetres in height. Express stated that the incremental contribution of this pipeline to sagebrush loss is extremely small and would be on a medium to long-term basis. Express also noted that sagebrush tends to develop on more coarse soils such as those unconsolidated soils that may develop over the trenchline.

With respect to the Sage Brush Vole, Express indicated that pipeline construction will not result in any fragmentation of that species habitat. Express stated that the short-term physical effects would be during the two to three month construction phase when Sage Brush Voles may not be able to actually cross the right-of-way. Express testified that its project would not, in the long term, reduce the capability of the prairie to support this species.

Wildlife Mortalities

Express indicated that wildlife mortalities are most likely to occur from road kills by project vehicles. Express submitted that while such collisions are rare along the actual right-of-way, they can occur more frequently on local secondary roads travelled at higher speeds by project personnel. Express stated that such wildlife deaths will represent negative, long-term, regional impacts of low magnitude to most populations if special status species are involved.

Express indicated that there is a moderately high potential for rattlesnakes to be encountered in large numbers by project personnel in the vicinity of the Red Deer and South Saskatchewan rivers, particularly during the late summer when snake movements to hibemacula are occurring. Express stated that such encounters often result in the death of the snake, as many people have a strong aversion and dislike for these reptiles. With respect to the Western Hognosed Snake, Express indicated that there are no known locations for hibemacula for this snake species in Alberta; however, important habitat areas would include the grasslands near Wild Horse.

Disruption of Hunting Activities

Express noted that hunting seasons within the Express Pipeline Project area are open during the fall for big game, waterfowl, and upland game birds, generally beginning in September and October. Express, believed that the low magnitude nature of project-related impacts on wildlife will not have a noticeable medium or long-term effect on hunting and non-consumptive uses of these resources. It further

indicated that limited short-term disruption of such activities could occur locally during the actual construction period.

3.3.6.2 **Public Comments**

Pursuant to subsection 12(3) of the CEAA, Environment Canada provided advice concerning the environmental effects of the Project. In a letter dated 15 September 1995, Environment Canada recommended specific distances from the right-of-way for the surveys of various species including the Swift Fox, Burrowing Owl, Ferruginous Hawk, Mountain Plover, Loggerhead Shrike, Cooper's Hawk, Long-billed Curlew and migratory birds. With respect to Swift Fox, Environment Canada recommended that the pipeline right-of-way be placed 500 m from any active dens, or construction be delayed until 15 July or later. With respect to the Burrowing Owl, it was recommended that construction disturbance not occur within 500 m of any active nest or that construction be delayed until 15 August. Environment Canada recommended that pipeline related disturbances not occur within 500 m of any Ferruginous Hawk nests until 15 June and 100 m after 15 June.

With respect to the Mountain Plover, Loggerhead Shrike, Cooper's Hawk and Long-billed Curlew, Environment Canada recommended that construction not take place within 250 m of any active nests or that construction be delayed until 15 July. To minimize disturbance to breeding and migrating waterfowl and shorebirds, it recommended that pipeline construction should not occur within 200 m of the wetted perimeter of any water bodies containing migratory birds, or that construction be delayed until 15 July.

In a further letter from Environment Canada, dated 30 November 1995, Environment Canada stated its belief that Swift Fox are in the immediate area of the proposed pipeline and recommended that surveys be conducted by experts that have experience working with this species. Environment Canada suggested that Express contact them regarding such surveys.

In addition, Environment Canada indicated that its mandate for the protection of migratory birds includes those birds that nest in the upland habitats as well as those that nest in the wetlands. Environment Canada indicated that potential impacts on migratory birds in upland and wetland habitats can be most effectively addressed if construction does not occur between 15 April and 15 July in areas where migratory birds may be nesting. With respect to the Long-billed Curlew, Environment Canada indicated that, because this species is listed as threatened (COSEWIC), a more thorough survey for nesting sites by experienced personnel needs to be conducted.

With respect to the COSEWIC system of dealing with endangered species, AWA/FAN submitted that it is not satisfied that this system is an appropriate measure of the status of these species. Express should have started at the level of information that identifies where the important ecosystems are and then one would avoid those that are the most significant. RMEC also expressed concerns with the use of the COSEWIC list indicating that COSEWIC does not have the necessary rigor to be used as a single indicator of a species status.

AWA/FAN indicated that there is a lack of information on many key species. AWA/FAN stated that Express did not specifically survey for species such as the Baird's Sparrow or small passerines or cryptic nesters such as the Mountain Plover, even though it knew that these species were nationally significant. AWA/FAN further submitted that the surveys should have included ground squirrel/cricetid (mouse and vole) centres of abundance, since these are critical foraging or nesting

habitats for at least four species of the listed rare and endangered species. AWA/FAN submitted that bat surveys, including ultrasonic detection and diurnal searches for roosts, would also be advisable.

AWA/FAN expressed concerns with the timing of the surveys and submitted that, without a proper survey, Express's conclusions cannot be relied upon. AWA/FAN indicated that nocturnal surveys are important for Swift Fox, small mammals and calling amphibians. AWA/FAN further indicated that there is no indication that all bird song counts were conducted at appropriate times. It submitted that the information on Swift Fox, from the proposed spring 1996 survey, should be provided before any approval. In addition, it submitted that there are no plans on how to deal with this endangered species. AWA/FAN also expressed concerns with Express's comments in regard to the Swift Fox release program. It stated that Express has provided no evidence to support the use of the release program or any modification of the program to accommodate losses of Swift Fox; or any approval from the recovery team associated with the releases.

With respect to the mitigation for Loggerhead Shrike and Burrowing Owl nests, AWA/FAN indicated that separation (re-routing) should be implemented rather than timing restrictions to avoid any possible negative impacts of the disturbed pipeline right-of-way. AWA/FAN further indicated that Baird's Sparrow, Upland Sandpiper and Long-billed Curlew significant habitats (concentrated populations) should be avoided through re-routing.

AWA/FAN also expressed general concerns with pipeline construction occurring within prairie grasslands, specifically the Sage Creek Grazing area. AWA/FAN testified that there are too many uncertainties associated with the construction of the pipeline and a lack of information, specifically whether it is site-specific information or whether it is information about the impacts of fragmentation of these large grassland blocks on the whole complex of prairie species. AWA/FAN submitted that the recovery plans for endangered species, and some of the threatened ones, recommend that we do not lose any more of the populations and, in most cases, it recommends increasing the population so that there is a better chance that the species survive in the future. AWA/FAN testified that the big blocks of native grasslands should be strictly protected to prevent major incursions which cut up the landscape or change the composition of the vegetation and animal life. AWA/FAN submitted that there are very few of these larger areas left and the area south of Cypress Hills stands out as an area where all of these rare species occur.

3.3.6.3 **Proposed Mitigation Measures**

In regard to the use of the COSEWIC list, Express testified that, on a national basis, COSEWIC would certainly be the primary agency. COSEWIC draws on the expertise of provincial agency people and other experts in the field as much as possible. It also relied on the Province of Alberta lists.

With respect to AWA/FAN's concerns about a lack of information on key species, Express stated that its evidence demonstrates that its commitment to avoid encounters with the species considered will likely result in no significant effects or impacts. Express further stated that it makes no ecological sense that wildlife would be affected by a narrow linear development such as a pipeline that would subsequently be reclaimed. Express indicated that, although it dealt with a number of individual species in its description of the resources along the route, its approach to impact assessment and mitigation was in fact a habitat-based approach.

Express testified that its surveys were not specifically designed for Baird's Sparrows or small passerines, or cryptic nesters, rather they were designed to pick up those localized habitat features which were considered to be of particular significance to species in question. Express stated that if it were in an area that appeared to be particularly dense with a specific bird, it then looked to see if there were particular habitat features that may have supported that extra density. Therefore, Express submitted that the focus of the surveys was on those types of localized habitat features supporting an important component of a special status species that, if affected by pipeline construction, could have an impact on the productive capacity of that species.

With respect to the recommendations by Environment Canada, Express indicated that it will comply with either avoidance guidelines or timing restrictions for special status species identified.

Sensory Disturbance and Habitat Alienation

Express stated that, to minimize impacts from a spring clean-up time period, it would schedule clean-up activities to avoid important occupied denning/reproductive habitats during their designated period of use as identified in its application.

In regard to the concerns raised about Pronghom Antelope, Express indicated that Pronghom Antelope generally use the winter ranges from early December through until March. There would therefore not be an overlap between the use of the winter ranges by antelope and the construction schedule.

With respect to the concerns raised in regard to the Swift Fox, Express has proposed early spring 1996 surveys for the area. If dens are identified along the proposed route, Express stated that pipeline construction within 500 m of such dens will be delayed until after 15 July or later as per Environment Canada recommendations. In addition, Express committed to assist in the funding of a radio collaring program of Swift Fox in the vicinity of the proposed right-of-way to enable animal movements and seasonal habitat use patterns of the species to be monitored. This work will done by a graduate student in conjunction with Environment Canada. Express submitted that the data will be used in final project development plans and may also permit any project-related responses of foxes to be identified. It indicated that it will provide the best information available on the distribution and den sites for Swift Fox within the pipeline corridor. Express testified that it would be better able to ascertain the level of risk, once the information is available; however, it does not anticipate that there would be a high risk. With respect to the potential for any loss of animals, Express testified that such a loss could be accommodated through a modification of the Swift Fox release program.

With respect to the Loggerhead Shrike and Burrowing Owl sites identified in the wildlife survey, Express indicated that it is anticipated that construction timing restrictions will be implemented in the vicinity of these nests, according to Environment Canada's guidelines. Re-routes will therefore not be required.

Express indicated that Sage Grouse and Sharp-tailed Grouse will be included in the March-April surveys. Express indicated that mitigation measures will include minor (20 to 30 m) route deviations to avoid direct habitat loss to lekking areas. With respect to Sharp-tailed Grouse, Express indicated that the pipeline right-of-way will not change the land capability for that species as it will be constructing the pipeline during August to November and therefore there will not be any nests physically encountered by construction activities. Express indicated that the leks are primarily used in the spring but some may be used by the males in the fall. If it encountered or came close to a fall

lekking area, Express testified that there may be some displacement of the birds; but it would not be considered to be significant.

Express stated that it is complying with Environment Canada's recommendations for construction timing through the migratory bird areas; specifically, it will be in those areas in August, after the birds have finished nesting and the young have fledged. Express indicated that the two major waterbodies that would support staging activity would be Milk River Lake and Rush Lake. Pipeline construction will be well beyond the 200 m distance from Milk River Lake. Express submitted that, depending on the time of year and the wetness of the season, construction near Rush Lake may be approaching 200 m of open water. Express submitted that there are no other waterfowl fall migration or staging areas that the pipeline will approach (i.e. within 200 m).

Habitat Loss, Alteration and Fragmentation

With respect to loss of habitat associated with tree and shrub cover, Express stated that, through final routing modifications, it will avoid needless clearing, particularly on flood plain and wetland areas. In addition, Express indicated that temporary workspace will be permitted only in these habitats at designated sites approved by Environmental Inspectors. Wherever possible, to encourage suckering of native vegetation after construction, temporary workspace required in unimproved shrub or treed habitats will not be grubbed of roots or stripped of topsoil. In the Draft Reclamation Plan, Express indicated that the banks of the fishbearing streams/rivers will be reclaimed using locally harvested cuttings of poplar, Wolf Willow, Thorny Buffaloberry, cottonwoods, etc. where appropriate.

In regard to the sagebrush habitat areas, Express indicated that its soil handling and restoration procedures will not discourage sagebrush from recolonizing on the right-of-way, and may actually FAVOUR sagebrush establishment.

For grassland communities, Express indicated that, for areas that are currently providing low grass cover like Blue Grama or June grass, a wheatgrass community will represent more of an upright structure. Express submitted that, physically, the reclaimed right-of-way will differ from the native prairie and will probably add some diversity in structure for a short period of time until the taller species die out and the local shorter ones persist. It indicated that this will generally occur within three to five years after construction.

Express testified that it is not adding to habitat fragmentation, as it is returning the pipeline corridor to a habitat capability comparable to preconstruction conditions. The right-of-way will be reclaimed to a grass community comprised of native grass species which will not discourage the re-establishment of the adjacent off right-of-way communities. Express submitted that the right-of-way will have comparable medium to long-term habitat values to surrounding habitats and therefore will not reduce the size of the existing habitat blocks. With respect to short-term conflicts, it submitted that pipeline construction will represent a highly localized temporary disturbance which will be routed and scheduled to avoid significant short-term effects with wildlife species.

Express submitted that, with the survey information, impacts from habitat loss/alteration will be localized to sub-regional, moderate to long-term (depending on the habitat involved) and generally neutral to negative. However, through the avoidance of key localized habitats, impact magnitude can be kept low. Express indicated that it will ensure that previously unidentified plants and habitat for wildlife with a designated status, will be identified by retaining Environmental Inspectors who are well

qualified in such matters and would be well trained to identify special plants, animals and areas of environmental importance.

Wildlife Mortalities

To reduce the potential for road kills, Express submitted that it will brief construction personnel on areas of likely wildlife concentrations. Express indicated that rules of conduct prohibiting the possession firearms and limiting the use of recreational vehicles by workers while on site will eliminate impacts associated with opportunistic kills by pipeline personnel.

With respect to the estimated increase in vehicle traffic, Express indicated that the maximum two-way traffic flow to converge on the marshalling (warehouse) point is estimated at 900 trips per day (one vehicle per person). Express testified that, from that central point, crew cabs, buses and company vehicles will be used to take the crews out to the right-of-way, with approximately 80 vehicles going to the right-of-way. Many of the roads that will be used by construction vehicles will be secondary gravel roads generally travelled at slow speeds. With respect to right-of-way travel, Express submitted that the speeds are low enough that they will not present any kind of mortality risk to the local species.

With respect to the Prairie Rattlesnake, Express indicated that, should ditching operations be active through the key snake movement areas in August and September, Express will retain a biologist experienced in snake identification, habitats and handling to monitor snake activity in the vicinity of the spread. All snakes removed from the site will be released in known hibemacula areas on the breaks of the river valleys. It will implement an aggressive worker awareness program relating to local fauna, and will strictly enforce regulations prohibiting the destruction or harassment of any wildlife species.

In regard to Mountain Plovers, Express submitted that the probability of encountering such a species and actually causing mortality, particularly given an August to November construction schedule, is extremely low.

With respect to Richardson's Ground Squirrels, Express indicated that they are one of the least colonial species of the ground squirrels and they do not tend to form discrete colonies. Express submitted that its burrow count transects varied anywhere from less than a dozen burrows per hectare to upwards of 200. Express indicated that, with the August to November schedule, initial grading and ditching operations could encounter ground squirrels that had already gone into their winter hibernation, therefore, there could be some localized mortality. However, Express further indicated that it does not anticipate it to be an effect that would measurably affect the local populations of the species.

Disruption of Hunting Activities

As part of its on-going public consultation process, Express stated that it will post notices of the proposed Project in local Fish and Wildlife offices prior to construction, identifying the location and timing of construction activities and potential hazards to hunters.

3.3.6.4 **Views of the Panel**

The Panel finds that the information provided by Express with regard to the potential adverse environmental effects on wildlife, which may result from the construction and operation of the proposed pipeline, is adequate. The Panel recognizes that Express will be conducting further surveys for the Swift Fox, Sharp-tailed Grouse and Sage Grouse. However, the Panel notes that Express did provide general descriptions of their habitat requirements, as well as wildlife/wildlife habitat observations made during the survey already undertaken in 1995. The Panel therefore finds that sufficient information has been provided to determine the potential environmental effects on these species for pipeline construction.

With regard to the concerns raised about the use of the COSEWIC list, the Panel finds that Express's approach to identifying species to include in the survey, using the COSEWIC and Province of Alberta lists, was reasonable and the methodology used for the wildlife survey was adequate. The Panel recognizes that Express's surveys focussed on identifying localized habitat features as opposed to relying on specific identifications of the more cryptic species. Given the late summer/fall construction schedule, the Panel finds that the information provided using this approach is sufficient to evaluate the potential adverse effects and their significance for these species. The Panel notes, however, that a more thorough survey of certain species, e.g. cryptic ground nesters such as the Mountain Plover, as well as further reliance on existing sources of information for species such as the Hognosed Snake and the Western Small-footed Bat, could have alleviated some of the concerns raised during the hearing.

The Panel is generally satisfied with Express's proposed mitigation measures in regard to wildlife issues. The Panel would like to reiterate, as outlined in Section 3.2 "Construction Schedule", that it recommends that, unless otherwise allowed by the Board, Express be required to comply with the 1 August to 31 November construction schedule for pipeline construction, as provided in its construction schedule update.

The Panel notes that Environment Canada recommended further surveys for the Long-billed Curlew, however, it also recommended that the construction occur after 15 July when migratory birds have finished nesting. The Panel notes that, since the Long-billed Curlew is a migratory bird and construction will not start before the beginning of August, a further survey for this species is not necessary. This is consistent with Environment Canada's previous recommendation (in its letter dated 15 September 1995) that construction' not take place within 250 m of any active Long-billed Curlew nests or construction be delayed until 15 July.

The Panel acknowledges that Express does not consider re-routes to be necessary for the Loggerhead Shrike and Burrowing Owl nest sites identified during the wildlife surveys, as construction will not commence before the beginning of August. AWA/FAN expressed a concern with Express's proposal and indicated that to avoid any possible negative impacts of the disturbed pipeline right-of-way, re-routing should be implemented. Because Express is committed, during the spring clean-up period, to comply with the timing restrictions established by Environment Canada for those species during the spring clean-up period, the Panel is satisfied with Express's proposal.

The Panel has the following concerns and related recommendations with respect to some of the mitigation measures proposed by Express.

The Panel recognizes that Express has provided general measures that it intends to implement, depending on the results of the further surveys, for Swift Fox, Sharp-tailed Grouse and Sage Grouse. It acknowledges Express's intention to avoid Swift Fox denning areas through compliance with the timing restriction set out by Environment Canada. However, the Panel is of the view that, although the dens may not be used during the construction period, Express be required to ensure that it does not destroy any denning areas during construction. The Panel recommends that the information filed in regard to the further surveys, should include the results and Express's specific measures to address any conflicts. This information should be filed 30 days prior to the commencement of construction.

The Panel is of the view that there is the potential to encounter previously unidentified significant habitat features during construction. The Panel is also of the view that the loss of significant habitat features for wildlife with a designated status should be avoided. In addition, nesting habitat for raptors and song birds should be protected. Therefore, the Panel recommends that, if any previously unidentified significant habitat features/specialized habitat for wildlife with a designated status, nesting habitat for song birds and any raptors are discovered during construction, Express should, in consultation with the appropriate regulatory agencies, avoid, relocate, or restore those features or areas.

The Panel acknowledges Express's commitment to retain Environmental Inspectors who are well qualified in environmental matters and will be trained to identify special plants, animals and areas of environmental importance. However, for purposes of identifying previously unidentified wildlife habitat features during construction, the Panel is of the view that only an individual with an appropriate wildlife background and previous experience in identifying wildlife habitat features would be qualified to carry out this work. Therefore, the Panel recommends that Express retain a specialist with a wildlife background, including experience in identifying wildlife and their habitat features, to identify such features during construction. The Panel notes that the wildlife specialist is in addition to the Environmental Inspectors.

The Panel also acknowledges Express's intentions to retain a biologist experienced in snake identification, habitats and handling to monitor snake activity in the vicinity of the pipeline construction activities. This biologist will remove Prairie Rattlesnakes from the trench or other construction areas. The Panel notes, however, that it would be appropriate that all snakes with a designated status be monitored for and removed from the vicinity of the construction activities. Therefore, the Panel recommends that, in addition to Express commitments in regard to the Prairie Rattlesnake, the experienced biologist be required to monitor and handle all snakes with a designated status in accordance with the commitments set out for the Prairie Rattlesnake.

The Panel is concerned with the potential for road mortalities of wildlife during construction. The Panel recognizes that Express is committed to reducing vehicle traffic by busing crew members to the right-of-way and expects that vehicle speeds would be slow. However, the Panel recommends that Express also implement a worker awareness program in regard to the potential for wildlife mortalities along roads. The Panel also recommends that Express's workers be required to maintain reduced speeds along the right-of-way, along access roads, and where feasible, along secondary roads. The Panel further recommends that off right-of-way traffic be prohibited, except for designated access routes.

The Panel notes that considerable time was spent during the hearing on the issue of habitat fragmentation. Express indicated that it has avoided significant habitat features through routing

modifications and/or timing restrictions. Express provided evidence in regard to the reclamation of the fight-of-way, whereby the habitat capability would be comparable to existing situations within three to five years after construction. The Panel is of the view that with the implementation of Express's mitigation measures for wildlife and those outlined in the previous sections on soils and vegetation, any fragmentation associated with the proposed pipeline is not likely to result in significant adverse environmental effects on wildlife.

With respect to hunting activities, the Panel is of the view that this Project is not likely to significantly affect the capacity of wildlife, a renewable resource, or its ability to meet the needs of the present and those of the future.

With the mitigation measures proposed by Express and incorporation of the above-mentioned recommendations, the Panel is of the view that the Project is not likely to cause significant adverse environmental effects on wildlife, including: effects of sensory disturbance and habitat alienation; habitat loss, alteration and fragmentation; blockage of daily or seasonal movements; and project-related wildlife mortalities.

3.4 Terminal and Pump Stations

3.4.1 Site Selection and Biophysical Resources

3.4.1.1 Site Selection and Alternative Means

With respect to the Hardisty Terminal, Express noted that a review of several sites was undertaken. The criteria used to evaluate the sites included topography, drainage, vegetation/wildlife, and access. Sites that were' well removed, for example more than 300 m from residences, and which minimized disruption of local land uses were preferred. Express noted that the location of the pump stations is largely dictated by the hydraulic demands of the pipeline system and land availability.

To minimize effects, Express stated that the Terminal and pump stations would be located to avoid important localized habitat conditions and would generally be situated adjacent to existing road systems where some level of habitat alienation has already occurred. Express submitted that, while impacts are expected to be negative and long-term, residual impacts will be local to sub-regional in scope, and with low magnitude.

With respect to field surveys for the Terminal and pump stations, Express indicated that initial information on pump station sites was collected during extensive pipeline corridor surveys in May, June and July 1995. Express also indicated that additional surveys focussing on proposed access and powerline routes to the pump stations were undertaken during two additional field trips conducted 17 and 18 September and 3 October 1995.

Express stated that Station 1 would require an approximately 1.2 km access road that would be constructed along an existing undeveloped road allowance and the quarter section line. Station 3 would require an approximately 0.8 km access road that would be constructed along a section line. Station 5 would not require any new access roads. With respect to Station 7, Express stated that an approximately 1.6 km access road would be constructed along the section line. Express noted that sagebrush habitat would be encountered by the road from Station 7 to the highway, but further noted

that it is not a specific community and is a scattered component of much of the native prairie in the area.

Express noted that the main electrical load at Station 1 would be from two of the three mainline electric pump motors and two of the three electric booster pump motors. Station 1 would require one kilometre of distribution line that would run along a developed road allowance and a quarter section line, as well as a new substation including a transformer with fuse protection. Express further noted that the main electrical load at Stations 3 and 5 would be from the two mainline electric pump motors at each station. Station 3 would require 6.4 km of distribution line that would run adjacent to a highway and along section line. This station would also require the replacement of a transformer, a capacitor bank, and a new substation including a transformer with fuse protection. Station 5 would require a new regulator and a substation including a transformer with fuse protection.

Express noted that it had considered a variety of design alternatives and the potential effects of those alternatives in reaching a conclusion as to its preferred route. Express further noted that these alternatives included the type of drivers at the pump stations and the potential emissions.

Express determined that reciprocating drivers fuelled by synthetic crude is the preferred option for the two mainline pumps at Station 7. Express submitted that the use of the Express Pipeline to deliver fuel to the station would eliminate traffic associated with fuel delivery, potential spills during delivery, and emissions associated with delivery vehicles. Express further submitted that fuel drivers would also eliminate new disturbances that would be associated with a natural gas delivery line or construction of approximately 130 km of new powerline.

In regard to land requirements, Express noted that Stations 1, 3, 5 and 7 would require 17.6, 1.6, 1.6, and 1.63 ha, respectively.

RMEC inquired as to the flexibility that Express has in locating the pump stations, specifically whether the Wild Horse Pump Station could be relocated onto cultivated lands in the U.S. Express submitted that, based on the original hydraulic design, it had approximately one km in flexibility in terms of locating the pump stations without incurring a serious degradation in capacity. It was noted that the Wild Horse Station had already been moved approximately one km to the south to minimize the distance to Highway 41. Express noted that it would require a further shift of over 14 km to locate the station on cultivated land in the U.S.

Express noted that a resident in the vicinity of Station 1 had raised concerns with the visibility of the station facilities. The possibility of using trees to screen the terminal was noted.

3.4.1.2 Identification of Potential Effects and Their Significance

Soils and Hydrology

Express indicated that the Hardisty Terminal will contain two sump tanks and each pump station will contain one sump tank, with a volume of 15 m^3 each. Express indicated that there will be no refined petroleum products stored at the Hardisty Terminal.

The Terminal site lies in the centre of a local depression which appears to be dry and well drained due to the permeable sandy subsoil and the regional slope towards the Battle River Valley. Site visits

conducted throughout the spring, summer, and fall of 1995 noted no standing water at the site. However, the site is fed by several ephemeral runs and likely supports shallow standing water after high snow years and during heavy precipitation events.

Express indicated that at the proposed facility sites (Terminal, pump stations, and valve sites) considerable grading may be required to prepare the sites for the development of the buildings, roads and pipeline infrastructure. Given the fine sandy texture and loose structure and consistency of the soils at the Terminal site, the soils are likely susceptible to wind erosion when disturbed.

The road allowance that will be developed to provide access into the Terminal site at Hardisty, and also one of the connector pipelines, will encounter a portion of a cattail marsh and there will be some loss of that cattail community and some open water.

With respect to specific site geotechnical surveys for the proposed pump station locations, only topographical survey information has been gathered. Express indicated that, as part of the recently' initiated detailed design process, these surveys will be conducted and subsequently filed with the Board.

Vegetation

With respect to rare plant surveys, Express indicated that the actual pipeline right-of-way in the immediate vicinity of the stations was surveyed during the course of the July surveys, with additional botanical work done in September along with the wildlife work. Express indicated that botanical work for the access roads and power facility corridors was also undertaken in September. It recognized that it missed the window for the flowering period when most plants would be identified.

Express indicated that the Terminal would fall entirely within a cleared pasture area which has been cultivated and seeded to non-native grass species in recent years, and no clearing of native tree or shrub communities will be required for the site preparation. No rare or endangered plant species or native communities will be encountered by site preparation. The Terminal requires approximately 1.2 km of access road and it will be constructed along an existing undeveloped road allowance and then along the quarter section site to the pump station site. Express indicated that the Terminal requires one km of distribution line that will run along a developed road allowance and a quarter line.

Station 3 falls within native pasture that has been heavily grazed by cattle, and contains patches of crested wheatgrass (an introduced Eurasian economic species). Express indicated that the pump station site is located on native prairie dominated by Blue Grama grass/Pasture sage, and with Needle-and-thread grass and wheatgrass above a ground cover of little club moss occurring to a lesser degree. This station requires approximately 0.8 km of access road along a section line. Express indicated that Station 3 requires 6.4 km of distribution line that will run adjacent to a highway and then along a section line.

Station 5 will be located on a Crown Grazing Lease in native prairie. Express indicated that no rare or endangered plant species, or significant plant communities were found. This station does not require any new access roads, and power for this site will be sourced from an existing distribution line on the east side of the road allowance.

With respect to Station 7, Express indicated that this station is located on native prairie, in good condition, within the Sage Creek Grazing lease in the Dry Mixed Grass Ecoregion. It submitted that no rare or endangered plant species, or significant plant communities were found during the survey. Approximately 1.6 km of access road along the section line is required for this station. No power line facilities are proposed for this site.

Express submitted that, from a botanical perspective, station construction will represent a long-term, negative, but generally localized, impact to native vegetation communities.

Wildlife

Express indicated that the Hardisty Terminal, three pump stations and ten mainline valves will occupy approximately 23 ha of land, and may permanently alienate a comparable amount of additional area from many wildlife species because of persistent disturbance levels.

With respect to field surveys for the Terminal and pump stations, Express indicated that the initial information on pump station sites was collected during extensive pipeline corridor surveys in May, June and July 1995. Express also indicated that additional surveys, focussing on proposed access and powerline routes to the pump stations, were undertaken during two additional field trips conducted on 17 and 18 September and on 3 October 1995. Express recognized that the surveys in September occurred after the reproductive period for indigenous species, when animals are less likely to be occupying reproductive habitats and it indicated that surveys focussed on an assessment of habitat conditions/features in the surveyed area and the capability of the area to support important concentrations of special status species.

Express indicated that active burrows of pocket gophers, Richardson's Ground Squirrels and badgers were common in the Terminal site and along the powerline corridor. It stated that clearing of the remnant aspen stands should not be required during development. Although no special status species or nesting/denning features were observed in the vicinity of the Terminal during wildlife surveys, the mosaic of remnant aspen stands/shrublands and open pasture areas in the region has the capability of supporting several special status species during the reproductive period, including White-tailed Jackrabbit, Loggerhead Shrike, and Cooper's Hawk. Express stated that the Terminal will, however, be located on a recently cultivated pasture area to minimize impacts to local species.

For Station 3, Express indicated that a depression exists near the western-most end of the proposed powerline right-of-way; however, this depression would not provide suitable waterfowl habitat, but may provide suitable nesting habitat for Baird's Sparrows. Several ground squirrel and badger burrows were observed by Express along the proposed road corridor, although none appeared active. Express submitted that the Station 5 site is located adjacent to a developed road allowance and the quality of this site as primary foraging habitat or as breeding habitat for wildlife is limited.

With respect to Station 7, Express indicated that three badger holes were observed within the road allowance corridor, although there was no evidence that Burrowing Owls have ever used these sites as nests. Express indicated that potential Baird's Sparrow habitat exists along the road allowance near the pump station, and within a large depressional area halfway along the road allowance corridor. Express testified that the pump station could affect, on a very localized scale, the distribution of Pronghom Antelope in the Sage Creek Grazing area by occupying about 1.6 ha and possibly alienating a small amount of area around it.

3.4.1.3 Public Comments

AWA/FAN noted that once the pipeline is installed, there would still be a pump station and a storage site remaining in the Sage Creek Grazing area. It was further noted that there would be operational activities associated with the facilities. It expressed a number of concerns in regard to the Wild Horse Station, specifically impacts associated with a permanent road to the station and access into the site three or four times a week, including helicopter access for the maintenance activities and access to monitor reclamation and remediation.

3.4.1.4 Proposed Mitigation Measures

Express indicated that tanks will have overfill protection, secondary containment systems and leak detection as per the requirements of ERCB Interim Directive 95-03. Express indicated that a storm water management plan will be incorporated into the station design and will contain provisions to ensure contaminated storm water is not directly drained off-site. The underground sewage tank will be equipped with overfill protection.

Since the Terminal site is fed by several ephemeral runs and likely supports shallow standing water ERCB after high snow years and during heavy precipitation events, Express submitted that as part of site preparation, the site will be stripped of topsoil, levelled with a gravel pad and equipped with subsurface drainage structures in the pad to ensure that normal surface flow patterns are maintained through the area.

With respect to the facility sites, Express submitted that topsoil will be stripped from the lease area, as well as certain subsoil materials, and stockpiled separately as one or several low profile berms on the leeward side of the site. After construction, Express indicated that subsoil materials, and a portion of the topsoil, may be recontoured over non-operating portions of the lease area and seeded to grass. Express further submitted that the remaining topsoil stockpile berms will be seeded to a grass cover crop to prevent loss to wind and water erosion during the period of storage (life of the facility). Some modifications to lease stripping practices will be implemented where problematic soil conditions are encountered. For the Terminal site, stripped topsoil materials would require the application of a tackifier to ensure they are protected from wind erosion during the period that vegetation seeded to the topsoil stockpiles would be establishing. Express indicated that, unless otherwise advised by landowners, it would use a native seed mix to reclaim non-operating portions of the lease area.

Express undertook to file with the Board, 15 days prior to construction, supplementary wildlife information for the station access roads and power facility sites during the spring and summer.

Express undertook to supplement the information on plant species for the station access road locations and power facility locations during the vegetation inventory. Express indicated that the results of the survey, including any additional mitigation measures, will be filed with the Board 15 days prior to construction.

With respect to the construction schedule associated with the Terminal and pump stations, Express indicated that construction is scheduled to commence on 1 July. Express stated that this avoids the nest establishment, incubation and fledging periods for the majority of avian species potentially occupying either grassland or forested habitats in the area, and completely avoids conflicts with the reproductive and early rearing activities of local mammalian species.

