ALSANDS PROJECT GROUP

ENVIRONMENTAL IMPACT ASSESSMENT

Oil Sands Mining Project

SUPPLEMENTAL INFORMATION

requested by

Alberta Environment

APRIL 1979

ALSANDS PROJECT GROUP

Box 2606, Station 'M', Calgary, Alberta T2P 3A9

April 26, 1979

Mr. K.R. Smith
Director
Environmental Assessment Division
Alberta Environment
11th Floor, Oxbridge Place
9820 - 106 Street
Edmonton, Alberta
T5K 2J6

Dear Mr. Smith:

SUBJECT: ALSANDS PROJECT GROUP
OIL SANDS MINING PROJECT

We are pleased to submit the attached supplementary report in response to your letter dated April 12, 1979, and as a supplement to the following three volumes submitted earlier:

(a) Environmental Impact Assessment;

(b) Regional Socio-Economic Impact Assessment, Volume 1 - Summary;

(c) Regional Socio-Economic Impact Assessment, Volume 2.

Sections of this supplementary report also refer to the ERCB Application and the Social Impact-Benefit/Cost Analysis.

Alsands will continue to consult with Alberta Environment staff and will supply additional detailed information as it is developed in support of applications for the various licenses, permits and approvals that will be required as the Project proceeds.

This supplementary report is being sent to all parties who request copies of our Application.

Yours very truly

M.E. Wopnford
Manager
Environmental and Community Affairs

Attachment

TABLE OF CONTENTS

Muskeg River Assimilative Capacity

As a basis for calculating safe disposal rates in the Muskeg River, the aggregate pumping rate from all depressurization wells was considered as 250 l/s (4000 USGPM) during summer, decreasing to 200 l/s in winter.

Mean monthly disposal rates were calculated by applying a dilution factor of 16.5 to the respective mean monthly discharge for the Muskeg River.

The dilution factor of 16.5 was determined on the basis of a total dissolved solids (T.D.S.) tolerance level for fish derived from a review of scientific literature. The assumed safe limit of 500 mg/l is 50 percent of that regarded as acceptable under the Canadian Drinking Water Standards and Objectives (Department of National Health and Welfare, 1968). Limits are shown in Table 1.2.1D.

Effect on the Muskeg River

Mean monthly disposal rates and mean monthly salt loadings in the Muskeg River are presented in Table 1.2.1E. The mean annual disposal rate necessary to maintain tolerance levels is 265 l/s, approximately 14 percent greater than the expected mean annual combined rate of production from all depressurization wells. Disposal to a maximum T.D.S. level of 500 mg/l would produce dilutions similar to the maximum recorded background T.D.S. levels (Table 1.2.1B). Corresponding increases in sodium and chloride ion levels to 122 and 128 mg/l, respectively, are about 4 times maximum recorded background figures.

The total period for depressurization water disposal into the Muskeg River will not exceed 24 months. Even if

changes occur within the biota during that period, recolonization would probably take place within one to two years. Any effects on bottom fauna, therefore, would not likely be irreversible.

The gradient of the Muskeg River downstream from the mine area varies from 0.03 percent to 0.47 percent in lower reaches (see Fig. 3.4.3 in the EIA). The latter figure is low in comparison to that for streams of hilly or mountainous terrain. The stream in its steepest reach follows a meandering channel, indicative of the low gradient.

For the period of record (1974-1978) the maximum annual mean monthly discharge varied by 440 percent - from 4956 l/s in 1977 to 21 948 l/s in 1978 (Table 1.2.1C). In contrast, the discharge of depressurization water to the Muskeg River would increase mean monthly flows by approximately 6 percent (Table 1.2.1E). This is not expected to significantly increase channel scour or flooding potential.

Since storage pond content would be released over a long period, rapid flushing of the river will not occur and beaver activity should remain unaffected.

Alternatives

In 2 years of the 5 for which flow records are shown (Table 1.2.1C), annual means are below the 5 year average. In those years, predicted T.D.S. loadings would be approximately twice the recommended tolerance level unless other remedial action is taken. Alsands proposes to monitor depressurization rates, river flows and water quality in both disposal water and receiving water, as well as monitor aquatic habitat and conduct live fish bioassays in the Muskeg River downstream from the proposed disposal point. If inadequate dilutions appear imminent, it is proposed to further dilute depressurization

water by mixing with surface drainage water from one of the interceptor ditches encircling the project area.

Should salt water from the Methy aquifer appear in the basal aquifer depressurization water (as a result of unexpected communication between the two aquifers) the stream would be diverted to the tailings pond until other disposal methods become available (see response to 1.2.2 for discussion of candidate reservoirs and 1.9.4 for further consideration of this contingency measure).

Other means of disposing of the water produced by McMurray basal aquifer depressurization are: 1) directly into the Athabasca River, or 2) injection into geological formations.