Express indicated that the pump stations would be fenced and access along the access roads would be limited.

3.4.1.5 **Views of the Panel**

The Panel notes that the location of the pump stations is largely dictated by the hydraulic demands of the pipeline. The stations have been located to avoid important localized habitat conditions and to minimize disturbances associated with new access and power lines. The Panel therefore finds that the proposed locations of the terminal and pump stations are acceptable.

Adequate information has been provided by Express in regard to the potential adverse environmental effects associated with the Terminal and pump stations. Express has provided sufficient mitigation measures in regard to the potential adverse environmental effects. The Panel recognizes that Express will provide supplementary plant and wildlife information 15 days prior to construction. The Panel acknowledges that there will be a loss of land use and/or habitat associated with the pump stations but finds that this loss is insignificant.

The Panel recommends that Express continue to work with landowners to resolve issues related to the visibility of station facilities.

Based on the information provided, the Panel is of the view that the construction of the proposed Terminal and pump stations is not likely to result in significant adverse environmental effects.

3.4.2 Air Emissions

3.4.2.1 Identification of Potential Effects and Their Significance

The air quality concerns include those related to fugitive emissions from the tanks at the Hardisty Terminal, emissions produced by the Wild Horse Pump Station, fugitive emissions from valves, and greenhouse gas ("GHG") emissions.

Express Tank Farm

In its application, Express stated that evaporative losses expected from the four storage tanks proposed at the Hardisty Terminal would be 4 554 kilograms/year ("kg/yr") from synthetic crude, 4 800 kg/yr from sweet crude, and 5 196 kg/yr from bitumen blend. Express noted that there is an ongoing concern with nuisance odour at the existing Hardisty Complex (the Hardisty Complex includes crude oil storage facilities operated by Husky, Gibson and IPL). Express provided additional details respecting the chemical profile of emissions, including the seasonal variation, and provided analysis of the cumulative effects of these emissions. RMEC requested that Express estimate the impact of atmospheric emissions on cattle in the vicinity of the Terminal.

Express conducted a detailed analysis of the dispersion of the compounds emitted into the airshed, and estimated ground level concentrations of several of the chemicals at nearby residences using the most recent version of the United States Environmental Protection Agency ("US EPA") Industrial Source Complex Short Term Dispersion Model, Version 3 ("ISCST3"). This model incorporates meteorological data available from the observing site at Coronation which is the closest site to the Terminal. Express stated that a detailed evaluation of these data concluded that it was representative

of the Hardisty Terminal. Express also noted that the ISCST3 model was designed to handle such factors as topographical differences between the Terminal and the town site.

Respecting human health concerns, Express evaluated the potential impact of the key chemicals including benzene, hydrogen sulphide ("H_2S"), and reduced sulphur compounds. Express noted that the atmospheric concentrations arising from the Terminal would be barely discemable above the levels already present at the Hardisty Complex. These compounds when considered individually, and additively, would not be expected to result in adverse human health impacts since predicted exposure levels would be below exposure limits cited in the literature. In combination with existing background levels, exposure limits would not be exceeded for any compounds except for H_2S where background levels are already slightly above the Alberta standards. Express noted that, even in this case, the H_2S exposure would not result in human health effects as the risk assessment procedure employed conservative assumptions. Express noted that for the town of Hardisty, a full study of human health effects would be of questionable statistical significance, because of the town's small population.

Respecting impact on domestic livestock, Express advised that it had conducted a literature review and noted that in the studies it examined, atmospheric concentrations of benzene and H_2S which have adverse effects on cattle were much higher than those to be expected at the Terminal. Express also attempted to obtain a copy of the study being prepared for the Alberta Cattle Commission which examined the impact of emissions on livestock from petroleum facilities. Only the Executive Summary of the report was available and Express was unable to obtain sufficient information to draw any conclusions.

Emissions from Wild Horse Pump Station

In its application, Express stated its intent to have electric pumps at all stations along the pipeline. Subsequently, Express advised that, at the Wild Horse Station, the lack of available electrical service and the need to construct a lengthy electric power line into the site necessitated examination of alternate power sources. Emissions were calculated for each of five configurations of engine and fuel type including natural gas, diesel, synthetic crude, and propane. Engines fuelled by synthetic crude were chosen as the preferred power source. Express estimated the emissions from the synthetic crude storage tanks to be 1.04 m^3/yr. The projected emission rates for the synthetic crude powered engine are shown in Table 3-4.

Table 3-4
Emissions from Wild Horse Pump Station
(t/yr)

	THC	VOC	CH,	NO,	CO	CO,	N_2O	SO,	GWP
Synthetic Crude Powered Engines	13.96	12.51	1.45	298.65	10.72	20 146	0.88	14.95	20 462

Source: Express's Response to NEB Information Request No. 139.

To calculate ground level concentrations, Express conducted a modelling study which employed the US EPA ISCST3 model and one year of meteorological data from the closest adjacent meteorological stations. Maximum one hour, 24-hour and annual ground level concentrations of NO,, NO,, SO, and CO were calculated. When combined with the existing background levels of these pollutants in Alberta, the concentration levels were predicted to be below the Alberta ambient standards.

Fugitive Emissions from Pipeline

Emissions of gaseous compounds associated with the blended crude shipped in the pipeline may be released from the pipeline during pigging operations and from leaks from valves and fittings. At the Wild Horse Pump Station, Express estimated emissions of Volatile Organic Compounds ("VOCs") to be 570 kg/yr and of methane ("CH_4") to be 0.28 kg/yr.

Greenhouse Gases

Greenhouse gases considered include carbon dioxide ("CO,") and nitrous oxide ("N_2O") from combustion of synthetic crude at the Wild Horse Pump Station, and CH, arising from fugitive releases at pipeline fittings and valves. Express submitted that direct emissions of carbon dioxide ("CO") at the Wild Horse Station amount to 20 146 tonnes per year ("t/yr") arising from the synthetic crude powered engines. Fugitive CH, emissions at the Wild Horse Station are noted in Table 4. Express estimated that the emissions of GHGs associated with construction of the pipeline would not be significant.

Estimates of GHG emissions from the generation of electricity to power the electric drives at the pump stations were provided assuming that the electricity is provided to the three pump stations and the Terminal from the TransAlta Corporation grid. Express estimated that the total GHG emissions would be 126.4 kilotonnes per year ("kt/yr") for CO,, 41.7 t/yr for CH, and 3.05 t/yr for N_2O. Express noted that there would be no net incremental emissions arising from this electric power generation, as measures will be taken by TransAlta to reduce the utility's emissions to 1990 levels by the year 2000 in spite of a 15% increase in electricity demand. TransAlta will accomplish the reduction through measures outlined in the action plan submitted by TransAlta under Canada's Voluntary Challenge and Registry ("VCR") program. Express noted that inclusion of these incremental emissions due to electric power generation would amount to a double. counting of emissions in Alberta.

3.4.2.2 Public Comments

Environment Canada recommended that Express calculate the CO, emissions arising from the Project, and provide estimates of Alberta and Canadian CO, emissions for comparison. Environment Canada recommended a hydrocarbon monitoring program be established at the pump stations and for periodic monitoring at the mainline valve sites. In a subsequent letter, Environment Canada asked for further mformation about NO, emissions from the Wild Horse Station in light of Express's evaluation of options for powering at that site. Environment Canada noted that pump engines should comply with guidelines in the federal NO_x/VOC Management Plan.

In light of the Canada - US Air Quality Accord, Environment Canada recommended that Express evaluate the impact of NO, emissions on visibility. Express responded that visibility would not be impacted at Wild Horse since NO, emissions would be relatively small and the facility would comply

with Alberta's ambient air quality objectives. Further, since the site is not within designated ozone non-attainment areas, nor adjacent to urban areas, smog formation should not be a problem.

Gibson requested that Express identify specific compounds and their emission levels from the Express storage tanks at the Hardisty Terminal. As noted above, these were provided and detailed ground-level concentrations were calculated and an evaluation of the impact of emissions on human health was conducted.

RMEC had concerns respecting emissions from the Hardisty Terminal and GHG emissions. RMEC took the position that quantification of GHGs should include those from not only the Project itself but also from the associated facilities (electric power generation for electric pumps) and from facilities upstream of the Express Project. Total CO, emissions for the pump stations were estimated by RMEC at 165.0 kt/yr and N_2O emissions at 2.3 t/yr (assuming all pump stations are electric powered). Greenhouse gas emissions from upstream facilities were calculated by computing emissions that result from production of petroleum products carried through the pipeline. Using information obtained from the EUB and from Environment Canada, GHG emission factors, in CO, equivalents (a blend of CO, and CH, emissions), were calculated for crude from oil sands plants and from conventional crude production. These emission factors were applied to the crude blends assumed to be transported in the Express Pipeline resulting in an annual GHG emission of 8.98 megatonne ("Mt") of CO, equivalent for the year 2000.

RMEC also inquired if Express had considered the implication for crude oil demand in the U.S., should policy changes develop respecting GHGs in the U.S. Express noted it had not done such an examination but had considered amendments to the *U.S. Clean Air Act* and the implications that would have on refiners in the U.S.

Respecting the impact of emissions from the Hardisty Terminal on livestock, RMEC entered into evidence a copy of the Executive Summary of the study prepared for the Alberta Cattle Commission.

3.4.2.3 **Proposed Mitigation Measures**

Express stated that the four storage tanks to be installed at the Hardisty Terminal will be built to comply with provincial emission standards and appropriate codes. The Canadian Council of Ministers of the Environment ("CCME") have developed the "Environmental Code of Practice for Above Ground Storage Tank Systems Containing Petroleum Products", and there also exists a Canadian Standards Association ("CSA") 2662-94 for Oil and Gas Pipeline Systems. Express confirmed that it will follow the most stringent standards and it will be consistent with the CCME or CSA standards for its storage tanks at the Hardisty Terminal, and will use the same codes for the two storage tanks at the Wild Horse Station. Further, Express stated that storage tanks at Wild Horse Station will be internal floating roof tanks and that the pump engines will be designed to comply with CCME Source Emission Guidelines for NO, and with Province of Alberta guidelines for natural gas fired reciprocating engines.

In response to concerns from Environment Canada, Express advised that it will establish a program to monitor fugitive hydrocarbon emissions from mainline valve sites and pump stations.

'With respect to GHGs related to the Project, Express testified that it will be participating in the Voluntary Climate Change Program *(sic)* and intends to prepare an Action Plan for submission to

Natural Resources Canada. Express stated that it would consider a number of technologies to reduce CO, emissions through efficiency enhancement measures such as variable frequency drive motors and use of discharge control valves. Express implied that the extraction of CO, from project facilities and the subsequent disposal of this CO, by injection into formations may not be cost effective for the emissions of 20 000 tonnes attributable to the Express Project.

3.4.2.4 **Views of the Panel**

Express has committed that construction of storage tanks at the Hardisty Terminal and at the Wild Horse Pump Station will incorporate appropriate CCME or CSA standards. The Panel finds that construction to these standards constitutes appropriate mitigation for tank emissions. It is the recommendation of the Panel that storage tanks at both the Hardisty Terminal and the Wild Horse Station be constructed to meet the more rigorous of the CCME or CSA standards for storage tanks.

Respecting residual emissions at the Hardisty Terminal in particular, while it is acknowledged that nuisance odours will act cumulatively with existing odour sources, the Panel finds that the residual emissions will pose no cumulative negative health effects at nearby residences, nor in the town of Hardisty. As well, because estimates of the fugitive emissions are well below levels which have been demonstrated to cause negative impacts on livestock, the Panel finds that there would not be any impacts on livestock in the vicinity of the Hardisty Terminal.

The Wild Horse Station is in an area where background pollutant concentrations are low. Since emission levels from the pump engines will result in ground level concentrations below Alberta Ambient Standards, the Panel finds that proposed installation will not result in air quality concerns. The Panel finds that no cumulative air quality effects are to be anticipated.

The Panel concurs with Express's commitment to develop a monitoring program to measure fugitive emissions of hydrocarbons arising from mainline valves and at pump stations. The Panel recommends that the monitoring plan be developed in consultation with Environment Canada and that a copy of the plan be provided to the Board.

Calculations of GHGs arising from project facilities constitute a negligible proportion of Alberta's and Canada's annual emissions. The Panel finds that it has sufficient information to determine that such emissions would be insignificant and that there would be no significant adverse effects associated with GHG emissions from the Project.

Express states its intention to develop and submit an action plan to deal with greenhouse gas emissions under the federal VCR Program. The Panel recommends that a copy of the VCR plan be provided to the Board. In addition, the VCR action plan should include annual calculations of GHG emissions and be provided to Environment Canada.

With the incorporation of the above-mentioned recommendations, together with the commitments made by Express, the Panel is of the view that the Project is not likely to cause significant adverse environmental effects in regard to air quality.

3.4.3 Noise

3.4.3.1 Identification of Effects and Their Significance

Express undertook a noise assessment for the proposed pump stations, as per the requirements of the EUB Interim Directive 94-4 ("ID 94-4"). Express submitted that mitigation measures would be incorporated, as required, to adhere to the requirements of ID 94-4.

Express noted that the general intent of ID 94-4 is to control facility sound to an extent that the majority of the general public are generally not annoyed by it. Express further noted that this does not imply inaudibility of the sound. ID 94-4 establishes maximum allowable outdoor sound levels based on controlling sound levels at dwellings. Accordingly, lands between a facility and residences are accepted pursuant to ID 94-4 as a buffer zone. However, it is noted that it is the responsibility of the facility operator to address any situations resulting from residential encroachment.

Express noted that the stations are predicted to radiate an A-weighted sound level of 64 to 86 decibels ("dBA") at a distance of 50 m. The sound is expected to be attenuated by 29 to 86 dBA while propagating to the existing nearby, or potential, residences. This yields a predicted sound level contribution due to the pump stations of between 0 to 35 dBA for the sites assessed. The combination of the predicted sound level for the pump stations and the measured, or assumed, nighttime ambient sound level ranged from an energy-equivalent sound level ("L_{eq}") of 28 to 59 dBA.

Express submitted that, based on the requirements set out within ID 94-4, the maximum sound level which should not be exceeded at a point 15 m from the nearest or most impacted dwelling ranged from 33 to 58 dBA L_{eq} for the nighttime period. Express further submitted that, based on a comparison of each pump station's predicted sound level to these maximum sound levels, a margin of safety of between 5 to 57 dBA is predicted. Express concluded that an acceptable minimum impact scenario would exist as the pump stations would meet the ID 94-4 requirements at all sites.

Express committed to meeting a target of 40 dBA L_{eq} at a distance of 1.5 km as recommended in ID 94-4. Express noted that actual compliance to ID **94-4 can** only be determined if sound monitoring is conducted under acceptable meteorological and ground cover conditions once the pump stations have commenced operations.

Express noted that, in its contacts with residents during its noise survey, a resident located approximately seven km from the proposed Wild Horse Bump Station (the closest resident to this station) raised concerns regarding the distance that the sound would travel and the fact that the area is quite quiet. Express noted that in response to the concern it is providing the resident with a copy of its noise assessment and technical data about the engine. Express submitted that the results of its noise assessment showed that there would be no impact on the residence.

Express identified several studies to demonstrate the variability of responses of different wildlife species to noise stimuli. Express stated that it appears that a number of species indigenous to the project area have the ability to habituate to predictable stimuli. Express stated that it does not have enough biological information and response information on some of those rarer species to be able to comment on whether any species indigenous to the project area, and to the proposed Wild Horse Bump Station in particular, would be expected to habituate to the predicted noise levels. Express noted that the general trend is that stationary features within a habitat can be habituated to some degree by

species as long as it is a predictable kind of stimuli such as a constant noise. However, Express noted that it cannot comment with any level of confidence on some species that it has very little information on. In the event that species do habituate to the noise levels of the pump stations, Express noted that it is a possibility that these species would nest or den or rear young in the vicinity of the station. Express noted, for example, that there are a large number of Burrowing Owl nests that occur very close to roads and human structures of one sort or another. Express submitted that it does not anticipate that those species which may habituate to the noise level would necessarily avoid the pump station area if there is good nesting habitat in the area.

Express noted that it does not expect fluctuations in the noise level to any great extent. Express further noted that it would not anticipate any noise, beyond the normal operation of the pumps and motors, that would affect wildlife behaviour.

During the hearing, Express agreed to a proposed condition that it file for Board approval, 30 days prior to construction, its noise assessment conducted in respect of the interconnection booster pumps. Express noted that the location of facilities at the interconnects is being determined and the supplementary results would be forwarded to the Board when complete.

3.4.3.2 **Public Comments.**

AWA/FAN noted that space crowding would occur when construction activities overlap with impacts of other land uses, particularly the Wild Horse Pipeline. While this will be temporary along the pipeline itself, it may persist near above-ground facilities such as terminal and pump stations if they are situated adjacent to existing disturbances.

3.4.3.3 **Proposed Mitigation Measures**

Express indicated that various noise control features would be included in the design of pump station facilities. The noise control features would assist in the attenuation of acoustical energy reradiated from the pump stations and would reduce the sound levels at nearby residential sites and potential residence sites.

At the Hardisty Pump Station (within the Hardisty Terminal), the electric drivers for the pumps may incorporate sound attenuating silencers on the cooling air system. To reduce the amount of sound which is radiated by above ground station piping, the intake and discharge piping at both the Hardisty and Wild Horse Pump Stations would be treated with acoustical pipe lagging or acoustical blankets.

At the Wild Horse Pump Station, the driver engines and the mainline pumps would be enclosed in an acoustical building. Express further noted that acoustical silencers would be provided on the Wild Horse engine exhausts to reduce the acoustical energy radiated to the environment from the engine exhaust stacks.

3.4.3.4 Views of the Panel

The Panel notes the absence of information on the response of species to the increase in noise levels that would result from the operation of the pump stations. Subsection 14(c) of the Board's ***Onshore Pipeline Regulations*** requires that a station be designed so that the noise level during operations does not adversely affect any wildlife known to exist in the vicinity of the station. However, taking into

consideration that there were no habitat features supporting localized concentrations of special status species within 500 m of the proposed pump station sites, Express's commitment to meet an energy-equivalent sound level of 40 dBA at a distance of 1.5 km from the pump stations, and Express's undertaking to monitor the noise levels, the Panel finds that the pump stations have been appropriately designed.

The Panel notes that Express has not filed a noise assessment for the interconnection booster pumps. The Panel recommends that Express be required to file with the Board, 30 days before the commencement of construction, the noise assessment for the booster pumps.

The Panel acknowledges Express's statement that actual compliance to ID 94-4 can only be determined if sound monitoring is conducted. Accordingly, the Panel recommends that Express be required to:

(a) notify the Board of any noise complaint(s) received in respect of the operation of its pump stations and apprise the Board of any measures that have been taken to address the complaint(s); and

(b) file with the Board, within eight months after the commencement of operation of the pump stations, a monitoring report for each pump station detailing the results of an appropriate monitoring program. This report should include, but not be limited to, the noise emission levels at the source, the fenceline and the three closest residences at the maximum operating level.

The Panel is of the view that noise emissions associated with the Terminal and pump stations are not likely to cause significant adverse environmental effects.

3.5 Other Facilities/Issues

3.51 Mainline Valves

3.5.1.1 Site Selection and **Alternative Means**

Express indicated that mainline valves will be constructed at approximately 40 km intervals along the pipeline and on both sides of major watercrossings. Express indicated that the valves will be powered electrically to permit their operation from the Sherwood Park Control Centre. The valves will be located within a fenced area of the right-of-way (approximately 20 m x 18 m), and will be serviced by an all-weather access road.

Express stated that mainline valve locations have not been finalized for the Project. The sites selected for these valves will be well-drained, cleared of vegetation, and accessible on a year-round basis, and would be located to avoid impacts to sensitive biophysical features (e.g. Burrowing Owl nesting areas, historic resource sites). In addition, Express provided criteria that will be incorporated into the site selection criteria process, including:

- maximize the use of existing roads;
- minimize the use of new access roads;

- minimize distance to power grid;
- assess alternate power;
- minimize use of lands for valve sites; and
- minimize distance to water bodies for spill response while maintaining terrain between valve site and nearest water body.

With respect to access roads to mainline valve sites, Express stated that it is committed to minimizing any type of disturbance within native prairie. In siting access roads, Express indicated that, in addition to locating them near existing roads and minimizing disturbance to native prairie, it would avoid wetlands or specific habitat or specific soil conditions. The valve sites would be located out of the zone of potential disturbance from specialized habitat features so that ongoing maintenance work would not encounter those features. Express committed to avoid any special status plant species identified during the spring work and to avoid any sites that indicated high water tables at one time of the year or another.

Express indicated that, if it was necessary to have valves located quite a distance from the existing roads, it would have to look at other alternative means of access, such as helicopters. Express stated that the expected maximum length of an access road that would need to be constructed to a mainline valve that it would consider appropriate would be approximately one km. Express testified that, at this time, it believes that its valve sites, south of the South Saskatchewan River, are all adjacent to roads so that the development of access roads may not be necessary. However, this would be dependent on availability of power.

With respect to power requirements, Express indicated that to reduce the effects of the construction of power lines, it would locate mainline block valves near existing powerlines that are in the close proximity to the pipeline route. Express does not anticipate a problem with minimizing the distances from the mainline valves to the power grid. If the distance is more than five km, Express would consider using an alternative power source. The alternatives identified by Express include solar power for charging batteries and running an electro-hydraulic system or a thermo-electric generator which would also charge batteries and run some hydraulics.

With respect to locating the valves at the Red Deer and South Saskatchewan rivers, Express stated that the valves will be placed above the l-in-100 year flood mark, therefore out of the active flood plain.

In regard to the fact that the mainline valve locations have not yet been finalized, Express indicated that certain details are not known until the detailed design stage with projects such as a pipeline. Express submitted that there is no expectation that every detail is going to be done at the point in time when the Project is evaluated.

3.5.1.2 Identification of Potential **Effects** and Their Significance

The issues associated with the construction and operation of the mainline valves identified by Express include soils, disturbance to native prairie, and wildlife, specifically specialized habitat features. Express's commitment to minimize disturbances to native prairie and special status wildlife species, in regard to siting mainline valves, was discussed above. Also, Express identified situations where alternate power sources may be required.

Express submitted that the completed valve sites and the access roads to the mainline valves will be gravelled, and the site accessed monthly or bimonthly. Herbicides will be used for the sites and will only be applied by a registered applicator.

With respect to the use of alternative sources of power identified by Express, solar power or a thermo-electric generator, Express indicated that the thermo-electric generator would be powered off some fuel, most likely propane. Express indicated that there are no environmental effects associated with the solar panels. With respect to the thermo-electric generator, Express indicated that there would be some minor noise associated with the motor, as well as some gases given off in the burning of the fuel, but the amounts would be minimal.

3.5.1.3 Public Comments

AWA/FAN expressed concerns about the locations of the mainline valves not being known at this time. AWA/FAN indicated that, once the approximate locations for the mainline valves have been' determined, the proponent should undertake to conduct surveys in the appropriate seasons to ensure that these facilities be sited in the most appropriate locations to avoid impacts on species of concern.

3.5.1.4 Proposed Mitigation Measures

Express submitted that, once the locations are finalized, associated environmental assessment and mitigation measures consistent with those used for other facilities will be undertaken.

Express indicated that in the spring, a vegetation inventory, wildlife surveys and historical resources evaluations would be carried out in conjunction with the locations for the mainline valves and access roads. In addition, Express submitted that a soil survey may be required, if any grading or soil disturbance was necessary. Express undertook to file with the Board, 15 days prior to construction, the assessment information and associated mitigation measures regarding the final selection of valve sites.

Express's commitment to minimize disturbance in locating the mainline valves is discussed in Section 3.5.1.1.

3.5.1.5 **Views of the Panel**

Although Express has not finalized the locations of the mainline valves, the Panel finds that the criteria presented by Express in determining the locations will minimize disturbances associated with these facilities.

Adequate information has been provided in regard to the potential adverse environmental effects' associated with mainline valves, which may result from the construction and operation of the proposed pipeline. The Panel is satisfied with Express's commitment to minimize disturbance to native prairie areas, as well as specific habitat features and wetlands areas.

The Panel acknowledges Express's commitment to provide, 15 days prior to the commencement of construction, the fmalized mainline valve locations as well as further mitigation measures based on the additional information to be gathered in the spring-summer. In order to ensure that these measures are

appropriate, the Panel recommends that Express be required to file this information with the Board, for approval.

With Express's proposed mitigation measures and the incorporation of the above-mentioned recommendation, the Panel is of the view that the construction and operation of the mainline valves are not likely to cause significant adverse environmental effects.

3.5.2 Construction Camps and Storage Areas

3.5.2.1 Site Selection

With respect to selecting the location of construction camps and warehouse assembly points, Express provided a list of criteria that it would utilize in order to minimize any potential environmental effects. Express indicated that these criteria would include:

- relatively level ground;
- good accessibility to major roads and utilities;
- good load bearing soils;
- good drainage;
- minimal clearing of trees;
- proximity to local infrastructure;
- minimal disruption to farming;
- avoiding environmentally sensitive areas ("ESA") (e.g. wetlands, nesting areas, cultural sites, etc.);
- taking local landowners concerns into account;
- land and road use suitability with respect to the local municipality; and
- minimizing visual impacts.

Express stated that once sites for construction camps have been selected it would provide public notification of the sites by various means, including where appropriate, newspaper publications, mailouts to potentially affected landowners, meetings with local government officials, and public information sessions. Express further stated that it will ensure that contractors are fully apprised of any concerns raised in regard to construction camps and concerns on local accommodation. Express noted that it will work with contractors and local agencies to resolve any issues that may arise.

Express stated that it does not anticipate that construction camps, equipment storage, or staging areas would be located in the Sage Creek area with the exception that it may utilize the fenced area at the Wild Horse Pump Station for storage of equipment.

Express noted that it has received an offer from the Village of Youngstown to host a construction camp.

3.5.2.2 Identification of Potential Effects and Their Significance

The environmental effects associated with construction camps, warehouse assembly points, and storage areas would not be significantly different from those identified by Express for other aspects of the Project. In addition to these effects, construction camps have the potential to be a nuisance to area residents.

3.5.2.3 Public Comments

AWA/FAN submitted that there is no indication that warehouse assembly points and construction camps will be situated outside of the environmentally significant grassland areas.

352.4 Proposed Mitigation Measures

Express stated that all mitigation measures outlined in the Application, and responses to information requests, apply to warehouse assembly points, construction camps and shoo-flies. Express further indicated that the remediation of these sites will be consistent with Express's reclamation plan and will include the following: re-grading the sites for positive drainage; removal of imported granular material where required; removal of security fencing upon abandonment of the site; and testing, removal and disposal of any contaminated soils upon the site abandonment.

Express committed to further HRIAs for the temporary workspace, mainline valves, staging areas, permanent and temporary access roads, shoo-flies, construction camps and the connections to upstream facilities.

With respect to any contaminated soils, Express indicated that a remediation plan will be filed prior to construction.

3.5.2.5 Views of the Panel

The Panel notes that Express intends to encourage its contractors to meet with hotel/motel managers and campground managers to discuss accommodation requirements. The Panel notes that the housing of workers has the potential to impact on tourism, especially in the event that area campgrounds are utilized by workers.

The Panel notes that Express has stated that it does not anticipate locating construction camps, equipment storage or staging areas within the Sage Creek area. The Panel finds that the criteria provided by Express for the siting of construction camps and warehouse assembly points are appropriate, provided that no sitings occur in ESAs and areas of native grassland. The Panel notes that there is flexibility in the location of construction camps, equipment storage, warehouse areas, and staging areas and recommends that Express be required to locate all construction camps, equipment storage, warehouse areas, and staging areas outside of the ESAs and areas of native grassland.

The Panel recommends that Express be required to contact the operators/managers of all potentially affected campgrounds and apprise the Board of any concerns raised by the responsible operators and how these concerns have been addressed by Express.

The Panel is of the view that, with these recommendations, Express's commitment to work together with local agencies, and avoidance of ESAs and areas of native grasslands, the siting and operation of construction camps and warehouse assembly points is not likely to cause significant adverse environmental effects.

3.5.3 Upstream Facilities

3.5.3.1 Identification of Potential Effects and Their Significance

Express stated, in its application, that no specific upstream oil exploration and development activities can be directly linked to this Project, as the Express Pipeline is designed to carry products from a central terminal which can be fed from a variety of upstream sources. Consequently, the Express Pipeline and its associated ancillary facilities are the sole focus of the Applicant's assessment document.

Express described the facilities which it would need to construct at Hardisty Terminal as: two pipeline headers for interconnection to IPL facilities; two pipeline headers, piping, valves, and a discharge header for interconnection Gibson facilities; and, piping, valves, a discharge header and an interconnect pipeline between the Husky and Express terminals. Site selection for upstream facilities was limited by the location of the various terminals.

Express indicated that upstream facilities required by other companies for connection to Express interconnection facilities are: (a) with respect to IPL, measurement facilities, piping connecting the metering facilities to existing headers, meter proving facilities, piping to the IPL/Express custody transfer point; (b) with respect to Husky, measurement facilities, booster pumping facilities, piping and valves connecting the metering facilities to existing headers, meter proving facilities, piping to the Husky/Express custody transfer point; and (c) with respect to Gibson, measurement facilities, booster pumping facilities, piping connecting the metering facilities to existing headers, additional piping to existing tankage, meter proving facilities, piping to the Gibson/Express custody transfer point. Pipeline installations linking the Hardisty Terminal to existing tankage facilities will be constructed within the August to November 1996 period.

Express indicated that a total of approximately 3 300 m of pipe in 2 200 m of new right-of-way will be installed to link existing tankage facilities with the Hardisty Terminal, in an area that is a mosaic of aspen stands among agricultural fields and industrial facilities. Ditching will occur in Wainwright soils that are prone to wind erosion. These aspen stands are generally mature, with regenerating aspen on their peripheries. A variety of vegetation is found as undergrowth within the stands. The pump station site and the pipeline corridors contain active burrows of Pocket Gophers, Richardson's Ground Squirrels and Badgers. Birds which may be found in the area are Magpies, Red-tailed Hawks, Swainson's Hawks and Great Homed Owls. Aspen stands provide excellent habitat for White-tailed and Mule Deer.

Express indicated that the Terminal would be located on previously cultivated pasture and the interconnecting pipelines would be located on the edge of existing utility corridors which currently intersect aspen stands and one small cattail wetland. Express indicated that some clearing along the perimeter of some aspen stands, a total of 1.3 ha, will be required and that the wetland had previously been disturbed. There will be no unique or unusual botanical features affected by the clearing. Existing, cleared easements would be used for temporary workspace in nearly all cases. The possibility exists for the use of existing right-of-way that is no longer in use for a portion of the line connecting to IPL facilities. The intensity of existing land use has undoubtedly caused some reduction in habitat effectiveness in the area. Long-term loss of wildlife habitat will be restricted to forested portions or to shrub stands cleared for new right-of-way. Short-term sensory disturbance and wildlife displacement may occur during construction of the pipelines; however, such disturbance will avoid the

reproductive periods of wildlife in the area. Express indicated that impacts would be negative, both short-term and long-term, subregional events of low magnitude. Express's conclusion is that any potential environmental effects will not be significant.

Express argued that the described facilities constitute all of the new facilities that are required to be constructed by Express or other companies for the operation of the Express Pipeline Project and to ensure the availability of the volumes forecast to be transported by Express.

3.5.3.2 **Public Comments**

RMEC stated that the factors required to be considered under subsection 16(1) of the CEAA include more than the specific environmental effects of the Project but also "any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out". RMEC further stated that upstream sources of oil now and in the future, for the life of the Project, are not only possible, likely or even probable, they are essential to the Project.

With respect to upstream facilities, RMEC submitted that the Express Pipeline Project will result in new exploration and development of conventional crude oil supplies and the expansion of existing and the opening of new bitumen mines or in-situ recovery projects during the economic life of the Project. RMEC provided evidence in regard to the cumulative effects of upstream developments.

3.5.3.3 Proposed Mitigation Measures

Express indicated that the propensity of soils in the area towards erosion by wind requires the use of certain measures, such as tackifiers and straw crimping both during and after construction. Clearing will be limited to edges of aspen stands and existing cleared areas will be used for temporary workspace. In addition, the potential exists to use existing right-of-way, no longer in use, for part of the pipeline to the IPL terminal facilities. Reclamation of excavated areas will be done in accordance with the Draft Reclamation Plan.

3.5.3.4 Views of the Panel

The Panel, in a ruling from the bench (Appendix IV at pages 184 to 188), confirmed the scope of the Project, as being in accordance with the Minister's letter dated 13 September 1995. In that letter, the scope of the Project was to include accessory physical works, such as " . . . any upstream facilities that would need to be constructed to enable the principal project to proceed". The Panel considered the "accessory physical works" as those required to be built to make possible the commencement of operation of the principal project. They would be minor in nature in relation to the principal project and be interdependent with it. The Panel further ruled on the consideration of cumulative environmental effects.

The Panel finds that the effects of the construction of upstream facilities described by Express are limited in extent and magnitude. They are, with the exception of minor loss of habitat, short-term in duration and will occur only during actual construction. The application of wind erosion and reclamation measures will serve to mitigate any adverse effects of the excavation activities.

The Panel recommends that, once the Draft Reclamation Plan is finalized, the measures for the reclamation of excavated areas upstream of the Hardisty Terminal be implemented.

The Panel is of the view that there is not likely to be any significant adverse environmental effects related to the construction and operation of the upstream facilities associated with the Express Pipeline Project

3.5.4 Heritage and Archaeological Resources

3.5.4.1 Identification of Effects and Their Significance

Express, as part of its application, submitted a HRIA 1995. A total of 222 historical resource sites within the project area were assessed, and based on the results of the assessment, none of the individual sites were found to be, in Express's view, of sufficient significance to require complete avoidance. The sites included 11 isolated finds, 38 artifact scatters, 28 campsites, 135 stone feature sites, and 10 historic homestead related sites.

Express noted that the HRIA is being reviewed by the Cultural Facilities and Historical Resources Division of Alberta Community Development ("Alberta Community Development") and that a letter accepting the HRIA and stipulating the final mitigation measures would be provided to Express. Further HRIAs for the Hardisty Terminal, temporary workspace, mainline valves, staging areas, permanent and temporary access roads, shoo-flies, construction camps and the connections to upstream facilities will be conducted. Express further- noted that the Royal Tyrrell Museum of Palaeontology has reviewed the HRIA and concurs with the recommendations for palaeontological monitoring set out therein.

Express noted that it had contacted 16 First Nation groups regarding the Project: Lucky Man; Mosquito Grizzly Bears Head; Red Pheasant; Little Pine; Poundmaker; Sweetgrass; Ermineskin First Nation; Frog Lake First Nation; Kainaiwa First Nation; Siksika First Nation; Samson Cree Nation; Montana Band; Louis Bull Band; Peigan Nation; Onion Skin Band; and the Nikaneet Nation. Express noted that telephone contact was made with each of these 16 First Nation groups during the fall of 1995 and that copies of the HRIA, in addition to other environmental information, had been provided.

Express noted that it had met with four of the First Nation groups and plans on follow-up meetings. No concerns were raised by the four First Nations. Express has committed to meet with each of the First Nation groups and advise the Board with respect to any concerns raised.

3.5.4.2 Public Comments

RMEC stated that pipeline construction could result in impacts on the aesthetic, recreational and research value of archaeological and historical resources. RMEC noted that, in addition to possible damage to palaeontological resources, access to remaining resources could also be reduced.

3.5.4.3 Proposed Mitigation **Measures**

Express stated that it would reduce the impacts to historical resources located within the right-of-way. In instances where archaeological features are located in the temporary workspace, Express would restrict construction activities to avoid unnecessary impact. Express further noted that pipe laying

techniques can be altered to accommodate site avoidance, and that techniques such as boring may be used to avoid sites if required by Alberta Community Development. Express noted that re-routes have been considered but are not feasible due to the density of sites.

Express stated that an archaeologist would be present to identify each site and to supervise the staking and erection of temporary (snow) fencing to flag sites, as required. Staking would be completed by Express immediately prior to any construction activity in the site area, and will remain in place until reclamation is undertaken. The archaeological sites would also be clearly identified on the plans. Express further stated that pre-construction worker awareness programs would also be completed to ensure that surface impacts would be avoided.

Express noted that the provisions to detect any previously unidentified archaeological sites would be two-fold. First, archaeological monitoring has been recommended for those areas with the highest potential for intercepting previously unrecorded sites. As construction approached these areas a qualified archaeologist would be present to monitor construction activities. The archaeologist would make recommendations for any additional mitigation measures, as required. Second, for those portions of the right-of-way that would not be monitored by an archaeologist, the Environmental Inspector would be responsible for reporting the discovery of previously unknown archaeological sites as per the provisions of the *Alberta Historical Resources Act. The* Environmental Inspector would halt the work in the vicinity of the find until the significance of the find has been assessed and recommendations were made regarding additional mitigation measures, if necessary. Express submitted that in order to facilitate the recognition of archaeological sites by the Environmental Inspectors, a preconstruction meeting would be held to brief the Environmental Inspectors regarding the potential types of cultural material which could be encountered. The appropriate procedures in the event of an unforseen discovery would be reviewed with Express personnel prior to construction.

Express stated that it would conduct palaeontological monitoring in accordance with the recommendations set out in the HRIA. The palaeontologist would collect any specimens and make any recommendations for halting work and/or mitigation as necessary.

3.5.4.4 **Views of the Panel**

The Panel finds that the measures identified by Express to mitigate impacts on archaeological, palaentological, and historical resources are appropriate.

The Panel, however, is concerned about the potential for disturbance and/or destruction of stone features in the project area. Accordingly, the Panel emphasizes the importance of the pre-construction worker awareness programs, to which Express has committed, and in addition, the need to alert workers to avoid disturbance of stone features. The Panel further notes that access to the right-of-way should be controlled and traffic should be prohibited off of the right-of-way, except for designated access routes.

The Panel also notes the importance of contacting First Nation groups regarding the HRIA. Accordingly, the Panel recommends that Express file with the Board, at least 30 days prior to the commencement of construction:

(a) confirmation that all of the First Nations identified have been contacted, and afforded an opportunity to identify any concerns that they may have with the proposed routing;

(b) a summary of First Nations' concerns and how these concerns have been addressed by Express; and

(c) comments received from Alberta Community Development, including any further mitigation.

The Panel is of the view that, with the implementation of the measures identified by Express, the Project is not likely to cause significant adverse environmental effects on archaeological, palaeontological, or historical resources.

3.6 Cumulative Environmental Effects

3.6.1 Approaches to Assessment

An assessment of cumulative environmental effects is a new requirement in the federal environmental assessment process. As a result, and in light of the considerable amount of hearing time spent on this topic, the Panel is of the view that it would be useful to first consider the appropriate approach to cumulative effects assessment before actually examining those effects.

3.6.1.1 Applicant's Approach

Express testified that there are many methods of examining cumulative environmental effects and no single definitive approach. The approach, or combination of approaches, is tailored to the nature of the Project being assessed and the types of impacts it is likely to have. Express stated that it adopted, with minor modifications, the broad guidelines issued by the former Federal Environmental Assessment Review. Office for undertaking a consideration of cumulative environmental effects. This approach involves the steps of scoping, analysis, mitigating, determining significance and follow-up.

Scoping for the purpose of the assessment involved the identification of Valued Ecosystem Components ("VECs") and the selection of spatial and temporal boundaries.

Express referred to the Environment Canada definition of VECs as a "character of the environment that, when measured, quantifies the magnitude of stress, habitat characteristics, degree of exposure to the stressor, or degree of ecological response to the exposure". The definition was relied on by Express to bring out what sort of features are considered as VECs, not to pose a cumulative effects methodology. For the cumulative effects assessment of its proposal, it identified migratory birds, fish and flora/faunal species on the current COSEWIC list as VECs.

To consider VECs, Express focussed its study on species it considered to be vulnerable to the types of localized impacts that would result from a pipeline project. Vulnerability was determined on the basis of special status and the degree to which localized impacts from a pipeline could reasonably affect the population of the species in question. As a result there were various levels of VEC status.

It noted that information on individual species within those groups is not available in sufficient detail to address cumulative environmental effects in a meaningful way, so the VECs were combined into larger groups and the relative effects considered on those larger groups. The information deficiencies for some species included detailed habitat requirements, status and their interaction with various land use practices. There are no established regional guidelines or management plans for many of these species.

Express established spatial and temporal boundaries for the examination of the cumulative environmental effects. The Applicant first determined the study area, which it circumscribed on the basis of ecodistricts. For the purpose of identifying other projects that could act cumulatively with the Project, it considered a 100 km wide corridor. It set a study period of three years from the start of construction as the temporal boundary for the assessment on the basis that it reflected the time period that the project-related activities and impacts would likely be prevalent within the study area, other than for the permanent above-ground facilities.

It then looked generally at how past projects and activities have affected or stressed the VECs. It provided qualitative information on the land disturbances and stresses the ecodistricts are under, which information it considered adequate for the type of impacts associated with the Project. Express stated that effects on habitat, ESAs and VECs had occurred from existing land use practices and provided information on these effects.

It identified other projects and activities occurring or planned in the study area. The projects identified included: the Wild Horse Pipeline Project; three smaller pipeline projects[1]; a proposed IPL expansion of its mainline system from Edmonton, Alberta to Cromer, Manitoba; a recently announced plan of Gibson to construct a pipeline between Hardisty and Elk Point, Alberta; and agricultural and grazing operations. In relation to th.e latter, Express noted that it could not be expected to provide land use changes initiated at the individual landowner or occupant level.

The relationship between the effects related to the Project and the effects related to these other projects and activities was considered. Express noted that cumulative effects assessment should be viewed as a regional integrated land use planning tool which evaluates incremental impacts from a proposed project within the context of regional land use objectives. Express stated that due to a lack of objectives this cannot always be done. In its evaluation, Express used thresholds where they were available, as in its assessment of noise but noted that for most VECs, objectives, management plans, and guidelines are not available. Therefore it considered some cumulative effects quantitatively and some qualitatively. For example, Express provided a qualitative assessment of land use disturbances. A more quantitative assessment was done when Express thought its Project was contributing to existing stressors in the environment, such as air emissions at Hardisty. Express stated that it also consulted with government departments knowledgeable about the potential effects in the study area, landowners in the area, and land managers.

In cross-examination, one of Express's witnesses described some of the many approaches available to undertake cumulative effects assessment and indicated that Express used mapped information and the "ad hoc committee" approach, an approach which seeks to bring in information from a wide variety of

[1] NOVA Gas Transmission Ltd.'s ("NGTL") Ralston Crossover Lateral Loop of 17 km. and Suffield Lateral Loop of 23 km. NGTL also proposed a Sweeney Creek Lateral of 28 km.

people. Mr. Eccles of Axys described Express's approach as a "project based assessment" which he said is a "catch all". Their assessment method, he stated, was a "combination of approaches". In relation to Express's use of mapping, he acknowledged that Express had not mapped the distribution of habitats or species in the study area outside of the right-of-way. He also acknowledged that specific questions about cumulative effects were not asked in the consultation process. Express was of the view that its consultation with government officials, landowners and land managers would have brought out concerns about cumulative effects if they existed. Mr. Eccles stated that Express's consultation process was not a structured committee approach.

The approach to a cumulative effects study, Express said, should be based on the types of impacts the Project will have. Express considered its approach appropriate for an assessment of the cumulative environmental effects of its application, because it is developing a right-of-way which will be reclaimed and will only cause a short-term disturbance. Furthermore, it will be undertaking a reclamation program utilizing only native grassland species. It is not developing a paved highway or an irrigated agricultural practice over several sections of native prairie that would result in a long-term loss of that prairie. In the broad view, it found the nature of the incremental increase in loss resulting from the Project would not alter the ecological condition, nor approach any thresholds where thresholds are known.

Express's written evidence noted that the CEAA requires that every assessment conducted by a review panel consider cumulative environmental effects and the significance of those effects. They characterized this part of their evidence as an "assessment of cumulative impacts". In cross-examination, Express, however, stated that it has not provided a cumulative effects assessment as it is not required to do so. The CEAA, it argued, requires only a consideration of cumulative effects. Therefore, it has provided information on where it anticipates cumulative effects will occur and their relative significance. Mr. Eccles stated that a cumulative effects assessment takes on regional and land use planning connotations. It is not the responsibility of a single proponent and requires input from regional resource planners and managers, other interested stakeholders and landowners. What is needed to undertake a true cumulative effects assessment is a strong regional plan, regional objectives for land-based disturbances and thresholds for incremental impacts.

In cross-examination the Applicant stated that there is not a good information base for any kind of land use disturbance that results in a differing capability of the land base. Express stated that in this case, the reclaimed right-of-way will go back to a comparable habitat situation to what it is now. There will be a short-term disturbance period and then, following reclamation, the pipeline will not be adding incrementally to the cumulative loss of native prairie.

Express came to the conclusion that the Project would have no long-term cumulative environmental effects, other than air and noise emissions and the loss of habitat from the Terminal and pump stations. With the implementation of routing modifications, timing restrictions and other specified protection and reclamation measures there is no ecological justification to assume the sustainability of the native floral and fauna communities will be jeopardized by the Project. Impacts to VECs after proposed mitigation would primarily be localized to sub-regional, be short- to medium-term in duration, be of low magnitude and can be assimilated. Express noted the need for the development of provincial land use objectives and guidelines.

3.6.1.2 Public Comments

AWA/FAN was of the view that the approach to an examination of cumulative environmental effects by the Applicant was inadequate. It submitted that one has to look beyond the use of COSEWIC listed species for VECs. AWA/FAN stated that the analysis of cumulative effects did not include factors they considered relevant and the Applicant should have undertaken further expert consultation. The Applicant itself, they said, stated that it was not doing a cumulative effects assessment.

RMEC pointed out that the CEAA requires that cumulative effects that are "likely" to result from the Project in combination with other projects or activities are to be assessed. It was of the view that the Applicant has not properly done so because it took the position that "there is an effect but it is not significant; therefore we cannot consider cumulative effects". However, RMEC stated that cumulative effects must first be considered and then their significance assessed. Significance should be considered in relation to biological significance or criteria and within the context of existing public policy.

RMEC was of the view that the assessment was flawed in other ways as well. It relied on VECs, and furthermore in selecting those VECs, relied on a COSEWIC designation as the criteria. It argued that the timeframe selected for the study of two to three years was not appropriate. An appropriate timeframe would have been 20 to 100 years. In conclusion RMEC submitted that the Applicant had failed to meet the obligations of the CEAA and its application should be dismissed.

3.6.1.3 Views of the Panel

In the Panel's view, the place to begin when considering the approach used to undertake a cumulative effects assessment is with the requirements of the CEAA. The Panel outlined those requirements in its Ruling dated 17 January 1996 and set out in Appendix IV at pages 184 to **188** of this Report. In that ruling the Panel determined the scope of the Project subject to an assessment of its environmental effects. It then found that a cumulative effects assessment involved a number of steps.

First there had to be an environmental effect of the Project subject to assessment. Then, that environmental effect needed to operate cumulatively with the environmental effects from other projects or activities. It must be known that those projects or activities have been or will be carried out and are not hypothetical. The Panel agrees with the submission of RMEC that it is a further requirement that the cumulative environmental effect is likely to result. In the Panel's view, this means there must be some probability, rather than a mere possibility, that the cumulative environmental effect will occur.

The Panel realizes that cumulative environmental effects assessment is an evolving science with no single methodology. It agrees with the submission of the Applicant that the method of undertaking such an assessment will vary, depending on the nature of the Project and its environmental effects. Even within the cumulative effects assessment of one project, the method of assessing those effects can vary from one effect to another.

In this case, the Applicant retained Axys which utilized the services of a number of experts knowledgeable in environmental matters, including Dr. David Walker, an expert experienced in reclamation matters and Ms. Marilyn Neville, who has extensive experience in reclamation projects in arid rangeland. The Applicant first undertook an assessment of the environmental effects of the Project and developed mitigation measures as necessary. In some instances an assessment of the significance of those environmental effects involved a consideration of the existence of similar prior or

present effects in the surrounding environment. To undertake a cumulative effects assessment, the Applicant then established what new projects or activities will be carried out, provided information on the existing environment and defined the temporal and geographical boundaries of its examination. It then examined the cumulative environmental effects.

In some instances, such as noise and air emissions, where the environmental effects of the Project were readily measurable, Express undertook an objective, quantitative assessment using established guidelines. In other instances, it undertook a more qualitative and subjective analysis, relying on a consideration of the VECs and consultation with landowners and knowledgeable government representatives.

Finally, the Panel notes that considerable time was spent in argument on the issue of whether Express had to undertake an assessment of the cumulative environmental effects of the Project or only a consideration of those effects. Express was of the view that there need only be a "consideration" of the cumulative environmental effects. It is apparent from the evidence that Express had a specific'type of assessment in mind when it referred to a "cumulative environmental assessment". This undertaking would be done on an integrated regional planning basis and requires the establishment of guidelines and thresholds by local, provincial and federal government departments. This, the Applicant stated, cannot be done in this case as those guidelines and thresholds are not in place.

No such definition of cumulative effects assessment is contained in the CEAA. That the Panel is required to undertake an assessment which includes a consideration of any cumulative environmental effects of the Project is clear from the wording in subsection 16(1). It provides that the cumulative environmental effects must be considered, and then evaluated when their significance is addressed. The end result of those steps in combination, consideration and evaluation, is an assessment. Those steps occurred in this case. Therefore an assessment was carried out.

The Panel notes that the evidence about the Applicant's approaches to cumulative environmental assessment was not provided in a systematic fashion. It is found in the written evidence, the answers to Information Requests posed by the Panel and by other parties, and in the transcripts of the cross-examination of Express's environmental witnesses by Intervenors and Counsel to the Panel. The Panel is satisfied with the evidence of Mr. Eccles and the environmental experts retained by Axys on their approach to the cumulative environmental effects assessment. Their evidence was poorly presented, but overall it adequately described their varied approaches to the cumulative environmental effects assessment undertaken in this case and enabled the Panel to undertake the necessary cumulative effects assessment.

In the Panel's view these approaches were appropriate in this particular situation. Each assessment is unique and there is no single prescribed method for undertaking an analysis of cumulative environmental effects. The nature of the Project, its environmental effects, the significance of those effects, the proposed mitigation measures, the likelihood of cumulative environmental effects occurring and the nature and extent of those effects are all factors to be considered when deciding on the method or methods to be used to assess cumulative environmental effects.

The Panel finds that the method of undertaking a cumulative environmental effects assessment can vary from project to project and even within a single project. It can include the kind of regional planning-based assessment described by the Applicant, and it can include other methods of assessment as well. In this case, as the Applicant noted, a regional planning-based assessment was not possible

and the Applicant relied on other acceptable approaches to provide the information necessary for a cumulative environmental effects assessment.

The Panel notes that the *Responsible Authority's Guide* upon which the Applicant relied, also takes this approach. It states that in situations where there is uncertainty "available information and best professional knowledge and judgment should be used. In most cases, only qualitative assessments of cumulative environmental effects will be possible".[1] The Panel realizes that this document is only a guide, but is of the view that it supports the Panel's finding that a consideration of the acceptability of the Applicant's approach to cumulative environmental effects assessment must be based on the facts of each situation.

3.6.2 Assessment of Cumulative Environmental Effects

3.6.2.1 Identification of Potential Effects and Their Significance

3.6.2.1.1 Other Projects and Activities

In the previous sections, Express indicated that there are environmental effects associated with the proposed Project, such as on vegetation, wildlife, fish and fish habitat, air quality, and agriculture. With respect to existing projects and activities, Express identified various land use activities such as agriculture, grazing, oil and gas development, and roads, which have effects similar to those of the proposed Project.

Express indicated that it can be safely assumed that migratory birds and native floral and fauna1 communities within the study corridor are experiencing cumulative environmental effects from a variety of land use practices. Forty-one percent of the pipeline route falling within the Aspen Parkland Ecoregion encounters land under cultivation practices, although various degrees of clearing and grazing have also occurred along much of the remainder of the route. For the Mixed Grass and Dry Mixed Grass ecoregions, approximately 18% of the pipeline route encounters lands under obvious cultivation, although historic cultivation as well as pasture improvements and current grazing pressures have both worked to modify the natural vegetation communities along most of the route. Express stated that such reductions in the natural land base have resulted in population declines for most species occurring in the area, forcing some species into rare or endangered population designations. With respect to actual land uses, it indicated that approximately 9 km of the route encounters aspen/shrublands, 257 km native grasslands, 53 km improved pasture, and 115.5 km cultivated or haylands.

Express submitted that, although the majority of habitat disturbance has been agriculturally related, other land uses, including oil and gas exploration and development, are contributing to localized losses of habitat, both on a permanent (e.g., permanent facilities) and temporary (e.g., disturbed right-of-ways) basis. Express stated that agricultural expansion represents the most significant future threat to the VECs in question, and the degree to which such expansion will occur cannot be easily predicted. Although climatic limitations (particularly low precipitation levels) will control agricultural expansion to some degree in the grassland ecoregions, Express submitted that increased grazing pressures and irrigation practices could result in the future modification of large tracts of native prairie.

[1] **FEARO,** ***Responsible Authority's Guide 1994,*** **p.** ***146-147.***

From a fisheries perspective, Express indicated that the degree to which land use activities have collectively impacted the resident fish populations within the study area is less clear. However, Express submitted that agricultural land is undoubtedly contributing sediment and nutrient run-off into creeks and rivers in some areas, and the productive capacity of some streams may have been modified as a result. Express indicated that oil and gas-related impacts tend to be more short-term in nature, and are largely related to sediment introductions into streams from instream activities or poor initial reclamation on right-of-ways on approach slopes or banks of streams.

With respect to future projects and activities which will be carried out, Express held discussions with the AEP (Land Reclamation Division), EUB and the Palliser Regional Planning Commission (Hanna) on August 30, 1995. It determined that, with the exception of the Express Pipeline, other planned projects include the Wild Horse Project, NGTL's Ralston Crossover Lateral Loop (17 km), NGTL's Suffield Lateral Loop (23 km), NGTL's Sweeney Creek Lateral, IPL's Expansion Project (including a tank at Hardisty), and Gibson's proposal for a 146 km pipeline between Hardisty and Elk Point, Alberta, and there are no other known industrial developments of any size which have been approved or are currently in the approval process for the study area. Other activities which may impact the project area are essentially limited to agricultural operations. Express stated that it cannot be reasonably expected to provide the Board with land use changes initiated at the individual landowner or occupant level. It submitted that individual decisions to break an area of native prairie or return cultivated land to pasture are not subject to regulatory review or record and it has no access to this type of information.

Express stated that it is known that the Wild Horse Pipeline, which would parallel the southern third of the Express Pipeline, is scheduled for summer 1997 construction. The majority of the impacts associated with actual construction activities on the Express Pipeline (e.g. displacement of wildlife in the vicinity of the right-of-way, sedimentation at river crossings) should have been assimilated by the ecosystem prior to the onset of construction of the Wild Horse Pipeline. Express further submitted that it is possible that the Express right-of-way will not have been reclaimed to a condition suitable for nesting songbirds by 1997, and this impact will be additive with right-of-way disturbance from the Wild Horse Pipeline.

With respect to the approved Wild Horse Pipeline, Express stated that time crowding becomes of significance where the overlapping impacts from two or more projects combine to exceed a particular threshold which would not otherwise have been exceeded by impacts from any one project. By exceeding a threshold, Express indicated that the resource in question will demonstrate altered stability or population trends. Since impacts from construction of these pipelines on biophysical resources will be localized and of low magnitude in both cases, there is little ecological basis for assuming that the time crowding nature of their impacts will be of consequence to local resources, although it will extend the period of disturbance (by one year) and will broaden the physical dimensions of right-of-way disturbance by approximately 20 m in most areas.

Express indicated that an easement will not be shared with the Wild Horse Pipeline where the pipelines enter pump station or compressor station facilities. In addition, Express submitted that easement sharing may not be possible for short stretches on steep slopes, where heavy grading practices in close proximity to any existing pipeline could pose a threat to human life and pipeline integrity. With respect to the sharing of easements at the South Saskatchewan River crossing, Express submitted that ditching operations must be well-removed from existing adjacent operating pipelines to

ensure that ditch slumping does not jeopardize the integrity of the adjacent pipe. Express submitted that this typically eliminates the potential for shared easements at river crossings.

3.6.2.1.2 Project Effects

In evaluating cumulative environmental effects, Express submitted that it used a threshold approach for air emissions, a quantitative approach for wildlife around the Hardisty Terminal, a threshold approach of no net loss for fisheries, and a qualitative approach to landscape ecology and species biology for wildlife. With respect to long-term cumulative effects, Express indicated that the only long-term effects would be the air emissions, the incremental loss from pump stations of habitat, and the incremental long-term addition to noise from the pump stations.

Pipeline - Vegetation

Express indicated that the proposed Sweeney Creek Lateral intersects the Express route south of the Hardisty Terminal in Township 39, while the other two NGTL projects are located no closer than two km to the proposed Express routing. Express indicated that the physical effects of these lines (e.g., disturbance of native vegetation) will not have been assimilated by the ecosystem prior to the construction of the Express pipeline. Therefore, Express submitted that the projects will contribute in an additive although localized fashion to native grassland disturbance in the area. Express subsequently indicated that the proposed Sweeney Creek Lateral is currently on hold.

In regard to the quantification of the extent or distribution and the status of native prairie, Express submitted that, if the Express Pipeline Project were a paved highway, and it represented a long-term loss of native prairie condition, then Express would have undertaken more efforts in quantifying how much of the land base had been altered and the relative significance of cumulative impacts from the highway. Express further submitted that it does not feel that the right-of-way is contributing to the long-term incremental loss of prairie.

Express stated that there will be a short-term disturbance period, and then following reclamation, it will not be adding incrementally in the cumulative loss of native prairie. Express testified that the effects of this Project are not acting incrementally with other land use changes that are removing native prairie habitat. Express's evidence and views on reclamation are presented in the vegetation section. In summary, Express stated that the reclaimed right-of-way will go back to a comparable habitat capability as it is at the present time.

Pipeline - Wildlife

Express stated that the majority of the project-related effects on botanical/terrestrial VECs will be additive to those resulting from other existing land uses. However, it further stated that, because the right-of-way in non-cultivated areas will be reclaimed to a stable grass mix and will be allowed to recolonize to native vegetation (including shrubs), the majority of the Project's physical effects will be assimilated by the ecosystem within the three year time frame and will not represent long-term additive effects to the VECs. Express argued that construction activities will result in a short-term displacement of wildlife away from the active corridor during construction, in addition to a medium-term localized reduction in habitat suitability on the actual right-of-way for some species during the period of vegetation re-establishment.

Express testified that there are various levels of stress from different land-use practices and human activities and any incremental stress that Express is placing on any of these species would not be noticeable on a broad scale. Express acknowledged that there was an effect on wildlife species; however, Express felt that the nature of the effect was such that it would be assimilated in the short-to-medium-term and not contribute incrementally in the long-term.

With regard to the Express Pipeline, Express stated that the incremental disturbance from pipelines is small relative to agricultural practices, particularly where the pipeline is reclaimed to a community similar in physical structure to pre-construction conditions. Express also submitted that, because land use over the pipeline right-of-way will not change from pre-construction conditions (except at permanent facility sites), Express does not believe that significant habitat fragmentation will occur as a result of pipeline construction.

With respect to Gibson's proposed Hardisty to Elk Point Pipeline, Express indicated that it will result in some right-of-way development in the vicinity of Express's proposed Hardisty Terminal. Any clearing of native vegetation communities by the Gibson Project will add incrementally to habitat losses or modifications from other existing and future land uses in the area. Given the narrow linear nature of such impacts and the degree of existing land use disturbance in the area, Express stated that it is unlikely that disturbance-related impacts in late summer-fall cannot be accommodated by local wildlife species.

Pipeline - Fisheries

Express indicated that under current plans, the Wild Horse Pipeline would be constructed upstream of the Express crossing approximately one year after the Express installation, with the pipelines likely being separated by 25 m. Express assumed similar deposition patterns from Wild Horse trenching activities as that from Express, with all but 25 m of the deposition zone overlapping that of the Express zone. It stated that the combined zone of deposition would be 0.24% of the total aquatic habitat available for the South Saskatchewan River in Alberta. In addition, the adverse effects from deposition would likely be extended. temporarily for an additional one to two years, and the river system would take longer to assimilate the deeper deposits resulting from two trenching events. Express anticipated, however, that these combined events would still represent a low magnitude impact to stream productive capacity because of natural bedload dynamics.

If both crossings require blasting, Express indicated that any fish mortalities resulting from such activities represent additive (time crowding) effects on local fish populations. It stated that the lethal blast zone for the Project will represent less than 0.2% of the available aquatic habitat in the South Saskatchewan River and will be entirely situated in habitat that has been categorized as Run Habitat (equivalent to non-critical DFO Class II habitat), where fish numbers are naturally low. Express noted that geotechnical information suggests that blasting requirements will be unlikely in the bedrock formations encountered.

With respect to the sturgeon, Express submitted that it did not feel that the Project was incrementally adding to stresses on sturgeon from current human activities and dams and obstructions. Express submitted that the impacts of the Project were of a short-term nature that would be assimilated by the river. Express stated that, even in combination with the Wild Horse Project impacts, this Project will not contribute to any chronic cumulative reductions in the productive capacity of the South Saskatchewan River.

Terminal and Pump Stations - Loss of Habitat

Using recent (1992) air photos, a breakdown of land use was undertaken by Express within a two km radius of the proposed Terminal site. Express indicated that the predominance of land altered by agriculture or industrial development (i.e. 67%) has undoubtedly eroded the habitat capability of the land based around the Terminal for many indigenous species, particularly those requiring more abundant forest and shrubland cover for certain life requisites. It submitted that construction of the Terminal will not contribute to additional clearing of such communities, although it will convert approximately 20 ha of improved pasture to non-vegetated area. It stated that this loss of improved pasture area will not noticeably impact the regional capability of the land base to support wildlife.

Express submitted that there will be incremental losses of habitat at the pump stations or any of the permanent above-grade facilities, however, those are very localized features. It further submitted that it was not going to be approaching any thresholds because of the small nature of these incremental effects. Express also indicated that the Wild Horse Pump Station will occupy a minute quantity of Pronghom Antelope range and will not add significantly to cumulative effects.

Express stated that, in general, the pump stations have been located to avoid significant botanical habitat features, and each will represent a very localized loss of 1.6 to 2.0 ha of native vegetation and wildlife habitat suitability which will not contribute measurably to decreased population sustainability.

Terminal and Stations - Air Emissions

Express calculated the GHG emissions from the Wild Horse Pump Station and, under protest, at RMEC's request, also calculated emissions from electric generation assumed to supply the electric motors at the remaining Project pump stations. Emissions of CO, due to the Wild Horse Station itself amount to 0.0159% of Alberta's, and 0.0044% of Canada's emissions for 1990. Express noted that the incremental emissions attributable to electric power are already accounted for by TransAlta's VCR action plan but calculated that the total emissions attributable to electric power and Wild Horse Station would contribute a 0.1159% increment over Alberta's 1990 CO, emission total, and 0.0318% of Canada's 1990 emissions. Express held the view that these emission levels would have no measurable environmental effect. Moreover, Express noted that inclusion of incremental emissions due to electric power generation would amount to a double counting of emissions in Alberta.

With respect to IPL's proposed additional tank at Hardisty, Express submitted that this tank will likely contribute additional hydrocarbon, benzene, and reduced sulfur compounds into the regional airshed, although the exact composition of hydrocarbons is not known. It concluded that, as a floating roof structure would be planned for the tank, the incremental emissions are not expected to significantly alter existing emission levels, air quality or health risks.

Express stated that the effects on air emissions of its Project are insignificant. Express testified that it felt that it was not going to be approaching any thresholds because of the small nature of these incremental effects.

Terminal and Stations - Noise Emissions

Express stated that the incremental long-term addition to noise from the Terminal and pump stations would be a cumulative effect. Express noted that, based on its ambient sound surveys and predicted

sound level contributions, the predicted sound levels due to the operation of the pump stations would not exceed the ID 94-4 Permissible Sound Levels at nearby residential, and potential residential sites.

3.6.2.2 **Public Comments**

With respect to Express's comment about agricultural expansion representing the most significant future threat, AWA/FAN submitted that, while this is true, this points out the need to raise awareness about the importance of significant parkland and grassland habitats through environmental assessment and hearings such as those on the Express Pipeline Project. AWA/FAN indicated that this is precisely the reason that its critique is concentrating on the need to avoid any remaining significant areas or relatively undisturbed land so that the option remains to conserve key parkland and grassland ecosystems.

AWA/FAN stated, under cross-examination, that the construction and all the post-construction activities associated with the pipeline represent cumulative activity in the area. Increased traffic on the roads is cumulative in the area. The pump station construction and the power lines are all cumulative. AWA/FAN further stated that any exotic species or species changes associated with all this construction and activity also represents a cumulative change to what the natural "ecosystem" is at the present time.

RMEC, in its evidence, provided a discussion of cumulative effects of the Express Pipeline Project with respect to routing and upstream oil and gas development. RMEC argued that the assumption that because one cannot identify it precisely, therefore it cannot be assessed, is a wrong assumption. RMEC submitted that it provided in its evidence a description of a number of proposed projects upstream and a connection has been established. RMEC argued that evidence on upstream and downstream impacts should be examined closely. It further argued that by far the greatest effects from the Express Pipeline Project on fish and fisheries will be felt in the upstream development areas.

RMEC indicated that it compiled data on road and seismic lines in the area and that based on the results, Express should re-route the proposed route so that it does not fragment those remaining blocks of undisturbed grassland habitats found within the pipeline corridor.

RMEC stated in its evidence that GHG emissions attributable to the Project including those emissions from upstream facilities would constitute a significant cumulative effect. Canada's incremental increase of GHGs in 2000 are projected to be 74 Mt of CO, equivalent above 1990 levels. In the view of RMEC, the emissions attributable to the Project would jeopardize Canada's ability to meet its commitment to reduce emissions in 2000 to 1990 levels.

RMEC indicated that the information presented does not allow the Panel to consider cumulative effects in a meaningful way and is demonstrated from a quote by Express, "Information on individual species within these groups is not available in sufficient detail to address CEE [cumulative environmental effects] in a meaningful way".

3.6.2.3 **Proposed Mitigation Measures**

Express stated that: "Shoemaker (1994) suggests that no net loss is a reasonable objective for any VEC, and that mitigation should be implemented which eliminates significant degradation to a VEC. While there is little ability of the Project or any other project involving surface disturbance in native

habitats to meet this objective in the short- to medium-term, the impacts to VECs anticipated from the Project after proposed mitigation would primarily be localized to sub-regional, short-to-medium- term and of low magnitude."

Express's mitigation measures are generally described in the various issue sections contained in earlier portions of this chapter. Express indicated that pipeline construction is a short-term disturbance effect during the construction phase and it has been scheduled to avoid any sensitive periods.

Express stated that, because of the existing federal policy of no net loss of productive capacity, most projects are considered acceptable if their incremental impacts on fish resources and aquatic habitats do not result in a reduction of productive capacity. This can be achieved through avoidance and mitigation procedures to minimize impacts during an activity, or through post-activity compensation where aquatic habitat is restored to or enhanced above pre-impact productivity levels.

Express submitted that clean-up and reclamation activities on the Express pipeline where it shares a common corridor with the Wild Horse Pipeline will be somewhat dependent on the timing of the Wild Horse Pipeline construction. If Wild Horse remains scheduled for June, 1997 construction, that portion of the Express right-of-way to be used by the Wild Horse Pipeline would likely be stabilized with tackifiers to prevent wind and water erosion, but not subjected to crimping or seeding. Express submitted that final reclamation would be undertaken in conjunction with clean-up on the Wild Horse Pipeline. If the construction of the Wild Horse Pipeline is delayed significantly (i.e., by one year), Express submitted that the Express right-of-way would be subjected to full reclamation efforts.

Express submitted that it will work with Foothills to fmalize easement sharing arrangements prior to commencement of construction of the Wild Horse Pipeline. Express indicated that it is assumed that Foothills will adopt similar reclamation approaches as those developed by the Express reclamation initiative. Therefore, Express submitted that it expects to work jointly with Foothills on the reclamation of that portion of the Express right-of-way disturbed by the Wild Horse Pipeline, assuming that construction of the Wild Horse Pipeline commences June, 1997.

Express indicated that, should other projects arise that intersect with the Express Pipeline, Express will ensure that its reclamation objectives are discussed with the other project proponents. Express further indicated that communication of reclamation plans will ensure that overall reclamation objectives are not compromised for any of the involved parties.

3.6.2.4 **Views of the Panel**

In regard to RMEC's evidence on cumulative environmental effects with respect to upstream oil development and downstream facilities, the Panel set out in a ruling from the Bench dated 17 January 1996 (Appendix IV at pages 184 to 188), the requirements that must be met for the Panel to consider cumulative environmental effects.

An analysis of the evidence on cumulative environmental effects in relation to upstream and downstream facilities has been carried out. by the Panel and the Panel finds that, for the most part, the criteria set out in the Panel ruling have not been met. Therefore, the Panel finds that RMEC's evidence in regard to this issue is not relevant to this Project with the exception of a consideration of GHG emissions.

The Panel notes that considerable time was spent during the hearing on determining cumulative environmental effects associated with the proposed Project. The Panel is of the view that the information on the cumulative effects assessment by the Applicant was presented in a scattered fashion throughout the application, information requests and in cross-examination and should have been presented in a more efficient and coordinated manner. Nevertheless, the Panel finds that adequate information has been provided by Express in regard to cumulative environmental effects that are likely to result from the Project in combination with other projects or activities that have been or will be carried out. Express has provided mitigation measures in regard to the likely cumulative environmental effects, and the Panel notes that some of these mitigation measures are already presented in the other sections in this chapter.

With respect to the issue of fragmentation, the Panel notes that this issue has been addressed in Section 3.3.6 "Wildlife". In regard to cumulative environmental effects of fragmentation with existing or proposed projects and activities, the Panel finds that cumulative environmental effects are likely in combination with the proposed Wild Horse Pipeline Project. The Panel notes that there will be a time crowding of environmental effects, especially in regard to wildlife. However, the Panel finds that with the implementation of the mitigation measures proposed by Express and the recommendations made by the Panel (as identified in Section 3.3.3 "Vegetation", and Section 3.3.6 "Wildlife"), the cumulative environmental effects would be insignificant.

With respect to the loss of native prairie and wildlife habitat, the Panel concurs with Express's statement that, following reclamation, it will not be adding incrementally to the cumulative loss of native prairie in regard to the pipeline right-of-way. For the pump stations, the Panel finds that these are localized features and will not have a significant cumulative environmental effect. Due to the nature of the Terminal site, the Panel concurs with Express's view that this loss of improved pasture will not noticeably impact the regional capability of the land base to support wildlife.

With respect to fisheries at the South Saskatchewan River, the Panel finds that cumulative environmental effects are likely in combination with the proposed Wild Horse Pipeline Project, if built, due to the time crowding of effects associated with pipeline water crossing construction. However, with the mitigation measures proposed by Express, including those contained in Section 3.3.5 "Fisheries", and the Panel's recommendations, the Panel finds that the cumulative effects would be rendered insignificant.

With respect to air emissions, the Panel notes that the proposed fuel-driven Wild Horse Pump Station will produce emissions below the Alberta ambient standards, it will be in an area where industrial development is non-existent and background air quality concentration levels are low, therefore cumulative effects will be insignificant. Respecting GHGs, the Panel notes that Project emissions constitute approximately 0.1% of Alberta's and 0.03% of Canada's annual CO_2 emissions. The Panel observes that the inclusion of emissions allegedly associated with electricity generation for the electric drive pumps is questionable, such that if they were excluded from the calculation of the GHGs, the foregoing proportion would be much reduced. In any event the Panel finds that the cumulative effects of GHG emissions, however calculated, would be insignificant.

For noise emissions, the Panel finds that the cumulative environmental effects are insignificant. The Panel notes that Express is committed to operating these facilities within the guidelines set by the EUB.

Based on the information provided, and with the implementation of the proposed mitigation measures and the Panel's recommendations, the Panel is of the view that the proposed Project is not likely to result in significant adverse cumulative environmental effects.

3.7 Malfunctions and Accidents

3.7.1 Identification of Potential Effects and their Significance

3.7.1.1 Identification of Potential Effects

In considering the environmental effects of malfunctions or accidents that may occur in connection with the Project, Express evaluated the effects of major pipe failures and associated hydrocarbon spills. Two scenarios were selected, the first an on-land rupture/spill and the second, a rupture/spill in or near the Red Deer or South Saskatchewan rivers. Potential spill quantities were estimated to be between 1 m^3 and 5 000 m^3, based on typical distances between mainline block valves, response times for segment isolation, and anticipated drainage from the damaged segment. Express stated that the maximum spill size could occur only at a small number of segments along the line.

Inland Pipeline Rupture/Spill

In this scenario, Express submitted that oil would likely exhibit subsurface flow along the ditchline or would percolate to the surface where it would pond or flow to low-lying areas. Depending on soil texture, the oil would either remain at or near the surface or it would infiltrate into subsurface horizons. If no near-surface groundwater was contaminated, Express indicated that the total area affected would likely be several hectares at maximum, resulting in the loss or reduction of soil productivity as well as the loss or reduction in productivity of native vegetation communities or crops. Near-surface groundwater contamination could occur to a much greater extent through the dispersal of the oil with natural hydrological and hydrogeological flows in a given area.

Express indicated that the effects on wildlife would be dependent on the time of year when the spill occurred. A winter spill would primarily affect resident species dependant on subnivian or subterranean burrows, for example gophers or microtines. This would likely lead to an increase in mortality. Among the probable effects would be direct contamination resulting in loss of insulation capacity of fur or ingestion of oil through grooming or feeding on oil-contaminated food items. Ungulates (including cattle) have been known to be attracted to spill sites and could be affected through ingestion as well. This too would likely lead to mortality or other physiological complications. Predators would likely be affected through the ingestion of oil-contaminated prey species. The effects of a winter spill on migratory species would likely be restricted to localized loss of productive feeding/nesting areas containing residual oil after the clean-up.

Express stated that a spill occurring in the period from spring to fall would have much greater effects on wildlife. A greater diversity of species would be present in the general area. These effects would include: destruction of nests for ground-nesting birds and raptors; feather contamination; or ingestion of oil-contaminated food items. Express felt that only individual birds would be impacted. Reptiles would be exposed to contaminated food items as well. Any oil extending to wetlands would likely expose waterfowl and shorebirds to nest and feather contamination, as well as ingestion-induced mortality. Amphibians would likely experience reduced respiratory function as well as being exposed

to oil-contaminated food sources. The ingestion of oily water by many species is another likely result. The generally poor capability of local streams other than the Red Deer and South Saskatchewan rivers, to support fish gives a low probability for affecting any fish species.

Express indicated, in response to AWA/FAN questions regarding the effects of emergency access to a spill site, that its first task in the event of a spill,, would be containment and that its Emergency Response Plan would give consideration to environmental effects through addressing clean-up administration, access, habitat, and wildlife issues. Control on personnel movements would be involved in clean-up operations.

Express indicated that the effects of an inland spill on vegetation would range from localized to subregional in extent, and be low to moderate in magnitude. As hydrocarbons are subject to microbial breakdown, and effects on vegetation are assimilated, with enhancement of recovery with nitrogen fertilizer applications, impacts to soils and vegetation would be expected to be reversible. Based on studies in tundra areas, recovery to pre-spill ground cover took about 7 years and full recovery about 10-l 5 years. Express indicated that the effects could be expected to be of medium-to-long-term duration.

An inland spill would be expected to come into contact with relatively few members of any particular species of wildlife. Express indicated that even if a reproductive concentration of a special status species was eliminated, it is unlikely that more that 1% of the population within an ecodistrict would be affected. The greatest potential effect would be caused by extensive contamination of snake hibernaculae supporting high numbers of snakes. These impacts are said to range from localized to subregional in extent and be of low magnitude. Effects were felt to be short-to-medium-term (essentially the period prior to and during the clean-up operations), but reversible through clean-up and natural degradation.

Pipeline River Crossing Rupture/Spill

Heavy Crude

Spill volumes for the two major river crossings are estimated by Express, to be 1000 m^3 for the Red Deer River and 1500 m^3 for the South Saskatchewan River, based on proposed mainline block valve locations and anticipated drainage from the damaged segments. The assumption used for oil type was a heavy crude, specific gravity 918 kg/m^3. This would exhibit near-neutral buoyancy characteristics and may form globules of varying size (particularly at low temperatures) which may sink and accumulate in very low to zero velocity areas or be carried, when there is sufficient stream flow, near the stream bed to downstream areas. At higher temperatures, the globules may coat the substrate with oil as they travel. Lighter crudes are likely to form a dispersed surface film of varying thickness. Some emulsification is likely to occur, neither it nor the oil from the surface film is expected to disperse widely through the water column. Dispersal of the oil is dependent on water temperatures, water volumes and sediment loads at the time of the spill. The areas that would be affected downstream would be 37.5 km long in the Red Deer River and 18 km long in the South Saskatchewan River.

Express stated that water birds would be most at risk from spills in the major rivers. Mortality would likely result through several mechanisms. For example, oiled feathers would result in a loss of flight capabilities, buoyancy and insulative properties. Ingestion or inhalation of oil would result in toxic effects. Effects on other wildlife species would likely be more incidental, such as a result of ingesting

oiled prey or oil-contaminated water. Livestock could be affected through ingesting oil-contaminated water as well. Adult fish are not likely to be directly affected by a spill in a large river due to their mobility and ability to avoid contaminated sites. Fish eggs and larvae are considered to be more sensitive to oil contamination, particularly since they are relatively immobile and they develop near the surface where the risk of contamination is higher. Express indicates that the effects and toxic concentrations of the various components of crude oil are variable and poorly understood. The volatile aromatic components are the most toxic but also evaporate fairly quickly.

Express contends that because of the chemical complexity of crude oil, the variable solubility of constituents, and the variation in stream flow, temperature and rates of input, it is very difficult to predict what concentrations of chemicals might result from a spill. While small concentrations of crude have proven toxic to fish, it is almost impossible to predict the amount of and distribution of oil entrained in the water column. A spill in spring would likely affect the semi-buoyant eggs of Goldeye and Mooneye fry, which tend to be near the surface for at least three weeks after hatching. The eggs of Pike and Perch, which are deposited on submerged vegetation in shallow water would also likely be coated in oil. Spring spawners in the two rivers, deposit their eggs on coarse substrates in fast water. While a surface film is not likely to affect these, globules of heavy crude moving downstream, in contact with the substrate, could contact these eggs causing mortality. A reduction in benthic invertebrate and periphyton production could also be expected.

Lighter Crude

A spill of lighter crude in the spring has the potential to have high impact on the eggs and fry of Mooneye, Goldeye, Pike and Perch, but should not have much impact on the eggs of other species. If a spill occurs when recently hatched fry are present (May through July), high mortalities would occur depending on the volume of the spill. Oil would likely collect in backwaters and shoal areas near shore, where fry are generally found. Coating of the shoreline areas would initially reduce invertebrate and periphyton production, however recovery would likely occur within one year. It is unlikely that there would be much dispersion in the water column. Given the probable small volume and short duration of the such a spill, it is unlikely that mortality to larger juvenile and adult fish would occur, as behavioral responses, such as flight from the area would be expected.

3.7.1.2 Significance

A spill into either of the major watercourses, the Red Deer or South Saskatchewan rivers, would have the greatest effect on water birds, especially during the early spring staging period. A major spill at this time could potentially contaminate a number of birds, possibly greater than 1% of the populations of some species. The effects could extend throughout the ecodistrict, they would represent regional events of moderate magnitude. Effects would be reversible and species would have the ability to recover from losses in subsequent years, therefore, effects would be short-to-medium-term events.

Express indicated that the severity of a river spill to fish will depend on many factors. The nature of the spilled material, heavy crude or light crude will dictate the accumulation patterns and the speed of travel in the water of the spilled material and the area covered. The effects were felt to be subregional to regional in extent. The magnitude of the effects would be dependant on the time of year and quantity of oil spilled. A spill at any time of the year could be a moderate to high magnitude event. These spills are also subject to microbial breakdown and recovery of aquatic systems from spills can

be relatively rapid, ranging from one to several years. Express felt that effects would be medium-term for most situations.

Express utilized criteria in the CEAA *Responsible Authority's Guide* for determining the significance of effects from oil spills. Generally, Express indicated that the adverse environmental effects of a spill can be avoided through prevention, minimized through emergency response and mitigated in accordance with measures outlined in the Company's draft Hydrocarbon Leak Response Guidelines ("HLRG"). Given those, Express was of the opinion that any long-term effects would not be significant.

Health Effects

Express looked at the effects of a hypothetical 500 m^3 oil spill on human health. The study was restricted to the effects of benzene and H_2S emissions from the spill, as these are the most toxic constituents of vapours associated with the various types of oil that will be transported by the proposed pipeline. Concentrations of the two chemicals were predicted, based on elapsed time and distance from the pool, and then compared to time-weighted average occupational exposure limits assumed or recommended by various agencies. The comparison is expressed as the Concentration Ratio ("CR"), which is the predicted air concentration divided by the relevant occupational exposure limit. Human health effects may potentially occur for CRs greater that 1.0. Express's conclusion was that no adverse health effects are predicted for all H_2S exposures. The Express data show that predicted three-minute benzene air concentrations and associated CRs are well below the concentrations that would be life threatening at all locations.

Failure Rate

Express provided statistical information on pipeline failures resulting in liquid hydrocarbon spills, in the form of reports from the CAPP, " 1993 Pipeline Performance Review" and " 1992 Pipeline Performance Review". In 1992 there were 51 failures of liquid hydrocarbon pipelines resulting in a total volume of 3 722 m^3 of spilled product. In 1993, there were 59 failures for a total of 8 498 m^3 of spilled product. The latter represented about one m^3 spilled for every 34 200 m^3 of product moved.

3.7.1.3 Public Comments

The AWA/FAN, in their written evidence, indicated that there was no discussion of potential impacts on Pronghom Antelope ranges should there be a failure of the pipeline. They stated that the discussion should not be limited to direct effects. There will be considerable human activity needed to remedy any problems that may arise, and that there would be impacts from a significant amount of traffic over a short period of time. In the Hearing, AWA/FAN pursued its concern with access to the right-of-way during an emergency, stating that Express would not have time to consider what impacts access would have, and how impacts to wildlife in the area at that time would be minimized. An additional concern was the question of new access from roads. The question of the effects on nesting birds during a spring spill was raised. AWA/FAN put forward the position that there would be a severe impact on birds if there were a spill in a nesting area, specifically, with respect to Mountain Plover. The final issue raised by AWA/FAN with respect to spills was the restoration of native prairie. AWA/FAN indicated in Argument, that the effect of emergencies is long-term and that Express had not addressed the issue.

RMEC raised the issue of effects on birds of a spill into a river , particularly the Red-necked Grebe. It also raised the issue of the history of pipeline failures in the industry and the effects of a spill into the Red Deer or South Saskatchewan rivers. Operational issues such as the amount of equipment and its location and leak detection were also raised, as were minor spills from pigging operations.

3.7.1.4 Proposed Mitigation Measures

Express included a Mitigation Plan and a draft HLRG in their evidence regarding the effects of malfunctions and accidents. The plan indicates that various measures, considered to be technically and economically feasible, will be applied to the design, construction and operations phases of the Project, to mitigate any significant environmental effects. These measures include features such as: the design of facilities to CSA or CCME standards; the design of stream crossings applying industry standard technologies; the placement of mainline block valves and check valves to minimize potential spill impacts, especially at major watercourse crossings; construction and safety practices and standards, such as leak detection for both terminal facilities and the pipeline using a SCADA system; and operational practices, including the development of an Emergency Response Plan ("ERP"). Express indicated that it would implement the measures in the HLRG to minimize the effects of a spill. Express undertook to file, with the Board by 1 April 1996, the ERP, that will conform to CSA 2731, Emergency Planning for Industry. Express discussed remediation for oil spills, both through a treatment facility and in-situ for a large spill. In addition, Express undertook to file with the Board, prior to the start of construction, a remediation plan for dealing with spills.

Express indicated 'that tankage at the Hardisty Terminal would be constructed to the standards of either of the CCME Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products or the CSA standard Z662-94, Oil and Gas Pipeline Systems, whichever is the most stringent and that each tank will be located within a properly constructed berm that will contain 110% of tank volume. Express also addressed the timeframe for detection of leaks. Time ranged from about ten minutes for larger leaks amounts to a number of hours for small leaks. Express indicated that there was little that could be done to improve leak detection capability at river crossing areas, but that the mainline block valves on either side of crossings would be routinely monitored for pressure and temperature.

Express discussed the handling of hazardous materials and spill response in the Environmental Protection Plan portion of its evidence and provided general procedures for the clean-up of a hazardous substance spill.

In terms of protection of wildlife, particularly birds, Express indicated that any impact would be on young-of-the-year, while adult birds would simply move off. Young-of-the-year would be recovered and monitoring programs would be instituted. Express would make itself aware of nests and develop measures for salvaging eggs. All new information would be recorded on Final Construction Alignment Sheets.

3.7.1.5 **Views of the Panel**

The commitment of Express to construct the pipeline and associated facilities, to stringent up-to-date standards, such as adherence to CSA and CCME standards, the use of modem materials and the use of state-of-the-art techniques, will provide the best mitigation measures for prevention of spills. The CAPP information on historical pipeline failures combined with the use by Express of the most

modern construction methods and materials gives the Panel confidence that operation of the proposed pipeline is not likely to result in serious spills. The Panel notes that the statistics in the CAPP reports relate to installations with different vintages and that present technologies are superior to those used in pipelines covered by those reports. The Panel also notes that the HLRG provides good information on spill response strategy and on the techniques for containment, recovery, clean-up and protection. The Emergency Response Plan, conforming to the CSA 2731 standard, to be submitted by Express for Board approval, will provide mitigation measures in the form of clean-up methods and Express has undertaken to submit to the Board, a remediation plan for oil contamination.

The Panel notes that, should a spill occur during the operation of the Express pipeline, there would be significant adverse effects on the environment, particularly in the short-term. Mitigation measures, combined with the natural degradation of oil, would greatly reduce the significance of any long-term effects. Considering that the probability of a spill occurring is very low and based on the scenarios chosen by Express as representing worst-case situations and with the mitigation measures proposed, the Panel is of the view that there are not likely to be any significant adverse environmental effects as a result of malfunctions and accidents that may be associated with the Project.

3.8 Environmental Inspection, Monitoring and Follow-up Program

3.8.1 Applicant's Proposal

X8.1.1 Environmental Inspection

Express indicated that it will provide environmental quality assurance during construction through on-site environmental inspection. A qualified Environmental Inspector familiar with the specific environmental issues of the Project will be assigned to each of the three construction spreads. Express indicated that each Environmental Inspector will have a minimum of a Bachelor of Science or technical diploma in a biophysical discipline, will have completed an environmental inspection course for pipeline construction, and will have two or more years' experience in pipeline construction/inspection. Express indicated that it will further enhance the training of its experienced Environmental Inspectors to identify Project specific potential adverse impacts during construction.

Express stated that each Environmental Inspector will interact continuously with the landowners and regulatory agencies involved in the Project on environmental issues, and will have the authority to temporarily suspend operations where unacceptable situations with serious environmental implications arise. Express has set out a number of criteria for identifying unacceptable situations with serious environmental implications.

In response to the Board's request for a confirmation that Express would apply to the Board for any changes to the mitigation measures provided in its application or subsequent documentation, Express indicated that effective environmental mitigation during construction is dependent on response time. Express proposed that the Board consider a system to avoid the necessity for an "application" process to address field changes. Express submitted that it will have highly trained Environmental Inspectors on-site throughout construction and they will constantly assess the site specific conditions and select from a range of mitigation actions to meet the objectives agreed to for the Project. If a contact system with the NEB field representative can be established to keep response time low, damage to the environment will be kept to a minimum. Express indicated that a system which allows for consistent

field interaction between Express and the Board will permit accurate interpretation of objectives in situations where Board representatives are not available. All situations and changes will be documented and/or ratified in a timeframe that satisfies all parties. This will typically be on the same day the problems and the proposed changes are identified. Express also indicated that contact will take place by phone or fax whenever in-person discussions are not possible.

Express stated that it will attempt in its construction planning efforts to anticipate any situations that may require alternative mitigation considerations and incorporate these contingencies in its instructions to the selected construction contractors. Express further stated that the proposal for field changes will enhance the commitments already made to the Board.

3.8.1.2 **Advisory Committee**

As previously noted in the "Vegetation" portion (Section 3.3.3) of the report under "Proposed Mitigation Measures", a Memorandum of Understanding between Express and AWA, FAN and AGFA to establish an Advisory Committee was filed during the proceeding. Express indicated that participation in the Advisory Committee is open to any interested person and it undertook to provide a list of the members of the Advisory Committee, once it has been established. Express indicated that the Board will be advised of committee meetings, and the minutes of any meetings will be filed with the Board.

3.8.1.3 Monitoring

Express stated that, following construction, a post-construction environmental report will be prepared by Express in conjunction with the Environmental Inspectors, and submitted to the Board within six months of construction completion. Subsequent monitoring reports dealing with identified issues will be prepared one year and two years after construction for the Board's review. The Draft Reclamation Plan outlines the components of Express's monitoring program, including: identification of any problem areas where remedial action is needed to meet regulatory compliance standards, and to determine and design remedial action where necessary; confirmation that the right-of-way is reclaimed, in a self-sustaining manner; and that the conditions for regulatory approval have been met.

With respect to native prairie and previously undisturbed land, Express agreed with the timeframes for monitoring as recommended by AWA/FAN, but would like to ensure that there is flexibility to change the timing, based on the concerns identified by the Advisory Committee. Express indicated that it would complete, in addition to the above-noted reports, an interim post-construction environmental report on 1 February 1998 (approximately six months after the first report), given the late summer-fall construction schedule.

Express submitted, in the Draft Reclamation Plan, that an inspection will be undertaken during the first growing season, after reclamation has been completed, and will be accomplished through visual assessment of the right-of-way by helicopter, and through ground assessment of areas which may require remedial action. Express submitted that, after the first growing season, the sites which have received remedial reclamation or weed control will continue to be monitored until they are successfully reclaimed. The rest of the right-of-way will be visually assessed as part of routine maintenance, and landowner concerns will be investigated and addressed. With respect to determining the success of reclamation, Express indicated that it intends to use a combination of quantitative and qualitative evaluation methods. The exact methodologies will be identified by Express in conjunction with the

Advisory Committee. It is expected that qualitative air and ground reconnaissance by trained individuals will be employed to assess general vegetative cover and problem areas, while issues such as species composition and diversity are expected to require quantitative plot sampling techniques.

After the completion of construction, Express stated that the pipeline right-of-way will be patrolled by aircraft on a weekly basis. Vehicular access along the required right-of-way will be required only in the unlikely event of an emergency situation.

To avoid conflicts between operations and maintenance activities and wildlife species of particular concern, Express indicated that no permanent above-ground facilities which will require regular maintenance activities will be located within the designated protection zones for identified species of concern. In addition, Express submitted that non-emergency remedial work (e.g. maintenance digs, erosion control corrections) will be scheduled to comply with timing restrictions identified by Environment Canada for sites which continue to support species of concern. Express stated that less intrusive activities (e.g. regular surveillance flights) will not be subject to such restrictions.

3.8.1.4 Follow-up Program

Express indicated that reclamation in some native prairie regions of the province are complicated by light textured soils (prone to wind erosion) and low precipitation levels, and monitoring of reclamation success will be required. Express submitted that consequently it will be undertaking post-construction sample plot monitoring of reclamation success for various combinations of topsoil salvage treatments (e.g. trenchline *vs* trench and work side stripping), soil conditions (sandy *vs* loam-textured soils) and seed mixes. The final experimental design for the monitoring program will be worked out with provincial authorities and interested or public stakeholders in the area. It anticipated that vegetative cover, structure and composition measurements will be monitored at designated sample plots for a minimum of three years.

Express undertook to file, prior to reclamation, a copy of the methodology for the follow-up program.

3.8.1.5 Public Comments

AWA/FAN initially recommended that, if the Project were' approved, it be conditioned to require that the proponent undertake to implement a long-term monitoring program that will endure for the life of the Project. This should involve an annual monitoring program for the first. five years of the Project with respect to reclamation success and, on an as needed basis or every three years thereafter, whichever comes sooner. After five years, the intent of the monitoring program would be to address any concerns not satisfied in the first five years and any site specific impacts that may have arisen through pipeline failure or changes in pipeline operations.

3.8.1.6 Views of the Panel

The Panel is satisfied with Express's commitments for environmental inspection; however, the Panel notes the recommendations made in Sections 3.3.3 "Vegetation", and Section 3.3.6 "Wildlife". These were in regard to having a botanical specialist and a wildlife specialist to identify special status species/habitat along the right-of-way during construction.

The Panel notes that the issue of field changes has been addressed, in part, in Section 3.3.2 "Soils and Agriculture" where the Panel provides recommendations in regard to Express's proposal for field changes related to topsoil handling procedures. With respect to other circumstances requiring field changes and the system that Express has proposed, the Panel has concerns with the proposed approach. Section 5 1.1 of the NEBA specifies the powers of its inspection officers stating that they "...may make an order where the inspection officer has reasonable grounds to believe that a hazard to the safety of the public or employees of a company or a detriment to property or the environment is being or will be caused...". This section of the NEBA implies that the grounds for making orders by an inspection officer are related to non-compliance or emergency-type situations, as opposed to making provisions for developing a system of field changes with a company. Therefore, the Panel is of the view that Express's proposed system for dealing with field changes is not consistent with the powers of the Board's inspection officers under the NEBA and, therefore, is not acceptable.

With respect to unforeseen circumstances, the Panel notes that, to the extent possible, these should be anticipated prior to construction. The Panel recommends that Express should be required to apply to the Board for any changes to its mitigation measures provided in its Application, or other evidence adduced in the hearing process.

The Panel notes that paragraph 16(2)(c) and the Agreement require the Panel to consider an appropriate follow-up program for the Project. However, the Panel notes the Board's reporting requirements pursuant to section 58 of the ***Onshore Pipeline Regulations*** and further notes that Express is committed to filing the reports identified therein. Therefore, with respect to the need for, and the requirements of, any follow-up program, the Panel is satisfied with the Board requirements as a follow-up program within the meaning of CEAA for this application.

There was considerable time spent, during the course of the hearing, on native prairie issues associated with the reclamation and time of vegetation re-establishment. The Panel notes Express's view that species composition for the major grasses would take three to five years to establish. Therefore, it would be appropriate to ensure that monitoring is conducted for a minimum of a three year period. In addition, the Panel notes that, at the time of review of the three year monitoring report, the Board has the authority to require additional monitoring or reclamation work if deemed appropriate. Therefore, the Panel is of the view that a three year monitoring program is appropriate at this time and, if necessary, additional work can be identified at a later date.

In regard to the Board's monitoring requirements, the Panel is of the view that specific details should be included in these reports and, therefore recommends that Express be required to file with the Board a post-construction environmental report within six months of the in-service date for the Express Pipeline Project. The post-construction environmental report shall set out the environmental issues that have arisen and shall:

(a) indicate the issues resolved and those unresolved; and

(b) describe the measures Express proposes to take in respect of the unresolved issues.

The Panel also recommends that Express should be required to file with the Board, on or before 31 December following each of the first three complete growing seasons subsequent to the filing of the post-construction environmental report referred to above:

(a) a list of the environmental issues indicated as unresolved in the report and any that have arisen since the report was filed, including details on the monitoring of the following items:

(i) the effectiveness of the reclamation program in areas of native pasture, including in the Sage Creek Grazing area and any significant areas of northern fescue (if found), the vegetation composition on the right-of-way in comparison to native vegetation off the right-of-way;

(ii) the effectiveness of the measures to reduce cattle-caused damage to revegetated areas;

(iii) the locations of, and the reasons for, any alternate soil handling procedures implemented, and a discussion of the positive or negative effects of this activity;

(iv) the effectiveness of the reclamation program at the South Saskatchewan River crossing, and the condition, including stability and revegetation, of the banks of the South Saskatchewan River;

(v) for all plant and wildlife species with a designated status, including habitat, that are encountered by construction activities, the comments from the appropriate regulatory agencies, the mitigation measures undertaken, and the success of those measures;

(vi) the locations of 'any areas of water impoundment and the measures being undertaken to address the situation; and

(b) a description of the measures Express has taken or proposes to take in respect of those issues.

The Panel commends Express and AWA/FAN/AFGA for their initiative in setting up an Advisory Committee to deal with reclamation and monitoring issues. It notes that Express's methods for determining reclamation success will be worked out with the Advisory Committee. The Panel also notes Express's commitment to provide a copy to the Board of the methodology for its follow-up program.

The Panel recommends that Express file its methodology for determining reclamation success with the Board for approval, within 15 days after the in-service date. This should include but not be limited to: comments from the Advisory Committee; objectives for reclamation success, including any standards that the Applicant intends to adopt; details on the frequency of monitoring; and details of the sampling program. The Panel further recommends that Express periodically review this methodology with the Advisory Committee and provide any updates to the Board.

Chapter 4

Conclusions, Recommendations, and Overall Panel View

The Panel reached a number of conclusions regarding the environmental effects of the proposed Project, and to address some of the issues raised in these conclusions, the Panel has made a number of recommendations. The Panel's conclusions and recommendations are set out below followed by the Panel's overall view on the Project.

4.1 Conclusions

Construction Schedule

1. With respect to Express's position that it may revert back to a spring-summer construction schedule (May to August), Express has not adequately addressed the concerns associated with such a schedule. Express's updated construction schedule (August to November) serves as a significant mitigation measure which appropriately addresses the potential adverse environmental effects for most wildlife species in the area. This updated construction schedule was used to alleviate previously expressed concerns in regard to spring-summer construction.

Routing

2. The Panel finds that Express's approach to route selection was acceptable. In regard to potential re-routes as an avoidance measure, the Panel is generally satisfied with the type of information that Express intends to file and additional requirements are outlined in the recommendation section.

3. It is not clear from the record that Express had communicated to all parties its intention to pursue a specific route rather than a corridor. Had Express clearly communicated such an intention to pursue a specific route, parties' concerns on the need for re-routes may have been raised and addressed in a more timely manner.

4. There is currently no restriction that would prohibit the routing of a pipeline within ESAs. Effects on key features known to occur within the ESAs would be satisfactorily addressed through the combination of routing modifications, timing restrictions on construction, and reclamation measures proposed by Express.

5. Having considered alternative means of carrying out the Project, including alternative routes, the Panel is of the view that the applied-for route is acceptable.

Soils and Agriculture

6. The Panel is generally satisfied with Express's proposed mitigation measures but some additional steps are warranted in regard to Express's plan for land farming of the drilling fluid and drill slurry. Additional measures are required to ensure that the potential adverse environmental effects will be mitigated and are outlined in the recommendation section.

7. In regard to environmental inspection, the Panel has concerns with Express's proposal to make changes in the field during construction. While the Panel is of the view that Express should not be limited in its ability to mitigate environmental effects that become apparent in the field, plans should be in place prior to construction to anticipate situations requiring changes.

Vegetation

8. Express intends to use the same methodology as with the rare plant survey that has already been undertaken, but the Panel notes that it is not clear that this methodology is the most appropriate to provide a site-specific characterization of the vegetation. However, the Panel is satisfied that Express has undertaken to provide a detailed methodology to the Board prior to carrying out the inventory.

9. The Panel is generally satisfied with Express's proposed mitigation measures with the exception of Express's proposal in regard to the restoration of rare plants from the seed bank. Additional measures are warranted with respect to some of the mitigation procedures proposed by Express and are outlined in the recommendation section.

10. Although Express has undertaken a rare plant survey and is committed to conducting additional surveys in the spring, Express should ensure, to the greatest extent possible, that it does not destroy any previously unidentified rare plants or significant plant communities during construction.

11. The significant botanical community at Rattlesnake Coulee should be avoided.

12. With respect to the Draft Reclamation Plan, it is appropriate to obtain comments from those parties that have provided input into the Draft Reclamation Plan. In general, the Panel notes that some additional specific issues should be incorporated into the final' Reclamation Plan; these issues are outlined in the recommendation section.

Hydrology

13. The Panel is satisfied with the measures Express plans to implement to address potential environmental effects associated with hydrology.

Fisheries

14. Express's proposed mitigation measures for fisheries issues are acceptable but additional measures are warranted and are outlined in the recommendation section.

15. Express's proposal to file the sediment control plan for the South Saskatchewan River only five days prior to construction does not allow sufficient time for the Board's review of this information.

16. The Panel accepts Express's rationale for proposing an open-cut crossing technique for the South Saskatchewan River. With the implementation of the mitigation measures proposed by Express, the Reclamation Plan, the monitoring program (identified in Section 3.8 "Environmental Inspection, Monitoring, and Follow up Program"), and the Panel's recommendations, the Panel is satisfied that the potential adverse environmental effects of the open cut technique at the South Saskatchewan River crossing would be insignificant.

Wildlife

17. The Panel recognizes that Express's surveys focussed on identifying localized habitat features as opposed to relying on specific identification of the more cryptic species. Given the late summer-fall construction schedule, the Panel is of the view that the information provided using this approach is sufficient to identify the potential adverse effects and their significance for these species. The Panel notes, however, that a more thorough survey of certain species, e.g. cryptic ground nesters such as the Mountain Plover, as well as further reliance on existing sources of information for species such as the Hognosed Snake and the Western Small-footed Bat, could have alleviated some of the concerns raised during the hearing.

18. Since the Long-billed Curlew is a migratory bird and construction will not start before the beginning of August, a further survey for this species is not necessary. This is consistent with Environment Canada's previous recommendation (in its letter dated 15 September 1995) that construction not take place within 250 m of any active Long-billed Curlew nests or construction be delayed until 15 July.

19. The Panel is satisfied with Express's proposal to not undertake routing modifications since Express is committed, during the construction and spring clean-up period, to comply with the timing restrictions established by Environment Canada for the Loggerhead Shrike and Burrowing Owl nest sites identified during the wildlife surveys.

20. The Panel is generally satisfied with Express's proposed mitigation measures in regard to wildlife issues and notes that some additional measures are warranted and are outlined in the recommendation section.

21. The loss of significant habitat features for wildlife with a designated status should be avoided. In addition, nesting habitat for raptors and song birds should be protected.

22. The Panel is of the view that with the implementation of the Express's mitigation measures for wildlife and those outlined in the previous sections on soils and vegetation, any fragmentation associated with the proposed pipeline is not likely to result in significant adverse environmental effects on wildlife.

Terminal and Pump Stations

23. The locations of the pump stations have been largely dictated by the hydraulic demands of the pipeline, the need to avoid important localized habitat, and to minimize disturbances associated with new access and power lines. Accordingly, the proposed locations of the Terminal and pump stations are acceptable.

24. The mitigation measures presented for the biophysical resources are sufficient, recognizing that Express will provide supplementary plant and wildlife information 15 days prior to construction.

25. Construction of storage tanks at the Express Hardisty Terminal and the Wild Horse Pump Station will incorporate appropriate CCME or CSA standards.

26. Emissions of GHGs arising from Project facilities constitute a negligible proportion of Alberta's and Canada's annual emissions.

27. Taking into consideration that there are no habitat features supporting localized concentrations of special status species within 500 m of the proposed pump station sites, Express's commitment to meet an energy-equivalent sound level of 40 dBA at a distance of 1.5 km from the pump stations, and Express's undertaking to monitor the noise levels, the pump stations have been appropriately designed.

Mainline Valves

28. Express's plans for finalizing the locations, and for the construction and operation of the mainline valves, are acceptable.

Construction Camp and Storage Areas

29. The criteria provided by Express for the siting of construction camps and warehouse assembly points are appropriate provided that no sitings occur in ESAs and areas of native grassland.

Upstream Facilities

30. Accessory physical works mentioned in the Minister's letter on the scope of Project were found to be those required to be built to make possible the commencement of operation of the principal project. They would be minor in nature in relation to the principal project and be interdependent with it. The effects of the construction of upstream facilities described by Express were found to be limited in extent and magnitude.

Heritage and Archaeological Resources

31. Measures identified by Express to mitigate impacts on archaeological, palaeotological, and historical resources are appropriate. However, the Panel is concerned about the potential for disturbance and/or destruction of stone features in the project area.

Cumulative Environmental Effects

32. The evidence about the Applicant's approaches to cumulative environmental assessment was poorly presented but overall it adequately described Express's varied approaches undertaken in this case and enabled the Panel to undertake the necessary cumulative effects assessment.

33. The method of undertaking a cumulative environmental effects assessment can vary from project to project and even within a single project. It can include the kind of regional planning-based assessment described by the Applicant, and it can include other methods of assessment as well. In this case a regional planning-based assessment was not possible and the Applicant relied on other acceptable approaches to provide the information necessary for a cumulative environmental effects assessment.

34. Information on the cumulative effects assessment by the Applicant was presented in a scattered fashion throughout the application, information requests and in cross-examination, and should have been presented in a more efficient and coordinated manner. Nevertheless, the Panel finds that adequate information has been provided by Express in regard to cumulative environmental effects that are likely to result from the Project in combination with other projects or activities that have been or will be carried out.

35. With the mitigation measures proposed by Express and the recommendations made by the Panel (as identified in Section 3.3.3 "Vegetation", and Section 3.3.6 "Wildlife"), the Panel finds that the cumulative environmental effects would be insignificant.

36. With respect to fisheries at the South Saskatchewan River, cumulative environmental effects are likely in combination with the proposed Wild Horse Pipeline Project, due to the time crowding of effects associated with pipeline water crossing construction. However, with the mitigation measures proposed by Express, including those contained in Section 3.3.5 "Fisheries", and the Panel's recommendations, the Panel finds that the cumulative effects would be rendered insignificant.

37. The cumulative effects of GHG emissions would be insignificant. With respect to air emissions, the Panel notes that the proposed fuel driven Wild Horse Pump Station will produce emissions below the Alberta ambient standards, it will be in an area where industrial development is non-existent and background air quality concentration levels are low; therefore cumulative effects will be insignificant.

38. Based on the information provided, and with the implementation of the proposed mitigation measures and the Panel's recommendations, the proposed Project is not likely to result in significant adverse cumulative environmental effects.

Malfunctions and Accidents

39. The commitment of Express to construct the pipeline and associated facilities to stringent up-to-date standards, such as adherence to CSA and CCME standards, the use of modem materials and the use of state-of-the art techniques, will provide the best mitigation measures for prevention of spills.

Environmental Inspection, Monitoring and Follow-up Program

40. The Panel is satisfied with Express's commitments for environmental inspection. However, Express's proposed system for dealing with field changes, whereby the necessity for an "application" process would be avoided through contact with an NEB field representative, is not consistent with the powers of the Board's inspection officers as outlined in section 5 1 .1 of the NEBA and, therefore, is not acceptable.

41. The Panel commends Express and AWA/FAN/AFGA for their initiative in setting up an Advisory Committee to deal with reclamation and monitoring issues. The Panel notes that Express's methods for determining reclamation success will be worked out with the Advisory Committee.

42. With respect to the need for, and the requirements of, any follow-up program, Express is committed to filing the reports identified in the Board's reporting requirements pursuant to section 58 of the *Onshore Pipeline Regulations. The* Panel is satisfied with the Board's requirements as a follow-up program within the meaning of the CEAA for this application.

Renewable Resources

43. In regard to renewable resources, the Panel considered agriculture, including ranching, as well as fishing and hunting, and found that this Project is not likely to significantly affect the capacity of these resources.

4.2 Recommendations

The Panel recommends that Express be required to implement or cause to be implemented all of the policies, practices, Panel recommendations, and procedures for the protection of the environment included in or referred to in its Application, in its undertakings made to DFO and Environment Canada, and as adduced in evidence before the Board in the OH- 1-95 proceeding.

Therefore, the Panel recommends that the construction and operation of the proposed Express Pipeline Project be allowed to proceed subject to the following recommendations:

Construction Schedule

1. Unless otherwise allowed by the Board, Express be required to comply with the 1 August to 31 November construction schedule for pipeline construction, as provided in its construction schedule update. With respect to the ancillary facilities, the Panel also recommends that, unless otherwise allowed by the Board, Express comply with the updated schedule of events as set out in Section 3.2.1 "Express's Proposal".

Routing

2. In regard to the potential re-routes (less than and greater than 50 m) that Express has identified as avoidance measures, Express should file with the Board for approval, any modifications that require a deviation from the proposed specific route as described in the application. Each

filing shall include: the results of public consultation (where appropriate); the identity of any affected landowner(s) and the status of land acquisition (where appropriate); an air-photo (where the modification is greater than 50 m); an environmental issues list identifying all relevant effects of the re-routes on e.g. soils, vegetation, wildlife, hydrology and archaeological information; and the associated mitigation measures to render those environmental effects insignificant. The Panel recommends that such filings be required prior to the filing of the plan, profile and book of reference pursuant to section 33 of the NEBA.

3. The Panel recommends that Express be required to acquire all rights for Crown Lands necessary for the pipeline prior to the Board's approving the plan, profile and book of reference for the pipeline pursuant to section 36 of the NEBA.

Soils and Agriculture

4. For land farming activities, Express should, at least 10 days prior to the commencement of the first disposal of drilling fluid components, file with the Board, for approval, a detailed disposal plan for each of the drilling fluid components. The Panel notes that this plan should include but not be limited to:

(a) an estimate of the complete composition of the drilling fluid components including the relative volumes/quantities of water, cuttings and other material, and any additives;

(b) the chemical composition of the solid and liquid portions;

(c) sufficient evidence to demonstrate that the soil capability and texture, the current land use, and any other potential environmental issues will not be adversely affected by the disposal of drilling fluid components, on any right-of-way areas or other sites proposed by Express for disposal;

(d) documentation indicating that Express has the agreement of the landowner whose private lands will be used for the disposal;

(e) documentation indicating that Express has an agreement in place with a waste disposal facility to dispose of drilling waste components in the event that land filling is proposed;

(f) detailed procedures to dispose of drilling fluid components, including excess water, if additives are used; and

(g) an acknowledgement that disposal of drilling fluid and drill slurry will occur only on existing cultivated land.

5. The Panel recommends that Express be required to update its criteria for determining appropriate soil handling procedures (Table 1) by including in those criteria differing site conditions that may be encountered while continuing to meet its objectives already set out in the written evidence. Further, it is recommended that Express file these updated criteria for Board approval at least 15 days prior to construction, together with the final construction

alignment sheets showing the related soil handling procedures. Express's proposal for field changes in regard to topsoil stripping procedures would then become unnecessary because procedures could be adjusted automatically according to the pre-approved criteria.

Vegetation

6. With respect to the vegetation inventory that Express intends to carry out in the spring, the Panel notes that Express intends to use the same methodology as with the rare plant survey that has already been undertaken. The methodology should clearly differentiate between the two methods, one for determining general vegetation characterizations needed for the revegetation program and significant plant communities (including fescue grasslands), and the other for determining additional rare plant species.

7. The information filed in regard to the vegetation inventory should include details of additional significant vegetation communities and rare plants, including Express's specific measures to address those communities/species.

8. In regard to the Panel's concern with Express's proposal to restore rare plants by relying only on regeneration from the seed bank, the Panel recommends that Express should rely additionally on the other methods provided, such as avoidance, or restoration techniques such as sod salvage and transplants, when plants with a designated status are encountered.

9. If any previously unidentified significant plant communities or plants with a designated status, are discovered during construction, Express should, in consultation with the appropriate regulatory agencies, avoid, relocate, or restore those areas.

10. As to identifying previously unidentified plants or significant plant communities during construction, the Panel is of the view that only an individual with a botany background and previous experience would be qualified to carry out this work. Express should therefore retain a specialist with these qualifications. This specialist should be in addition to the Environmental Inspectors.

11. The Panel recommends that Express be required to avoid the significant botanical community at Rattlesnake Coulee. Therefore, Express should be required to file further details confirming that it can avoid the area by narrowing the extra workspace or file the necessary information in regard to a re-route.

12. The criteria to determine significant remnants of fescue grasslands should be submitted to the Board for approval with the results of the vegetation survey and Express should provide to the Board its measures to minimize effects on any significant areas of fescue grassland anticipated to be encountered.

13. In addition to its commitment to wash all tracked equipment and wheeled vehicles prior to moving onto the right-of-way, to prevent the spread of weeds into native prairie communities, Express should ensure that: pressure hoses are used in cleaning all the equipment to remove plant material; the equipment is cleaned each time before entering the Sage Creek Grazing area; and equipment is cleaned only in an area of previously disturbed land.

14. The Panel recognizes that the Draft Reclamation Plan will be finalized based on comments received from the interested stakeholders and the results of the vegetation inventory. Express should, at least 30 days prior to the commencement of construction, file with the Board for approval, the final Reclamation Plan. This plan should include and/or address the following factors:

(a) the considerations and special measures associated with a spring clean-up, including those measures adduced during the proceedings;

(b) specific references, such as appropriate regulatory authority, reclamation officer, special areas officer, should be clearly identified (i.e. provincial or federal authority);

(c) with respect to mitigation options, the reclamation plan should incorporate the criteria adduced during the proceeding, and where criteria have not been presented, Express should provide its criteria for determining its range of mitigation options; and

(d) the final seed mixes, including a description of any changes to the seed mixes from those proposed and the reason for those changes.

Any comments received from the stakeholders on the Draft Reclamation Plan should be attached as an appendix to the final Reclamation Plan, including whether the comments were incorporated into the Plan and, if not, the reasons why they were not included.

Fisheries

15. Express should file, at least, 10 working days prior to the commencement of construction, for Board approval, the sediment control plan for the South Saskatchewan River along with comments from DFO.

16. If blasting is required at the South Saskatchewan River crossing, Express should file with the Board for approval, at least 15 working days prior to construction: the blasting plan; comments from DFO on the plan; and any DFO permits as required.

17. In regard to the slope restoration plans for the South Saskatchewan River, Express should file for Board approval, at least 30 days prior to the commencement of construction, the details for channel restoration, including any habitat features, and a slope grading and restoration plan for the banks and valley walls; and comments from the DFO on the above-noted plans and measures.

18. With respect to the Red Deer River crossing, Express should file, for Board approval, at least 30 days prior to the commencement of construction, a slope grading and restoration plan for the valley walls (upslope of the directional drill area).

19. In regard to the proposed directional drill of the Red Deer River, Express should file, prior to the commencement of any directional drill construction activities, a detailed drilling fluid plan

addressing the methods of drilling fluid containment and storage, and specific methods for recycling the drilling fluids.

20. Express should notify the Board within 12 hours of an inadvertent mud return occurring within the instream portion of the Red Deer River, and advise the Board of the efforts that have or will be taken to seal the leaking area and any mitigation measures to address environmental concerns.

Wildlife

21. The information filed, in regard to the further surveys for Swift Fox, Sharp-tailed Grouse and Sage Grouse, should include the results and Express's specific measures to address any conflicts. This information should be filed 30 days prior to the commencement of construction.

22. If any previously unidentified significant habitat features/specialized habitat for wildlife with a designated status, nesting habitat for song birds and any raptors are discovered during construction, Express should, in consultation with the appropriate regulatory agencies, avoid, relocate, or restore those features or areas.

23. Express should retain a specialist with a wildlife background, including experience in identifying wildlife and their habitat features, to identify such features during construction. The wildlife specialist is in addition to the Environmental Inspectors.

24. In addition to Express's commitments in regard to the Prairie Rattlesnake, the Panel recommends that the experienced biologist be required to monitor and handle all snakes with a designated status in accordance with the commitments set out for the Prairie Rattlesnake.

25. Express should implement a worker awareness program in regard to the potential for wildlife mortalities along roads, and its workers should be required to maintain reduced speeds along the right-of-way, along access roads, and where feasible, along secondary roads. Off right-of-way traffic should be prohibited, except for designated access routes.

Terminal and Pump Stations

26. Express should continue to work with landowners to resolve issues related to the visibility of station facilities.

27. Express's commitment to develop a monitoring program to measure fugitive emissions of hydrocarbons arising from mainline valves and at pump stations should be carried out in consultation with Environment Canada and a copy of the plan should be provided to the Board.

28. A copy of Express's plan to develop and submit an action plan to deal with greenhouse gas emissions, arising directly from the operation of the Project, under the federal Voluntary Challenge and Registry Program should be provided to the Board. The Express VCR action plan should include annual calculations of GHG emissions, which should be provided to Environment Canada.

29. The Panel recommends that Express be required to file with the Board, 30 days prior to the commencement of construction, the noise assessment for the booster pumps.

30. The Panel acknowledges Express's statement that actual compliance to ID 94-4 can be determined only if sound monitoring is conducted. Accordingly, the Panel recommends that Express be required to:

(a) notify the Board of any noise complaint(s) received in respect of the operation of its pump stations and apprise the Board of any measures that have been taken to address the complaint(s); and

(b) file with the Board, within eight months after the commencement of operation of the pump stations, .a monitoring report for each pump station detailing the results of an appropriate monitoring program. This report should include, but not be limited to, the noise emission levels at the source, the fenceline and the three closest residences at the maximum operating level.

Mainline Valves

31. The Panel recommends that Express be required to file the information regarding further mitigation measures with the Board for approval, 15 days prior to the commencement of construction.

Construction Camp and Storage Areas

32. The Panel recommends that Express be required to contact the operators/managers of all potentially affected campgrounds and apprise the Board of any concerns raised by the responsible operators and how these concerns have been addressed by Express.

33. Express should be required to locate all construction camps, equipment storage, warehouse areas, and staging areas outside of the ESAs and areas of native grassland.

Upstream Facilities

34. Once the Draft Reclamation Plan is finalized, Express should be required to implement measures for the reclamation of excavated areas upstream of the Hardisty Terminal.

Heritage and Archaeological Resources

35. The pre-construction worker awareness programs to which Express has committed, and in addition, the need to alert workers to avoid disturbance of stone features, should be implemented. Access to the right-of-way should be controlled and traffic off of the right-of-way should be prohibited except for designated access routes.

36. The Panel recommends that Express file with the Board, at least 30 days prior to the commencement of construction:

(a) confirmation that all of the First Nations identified have been contacted, and afforded an opportunity to identify any concerns that they may have with the proposed routing;

(b) a summary of First Nations' concerns and how these concerns have been addressed by Express; and

(c) comments received from Alberta Community Development, including any further mitigation.

Environmental Inspection, Monitoring and Follow-up Program

37. Since Express's proposal to seek approval in the field for changes in its mitigation measures is found not to be acceptable, the Panel recommends that Express be required to apply, to the Board, for any changes to its mitigation measures provided in its Application, or other evidence adduced in the hearing process.

38. In regard to monitoring, the Panel notes that Express is committed to filing monitoring reports consistent with the Board's requirements. The Panel is of the view that specific details should be included in these reports and therefore recommends that:

Express be required to file with the Board a post-construction environmental report within six months of the in-service date for the Express Pipeline Project. The post-construction environmental report shall set out the environmental issues that have arisen and shall:

(a) indicate the issues resolved and those unresolved; and

(b) describe the measures Express proposes to take in respect of the unresolved issues.

Express should be required to file with the Board, on or before 31 December following each of the first three complete growing seasons subsequent to the filing of the post-construction environmental report referred to above:

(a) a list of the environmental issues indicated as unresolved in the report and any that have arisen since the report was filed, including details on the monitoring of the following items:

(i) the effectiveness of the reclamation program in areas of native pasture, including in the Sage Creek Grazing area and any significant areas of northern fescue (if found), the vegetation composition on the right-of-way in comparison to native vegetation off the right-of-way;

(ii) the effectiveness of the measures to reduce cattle-caused damage to revegetated areas;

(iii) the locations of, and the reasons for, any alternate soil handling procedures implemented, and a discussion of the positive or negative effects of this activity;

(iv) the effectiveness of the reclamation program at the South Saskatchewan River crossing, and the condition, including stability and revegetation, of the banks of the South Saskatchewan River;

(v) for all plant and wildlife species with a designated status, including habitat, that are encountered by construction activities, the comments from the appropriate regulatory agencies, the mitigation measures undertaken, and the success of those measures;

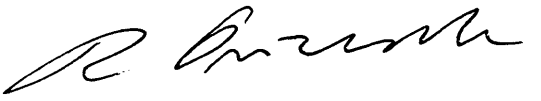
(vi) the locations of any areas of water impoundment and the measures being undertaken to address the situation; and

(b) a description of the measures Express has taken or proposes to take in respect of those issues.

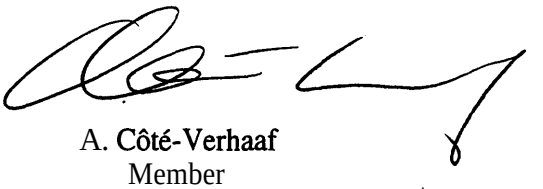
39. Express should file its methodology for determining reclamation success with the Board for approval, within 15 days after the in-service date. This should include, but not be limited to: comments from the Advisory Committee; objectives for reclamation success, including any standards that the Applicant intends to adopt; details on the frequency of monitoring; and details of the sampling program. Express should also, periodically, review this methodology with the Advisory Committee and provide any updates to the Board.

4.3 Overall Panel View

Having considered all of the evidence and information relevant to section 16 of the CEAA, Express's proposed mitigation measures and the Panel's conclusions, and with the incorporation of the Panel's recommendations, the Panel is of the view that the proposed Project is not likely to cause significant adverse environmental effects.



R. Priddle
Presiding Member



A. Côté-Verhaaf
Member

R. D. Revel
Member

Calgary, Alberta
May 1996

Chapter 5

Dissent

I find that I am unable to agree with my colleagues' conclusion that this Project is not likely to have significant adverse environmental effects. I reach this decision primarily on the basis that the evidence produced by the Applicant, Express Pipelines Ltd., is inadequate from both a legal and scientific perspective to permit this Panel to determine whether or not the Project will have significant adverse environmental effects in accordance with the CEAA.

The inadequacy of evidence is in regard to those effects on vegetation and wildlife, and cumulative effects. Since the evidence on effects is deficient to consider environmental effects on vegetation and wildlife and to consider cumulative effects, the consideration of mitigation measures and the acceptability of the route is not necessarily relevant. I also note there are some significant gaps in the evidence in regard to certain mitigation measures for effects on vegetation and wildlife, and there are shortcomings in Express's approach to routing. I consider these to be worthy of comment.

Legal Analysis

Pursuant to section 41 of the CEAA, this Panel is required to provide an assessment of the environmental effects of the Project and in so doing shall consider the factors listed in subsections 16(1) and (2) of the Act. Subsections 16(1) and (2) require consideration of the environmental effects of the Project, including the effects of malfunctions or accidents that may occur in connection with the Project and any cumulative effects **that'** are likely to result from the Project in combination with other projects or activities that have been or will be carried out. The Panel must then go on to consider the significance of these effects. We are to consider comments of the public. Next, follows a consideration of measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the Project. Subsection (2) requires the Panel to consider the purpose of the Project and alternative means of carrying out the Project that are technically and economically feasible and the environmental effects of any such alternative means, the need for a follow-up program and the capacity of renewable resources likely to be significantly affected to meet present and future needs.

There is a certain logic to the order in which Parliament has chosen to set out the considerations under subsection 16(1). It is a natural progression to consider the Project's effects, the cumulative effects, the significance of these effects, public comments and ***then*** to go on to consider the mitigation of any adverse environmental effects. One has to know what the environmental effects or cumulative environmental effects are or will be before mitigation of those effects can be properly considered. It is my view that the Applicant did not follow this logical progression in its environmental assessment. Rather, in many important areas it relied upon mitigation measures it was proposing ***before*** determining the environmental effects of the Project.

One result of this approach was to place so much faith in mitigation and reclamation measures that a thorough analysis of both the environmental effects and the cumulative environmental effects of the Project was not undertaken. The Applicant's position is that its mitigative and reclamation efforts will result in there being no significant long-term adverse environmental effects from this Project. In my

view, it is impossible to reach this conclusion if proper studies were not carried out to determine what the effects of the construction of the pipeline will be on certain environmentally sensitive areas, particularly the northern fescue grasslands and the area south of Cypress Hills. The Panel must know what the effects will be before it can determine whether or not the mitigative measures to be undertaken by the proponent of the Project will result in there being no significant adverse environmental effects.

I find that in certain key areas there was no evidence at all from the Applicant respecting the environmental effects of the Project. In other cases there was some evidence but the methodology used to arrive at the conclusions was suspect. Finally, in some areas, there was ample evidence proffered but, in my opinion, the Applicant drew the wrong conclusions from it.

The issue of inadequate evidence has been addressed by the Federal Court in several cases. In *Canadian Wildlife Federation Inc. et al. v. Canada (Minister of the Environment)', the* Federal Court, in a decision that was upheld by Federal Court of Appeal,[2] considered the granting of a licence by the Federal Minister of the Environment for a proposal by the Government of Saskatchewan to build the Rafferty and Alameda dams. The licence to build the dams was issued by the Minister on the basis of an *Initial Environmental Evaluation* ('TEE") conducted pursuant to the Federal *Environmental Assessment and Review Process Guidelines Order* ("EARP Guidelines"). There was a number of information deficiencies highlighted in the IEE, which were identified as "moderate" or "significant". The government's conclusion that the environmental effects were mitigable was seen by the Court as questionable because of significant data deficiencies identified by the IEE. Muldoon, J. held:

> In light of the extent of the information deficiencies in the IEE studies, it is difficult to understand how the departmental authors can so boldly assert that mitigation options truly exist when so many of the studies upon which the IEE relies are hampered by significant data deficiencies. (at p. 218)

Muldoon, J. went on to consider the use of mitigation options where there was insufficient data on water quality:

> Considering the first four significant information deficiencies above recited, the Court cannot find the known technology which para. 12(c) contemplates; and since the Minister did not identify any *known* technologies, but only vague hopes for future technology, it is not possible to consider that the recited adverse water quality effects are mitigable in contemplation of para. 12(c) of the *EARP Guidelines....* Monitoring plans for the future are a far cry from known technology whereby the adverse water quality effects can be mitigated. (at pp. 119-120)

The Court ordered that the licence be quashed unless the Minister appointed an Environmental Assessment Panel to conduct a public review with regard to the environmental effects of the Project.

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[1] [1989]4 C.E.L.R. (N.S.) 201 (FCTD).

[2] [1991] 1 F.C.R.641.

The issue of insufficient information was also considered by the Federal Court in Re ***Friends of the Island Inc. and Minister of Public Works et al.***[1] which dealt with the proposed fixed link between Prince Edward Island and New Brunswick. Reed, J. held:

> What does seem clear is that the assessment is required to take place at a stage when the environmental implications can be *fully* considered (s. 3) and when it can be determined whether there may be ***any*** potentially adverse environmental effects (s. 10(1)). In addition, the screening or assessment by the initiating department should take place at a time when both the proposal being assessed and the decision relating thereto, including the grounds on which it is based, can be released to the public. (at p. 721)

Both of these cases dealt with the EARP Guidelines which was, of course, different from the CEAA. There is no jurisprudence as of yet under the CEAA. However, both the EARP Guidelines and the CEAA provide for the same decision criteria, namely, "significance". Therefore, the cases decided under EARP Guidelines are, in my view, relevant in this respect to the decision to be made under the CEAA in the case before this Panel. As in the ***Canadian Wildlife Federation*** case, it is difficult to see how Express can so confidently assert that mitigation options will eliminate any adverse environmental effects when the studies it relies upon are hampered by significant data deficiencies. With regard to the ***Friends of the Island*** case, we are not too early in the planning stages of the Express Pipeline Project to obtain specifics, but, as that decision suggests, the information before the Panel must be sufficient to allow it to *fully* consider the environmental effects of the Project. Unfortunately, Express did not carry out an environmental assessment that would have put sufficient information before this Panel to enable it to fully consider what the environmental effects of the Project will be.

As the Applicant in this case, Express laboured under the legal requirement to provide all of the information necessary for this Panel to make findings in favour of the Project proceeding. Providing such information is a general legal burden which is borne by anyone who seeks to prove a fact, or facts, before a tribunal. In addition, as in any contested proceeding, there was a subsidiary obligation borne by Express to put forward evidence and information to refute the evidence and information submitted by intervenors, to the extent that intervenor evidence was contrary to the case Express sought to make before this Panel. Those are general, well-established principles of the common law which are fully congruent with sections 16 and 34 of the CEAA. There was no reason for the Panel not to expect full compliance and satisfaction from Express with respect to those obligations.

In addition, in considering "the significance of the effects", which is a requirement of section 16(l)(b) of the CEAA, it is noteworthy that no qualifying words such as "in the opinion of the Panel" have been inserted into this provision of the Act by Parliament. The existence of qualifying words might have implied a subjective, as opposed to an objective, test. For instance, if the qualifying words "in the opinion of the Panel" had been inserted into section 16(l)(b), it might be argued that the review Panel had been given the latitude to evaluate the significance of the environmental effects in a subjective manner, based on the specialized expertise of the Panel, or in light of other factors. Here, however, no such qualifying words appear in the pertinent section of the Act, which leads to a conclusion that the Panel must apply an objective, fact-based test. It is through application of an objective fact-based test that I reach my conclusions on the evidence in Express's application.

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[1] (1993), 102 D.L.R.. (4th) 696.

Scientific Analysis

A fundamental tenet of environmental effects assessment is that it must be science-based; that is, it must draw on the applicable scientific literature and the results of relevant studies conducted by the proponent. However, in considering the complex ecological and environmental issues potentially associated with a project, regulatory decision-makers must be concerned with scientific uncertainty. That uncertainty resides both in the information and the knowledge that is applied to the assessment.' Information uncertainty arises where relevant data has not been collected or submitted to the regulatory decision-maker.* Knowledge uncertainty arises where there is a lack of adequate scientific understanding of the issues or from situations where the collection of information is unfeasible due to economic and/or technical limitations.[3] The distinction between information and knowledge uncertainty may be unclear but the proponent must exercise sound judgement in providing a scientific analysis that allows the regulatory decision-maker to base a decision on scientifically defendable information and to factor knowledge uncertainty into the decision-making process.

Information uncertainty is remedied by quantitative studies and qualitative assessments. Quantitative studies should be based on generally acceptable principles of experimental design and analysis and they should be properly executed according to the specified methodology. Conclusions from the study must be based on the data generated by the study. A proponent may also choose to provide information based on qualitative assessments but, in the absence of an objective standard to measure conclusions drawn from such an analysis, it must be viewed in the context of the expertise of the individual presenting the information and an appreciation of the facts on which the qualitative analysis rests.

Knowledge uncertainty presents great challenges for proponents and regulatory decision-makers alike. However, where knowledge uncertainty exists, it should be identified to the regulatory decision-maker and it should be discussed in the context of current scientific thinking on the issue in question.

In considering Express's environmental assessment of the pipeline, **I** find little scientific basis on which to make a conclusion in regard to the environmental effects and the significance of those effects on vegetation and wildlife. The scientific basis for Express's assessment of cumulative effects is also weak. Where Express chose a quantitative approach, the studies were poorly designed to provide the necessary information. Express's consideration of environmental impacts through qualitative means was difficult to evaluate as some of their witnesses at the oral hearing lacked expertise to speak authoritatively on vegetation and cumulative effects. In many instances their qualitative assessments appear to rest only on weak speculation rather than any factual basis. I consider that Express has also failed to acknowledge key areas of knowledge uncertainty and identify them to the Panel. Furthermore, where they have not referred to broad ecological principles underpinning their view points, these have not been discussed in terms of the current scientific thinking on such issues.

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[1] L.A.Reynolds, The Era of Juriscience: Investigating the Relationship Between Science, Law and the Environment, Journal of Admin. Law & Practice 1996, 9; p. 62 at pp. 84-85.

[2] Ibid.

[3] Ibid.

It must be recognized that in many circumstances it is unfair to expect a proponent to provide information that is so expensive or so difficult to collect that it is, effectively, unobtainable. In several instances, Express has proposed to collect important information after the hearing. Clearly, this information is easily obtainable by Express and there is no excuse for not placing it before this Panel to reduce the degree of information uncertainty the Panel is faced with. In other circumstances, Express has simply chosen not to present valuable information or remedy its absence by further studies before construction. I have concluded that, in these circumstances, Express could easily have collected the information but chose not to do so.

I do not consider that Express's environmental assessment in regard to vegetation, wildlife and cumulative effects provides a basis for this Panel to make a decision on scientifically defendable information nor does it allow the Panel to factor knowledge uncertainty into the decision-making process.

Deficiencies and Inadequacies of Express's Evidence

Construction Schedule

I first would like to briefly comment on the issue of the construction schedule. I concur with the majority's view that Express has not adequately addressed the concerns associated with a spring-summer construction schedule (May to August).

I find I am unable to agree with the portion of the recommendation that would seemingly permit the Board to allow changes to the timing of construction. In my view, the timing of construction is a crucial factor with respect to the various environmental effects of the Project canvassed during the public hearing. An example arises in relation to winter pipeline construction and antelope winter ranges. Express has not placed evidence before the Panel on environmental effects in relation to winter construction. When asked about the effects of winter construction on antelope winter ranges, the Express expert witness declined to provide information, saying:

> I do not know why we would be providing any kind of information on a winter range when, as I said, under this Application, we do not anticipate being in there in the winter.
>
> If we are in there because of scheduling delays, as I said, we will talk to Fish and Wildlife about their specific concerns and we will evaluate the situation at that time.
>
> It is pointless to go on a hypothetical situation.

Express has merely speculated that the pipeline will not cause problems for antelope on their winter range. In final argument, Express mentioned that it would adhere to the management plan but it remains that no information on environmental impacts of the Project on antelope winter range was put forth for the Panel's consideration. I fail to see why the majority would allow Express to apply to construct the pipeline in winter after the CEAA Panel has rendered its decision.

One of the underlying purposes of the CEAA is to afford an opportunity for the public to comment on the environmental effects of a project such as the one before this Panel. This information should have been placed before this Panel for its consideration.

Vegetation

In considering the environmental effects on vegetation, I find that the evidence is inadequate. This includes a lack of evidence on the effects of disturbance or loss of native prairie, loss of rare or endangered plant species and/or significant or unique plant communities and weed problems both on the right-of-way and as invaders of native grasslands.

A determination cannot be made of the environmental effects of the project on vegetation and the significance of those effects in light of the following:

1. Lack of Expertise

Express's expert in the oral hearing admitted that he is not a botanical specialist and, therefore, I attach little weight to opinions on vegetation impacts offered by this individual. Express chose not to present its botanical consultant to testify on the impacts of the pipeline on vegetation.. In addition, the qualifications of that botanical consultant were not put before the Panel.

2. Lack of Analysis and Survey of the Vegetation, Particularly for the Fescue Grasslands

One of the most glaring deficiencies in the proponent's evidence was the failure to provide the results of any study to show the composition and range condition of plant communities along the right-of-way, at the pump stations and along the access roads and power lines. The praponent has provided general descriptions of vegetation by ecoregion, but I cannot see how this can lead to any understanding of the possible effects of the Project on the vegetation or the significance of such effects. The proponent also relied upon the Rare Plant Survey to make inferences in respect of the vegetation encountered by the right-of-way. The Rare Plant Survey was not designed to describe and classify vegetation. Express admits that it was not the intent of the Rare Plant Survey to provide a line list of native prairie. I find it provides no assistance in determining the vegetation communities impacted by the pipeline or the range condition of that grassland vegetation.

Express seems to be of the impression that grazing disturbs native grassland and, therefore, no meaningful characterization of plant communities could be done. I do not accept this as an excuse for not providing this information, in light of the fact that grassland ecologists routinely survey, characterize and evaluate the range condition of grasslands that are subject to grazing. I also consider that the vegetation surveys, conducted for the access roads and power lines, were carried out so late in the growing season that most plants would not be identifiable. Any conclusions drawn in regard to vegetation on these sites are highly speculative.

In respect of the northern fescue grasslands, I accept the evidence of AWA/FAN that the Northern Fescue Grassland is widely recognized as a distinct, natural subregion and is one of the most threatened natural ecosystems in Canada. I find the proponent's approach to determining the effects of the Project on these grasslands to be wholly insufficient. The Panel was not told of the extent or significance of any fescue grasslands that could be encountered by the pipeline right-of-way. Express's conclusion that the pipeline may encounter only localized fescue grasslands is speculative in the absence of any studies to confirm or negate this. In spite of this absence of evidence, the proponent has proposed mitigation measures, should it encounter a significant remnant of fescue grassland, as identified in later studies. The majority has stated that it is generally satisfied with these

mitigative measures. I cannot see how this conclusion can be reached without any information on the extent of the fescue grasslands potentially affected and the nature of those grasslands.

The evidence presented by Express on the potential effects of the pipeline on vegetation contains numerous references to grassland range condition and the effects of grazing on grasslands. It is Express's evidence that much of the grassland vegetation potentially impacted by the pipeline is not in a climax condition but is disturbed due to grazing. The range condition of the grasslands is relevant to Express's application in two ways. Firstly, they have noted that grazing is a disturbance that could allow invader plant species to become established. On the basis of this evidence, I surmise that grazed grasslands may be more susceptible to weed invasion from the pipeline right-of-way than climax grasslands. Secondly, Express's reclamation experts state that the reclaimed right-of-way will take longer to resemble the vegetation composition off the right-of-way in heavily grazed pastures. Information on grassland range conditions could have assisted the Panel in evaluating the risk of weed invasion on rangelands intercepted by the right-of-way. It could also have assisted the Panel in evaluating the accuracy of the time for the vegetation to be restored to that of the off right-of-way' composition; as well as considering the significance of the contrast that could exist between vegetation on the right-of-way and off the right-of-way.

I consider that an analysis of the range condition of the grasslands potentially affected by the pipeline could easily have been carried out by Express as part of a vegetation survey. Express's view on grazing effects in the grasslands is based on incidental observations. I do not consider this approach to have any scientific validity.

On the basis of this analysis, I must conclude that there was not adequate information provided to the Panel by Express for the Panel to consider the potential adverse environmental effects associated with vegetation which may result from the construction and operation of the proposed pipeline. There was, therefore, no evidence upon which to conclude that there are not likely to be any significant environmental effects with respect to this issue.

3. **Incomplete Evidence on Rare Plants**

I accept AWA/FAN's evidence that additional rare plant species were not searched for. AWA/FAN analyzed the list of rare plant species provided by Express in the Rare Plant Survey and it is their evidence that eight of those species occurred in upland grass situations. These species were not specifically looked for. They would have been located by a continuous survey along the route rather than the point surveys carried out by Express. AWA/FAN's witness, Mr. Wallis, is acknowledged as an expert on rare plants in the southern grasslands and I accept his evidence that the Rare Plant Survey was inadequate. Express has also admitted that some rare plants and significant communities may have been missed. It is also noteworthy that in excess of 30 of the 93 sample plots were sampled only in the June period and not re-sampled in the July sampling period. In spite of excuses put forth by Express as to why this could not be done, it remains that later flowering rare plants were not surveyed for over a significant part of the route. This is a significant gap in information that cannot be overlooked in evaluating the methodology used in the Rare Plant Survey.

Due to the deficiencies in the Rare Plant Survey, I must conclude that there was not adequate information provided to the Panel by Express for the Panel to consider the potential adverse environmental effects associated with vegetation which may result from the construction and operation of the proposed pipeline. There remains considerable uncertainty about the rare plant species

potentially affected by the Express pipeline. There was, therefore, inadequate evidence upon which to conclude that there are not likely to be any significant environmental effects with respect to this issue.

4. **Lack of Details on the Status of Restricted Range Plant Species**

I am of the **view** that Express has not provided sufficient information on the restricted range plant species that could be affected by the pipeline. Express's Rare Plant Survey states that plant species with restricted ranges are found along the proposed route. These occurred as populations extending inside and outside the right-of-way. The Survey stated that routing modifications may be warranted depending on further evaluation of their current status by provincial agencies or experts in rare plant conservation. Express has hired a botanical consultant to further investigate the relative abundance of restricted range plant species along the pipeline route. That investigation will take place through discussions with other botanical specialists in the province. I am of the opinion that information on the population status of these species should have been presented to the Panel to allow a consideration of potential impacts of the pipeline on these species.

I agree with the statement in the Rare Plant Survey that populations with fewer than ten provincial locations are significant. I cannot conclude that adequate information has been provided by Express to consider the potential adverse environmental effects associated with vegetation which may result from the construction and operation of the proposed pipeline. There was inadequate evidence on which to conclude that there are not likely to be significant environmental impacts on restricted range plant species.

5. Lack of Evidence on the Ability to Restore Native Prairie

Many of Express's claims about the environmental effects of the pipeline rests with their view that a reclaimed right-of-way poses no long-term loss of prairie habitat. It considers that after reclamation the vegetation will match or not be significantly different from that off the right-of-way in three to five years. The majority is satisfied that, with proposed mitigation, the reclamation plan and conditions established by the Panel, in time the right-of-way would be reclaimed to an acceptable composition of native species similar to the off right-of-way composition. I cannot agree since I find that the conclusions about the potential success of the reclamation to be based on incomplete evidence. I also consider that conclusions regarding reclamation on the Express right-of-way are improperly drawn from other studies.

Express's evidence is that an acceptable community on the right-of-way is native grass cover which they anticipate will establish in three to five years. However, their reclamation expert considers that a measure of success for reclamation is how the composition on the right-of-way matches that off the right-of-way. I agree with Express's view that the vegetation composition is a measure for reclamation success, but Express has failed to address the adverse effects associated with a change in vegetation composition until that reclamation success has been reached. I consider that Express should have provided information on vegetation effects up to the point that the right-of-way is successfully reclaimed and the native prairie is restored, factoring in the uncertainty associated with the reclamation process.

Express's evidence on the reclamation of the pipeline right-of-way reveals the uncertainties associated with restoration of the vegetation to the composition existing before the disturbance caused by the pipeline. There may be difficulties in re-establishing specific dominant species from the climax

community. Blue Grama grass is one of the dominant species in the dry mixed grass prairie but Express admits that it is difficult to establish. Fescue is dominant on fescue grasslands but Express also states that it seems difficult to establish and may take many years to establish. Some plants with specialized requirements may not re-establish on the right-of-way and those with slow growth or slow establishment could take five to ten years or longer to re-establish. Minor forbs and non-vascular species may take ten to 20 years to re-establish but that timing is a best guess. Both grazing and drought could delay the timing of reclamation to grass cover.

In addition, there is little information to substantiate Express's claims that the right-of-way will be reclaimed in three to five years. No studies were presented to the Panel to support that time estimate for the fescue grasslands. Two studies were submitted in support of Express's views on the timing of reclamation for the dry mixed grass prairie. These studies resulted from monitoring reclamation results on pipeline rights-of-way running through the Greater Sand Hills of Saskatchewan. Express acknowledged that these rights-of-way were in different environments to that encountered by the Express pipeline but noted that many of the plant species are the same. I do not consider that inferences about reclamation for Express's right-of-way can reasonably be drawn from the reclamation results on rights-of-way in different environments and under different management conditions. Express states that it relied on other studies on reclamation to make conclusions in regard to reclamation success but these were not put before this Panel or discussed in any substantive way.

Without such studies to substantiate Express's reclamation claims, I cannot come to the conclusion that the right-of-way will be reclaimed with the ease that Express has put forth. No clear picture emerges as to what the composition of the right-of-way will be in three years, ten years or 20 years as plant succession occurs. The majority has apparently arrived at its conclusions on the right-of-way reclamation without benefit of appropriate studies to support Express's conclusions.

The majority has concluded that with time the right-of-way would be reclaimed to an acceptable composition of native species similar to the off right-of-way composition. However, they have chosen to ignore the considerable uncertainties as to the time for the right-of-way to be reclaimed and the composition of the plant community established over time. I agree with the conclusion by the AWA/FAN that Express's "leading edge" reclamation is experimental. Not enough information has been submitted by Express to convince me that this experiment will succeed. There was inadequate evidence to conclude that native prairie will be restored on the right-of-way according to the timeframe put forth by Express.

6. Lack of Details on the Final Seed Mixes to be Used

The majority has expressed satisfaction with Express's reclamation plan even though the information on the reclamation seed mix has been presented only in draft form. The final seed mixture will be determined through discussions and surveys conducted after the hearing and may be quite different from the draft lists presented to the Panel. I consider this to be the case even though Express characterizes future changes to the mixtures as "fine tuning". Furthermore, the final composition of the seed mixes used may depend on Express finding adequate supplies of particular seeds since Express has made reference to the difficulties in obtaining certain species to use in the reclamation seed mixes.

I am of the opinion that the final seed mixtures to be used on the right-of-way are highly relevant to a determination of the potential for reclamation success on the right-of-way. The success in establishing

and sustaining native grass stands on the right-of-way is closely correlated to the conditions that vary on the right-of-way. This correlation is best evaluated by determining how closely the seed mixture approximates the vegetation composition along the right-of-way. Without evidence on the seed mix, the Panel cannot conduct such a necessary analysis. I see no reason why Express could not have undertaken these determinations in advance of the hearing and presented this evidence to the Panel for consideration. I cannot conclude that adequate information has been provided by Express to consider the potential for reclamation success on the right-of-way and I consider there is inadequate evidence on which to conclude reclamation will be successful in restoring native grasslands.

Wildlife

Wildlife species that are considered to be at risk in Alberta are of considerable concern. Express has focused on the 32 species that are identified by COSEWIC and the provincial listings as being at risk. Some of these species are very rare such as the Swift Fox which has been extirpated from Canada and is now being reintroduced. Other species such as antelope may not be immediately threatened but require special management to address concerns. I consider each of these wildlife species identified by Express as being at risk to be of priority for conservation. They must be fully considered in the environmental assessment for the Express pipeline.

Express's approach to assessing environmental impacts of the pipeline on wildlife is properly characterized as a species-by-species approach. By adopting this approach, Express is faced with a twofold challenge. Firstly, they must collect information on species for which there may be little understanding of their habitat requirements and distribution. This presents difficulties in identifying those habitat features which are of significance to the species in a wildlife survey. Secondly, adequate surveys must be designed and.carried out for species that may be very difficult to locate. This would be particularly true for a species that is restricted to a specific habitat impacted by the pipeline but is constantly sparse within that habitat. I do not consider Express has met these challenges and as a result I am of the view that there are considerable information deficiencies in the evidence related to adverse effects that are likely or unlikely to affect wildlife. I will now examine those deficiencies in detail.

1. Lack of Proper Surveys to Identify Populations of Wildlife Species at Risk

I agree with AWA/FAN that the wildlife surveys conducted by Express were simply inadequate and I am of the opinion that Express should have designed and conducted specific surveys for the identified species at risk. Express admitted that the wildlife survey conducted was not specifically designed for small passerines or cryptic nesters. It also admitted that the design of the wildlife surveys did not specifically allow for identifying the Western Small-footed Bat or the Sagebrush and the Prairie Voles along the right-of-way. Express's wildlife surveyors had no previous experience with Mountain Plover or the Great Plains Toad. The evidence shows that species such as the Mountain Plover, Brewer's Sparrow and Baird's Sparrow would have been difficult to see and identify using the survey methodology employed by Express.

Express has argued that widely dispersed species such as the Mountain Plover will not be affected by the pipeline since the probability of encountering them is very low. Express has not convinced me that this is a valid calculation of probability based on any understanding of the distribution and

abundance of these species. I do not consider that this excuses Express from carrying out proper surveys for these species.

In regard to the Western Small-footed Bat, Express indicated that this species has a very low reproductive rate. Express stated that there was insufficient information to attempt prediction of potential impacts on this bat. However, Express did not design any surveys for this species. I concur with the argument of AWA/FAN that surveys including ultrasonic detection and diurnal searches for roosts would have been advisable to address possible environmental effects of the Project on this species.

As a result of Express's failure to conduct well designed and relevant surveys for species at risk, I find it impossible to say that there likely will or will not be significant adverse effects on these species. The majority places great faith in the late summer and fall construction schedule as a means of mitigating any potential adverse effect on these species. I do not consider that the construction schedule negates the need for information generated by proper studies. This is especially true in light of the concerns about habitat fragmentation and habitat loss which will be discussed later.

2. **Lack of Evidence on Effects on Swift Fox**

I consider the lack of evidence on Swift Fox to be a serious deficiency in Express's Environmental Assessment. Express has admitted that they did not undertake any nocturnal call counts for Swift Fox during the May surveys. They state that as a result of the future collaring studies they will obtain the best information on the distribution and den sites within the pipeline corridor. The study will be carried out in March and April and the results will be submitted after the hearing. Express states that as a result of the survey they will have a lot of information on Swift Fox movements in the vicinity of the pipeline spread by the time of construction. They will be able to ascertain the level of risk to the species at that time. In spite of the lack of information, Express goes on to state they do not anticipate there would be a high risk to the Swift Fox from the pipeline.

I fail to see how an assessment of risk to the species can be made without the necessary studies having been conducted to examine the status of the populations in the vicinity of the pipeline. While Express can be commended for sponsoring further study on this species, the results of the study come too late for this Panel to consider in its decision. I cannot concur with the majority that a generaldescription of habitat and the results of observations from the 1995 survey provide any basis for considering environmental effects on this species and the significance of those effects. In the absence of information from properly conducted studies, I am unable to conclude that there are likely or unlikely to be significance adverse effects on the Swift Fox.

3. **Lack of Evidence on Sage Grouse and Sharp-tailed Grouse Lek Areas**

Express admits that the lekking surveys for Sharp-tailed Grouse and Sage Grouse were conducted too late to be effective and, hence, proposes to conduct further surveys in late March or early April of 1996. In spite of the incomplete survey, Express considers that they can physically avoid a lek area by routing deviations. They also conclude that, if they came close to a fall lekking area, there would be displacement of the birds but it would not be significant.

I fail to see how Express can draw these conclusions regarding avoidance and the significance of displacing birds in the fall when they do not know the lekking areas that might be encountered along the route. The results of the spring surveys come too late for this Panel to consider them in its decision. I do not concur with the majority that general habitat descriptions and the results of the 1995 survey provide a basis for considering environmental effects on these species and the significance of those effects. In the absence of information from properly conducted studies, I am unable to conclude that there are likely or unlikely to be significant adverse effects on these species.

4. Inadequate Analysis of Habitat Fragmentation and Habitat Loss

Express has downplayed the flaws in the wildlife survey by arguing that it is constructing after the nesting season. This is an important means of avoiding direct harm to the birds that may be nesting on or in the vicinity of the right-of-way. However, species also suffer harm from destruction, degradation and fragmentation of habitat. Express argues that it is not fragmenting habitat and it is not contributing to habitat loss of any significance. Express also is of the view that the species in question will be resilient enough to withstand the localized impacts from the pipeline.

The vegetation dynamics on the right-of-way are fundamental to a view of potential fragmentation and habitat degradation and destruction. Express considers that the pipeline will be a short-term disturbance and the habitat will be restored to its previous capabilities through reclamation to native grass cover. I have already set forth my views on the uncertainties regarding the temporal and compositional changes on the right-of-way. In relation to potential fragmentation, I consider that Express has a highly simplistic view of grassland vegetation structure and the importance of that structure to wildlife, particularly ground nesting birds. Express's expert states that the vegetation change on the right-of-way is not like forest removal. This view ignores the fact that grassland vegetation may have a complex canopy structure that will be altered by the pipeline right-of-way as it is replaced with grass cover from seeded species. It also does not consider the complexities of the habitat structure and quality that may be intersected by the right-of-way. In my opinion, the Panel would have benefited from a more meaningful discussion about potential habitat fragmentation resulting from a right-of-way that is not fully reclaimed and may take time to fully restore.

Overall, I agree with AWA/FAN's expert witnesses that fragmentation is a complex ecological concept in relation to the right-of-way. It may result from disturbance due to increased human activities on the right-of-way, and through change in the predator-prey balance. Fragmentation may also occur if weedy species invade native grasslands from the right-of-way. I find that Express has not addressed potential fragmentation in a manner that allows this Panel to fully appreciate these issues.

I do not consider that Express has provided a meaningful analysis of the ecological consequences to rare, endangered and vulnerable species resulting from habitat loss. Express argues that the small scale loss of habitat due to the pump houses would not be significant to any wildlife species but Express has neglected to provide any meaningful information on the ecological basis for this assumption. I also do not accept Express's assumption that wildlife species will necessarily have the resiliency to recover from impacts from the pipeline. It is not clear how such assumptions hold in relation to species that may be under stress and/or may exist at very low population numbers. By stating these assumptions as fact, Express has not acknowledged considerable knowledge uncertainty regarding the population dynamics of the species at risk. In my opinion, the Panel is, therefore, at a loss to fully consider the uncertainties that exist in relation to wildlife impacts from the pipeline.

Express's simplistic view of habitat loss is best illustrated by discussions on the Sage Thrasher. Express admits that Sage Thrasher is a sage obligate species that is dependant on sage of 50 centimetres in height or more. Express's expert admits that the right-of-way represents a medium or long term loss of sage habitat for this species. I consider that Express's evidence on the impacts due to loss of habitat for the Sage Thrasher to be highly speculative in light of an apparent lack of knowledge about the biology of this species and the lack of information concerning the distribution of critical habitat for the species. Furthermore, Express could only speculate on the re-establishment of sage on the right-of-way. I am not prepared to accept such speculations as the basis for finding there is or is not likely to be a significant impact due to habitat loss on the Sage Thrasher.

The majority is of the view that with the implementation of Express's mitigation programs that any fragmentation associated with the proposed pipeline is not likely to result in significant adverse environmental effects on wildlife. I consider that the majority has come to this conclusion without benefit of any meaningful analysis of potential fragmentation effects and potential habitat loss. I consider that they have ignored the considerable uncertainties previously pointed out for the reclamation of the right-of-way.

Moreover, I agree with AWA/FAN and the Rocky Mountain Ecosystem Coalition that Express should not have limited its analysis of wildlife to species that are listed by COSEWIC and provincial agencies. I do not consider these lists to be definitive of all species that should be of concern in conserving biodiversity . Express's approach ignores those species that have not yet been listed yet may be imperiled. Had Express consulted with AWA/FAN experts, Mr. Wallis and Mr. Wershler, in regard to the wildlife potentially affected by the pipeline, they would have designed a more meaningful approach to evaluating potential impacts on wildlife.

I consider that there was not adequate information provided to the Panel by Express with regard to habitat loss and fragmentation which may result from the construction and operation of the pipeline. There was, therefore, inadequate evidence upon which to conclude that there are not likely to be any significant environmental effects with respect to this issue.

Cumulative Environmental Effects

A cumulative effects assessment is the process of analyzing and evaluating cumulative environmental change. It consists of two distinct but related approaches.' Firstly, it is an information generating activity using principles of research and scientific analysis.* Secondly, it utilizes planning principles to determine an order of preference among a set of resource allocation choices.[3] It is the first approach that is appropriate for a cumulative effects assessment pursuant to CEAA. This is emphasized in the Panel ruling dated 17 January 1996 and set out in Appendix IV of this report which states that a cumulative effects analysis "should be based on the results of scientific investigation and systematic analysis and should be presented to the Panel in a manner that allows for a meaningful evaluation of cumulative effects."

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[1] B. Smit and H. Spaling, Methods for Cumulative Effects Assessment, Environ. Impact Assess. Rev. 1995, 15; p. 81 at p. 83.

[2] Ibid.

[3] Ibid.

I accept that Express has complied with the Panel ruling for the cumulative effects associated with air emissions. However, I find that the information presented by Express is inadequate to consider the cumulative effects of this Project in relation to wildlife and vegetation. This arises from a lack of expertise of Express's witnesses and from deficiencies in the approach to considering cumulative effects.

1. Lack of Expertise

In evaluating the qualitative evidence offered by Express on cumulative effects, I must consider the expertise of the Express witnesses who offered their opinions on this issue. When questioned about cumulative effects assessment, Express's experts often framed their answers in the context of a planning approach rather than an analytical approach. While the confusion that this added to the evidence was considerable, the majority considers that Express was only thinking of a planning approach when Express experts stated that they did not have to conduct a cumulative effects assessment. If this is a correct analysis of Express's evidence; I consider that Express's statement would not have been made by expert witnesses who fully appreciated their responsibilities under the CEAA and the analytical approach that it requires. There is ample evidence on the record that Express's consultants have conducted cumulative effects assessments for other projects. However, it remains unclear why Express's experts did not focus their testimony on the systematic procedure that was used to analyze and evaluate cumulative environmental change resulting from the Project and the results of that procedure. I consider that this raises serious questions as to the lack of expertise of Express's witnesses in regard to cumulative effects assessment.

In regard to cumulative effects, the majority considers that Express retained Axys which utilized the services of a number of experts knowledgeable in environmental matters, including Dr. Walker and Ms. Neville. I consider that the expertise required in this area extends beyond expertise on project effects and I note that the two individuals named by the majority presented evidence on reclamation matters but did not present evidence on the cumulative effects of the Project.

2. Approach to Cumulative Effects

Express claims that it used a combination of approaches to examining cumulative effects. The use of a suitable combination of methodologies is a reasonable approach to analyzing cumulative effects. However, the approaches used by Express were not presented in a systematic manner to allow the Panel to assess the methodology employed. For example, one of Express's expert witnesses testified that they used the "ad hoc committee approach" when they met with Fish and Wildlife personnel. On further cross examination, a second witness' **for** Express went on to state, "I think the term ad hoc committee in this particular situation was stretching it." The same witness admitted that, "I would not even refer to it as a committee." Express thus appeared to be confused about the methodology it designed and used to provide information on cumulative effects. Express also considered that consultations with experts and government officials provided meaningful information on cumulative effects when these individuals were not specifically asked about cumulative effects. Express considered that these issues would have been raised if they had been of concern. I fail to see why such a weak approach to cumulative effects assessment would have been used when Express apparently could easily have sought expert opinions specifically on the subject of cumulative effects of the Project. This could have allowed Express to better determine what further empirical analyses were required for cumulative effects assessment.

Express's study on cumulative effects suffers from numerous flaws in experimental design. Express has defined Valued Ecosystem Components (VECs) as:

> a character of the environment that, when measured, quantifies the magnitude of stress, habitat characteristics, degree of exposure to the stressor, or degree of ecological response to the exposure.

Express then considered fish, migratory birds and special status species on the COSEWIC list as VECs. In regard to special status species VECs, Express focused on those species which could be influenced or affected by the localized nature of a pipeline. The vulnerability of these species to impacts from the pipeline was determined in part by the status of the species and in part by the degree to which localized impacts could reasonably affect the population of the particular species. The special status species thus had various levels of vulnerability to the pipeline and various levels of VEC status. Express stated that it could not address cumulative effects in any meaningful way because of deficiencies in the information on detailed habitat requirements, on how VECs interact with land practices, and the status of the VECs. Furthermore, there are no established regional plans or guidelines for many of these VECs. Express proceeded to consider all the special status VECs together as a single entity in its analysis of cumulative effects.

I do not consider this a valid approach to defining VECs. The definition of VECs, as used by Express, is so convoluted that it is difficult to understand. Express has taken pains to define a VEC only to conclude that there is not enough information to proceed using special status species. Surely this was or should have been known before the study was designed. The combination of individual special status VECs into a single entity results in even further confusion to what this VEC is. The result is an approach to VECs that is so weakly defined as to be meaningless. Furthermore, the Panel has not been presented with any analysis as to why special status species are VECs in terms of their role in the ecosystem. I agree with AWA/FAN that Express did not recognize some of the most important VECs such as those that could be considered keystone species.

Express has defined the spatial and temporal boundaries upon which its analysis is based. Firstly, spatial boundaries were defined as ecoregions as these were considered to be ecologically defendable. Later, when Express turned to identifying projects that could have environmental effects that could interact cumulatively with those of the pipeline, the spatial boundaries were narrowed to a 100-kilometre corridor on an east/west basis. Express has not provided an analysis of why this is an appropriate geographic scale in relation to the perturbations resulting from the Project. Express has established the temporal boundaries of the cumulative study at three years. Based on my previous analysis of the uncertainties associated with the reclamation of the right-of-way, I do not consider that three years is an ecologically defendable, temporal boundary for the analysis of cumulative effects.

Having designed the approach to determining cumulative effects from the Project, Express proceeded to identify other projects that could have environmental effects that could interact cumulatively with the environmental effects of the pipeline. Some very general analysis was provided on cumulative effects, but Express claimed that it was not necessary to do a cumulative effects analysis, since the right-of-way would be reclaimed and there would be no significant long-term adverse environmental effects.

I note that Paragraph 16(l)(a) of the CEAA requires the Panel to consider any cumulative effects that are likely to result from the Project in combination with other projects or activities that have been or

will be carried out. Paragraph 16(l)(b) of the CEAA also requires that the Panel consider the significance of cumulative effects. These provisions do not limit the consideration of cumulative effects to only an examination of long-term effects. Since cumulative effects that occur in the short-term may also be significant, they should be considered. In this case, Express should have carried out such an analysis to allow the Panel to make the decision regarding the significance of the effects.

Furthermore, I do not consider that Express has fully acknowledged the uncertainty associated with its cumulative effects assessment. This is particularly apparent where the assumption is made that, in a broader view, the incremental increase in loss from the Project will not alter the ecological condition nor approach any thresholds where thresholds are known. The Panel would have benefited from more thorough discussions of the ecological bases for these views.

In accordance with the above analysis, I cannot conclude that the cumulative effects analysis carried out by Express is based on the results of scientific investigation and systematic analysis. The methodology employed by Express is defective. It has only generated information of such a general nature that it does not allow any meaningful assessment of the cumulative effects associated with the Project. I do not consider that the majority has adequate evidence upon which to undertake the necessary cumulative effects assessment.

3. **Evidence on Cumulative Effects**

There are particular concerns regarding cumulative effects arising in relation to the Wild Horse Pipeline which may be constructed in 1997. Express has stated that the impacts from its pipeline will be assimilated prior to construction of the Wild Horse Pipeline. Express has not provided the Panel with the factual basis for this opinion and it does not appear to acknowledge that the effects of drought or grazing could profoundly alter the assimilation of impacts.

Express admits that the right-of-way may not be reclaimed by 1997 to a condition suitable for nesting songbirds. This impact will be additive with the Wild Horse Pipeline. However, Express has not provided any evidence on what these impacts would be, particularly for those species that it has defined as VECs.

Express assumes that time crowding that may occur with the Wild Horse Pipeline will be localized and of low magnitude. It is difficult to assess the validity of such an assumption in the absence of a more rigorous analytical approach. Express concludes that there is little ecological basis for assuming that the time crowding nature of these projects will be of consequence to local resources. It is precisely the ecological basis for this assumption that requires greater examination.

Express admits that the impacts of the pipeline will extend the period of disturbance (by one year) and will broaden the physical dimension of the right-of-way disturbances by approximately 20 metres. The estimate of disturbances does not consider uncertainties about reclamation of the right-of-way. The spatial estimates of cumulative disturbance do not acknowledge that the Wild Horse route is subject to numerous conditions that apply in relation to the route it follows. Express has not considered fragmentation effects that could arise if the Wild Horse Pipeline varies from the route followed by Express.

In evaluating cumulative effects on vegetation, Express notes the potential for time crowding ‘with other pipelines and considers that the projects will contribute in an additive,.although localized,

fashion to the disturbance of native grasslands. Express has presented no evidence that allows this Panel to consider the nature and extent of such disturbances. While Express has chosen not to present a quantitative analysis of the cumulative effects on grasslands, it appears to have limited its qualitative assessment because it considers that the right-of-way will be reclaimed and, thus, is not like a paved highway. I do not consider this is a valid approach to analyzing cumulative effects. It ignores any short-term cumulative effects that arise from the Express pipeline. It lacks sufficient rigour to assist the Panel in drawing meaningful conclusions in regard to cumulative effects on vegetation.

In regard to cumulative effects on wildlife, Express considers that the effects from this pipeline will be assimilated by the ecosystem within the three-year time frame and there will be no long-term additive effects to VECs. This analysis does not address habitat loss and fragmentation effects that could act in a cumulative manner. Express also states that the incremental stress on wildlife will not be noticeable on a broad scale. It is not clear how this conclusion has been reached in regard to those species at risk that have VEC status.

Over all, I am of the opinion that the expert witnesses from Express have not substantiated their qualitative assessment of cumulative effects on vegetation and wildlife by setting out clearly the factual basis on which it rests. Where broad ecological concepts are raised in relation to this information, they have not acknowledged the uncertainty associated with these concepts nor have they framed them in the context of a discussion on current scientific thinking on cumulative effects.

I conclude that there is inadequate information presented by Express to allow me to make an assessment of the cumulative effects of the Project and the significance of those effects. I do not consider that the majority has adequate evidence on which to determine that the proposed Project is not likely to result in significant adverse cumulative effects.

Mitigation Measures

As previously stated, I find that the evidence is deficient in relation to environmental effects on vegetation, wildlife and cumulative effects. While the consideration of mitigation measures is not necessarily relevant to this dissent, there are some significant gaps in the evidence that are worthy of comment. Likewise, the relationship between the collection of information and mitigation measures warrants closer consideration.

The majority is generally satisfied with Express's proposed mitigation measures for effects on vegetation and wildlife. It is also satisfied that Express has provided mitigation. measures in regard to the likely cumulative environmental effects; Based on the following analysis, I fail to see how such conclusions can be reached.

Some of the mitigation measures proposed by Express were presented to the Panel without accompanying information to allow the Panel to evaluate the technical and economic feasibility as required by paragraph 16(l)(d) of the CEAA. Express proposes to use sod salvage and transplants for mitigating effects on rare plant species encountered by the right-of-way and as a means to reestablish significant fescue grasslands disturbed by the right-of-way. However, Express did not cite long-term studies that would speak to the success of this measure as a mitigative technique. The technical and economic feasibility of this technique is also difficult to evaluate without information on the biology and population status of the plant species it would be applied to and the extent and nature of the fescue grasslands that require reestablishment. Without this information, I must conclude that the

majority has not had an opportunity to fully consider the technical and economic feasibility of this proposed mitigation technique.

Express stated that rare plants would regenerate from the soil seed bank salvaged from the right-of-way. The majority has recommended that Express should additionally rely on other methods such as avoidance or restoration techniques when plants of a designated status are encountered. While it is not explicit in the majority's views, it would appear that they accept that regeneration from the soil seed bank is a legitimate method of mitigation for plants of a designated status. I agree with AWA/FAN that there have been no studies done on the regeneration of rare plants from the soil seed bank. I consider that the information provided by Express in support of this mitigation technique is anecdotal and does not provide the Panel with a reasonable basis for evaluating the technical and economic feasibility of this approach to mitigation.

With respect to the vegetation inventory, including the further survey for rare plants, restricted range species, and the potential lekking areas for the two grouse species, Express has indicated that it would use avoidance (re-routes) as a mitigative technique. I am of the opinion that Express should be allowed some flexibility for minor re-routes, especially for features that are discovered during construction that were not discovered in the original surveys. However, this flexibility should not be available for numerous issues, especially for vegetation communities where large re-routes may be required. In these circumstances re-routing may not be technically and economically feasible and the Panel is denied the opportunity to look at reasonable mitigation options.

Express considers that any loss of the Swift Fox could be mitigated by modifying the release plan for this species. I agree with AWA/FAN that there is no evidence that the release plan could be used or modified in this manner to replace the loss of individuals from this species.

The analysis presented above discusses the gaps in the evidence on the mitigation measures themselves but it also points to the relevance of evidence on the environmental effects that these measures are proposed to mitigate. The studies proposed by Express on rare plants, fescue grasslands, Swift Fox and Sage Grouse and Sharp-tailed Grouse lekking areas are to be conducted in the Spring of 1996, after the Panel has made its decision and recommendations. By not presenting this information to the Panel, Express has denied the Panel an opportunity to approach the consideration of mitigation in a logical way; that is, to understand the significant adverse effects and then to consider the mitigation measures that are technically and economically feasible. In the absence of information on these potential environmental effects, I consider that key evidence was lacking for the majority's conclusions in regard to mitigation.

Routing

Due to the inadequacy of the evidence on vegetation, wildlife and cumulative effects, I find that I cannot make a determination on the acceptability of the route. Moreover, there are some significant issues in the evidence in regard to the approach to routing and these are worthy of comment.

Express, in the selection of alternative routes, plotted the short-line distances between the end points of the Canadian portion of the proposed pipeline. It then went on to compare the two routes. I agree with AWA/FAN that Express should have used a coarse filter approach, focusing on the larger ecosystem in selecting a route. This would have more thoroughly considered the broader goals of

biodiversity protection which relies both on the protection of individual species and the ecosystems in which species thrive.

The evidence shows that Express did not carefully consider the information contained within the Environmentally Significant Areas (ESAs) nor did it discuss the southern grasslands in detail with the authors of those documents. Further consultations with experts on the southern grasslands could have assisted Express in finding a more appropriate route and determining how significant features within the ESAs could be avoided. Express argues that the ESAs do not have designated status, and thus there is no requirement to avoid them. However, I consider that non-designated areas may be as important to biodiversity protection as designated areas.

I accept the opinion of the AWA/FAN expert witnesses in regard to the need for maintaining large unfragmented areas of native prairie. If Express proceeds and the Wild Horse Pipeline is not built, then there is one right-of-way fragmenting the large tract of native grasslands south of Cypress Hills. If Wild Horse proceeds, then, potentially, there are two rights-of-way fragmenting the prairie. This is particularly of concern since the route for the Wild Horse pipeline has yet to be established, as the conditions to the Certificate must be met. Express chose not to look at routing the pipeline along existing disturbed areas in the southern grasslands except in response to an Information Request from the Panel. No adequate evidence was submitted to the Panel that allows any reasonable basis for making a decision on other routes that may have been more suitable from the stand point of biodiversity protection.

Due to Express's failure to adopt an acceptable approach to route selection and its failure to consider principles related to biodiversity protection, I cannot concur with the majority view that the evidence shows that the applied-for route is acceptable.

Conclusion

I disagree with the majority's findings, conclusions and recommendations. I consider it would be wrong at law to recommend that the Project proceed. In failing to put forth the necessary evidence, Express has failed to make its case and has not met the burden of proof imposed at law. I also find on the basis of scientific analysis that there is inadequate information to determine whether the Express pipeline is or is not likely to have significant adverse environmental effects.

In the absence of the critical evidence necessary to consider the environmental effects of the pipeline and the significance of those effects as required by the CEAA, I recommend that the Project not proceed.

G. M. Lewis
Member

Appendix I

Agreement Concerning Joint Establishment of a Review Panel

AGREEMENT

BETWEEN

THENATIONALENERGYBOARD

AND

THE MINISTER OF THE ENVIRONMENT

CONCERNING

JOINT ESTABLISHMENT OF

A REVIEW PANEL FOR THE EXPRESS PIPELINE PROJECT

AGREEMENT FOR JOINT ESTABLISHMENT OF A REVIEW PANEL FOR THE EXPRESS PIPELINE PROJECT

THIS AGREEMENT is made between

(original signed by) (13 Sept. 1995)

The Honourable Sheila Copps — **Date** — **Witness**
Minister of the Environment
Government of Canada

(original signed by) (13 Sept. 1995)

Roland Priddle — **Date** — **Witness**
Chairman
National Energy Board

WHEREAS, by application dated 8 June 1995, Express Pipeline Ltd. (the "Applicant" or "Express"), a company owned 50% by Alberta Energy Company Ltd. and 50% by TransCanada PipeLines Limited, has applied to the National Energy Board ("the Board") pursuant to Part III of the *National Energy Board Act* ("the NEBA") for a certificate of public convenience and necessity to authorize the construction and operation of a crude oil transmission pipeline in southern Alberta and pursuant to Part IV of the NEBA for certain orders respecting toll methodology and tariffs ("the Express project");

WHEREAS, the National Energy Board ("the Board") has statutory responsibilities for environmental assessment pursuant to the NEBA and the *Canadian Environmental Assessment Act* ("the Act");

WHEREAS, the parties to this agreement want to avoid unnecessary duplication, delays, and confusion that could arise from carrying out the environmental assessment requirements under the Act and the NEBA;

WHEREAS, the Act requires federal authorities involved in a project to cooperate and coordinate their environmental assessment responsibilities under the Act;

WHEREAS, the Act allows for a joint establishment of a review panel with another jurisdiction;

WHEREAS, the parties agree to cooperate and coordinate the environmental assessment requirements set out in the Act and the NEBA;

AND WHEREAS, the Parties to this agreement undertake to proceed with the joint establishment of a review panel for the environmental assessment of the Express project described herein with the objective of harmonizing environmental assessment requirements to avoid unnecessary duplication, delays, and confusion;

NOW, THEREFORE, the parties agree as follows:

1. DEFINITIONS

"Act" means the *Canadian Environmental Assessment Act;* «*Loi*»

"Agency" means the Canadian Environmental Assessment Agency;' «*Agence*»

"Environmental Assessment Report" means the report set out in paragraph 8 of Schedule I to this Agreement; «*rapport d'évaluation environnementale*»

"Environmental Effect" has the same meaning as set out in section 2 of the Act; «*effets environnementaux*»

"Express project" means the project to construct and to operate a crude oil transmission pipeline in southern Alberta which is the subject matter of an application by Express pursuant to Part III of the NEBA and includes the related applications respecting toll methodology and tariffs filed pursuant to Part IV of the NEBA; *aprojet Express>>*

"federal authority" has the same meaning as set out in section 2 of the Act; «*autorité fédérale*»

"follow-up program" has the same meaning as set out in section 2 of the Act; «*programme de suivi*»

"Joint Review Panel" means the four (4) person environmental assessment panel to be appointed pursuant to section 4 of this Agreement; «*commission d'évaluation environnementale conjointe*»

"jurisdiction" has the same meaning as set out in subsection 40(1) of the Act; «instance»

"Minister" means the Minister of the Environment; «*ministre*»

"NEB" means the National Energy Board; «*Office*»

"NEBA" means the *National Energy Board Act;* «*Loi sur l'Office national de 1'énergie*»

"participant" means a party who has 'obtained intervenor status as described in the Hearing Order attached as Schedule II; «*participant*»

"pipeline" has the same meaning as set out in section 2 of the NEBA; «*pipeline*»

"public registry" means the registry established and operated in accordance with section 55 of the Act; «*registre public*»

"responsible authority" has the same meaning as set out in section 2 of the Act; «*autorité responsable*»

"review" means the assessment of the environmental effects of the Express project to be conducted pursuant to the Act and the consideration of the Express project application under the NEBA. «*examen*»

2. GENERAL

2.1 Public Registry - The **NEB** will establish and operate a public registry.

3. PURPOSE OF THE AGREEMENT

3.1 Purpose - The purpose of this agreement is to establish a Joint Review Panel under the Act and set out the manner in which the review of the Express project will be undertaken pursuant to the Act and the NEBA.

4. CONSTITUTION AND POWERS OF THE JOINT REVIEW PANEL

4.1 Criteria - Persons appointed to the Joint Review Panel shall be unbiased, free from any conflict of interest relative to the Express project, and have knowledge or experience relevant to its anticipated environmental effects.

4.2 Joint Review Panel Membership - The Joint Review Panel shall consist of four (4) members:

(a) The Chairman of NEB will appoint the Chairman of the Joint Review Panel, subject to the approval of the Minister; the appointee shall be a permanent member of the NEB;

(b) The Minister will appoint two members, who shall first satisfy the eligibility requirements for temporary members of the NEB and shall be jointly nominated by the Minister and the NEB. A request will be made to the Minister of Natural Resources to recommend to the Governor in Council the appointment of those two proposed members as part-time temporary members of the NEB. Should those proposed members' appointments as part-time temporary members of the NEB be confirmed, those members will be appointed to the Joint Review Panel by the Minister;

(c) The fourth member shall be'a permanent member of the NEB.

4.3 Joint Review Panel Responsibilities - The Joint Review Panel will act as a joint review panel under the Act and as an NEB panel under the NEBA to hear, decide and make recommendations on all matters relevant to the application and falling within its jurisdiction. The Review will meet the requirements under the NEBA and under the Act.

4.4 Terms of Reference - The Joint Review Panel will conduct a review of the Express project in accordance with the terms of reference attached as Schedule I to this agreement.

5. PROCEDURES FOR THE JOINT REVIEW PANEL

5.1 Joint Review Panel Procedures - The procedures established for the hearing of the Express project application under the NEBA are described in the Hearing Order attached to this Agreement as Schedule II. The Joint Review Panel, when appointed, may modify these procedures as legally permissible pursuant to the NEB Rules of Practice and Procedure (1995) and an amended Hearing Order may be issued. The Joint Review Panel's procedures and any modifications referred to above shall be published or made available in any manner deemed appropriate by the Joint Review Panel prior to the commencement of the hearing.

5.2 Participant Funding - Participants in the review may apply for funding from the Agency in accordance with its Participant Funding Program. The Agency will review applications and allocate funds to participants as appropriate.

5.3 Hearing Process -

(a) a secretariat will be formed consisting of all relevant and necessary NEB personnel and of a person designated by the Agency to provide administrative, technical and procedural support to the Joint Review Panel;

(b) the Joint Review Panel will ensure that all information produced, collected or submitted with respect to the Express project and the review is made available to the public unless it is advice to the Joint Review Panel from the Secretariat or specific federal legislative provisions or procedural rulings made thereunder prevent the disclosure of the information;

(c) the principles of natural justice shall be observed;

(d) all documents issued by the Joint Review Panel, including the final environmental assessment report, will reflect the views of all of the members;

5.4 NEB Decision - The decision of the Joint Review Panel under the NEBA on the application that could permit the Express project to be carried out in whole or in part and the reasons for that decision shall be subject to subsection 37(1) and (1.1) of the Act. That decision may be made by the Joint Review Panel only after the report has been submitted and the requirements of subsections 37(1.1)(a) and (b) of the Act have been met.

6. AMENDMENTS AND TERMINATION

6.1 Should either party wish to amend this Agreement, that party shall provide seven (7) days written notice to the other party of the proposed amendment. Should agreement on the amendment not be reached within fourteen (14) days of this written notification, this Agreement shall lapse and be of no further effect.

6.2 Either party can terminate this Agreement upon one month written notice to the other party.

6.3 A party's ability to withdraw from this Agreement or terminate this Agreement will end at the commencement of the hearing.

6.4 The attached Schedules form an integral part of this Agreement.

SCHEDULE I
(Subsection 4.4 of the Agreement)

ENVIRONMENTAL ASSESSMENT JOINT REVIEW PANEL TERMS OF REFERENCE

General

1. The Joint Review Panel shall apply these terms of reference in accordance with the Agreement Concerning Joint Establishment of a review panel for the Express Pipeline project.

2. The Joint Review Panel will examine the environmental effects likely to result from the proposed construction and operation of the Express project.

Scope of the review

3. The Joint Review Panel will include in its review of the Express project, consideration of the factors identified in Schedule III for the purposes of the Joint Review Panel's environmental assessment report required under the Act.

Components of the review

4. The Joint Review Panel shall conduct the review by way of an oral public hearing and in accordance with the procedures set out in the Hearing Order attached as Schedule II.

5. The Joint Review Panel may modify these procedures as legally permissible pursuant to the NEB Rules of Practice and Procedure (1995) and an amended Hearing Order may be issued. The Joint Review Panel's procedures and any modifications shall be published or made available to the public prior to the commencement of the hearing as deemed appropriate by the Joint Review Panel.

6. The Joint Review Panel will consider the information filed in relation to the Express project and decide if the project is ready for an assessment of its environmental effects.

7. The Joint Review Panel will gather all documentary evidence it requires for the conduct of its review. This includes, but is not necessarily limited to:

(a) information on the Express project;

(b) existing technical, environmental or other information relevant to the review;

(c) supplementary information including a description of any proponent-initiated public consultation program, its nature and scope, issues identified, commitments made and outstanding issues;

(d) all necessary regulatory information required under the *National Energy Board Act;*

8. *The* Joint Review Panel will prepare a report as required by the Act setting out its findings, conclusions and recommendations on the environmental effects of the Express project, including any mitigation measures and follow-up program;

9. The Joint Review Panel's environmental assessment report shall be conveyed concurrently to all responsible authorities and to the Minister.

10. The Joint Review Panel will thereafter release the report to the public.

SCHEDULE II

File Number: 3200-E092-2
Date: 22 June 1995

HEARING ORDER OH-l-95

DIRECTIONS ON PROCEDURE
Express Pipeline Ltd.
Express Pipeline Project

By application dated 8 June 1995, Express Pipeline Ltd. (the "Applicant" or "Express"), a company owned 50% by Alberta Energy Company Ltd. and 50% by TransCanada PipeLines Limited, has applied to the National Energy Board (the "Board") pursuant to Part III of the *National Energy Board Act* (the "Act") for a certificate of public convenience and necessity to authorize the construction and operation of a crude oil transmission pipeline in southern Alberta and pursuant to Part IV of the Act for certain orders respecting toll methodology and tariffs.

The Canadian portion of the proposed Express Pipeline would consist of approximately 435 kilometres (270 miles) of 610 millimetre (24 inch) diameter pipeline extending south from Hardisty, Alberta to the international border near Wild Horse, Alberta, as well as associated terminaling, storage, and pumping facilities. On the U.S. side the pipeline would continue across the State of Montana and terminate near Casper, Wyoming. The estimated cost of the Canadian portion of the pipeline is about $189 million.

The pipeline is planned to have an initial capacity of approximately 27 000 cubic metres (170,000 barrels) per day, with line fill scheduled to take place by October 1996.

The proposed project falls under Part IV, subsection 14(a) of the *Comprehensive Study List Regulations* made pursuant to subsection 59(d) of the *Canadian Environmental Assessment Act* (the "CEAA"). To avoid duplication and overlap with the Board's own process, the Board has requested approval from the Minister of the Environment, pursuant to section 43 of the CEAA, for substitution of the Board's hearing process for an environmental assessment by a review panel under the CEAA. The hearing process will be carried out in accordance with the Board's current Rules of Practice and Procedure, SOR/DORS 95-208, 1995 (the "Rules").

Having considered the application, the Board has decided to hold an oral public hearing and directs as follows:

Public Viewing

1. The Applicant shall deposit and keep on file, for public inspection during normal business hours, a copy of the application at its offices at Express Pipeline Ltd., 3900, 421 Seventh Avenue S.W., Calgary, Alberta.

   A copy of the application is also available for viewing in the Board's Library, Main Floor, 311 Sixth Avenue S.W., Calgary, Alberta, telephone (403) 299-3561.

Interventions

2. Interventions are required to be filed with the Secretary of the Board and served on the Applicant by Thursday, 13 July 1995 at 12:00 p.m. (MT). If an intervenor wishes the Board to effect service on its behalf of its intervention and any subsequent documentation, it should include that request in' its intervention along with the reason why it cannot effect service itself. Interventions must be signed and should include:

   (a) the name, mailing address, address for personal service, telephone number and other telecommunications numbers, if any, of the persons or authorized representative of the person;

   (b) whether the person intends to appear at the oral hearing;

   (c) the nature of the party's interest in the proceeding;

   (d) a statement of the issues that the person intends to address at the oral hearing or, where the person does not intend to actively participate at the oral hearing, the reasons why the person's interest in the proceeding requires the intervention in respect of the proceeding; and

   (e) the official language in which the person wishes to be heard at the oral hearing.

3. The Secretary will issue a List of Parties on Tuesday, 18 July 1995.

Written Evidence of the Applicant

4. Any additional evidence that the Applicant wishes to present shall be filed with the Secretary and served on all parties by Monday, 24 July 1995 at 12:00 p.m. (MT).

Information Requests to the Applicant

5. Information requests directed to the Applicant shall be filed with the Secretary and served on all parties on or before Thursday, 7 September 1995 at 12:00 p.m. (MT).

6. Responses to information requests filed pursuant to paragraph 5 and received within the specified time limit shall be filed with the Secretary and served on all parties by Monday, 18 September 1995 at 12:00 p.m. (MT).

Written Evidence of the Intervenors

7. Intervenor written evidence is required to be filed with the Secretary and served on all parties by Monday, 25 September 1995 at 12:00 p.m. (MT).

Letters of Comment

8. Letters of comment are required to be filed with the Secretary and served on the Applicant by Tuesday, 10 October 1995 at 12:00 p.m. (MT). The filing of a letter of comment does not convey to the author the rights of an intervenor, specifically the right to be served with a copy of the application, the right to file evidence or the right to cross-examine and fully participate in the hearing.

Information Requests to Intervenors

9. Information requests with respect to the written evidence of intervenors filed pursuant to paragraph 7 are required to be filed with the Secretary and served on all parties by Tuesday, 10 October 1995 at 12:00 p.m. (MT).

10. Responses to information requests filed pursuant to paragraph 9 and received within the specified time limit shall be filed with the Secretary and served on all parties by Tuesday, 17 October 1995 at 12:00 p.m. (MT).

Process for Environmental Assessment

11. To avoid duplication and overlap, the Board has requested approval from the Minister of the Environment, pursuant to section 43 of the CEAA, for substitution of the Board's hearing process for an environmental assessment by a review panel under the CEAA. The hearing process will be carried out in accordance with the Board's current Rules of Practice and Procedure, SOR/DORS 95-208, 1995 (the "Rules").

Persons interested in applying for participant funding should contact the Canadian Environmental Assessment Agency (the "Agency"):

Ms. Ghislaine Kerry, Manager
Participant Funding Program
Canadian Environmental Assessment Agency
200 Sacré-Coeur Boulevard
13th Floor
Hull, Quebec
K1A OH3
Telephone: (8 19) 953-0179 (collect)
Facsimile: (819) 994-1469

A decision on participant funding will be made by the Agency if the Minister's approval of the Board's request for a substitution is granted.

Public Participation

OH-l-95

12. **The** public may participate in this hearing in one of two ways. A person may file a letter of comment as described in paragraph 8 of this hearing order. Parties filing letters of comment will not be entitled to further participate in the hearing process. Alternatively, a person may apply for intervenor status as described in paragraph 2 of this hearing order. An intervenor is entitled to participate in the hearing process including the filing of written materials, the questioning of witnesses and the presentation of argument.

    If an intervenor wishes to provide evidence, that evidence should be filed in written form in accordance with paragraph 7 of the hearing order to enable all parties to read and consider the evidence prior to the start of the hearing. Intervenors presenting technical or scientific evidence should be prepared to answer questions on it at the hearing.

    The hearing will also include sessions to be conducted in an informal manner to allow and encourage intervenors to present their views on the implications of the project. Those intervenors are encouraged, but not required, to file a written statement outlining their views prior to the start of the hearing. If there is sufficient interest, informal sessions will be held in selected communities near the pipeline route.

Hearing

13. The oral hearing will commence on Monday, 23 October 1995 at 8:30 a.m. in the National Energy Board Hearing Room, Third Floor, 3 11 Sixth Avenue SW., Calgary, Alberta.

Service to Parties

14. The Applicant shall serve a copy of these Directions on Procedure and Appendices on all the parties listed in Appendix II, including those parties pursuant to Hearing Order OH-l-93, forthwith, in either official language as appropriate or as requested. Express is directed to file with the Board a list of all parties served.

15. Unless otherwise directed by the Board, upon receipt of the List of Parties, the Applicant shall serve a copy of its application, any additional written evidence and all documents related thereto on each intervenor not yet served.

16. Unless otherwise directed by the Board, upon receipt of the List of Parties, each intervenor shall serve a copy of its intervention on all other intervenors.

Notice of Hearing

17. The Applicant shall publish the Notice of Public Hearing, attached as Appendix I, in the publications listed in Appendix III forthwith.

(a) The Applicant shall provide, for each local publication listed in Part D of Appendix III. a map showing the area served by that publication of a scale sufficient to represent with reasonable accuracy the location of the proposed facilities in relation to prominent topographical features, population centres, highways, utilities and other such prominent local landmarks.

(b) Each notice shall identify a location at a local municipal office within or near the area covered by the' plan referred to in paragraph (a), where pipeline route sheets for that area are available for inspection.

List of Issues

18. The Board has identified for discussion in the hearing the issues set out in the List of Issues (Appendix IV). Any party wishing to suggest an amendment or addition to the List of Issues is requested to do so when it files its intervention. When proposing additional issues, parties should clearly explain the relevance to the hearing and justification for inclusion of the proposed issue.

Timetable of Events

19. A timetable for filing and service is listed in Appendix V.

Filing and Service Requirements

20. Where a party is directed by these Directions on Procedure to file or serve documents on other parties, the following number of copies shall be filed or served:

(a) for documents to be filed with the Board, 25 copies; and

(b) for documents to be served on the Applicant and on intervenors, one copy.

21. Parties filing or serving documents at the hearing shall file five copies with the Hearing Officer and five copies with Board Counsel and shall leave sufficient copies for parties at a designated location in the hearing room.

22. Persons filing letters of comment shall serve one copy on the Applicant and file one copy with the Board, which in turn will provide copies for all other parties.

23. Parties filing or serving documents less than five days prior to the commencement of the hearing shall bring to the hearing a sufficient number of copies of the documents for use by the Board and other parties present at the hearing.

24. Parties are reminded that a document is not filed or served until it is received by its intended recipient.

Simultaneous Interpretation

25. Intervenors shall indicate in their intervention the official language they intend to use at the hearing. If it appears that both official languages will be used at the hearing, simultaneous interpretation will be provided.

General

26. Parties shall quote Hearing Order OH- 1-95 and File 3200-E092-2 when corresponding with the Board on this matter.

27. These Directions on Procedure supplement the Rules.

28. The Board wishes to remind parties that it encourages fairness and efficiency in all of its proceedings and therefore asks that all parties observe the deadlines set out in paragraphs 2, 4, 5, 6, 7, 8, 9 and 10 of these Directions on Procedures. Departure from a deadline will not be permitted unless, in the view of the Board, it can be reasonably justified.

29. For information on this hearing or the procedures governing this hearing including the Rules and the Information Bulletins on the Board's processes, please contact Diana Saunders, Regulatory Officer at (403) 299-2716. A prehearing seminar on Board procedures may be held if sufficient interest is expressed.

NATIONAL ENERGY BOARD

J.S. Richardson
Secretary

NATIONAL ENERGY BOARD
HEARING ORDER OH-l-95
NOTICE OF PUBLIC HEARING

Express Pipeline Ltd.
Express Pipeline Project

By application dated 8 June 1995, Express Pipeline Ltd. (the "Applicant" or "Express"), a company owned 50% by Alberta Energy Company Ltd. and 50% by TransCanada PipeLines Limited, has applied to the National Energy Board (the "Board") pursuant to Part III of the National Energy Board Act (the "Act") for a certificate of public convenience and necessity to authorize the construction and operation of a crude oil transmission pipeline in southern Alberta and pursuant to Part IV of the Act for certain orders respecting toll methodology and tariffs.

The Canadian portion of the proposed Express Pipeline would consist of approximately 435 kilometres (270 miles) of 610 millimetre (24 inch) diameter pipeline extending south from Hardisty, Alberta to the international border near Wild Horse, Alberta, as well as associated terminaling, storage, and pumping facilities. On the U.S. side the pipeline would continue across the State of Montana and terminate near Casper, Wyoming. The estimated cost of the Canadian portion of the pipeline is about $189 million.

The pipeline is planned to have an initial capacity of approximately 27 000 cubic metres (170,000 barrels) per day, with line fill scheduled to take place by October 1996.

The hearing will commence at 8:30 a.m. on Monday, 23 October 1995 in the National Energy Board Hearing Room, Third Floor, 311 Sixth Avenue S.W., Calgary, Alberta T2P 3H2.

The hearing will be public and will be held to obtain the evidence and views of interested persons on the application.

Any person wishing to intervene in the hearing must file a written intervention with the Secretary of the Board and serve a copy on the Applicant at the following address:

Express Pipeline Ltd.
3900,421 Seventh Avenue S.W.
Calgary, Alberta
T2P 4K9
Attention: Mr. R.H. (Dick) Wilson
Telephone: (403) 266-8 127
Facsimile: (403) 23 l-3687

and

Bennett Jones Verchere
4500 Bankers Hall East
855 Second Street SW.
Calgary, Alberta
T2P 4K7
Attention: Mr. Loyola Keough
Telephone: (403) 298-3 100
Facsimile: (403) 2657219

The Applicant will provide a copy of the application to each intervenor.

The deadline for receipt of written interventions is Thursday, 13 July 1995 at 12:00 p.m. (MT). The Secretary will issue a list of parties shortly thereafter.

Any person wishing only to comment on the application should file a letter of comment with the Secretary of the Board and send a copy to the Applicant by Tuesday, 10 October 1995 at 12:00 p.m. (MT)

To avoid duplication and overlap with the Board's own process, the Board has requested approval from the Minister of the Environment, pursuant to section 43 of the Canadian Environmental Assessment Act (the "CEAA"), for substitution of the Board's hearing process for an environmental assessment by a review panel under the CEAA. The hearing process will be carried out in accordance with the Board's current Rules of Practice and Procedure, SOR/DORS 95-208, 1995 (the "Rules")..

Persons interested in applying for participant funding should contact the Canadian Environmental Assessment Agency (the "Agency"):

Ms. Ghislaine Kerry, Manager
Participant Funding Program
Canadian Environmental
Assessment Agency
200 Sacré-Coeur Boulevard
13th Floor
Hull, Quebec
KIA OH3
Telephone: (819) 953-0179 (collect)
Facsimile: (819) 994-1469

A decision on participant funding will be made by the Agency if the Minister's approval of the Board's request for a substitution is granted.

Information on the procedures for this hearing (Order OH-l-95) or the Rules governing all hearings (both documents are available in English or French), may be obtained by writing to the Secretary or telephoning Diana Saunders, Regulatory Officer at (403) 299-2716.

J.S. Richardson
Secretary
National Energy Board
311 - Sixth Avenue S.W.
Calgary, Alberta
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Parties to OH-l-93

LIST OF PUBLICATIONS

A. Notice to be Published in English

Publication	City
The Edmonton Journal	Edmonton, Alberta
The Calgary Herald	*Calgary,* Alberta
The Globe and Mail (national edition)	Toronto, Ontario
The Financial Post	Toronto, Ontario

B. Notice to be Published in French

Publication	City
Le Franco	Edmonton, Alberta

C. Notice **to be Published in Both English and French**

Publication	City
Canada Gazette	Ottawa, Ontario

D. Notices to be Published with Local Route Map and Location of Plans

Publication	City
40-Mile County Commentator	Bow Island, Alberta
Brooks Bulletin	Brooks, Alberta
Castor Advance	Castor, Alberta
The Consort Enterprise	Consort, Alberta
Coronation Review	Coronation, Alberta

The Drumheller Mail	Drumheller, Alberta
The Hanna Herald	Hanna, Alberta
Medicine Hat News	Medicine Hat, Alberta
Oyen Echo	Oyen, Alberta
Provost News	Provost, Alberta
Sedgewick Community News	Sedgewick, Alberta
Taber Times	Taber, Alberta
Veteran Eagle	Veteran, Alberta
Wainwright Star Chronicle	Wainwright, Alberta

LIST OF ISSUES

The Board has identified (but does not limit itself to) the following issues for discussion in the hearing:

Part III

1. The economic feasibility of the proposed Express Pipeline having regard to, *inter alia:*

   (a) the outlook for the long-term supply of oil available to be transported on the proposed pipeline;

   (b) the outlook for the long-term demand for oil in the markets proposed to be served by the Express Pipeline; and

   (c) the ability of Express to provide competitive transportation services for oil and to successfully attract these products to its system over the long term.

2. The adequacy of connecting pipeline capacity, both upstream and downstream, to accommodate the project.

3. The potential environmental effects and socio-economic effects of the proposed facilities, including those factors outlined in section 16 of the *Canadian Environmental Assessment Act.*

4. *The* appropriateness of the location of the proposed facilities and the land rights acquisition.

5. *The* appropriateness of the design of the proposed facilities.

6. *The* adequacy of the public consultation process.

7. *The* appropriate terms and conditions to be included in any certificate which may be granted.

Part IV

8. The toll methodology and principles, including the proposed market-based and incentive tolling.

9. The method of toll and tariff regulation, including the proposal that the Express Pipeline be regulated on a complaint basis as per the Group 2 pipeline classification.

TIMETABLE OF EVENTS

Event	Deadline For Service and Filing
Interventions filed [2]*	13 July 1995
List of Parties released by the Board [3]	18 July 1995
Additional Written Evidence from the Applicant [4]	24 July 1995
Service of Application on Intervenors	24 July 1995
Information Requests to the Applicant [5]	7 September 1995
Applicant's Responses to Information Requests [6]	18 September 1995
Intervenor Written Evidence [7]	25 September 1995
Letters of Comment [8]	10 October 1995
Information Requests to the Intervenors [9]	10 October 1995
Intervenors' Responses to Information Requests [10]	17 October 1995
Hearing Commences [12]	23 October 1995

* Numbers in square brackets refer to corresponding paragraphs in the Directions on Procedure

SCHEDULE III

EXPRESS PIPELINE PROJECT
ENVIRONMENTAL ASSESSMENT FACTORS

The review of the Express project shall include a consideration of the following factors for the purposes of the Joint Review Panel's environmental assessment report required under the Act:

1. Express project description;

2. Purpose of the Express project;

3. Alternative means of carrying out the Express project that are technically and economically feasible and the environmental effects of any such alternative means;

4. The environment, including the socio-economic environment, which may reasonably be expected to be affected by the Express project;

5. The environmental effects of the Express project, including the environmental effects of malfunctions or accidents that may occur in connection with the Express project and any cumulative environmental effects that are likely to result from the Express project in combination with other projects or activities that have been or will be carried out;

6. The significance of the environmental effects referred to in item 5;

7. Measures, including contingency and compensation measures as appropriate, that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the Express project;

8. Follow-up and monitoring programs including the rationale for such programs;

9. The capacity of renewable resources that are likely to be significantly affected by the Express project to meet the needs of the present and those of the future;

10. Comments from the public and government agencies.

Appendix II

Biographies of Joint Review Panel Members

Roland Priddle

Mr. Priddle has been Chairman of the National Energy Board since 1986. He holds Master of Arts degrees in economic geography (Cambridge) and in economics (Ottawa). He was employed in the international petroleum industry before coming to Canada in 1965. Following nine years service on the staff of the National Energy Board, he joined the Department of Energy, Mines and Resources in 1974 and was Assistant Deputy Minister, Petroleum.

Anita Côté-Verhaaf

Mme. Côté-Verhaaf was appointed a member of the National Energy Board in September 1989. She holds a Master of Science degree in economics (Montreal). After graduating, she worked as a research assistant at the Université de Montreal, and subsequently as a senior economist at Lavalin-Ecoconsult. From 1982 to 1989, Mme. Côté-Verhaaf was employed in a number of positions at Gaz Métropolitain, inc., the last being Executive Advisor, Regulatory Affairs.

Glennis Lewis

Dr. Lewis is President of Lewis Consulting Ltd., a private company located in Calgary, specializing in environmental/biotechnical scientific and regulatory issues. She is also Vice President of the Board of Directors, Environmental Services Association of Alberta. Dr. Lewis' academic credentials include the following degrees: Bachelor of Science (Brandon); Master of Science (Calgary); Doctorate in Biological Sciences (Calgary); and Bachelor of Laws (Calgary). She is a member of the Law Society of Alberta. Highlights of Dr. Lewis' previous employment include: associate lawyer with Ogilvie and Company, Edmonton, Alberta; and advisor on biotechnology regulatory law to the Environmental Law Centre of Alberta and Environment Canada.

Richard Revel

Dr. Revel is Professor of Environmental Science, Faculty of Environmental Design, at the University of Calgary, Alberta, where he also chairs the interdisciplinary Resources and the Environment Graduate Program. He is also President of Earth-Options Research Corp. Dr. Revel's academic credentials include the following degrees: Bachelor of Science in Biology (Notre Dame University of Nelson, British Columbia); Doctorate in Plant Ecology (University of British Columbia); and post-doctoral studies in the field of applied environmental research. He was previously manager of the Calgary branch of Envirocon Ltd. and Director of the Environmental Sciences Program, Faculty of Environmental Design, University of Calgary.

Appendix III

Letter from the Minister of the Environment

Sep 13 1995
[date stamp]

Mr. Roland Priddle
Chairman
National Energy Board
311 Sixth Avenue South West
Calgary, Alberta
T2P 3H2

Dear Mr. Priddle:

As you are aware, an Agreement concerning the joint establishment of a review panel for the Express Pipeline project has been developed by our respective officials, released for public examination and comment, and subsequently finalized for our signatures. The Agreement sets out the framework for the panel review, and includes the terms of reference of the joint review panel and the factors to be considered by the panel for the purposes of its environmental assessment report.

In addition, section 15 of the *Canadian Environmental Assessment Act* requires that I determine the scope of the project, after having consulted with the National Energy Board as the responsible authority.

In order to satisfy this requirement, officials of the Canadian Environmental Assessment Agency and the National Energy Board have prepared the enclosed document, entitled "Express Pipeline Project: Scope of the Project", that lists the elements of the principal Express Pipeline project and its accessory physical works which, together, constitute the project for the purposes of the joint panel review. This document is consistent with the summary definition of the Express Pipeline Project as contained in section 1 of the above-mentioned Agreement, and with the application submitted by Express Pipeline Limited pursuant to PART III of the *National Energy Board Act*.

../2

As a result of the aforementioned consultations, I can confirm that the enclosed document establishes the scope of the Express Pipeline Project for the purposes of the joint panel review. In this regard, I would appreciate your ensuring that it is brought to the attention of the joint review panel immediately after the appointment of the panel.

Please accept my best wishes.

Yours sincerely,

(original signed by)

Sheila Copps

Enclosure

Express Pipeline Project

SCOPE OF THE PROJECT

The following defines the scope of the Express Pipeline Project in relation to the assessment of the environmental effects of the Project, to be conducted by the Joint Review Panel appointed by the Minister of the Environment and the National Energy Board.

The Project: Construction and operation of a 435-kilometre pipeline, terminal facility and three pump stations in Alberta.

The Scope of the Project:

Principal project:

Construction and operation of:

- 434.5 km (270 mi) of 610-mm (24-in.) pipeline from Hardisty to Wild Horse, Alberta;
- The Hardisty terminal (support buildings, meter station, pump station containing three electrically driven pumps, four 150,000-barrel storage tanks, and a scraper trap);
- three pump stations (two electrically driven pumps and support buildings at each station, and a scraper trap at the most southerly location);
- 12 main line valve sites; and
  various construction camps and storage/work areas.

Accessory physical works:

Construction and operation of:

power supply facilities for the terminal and the stations;
access roads; and
any upstream facilities that would need to be constructed to enable the principal project to proceed.

Any modifications or decommissioning activities would be subject to future review under the ***National Energy Board Act*** and, consequently, under the ***Canadian Environmental Assessment Act;*** therefore, they have not been included within the scope of this Project.

Appendix IV

Panel Rulings

EPL Request for Relief from Filing Requirements - Board Ruling

(17 January 1996)

The Board's Rules of Practice and Procedure, in section 15(l)(b), require an Applicant to file the information referred to in the Board's published Policies and Guidelines. The Board's Guidelines for Filing Requirements, in Part IV, require an Applicant for a certificate in respect of an oil pipeline to file certain information "unless the Board otherwise directs".

Upon a review of the information filed and a comparison of it against the Guidelines for Filing Requirements, the Board decides whether or not an Application is ready for consideration by way of a Hearing.

Generally, by setting the Application down, the Board has implicitly decided that the Application is ready for consideration by way of an oral Hearing.

No explicit relief from the Filing Requirements had been granted in this case, and Rocky Mountain Ecosystem Coalition raised this issue and asked to speak to it. The Panel asked Parties to comment on whether relief should be granted on the basis of whether the Application is ready to be considered.

The purpose of the Guidelines for Filing Requirements is to ensure that an Application is ready for consideration.

After considering the arguments of parties as to whether or not the relief should be granted and the Application should continue to be heard, the Panel finds that it is prepared to grant the Applicant relief from the Guidelines, as applied for by letter of January 16, 1996, together with relief from the requirements of Part X, as requested orally this morning.

The Panel finds that the evidence filed by the Applicant is sufficient to permit this Hearing to proceed.

The Panel notes, though, that this does not change the burden of proof. The Applicant must still satisfy the Panel that the proposed facilities are in the public convenience and necessity, as described in section 52 of the *National Energy Board Act*, and that toll orders applied for should also be granted.

Intervenors are able to argue that this burden has not been discharged by the Applicant, on the evidence filed.

Furthermore, Intervenors may seek further information from the Applicant on the basis that it is relevant to the ultimate decision to be taken by this Panel. In other words, the decision by this Panel to relieve the Applicant from these Guidelines is only a decision that the information filed is Sufficient to set the matter down for an oral Hearing; it is not a decision that the information filed is sufficient to

approve the Application. The burden of proving that the Application should be granted still rests with the Applicant. The Panel does not agree that the granting of this relief prejudices Parties in cross-examination of Express's Evidence.

Motion of EPL to Strike Portions of the Written Direct Evidence of RMEC - Board Ruling:

(17 January 1996)

By Notice of Motion entered as Exhibit C-47 in this Hearing, Express Pipeline Ltd., the Applicant, sought to strike certain portions of the Direct Evidence of the RMEC from the record of these proceedings. In particular, the Applicant sought to strike:

(i) those materials forming Tab 1 of the said Evidence;

(ii) those materials forming Tab 2, pages 32 to 48, and associated Tabs 16 to 26 inclusive, Tab 29, and Binder II referred to in said Tab 2;

(iii) all references under Tab 3 to the Milk River system in the United States and the document entitled "Effects of Wellfield Development on Aquatic Ecosystems", appended to Tab 3;

(iv) all references under Tab 4 with respect to upstream developments or developments in the United States;

(v) all references under Tab 5 to upstream developments and Table 3; and

(vi) Tab 6.

Much of this Evidence relates to the environmental effects of activities and facilities upstream and downstream of the applied-for facilities.

The Applicant alleged, in support of its Motion, that said materials were beyond the scope of the project and the scope of the assessment of that project and, furthermore, were not relevant to the environmental examination to be conducted by the Joint Panel.

The position of the Applicant was supported by a number of Intervenors, including Counsel for Amoco Canada Petroleum Company Ltd., Crestar Energy Inc., ELAN Energy Inc., Gibson Petroleum Company Ltd., Gulf Canada Resources Limited, Morgan Hydrocarbons Inc., Numac Energy, PanCanadian Petroleum Limited, Wascana Energy Inc., and the Alberta Department of Energy.

As well, we received a Written Submission from Counsel for the Canadian Association of Petroleum Producers.

The Application was opposed by Counsel for the RMEC, who acknowledged that the materials in Tab 1 of the Evidence filed by his client constituted the Argument in support of the filing of the disputed Evidence, and did not constitute Evidence itself.

The Panel accepts this acknowledgment, and the materials in Tab 1 are hereby designated as Argument rather than Evidence and, on that basis, will remain on the record.

Counsel for the RMEC agreed that evidence must be relevant and admissible to be considered. To determine relevance, the Panel should look to the new legislation, the *Canadian Environmental Assessment Act* ("CEAA") and the Minister of the Environment's definition of the scope of the project subject to assessment.

It was his position that the new legislation was broader in its scope than the *Environmental Assessment Review Process Guidelines Order,* and in conjunction with the definition of the scope of the project provided by the Minister of the Environment, gave an ability to broadly consider environmental effects.

The RMEC was supported in its position by the Federation of Alberta Naturalists, the Alberta Wilderness Association, and the Native Canadian Petroleum Association.

In reply, Counsel for the Applicant argued that boundaries must be put on environmental effects, and to do otherwise would ignore the letter from the Minister of the Environment to the RMEC dated 10 January 1996 and the new legislation itself.

It is not necessary to further delineate the arguments of the Parties on these issues, which arguments can be found in the transcripts of the first day of the Hearing.

In the Panel's view, it is faced with a question of deciding whether or not the impugned Evidence of the RMEC should be struck from the record at this time. To be considered, the Evidence must be admissible and relevant, and the onus is on the RMEC to ensure that this occurs.

Counsel for the Applicant is of the view that this cannot occur in light of the environmental assessment that the Panel is required to undertake. These arguments require the Panel to consider the scope of the project to be assessed and the scope of the factors to be considered in the assessment; in particular, the scope of the cumulative effects. Within those parameters, the Panel can then consider the relevance of the disputed material.

Scope of the Project

Paragraph 15(l)(b) of the CEAA provides that the scope of the project in relation to which the environmental assessment is to be conducted shall be determined by the Minister of the Environment after consulting with the Responsible Authority.

The Minister set out the scope of the project by way of an attachment to her correspondence to the Board dated 13 September 1995. She defines the scope of the project to be the "principal project", being the applied-for pipeline, the Hardisty Terminal, three pump stations, 12 mainline valve sites, and various construction camps and storage work areas.

The scope of the principal project is not in dispute.

She also defined the scope of the project to be:

> "Accessory physical works: construction 'and operation of:

- power supply facilities for the terminal and the station; access roads; and
- any upstream facilities that would need to be constructed to enable the principal project to proceed."

It is this latter phrase that the Panel is required to interpret, and in doing so the Panel has considered the relevant sections of the CEAA, the ordinary meaning of these words, and the context in which they are used.

Section 15 of the CEAA provides some guidance on the establishment of the scope of the project. It allows a single assessment where two or more projects are "so closely related that they can be considered to form a single project", and provides for a consideration of the various phases of a project, such as its construction, operation, and abandonment.

Section 5 contemplates an assessment of an entire project where the relevant Government Department is performing a duty or function in relation to only part of the project.

These sections seem designed to ensure that what is assessed is a project and its various phases. It is against the background of these legislative provisions that the words the Minister has used to establish the scope of the project subject to assessment must be interpreted.

In the Panel's view, the use of the heading "Accessory Physical Works" must first be considered.

"Accessory", when used as an adjective, has been defined to mean "additional", "subordinate", "contributing", "subservient", or "of inferior importance or rank".

In the Panel's view, "accessory physical works", in this context, are physical works more minor in nature than the principal project, that are in addition to the principal project and assist in its construction or operation.

The Panel also notes that the first two types of accessory physical works are clearly within this interpretation; that is, the power supply facilities needed to operate the Hardisty Terminal, the stations, and the access roads required to construct and operate the Express pipeline.

The Panel considered the last component of "accessory physical works", "any upstream facilities that would need to be constructed to enable the principal project to proceed" in the context of the aforementioned heading, "Accessory Physical Works", and the two identified accessory physical works.

In the Panel's view, the important words to be considered in this definition of the third type of accessory physical works are "need", "to enable", and "to proceed".

In the Panel's view, the word "need" in this context means "necessary" or "required to be constructed".

There must be a close interdependent relationship between the accessory facility and the principal project. The words "to enable" are used in the sense of "making possible or effective".

Lastly, the words "to proceed" mean "to go forward" or "to commence operation".

Therefore, the Panel is of the view that any "upstream facilities that would need to be constructed to enable the principal project to proceed" should be interpreted to mean any new upstream physical works (not activities) that are required to be built to make possible the commencement of operation of the principal project. These upstream facilities will be minor or subservient in nature to the principal project and be interdependent with it.

The Act does not contemplate, and the Minister cannot have intended, that any upstream facilities that may ever be constructed during the life of the pipeline and related to the oil that may eventually move on it should be within the scope of the project subject to assessment.

The Panel is of the view that her intention was to limit the accessory physical works to be considered within the scope of the project to those that are known and identifiable and that are required for the principal project to commence physical operation, not those that will be required in the future for its long-term economic health.

It follows that in light of the use of the word "upstream" in the description of the third type of accessory physical works, the Panel considers it clear that the Minister did not intend to include any downstream facilities within the scope of the project.

Scope of the Factors to be Assessed

It is within the ambit of this definition that the Panel is prepared to hear evidence on accessory physical works that will make up the scope of the project subject to environmental assessment. Scope of the Factors to be Assessed

It is the position of the RMEC that evidence in relation to the environmental effects of downstream and upstream facilities should be considered when the Panel considers cumulative environmental effects.

Paragraph 16(l)(a) of the CEAA provides that the assessment by the Panel shall include a consideration of the environmental effects of the project, "including.. any cumulative environmental effects that are likely to result from the project in combination with other projects and activities that have been or will be carried out".

As well, the Panel is to consider the significance of those effects.

As noted by the Minister of the Environment in her correspondence of 10 January 1996, no geographical limitation has been placed on the scope of the factors to be taken into consideration pursuant to section 16, including, therefore, the scope of the cumulative environmental effects.

An analysis of the aforementioned paragraph of the CEAA indicates that certain requirements must be met for the Panel to consider cumulative environmental effects.

First, there must be an environmental effect of the project being assessed.

Second, that environmental effect must be demonstrated to operate cumulatively with the environmental effects from other projects or activities.

Third, it must be known that the other projects or activities have been, or will be, carried out and are not hypothetical.

These three criteria from the CEAA must be met before the Panel will find Evidence on cumulative environmental effects to be relevant.

A "cumulative effects" analysis of the project should be based on the results of scientific investigation and systematic analysis, and should be presented to the Panel in a manner that allows a meaningful evaluation of the cumulative effects.

It is the intention of the Panel to carefully consider and measure the evidence presented against these requirements.

Decision on Relief Sought

The Panel intends to use the foregoing analysis on scope of the project to decide what, if any, further physical works will be included within the scope of the project.

In relation to cumulative effects, the Panel is of the view that the onus is on the Parties presenting evidence on cumulative effects to establish that those effects meet the above requirements.

Furthermore, the Panel intends to rely upon the same analysis and requirements when undertaking a consideration of those environmental matters under the *National Energy Board Act.*

As a result, the Panel is not prepared, at this time, to strike the Evidence of the RMEC that has been filed in this Proceeding.

A decision as to its relevancy and admissibility may be made by the Panel as the Hearing unfolds. Alternatively, it is possible that the Panel may wish to leave the Evidence on the record so that it can be considered in its totality when the Panel comes to its determination in relation to its assessment of cumulative environmental effects.

Simply put, it is too early in this Proceeding to undertake the assessment of relevance requested by the Applicant.

Therefore, the Application of Express is dismissed.

Requirement to Consider Alternatives Under the *Canadian Environmental Assessment Act* - Board Ruling:

(24 January 1996)

It became clear to the Joint Panel, from an examination of the evidence of Express and in the course of cross-examination of the Applicant's first Witness Panel, that a difference of opinion exists in relation to the obligations of the Joint Panel to consider alternatives under the Canadian Environmental Assessment Act ("CEAA") and as provided in Item 3 of Schedule III of the Joint Panel Agreement, dated 13 September 1995.

As a result, on 18 January 1996, the Joint Panel asked Parties to address the question of its obligation to consider alternatives to the Project and alternative means of carrying out the Project in argument the next morning.

Mr. Keough, Counsel for Express,argued that the Project is as defined in the Board Ruling re alternatives to be considered under CEAA attachment to the correspondence of the Minister, that is the principal project and accessory physical works. As a result, the Joint Panel is under an obligation to consider the alternative means of carrying out that Project, not alternative means employed by other parties of carrying out "what conceptually might be the purpose of the project".

The words of section 16 of CEAA, the Terms of Reference and section 9 of Part VII of the Board's Guidelines for Filing Requirements, he argued, are all similar and the meaning is clear. They require the proponent to consider alternative means of carrying out the Project and not other projects. This would include, for example, in the context of Express, different routes, different designs, and alternate river crossing methods. The requirement for the Joint Panel to consider the purpose of the Project goes to whether or not there is a need for a new pipeline to transport crude oil to those markets.

Mr. Sawyer, for the Rocky Mountain Ecosystem Coalition ("the RMEC"), argued that the National Energy Board Act ("NEBA") and the CEAA cannot be narrowly interpreted to require the Joint Panel only to consider the Project as defined; it must consider alternatives. A consideration of alternatives, by definition, means more than one project is considered. If you do not examine the question of purpose, he submitted, you cannot examine the question of alternatives.

Section 52 of the NEBA and the List of Issues in the Amended Hearing Order "make it clear that the purpose has to be viewed in several stages". An examination of alternatives can include examining alternative supplies, alternative means of transporting that crude, and alternative markets, either individually or as an entirety. Neither the Legislators nor the Minister intended a consideration of alternatives to be narrowly constrained and to do so would be contrary to the spirit of the CEAA.

In conclusion, he submitted that "in order to reach a proper and meaningful conclusion about what the environmental effects of this Project or the alternatives are, we need to be able to explore those".

The Joint Panel has considered these arguments. It has reviewed the CEAA, the attachment to the Minister's correspondence of 13 September 1995, and the wording used in Schedule III attached to the Joint Panel Agreement which describes the environmental assessment factors the Joint Panel is to consider.

Paragraph 16(l)(e) of the CEAA provides that the Minister may require a review panel to consider the "alternatives to the project".

Paragraph 16(2)(b) requires a review panel to consider "alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means".

This latter requirement was set out in Schedule III to the Joint Panel Agreement which requires the Joint Panel to consider "alternative means of carrying out the Express project that are technically and economically feasible and the environmental effects of any alternative means".

The Joint Panel notes that the Minister has referred specifically to the "Express project". The Joint panel finds that it is to consider alternative means of carrying out the Express Project as described in the attachment to the Minister's correspondence of 13 September 1995, that is the principal project and the accessory physical works. For example, these alternative means could include different routes.

The Joint Panel notes that the Minister has not asked it to consider alternatives to the Project, although she was free to do so. It follows that the Joint Panel is not charged with a consideration of the environmental effects of alternatives to the Project.

The Joint Panel has also been asked by the Minister to consider the purpose of the Express Project. Mr. Keough has suggested this means the need for the project. Mr. Sawyer argues that a consideration of purpose must be undertaken in light of the requirements of the NEB Act and encompasses a consideration of alternatives.

In paragraph 16(2)(a) of the CEAA, Parliament included the purpose of the project as a mandatory factor that must be considered in an assessment by a review panel. In the Panel's view, when considering the purpose of the Express Project as a factor, the Panel is obliged to consider the reason or use for which the project is being undertaken in the context of the Panel's overall mandate to undertake an environmental assessment of the project.

For example, the use or reason for which the project is being undertaken could be relevant when considering alternative means of carrying out the project. Some of those alternative means may be found inappropriate in light of the purpose of the project. When considering the environmental effects of the project and their significance, the purpose of the project could also be important when assessing whether or not significant environmental effects can be justified in the circumstances, as described in section 37 of the CEAA.

In summary, the Joint Panel has not been given a mandate under the CEAA to consider the environmental effects of alternatives to the Express Project. It has been empowered to consider alternative means of carrying out the Express Project and the related environmental effects, which alternative means are matters within the control of the Applicant, such as alternative routes for the pipeline. The Joint Panel has also been asked to consider the purpose of the Project, which means the reason or use for which the Project is being undertaken.

The Joint Panel emphasizes the fact that this analysis relates only to its responsibilities under the CEAA. When considering the application pursuant to the NEB Act, the Joint Panel must find the

project to be in the public convenience and necessity. The need for the project and alternatives to the project are issues that may arise within that requirement.

Written Reasons for Ruling on a Motion by Rocky Mountain Ecosystem Coalition to Dismiss the Express Application due to the Applicant's Failure to Comply with the *Guidelines for Filing Requirements:*

***(2* February 1996)**

Mr. Sawyer, on behalf of Rocky Mountain Ecosystem Coalition, brought a motion on February 2, 1996 at transcript 1980 to have the Express Application dismissed for failure to comply with the NEB's Guidelines for Filing Requirements. The Panel dismissed the motion without hearing from counsel for Express and stated that it would provide reasons for the dismissal at a later time (Transcript 2007).

This was the second motion by Mr. Sawyer to have the application dismissed on this basis. The Panel dismissed the earlier motion at transcript 302. In that instance, counsel for Express had asked for an exemption from specific provisions of the Guidelines. The Panel granted the exemption to the Applicant and determined that the balance of the evidence filed by the Applicant was sufficient to permit this hearing to proceed. It was made clear in that ruling that the Panel's decision did not mean that the information filed was sufficient to approve the application but only that it was ready to be heard.

Mr. Sawyer has now asked for a dismissal of the application on the basis that Express has failed to comply with paragraphs 9(2)(e)(i) and (ii) of Part VII of the Guidelines.

He also relied on Part I, section 3 of the Guidelines which states that if any information required by the Guidelines is not provided with the application, the application shall include the reasons for not including the information. Finally, he referred to Part VII, section 1 of the Guidelines which states that the information listed in Part VII shall be provided unless the Board otherwise directs.

In support of his motion Mr. Sawyer argued that he had established very clearly in his cross-examination that the Applicant's evidence did not consider a number of fish species, or address other species in the detail set out in the Guidelines. Mr. Sawyer stated that he intended to go through the same lengthy cross-examination with regard to terrestrial wildlife.

The Panel determined, however, that it did not need to hear Mr. Sawyer's cross-examination on terrestrial wildlife as it was clear where he was going in respect of paragraph 9(2)(e)(ii) of the Guidelines. The Panel accepts that he would likely have established that the Applicant's evidence does not mention certain terrestrial wildlife species or that some species were not addressed in the manner set out in the Filing Requirements.

As the Panel ruled in the earlier motion, the purpose of the Filing Requirements is to ensure that an application is ready for consideration by way of a hearing. The issue, then, is whether the evidence 'filed by the Applicant is adequate to permit an oral hearing to proceed. Compliance with the

Guidelines is not a question of the sufficiency of substance of the evidence filed by the Applicant, as Mr. Sawyer himself conceded in arguing his motion.

Mr. Sawyer has not convinced the Panel that this Application is not ready to be set down for hearing. In fact, since we have been in the hearing for three weeks it would appear to be clear that the Application was ready to be heard. It could be said that if RMEC thought that the environmental evidence did not comply with the Filing Requirements it should have raised this in its earlier motion rather than waiting until three weeks into the hearing, and after having cross-examined the Applicant's environmental panel for over two days.

This issue aside, however, the Panel is satisfied that the Applicant has filed information about the fish and terrestrial wildlife that may be affected by the project, as required by the Filing Requirements. What Mr. Sawyer takes issue with, in the opinion of the Panel, is the sufficiency of the Applicant's evidence in fish and wildlife and the scientific validity of the studies submitted by the Applicant.

The sufficiency and scientific validity of the evidence that has been produced by the Applicant, while important to the matter before the Panel, does not go to the question of whether the Applicant has met the Guidelines for Filing Requirements.

The completeness or thoroughness of the Applicant's evidence relates to the burden of proof the Applicant must meet and may be addressed by RMEC in cross-examination, in its own evidence and in final argument. Furthermore, because the Applicant has, in fact, filed information in accordance with paragraphs 9(2)(e)(i) and (ii), it was not necessary for it to seek relief from these provisions in the Filing Requirements.

The Panel also notes that Mr. Sawyer was asked at transcript 1649 and 1650 to advise the Panel if any other parts of the application did not, in his view, properly meet the Filing Requirements. In addition, at transcript 1980-8 1 Mr. Sawyer was asked to include in this motion any other perceived deficiencies in the Application in respect of the Guidelines. He based his motion only on the aforementioned sections of the Guidelines. The Panel therefore considers that all arguments related to any other sections of the filing Requirements have been included in this motion and will not entertain any further motions with respect to non compliance with the Guidelines for Filing Requirements. For the reasons set out above, the RMEC motion is dismissed.

Appendix V

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Notes:

1. The Alberta Wilderness Association and the Federation of Alberta Naturalists joined to present a combined intervention during the Hearing.

2. There were a number of other parties to the oral hearing but only AWA/FAN and RMEC took part in the examination of the environmental aspects of the Project.

Appendix VI

Bibliography

1 Allan, J.H., Pisces Environmental Consulting Services Ltd., Assessment of Fisheries Resources at Water Crossings on the Proposed Express Pipeline, October 1995.

2 AXYS Environmental Consulting Ltd., Wildlife Surveys for the Proposed Express Pipeline Project, September 1995.

3 AXYS Environmental Consulting Ltd., et. al., Environmental Assessment and Mitigation Plan for the Proposed Express Pipeline Proiect Hardisty to Wild Horse, Alberta, June 1995.

4 Express Pipeline, Environmental Management Guidelines, December 1995.

5 Express Pipeline, Facilities and Tolls and Tariffs Application, June 1995.

6 Fedirchuk McCullough 8z Associates Ltd., Historical Resources Impact Assessment 1995 (volumes I-III), October 1995.

7 J. Williams Consulting, Rare Plant Surveys Along the Proposed Express Pipeline Proiect (Hardistv to Wild Horse, Alberta), September 1995.

Appendix VII

Glossary

aeolian	wind-borne
avian	relating to birds
"B" horizon	an horizon immediately beneath an A (Ah) or E (Ae) horizon characterized by a higher colloid (clay or humus) content, or by a darker or brighter color than the soil immediately above or below, the color usually being associated with the colloidal materials
biomass	the dry mass of living organisms in a particular area
clean-up bucket	a back-hoe bucket with a flat cutting surface (ie. no teeth) used to pull back topsoil or other material without mixing soil layers or scalping the sod layer
corridor	general area of proposed linear development of arbitrary width, typically selected for study purposes
cryptic	secretive, camouflaged
dendritic	treelike; resembling a tree in appearance or growth pattern
ditch plug	portion of a trench with material left unexcavated to minimize water movement downslope or to minimize water infilling trenches approaching water crossings
downstream	typically refers to those facilities to which hydrocarbon transmission lines carry product (eg. other pipelines, oil refineries, gas distribution systems, etc), in the case of the Express Project these. facilities are located in the United States.
ecoregion	area characterized by a distinctive regional climate as expressed by vegetation; typically of large area1 extent
federal authority	as defined by the *Canadian Environmental Assessment Act*
flume	culvert or pipe acting as an artificial channel used to convey water from the crossing area
fluvial	pertaining to rivers
fragmentation	the reduction of large habitats into smaller areas through development
glacial	pertaining to glaciers

hibemacula	shelter utilized by dormant animals in winter eg. snakes
lacustrine	pertaining to lakes
lek	pairing and mating habitat area, primarily utilized by Sage and Sharp-tailed grouse
moraine	accumulation of unconsolidated surficial material moved and deposited by a glacier
parabolic soil ripper	agricultural implement used to loosen or remove compaction in soil and subsoil
PH	measure of acidity/alkalinity of a solution (related to hydrogen ion concentration)
pig	a device utilized inside a pipeline for a variety of tasks, such as separating crude oil types, cleaning the pipe wall or inspection of the pipe wall
prairie protector blade	a specialized adaption of construction equipment, used for clean-up purposes, which utilizes plastic or rubber shoes on the blade to minimize damage to the sod layer when returning topsoil to its original location; typically used in native prairie areas
project study area	elliptical area between Hardisty and Wild Horse, approximately 435 km long by 70 km wide at its mid-point
responsible authority	a federal authority that is required by the *Canadian Environmental Assessment Act* to ensure that an environmental assessment is conducted
right-of-way	the legal right of passage over public land and privately-owned land; also the way or area over which the right exists
riparian	related to plant communities on the banks or flood plain of a river
roach	raised area of back-filled trench line, left to allow for settling of material
scraper trap	device for catching pigs at the end of a run
shoo-fly	access road used during construction of a pipeline; may be specially constructed or may be existing roads
spike cultivator	agricultural implement used to break large clods of soil, surface-levelling and alleviation of surficial compaction

step blade	dozer blade fitted with special shoes which raise the cutting portion of the blade above the ground to minimize cutting and mixing of surficial material
tackifier	organic liquid application used to solidify the top layer of soil storage piles to prevent wind erosion
temporary workspace	lands in addition to the right-of-way that are necessary to facilitate construction
three-lift stripping	topsoil stripping and storage method, used when more than two distinct soil types are present, where all layers are stripped, stored and replaced separately
till	unconsolidated or unstratified material, consisting of stiff clay containing boulders, sand, and gravel, deposited by melting glaciers and ice sheets
ungulate	herbivorous, hoofed mammal, generally living in herds
upstream	typically refers to facilities utilized to provide hydrocarbons to transmission facilities (eg. exploration, production wells, flowlines)
Wild Horse Pipeline	Foothills Pipe Lines (Alta.) Ltd.'s certificated but unbuilt, natural gas pipeline from Princess to Wild Horse, Alberta