In the former case, depressurization water would be directed to the Athabasca River through an above ground small diameter pipeline. Discharge during minimum winter flow periods would produce an increase in chloride and sodium ions of approximately 4 mg/l, based on natural levels of 25 to 30 mg/l. Impact on aquatic biota would be localized and relatively minor.

Either the Methy or the La Loche formations could be candidate reservoirs for basal aquifer depressurization water disposal.

TABLE 1.2.1A

CHEMICAL ANALYSIS OF TEST PIT DISCHARGE WATER

FROM McMURRAY BASAL AQUIFER *

pH	7.4
Specific Gravity	1.005
MAJOR COMPONENTS (mg/l)	
Sodium	1137
Calcium	55
Magnesium	30
Chloride	1061
Bicarbonate	1440
Sulphate	55
Carbonate	0
Hydroxide	0
TOTAL DISSOLVED SOLIDS	3778
OTHER COMPONENTS (mg/l)	
Barium	0.9
Iron	0.5
Sulphide	23.5

* Table 2.4.3, p. 27, Environmental Impact Assessment.

TABLE 1.2.1B

WATER CHEMISTRY - MUSKEG RIVER ABOVE CONFLUENCE WITH ATHABASCA RIVER (LOCATION M)*

(7-76 - 10/77)

	Minimum	Maximum
pH	7.3	8.2
Conductivity	126	520
MAJOR COMPONENTS (mg/l)		
Sodium	4.9	38.5
Calcium	16.5	82.0
Magnesium	4.5	18.5
Potassium	0.5	2.6
Chloride	1.7	29.7
Bicarbonate	78.7	352.3
Sulphate	0.1	9.5
Carbonate	0	0
TOTAL DISSOLVED SOLIDS	151	487
TOTAL ALKALINITY	64.6	577.0
TOTAL HARDNESS	59.7	280.7

* Table 3.4.5, p. 153, E.I.A.

* Location M shown on Map 3.4.4, p. 302, Environmental Impact Assessment.

TABLE 1.2.1C

DISCHARGE RECORDS FOR MUSKEG RIVER NEAR FORT MACKAY,

WATER SURVEY OF CANADA STATION NO. 07DA008

monthly and mean discharges in l/s

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	MEAN
1974	649	490	405	16624	20730	9657	12800	5862	2889	3370	1396	637	6315
1975	365	348	388	2662	6117	7420	14358	6740	18550	12008	3172	739	6089
1976	552	447	436	7731	2577	841	807	1051	3427	5126	1739	210	2073
1977	249	348	334	4956	3653	3370	4729	1906	1997	4050	1634	496	2317
1978	312	252	255	3172	9176	4928	1209	3370	21948	19370	5721	1161	5919
mean	425	377	362	7023	8439	5239	6768	3767	9770	8779	2733	649	4531

TABLE 1.2.1D

CANADIAN DRINKING WATER STANDARDS AND OBJECTIVES AND RECOMMENDED TOLERANCE LEVELS FOR FISH; FOR SODIUM, CHLORIDE AND TOTAL DISSOLVED SOLIDS (T.D.S.)

	Sodium mg/l	Chloride mg/l	T.D.S. mg/l
Canadian Drinking Water Standards			
Acceptable	(300)*	250	1000
Objective		250	500
Recommended Max. for Fish			500+

*Alberta Department of Health Recommended limit

+R. Seidner, A.O.S.E.R.P., Personal Communication

TABLE 1.2.1E

MEAN MONTHLY DISPOSAL RATES AND SALT LOADINGS IN THE MUSKEG RIVER FOR OPTION A - DISPOSAL OF DEPRESSURIZATION WATER AS PRODUCED, AND OPTION B - DISPOSAL OF DEPRESSURIZATION WATER DURING HIGH FLOW PERIODS WITH STORAGE DURING LOW FLOW PERIODS

	OPTION A				OPTION B			
	Mean Monthly Disposal Rate l/s	Mean Monthly Salt Loading			Mean Monthly Disposal Rate l/s	Mean Monthly Salt Loading		
		Sodium Conc. mg/l	Chloride Conc. mg/l	T.D.S. mg/l		Sodium Conc. mg/l	Chloride Conc. mg/l	T.D.S. mg/l
January	200	590	650	1420	0	20	15	300
February	200	634	703	1513	0	20	15	300
March	200	653	721	1546	0	20	15	300
April	250	81	83	420	426	122	128	500
May	250	71	72	401	511	122	128	500
June	250	101	105	459	318	122	128	500
July	250	83	86	425	410	122	128	500
August	250	131	139	518	228	122	128	500
September	250	64	65	387	592	122	128	500
October	250	69	70	397	532	122	128	500
November	250	169	181	593	166	122	128	500
December	200	515	567	1125	0	20	15	300
Mean Annual Discharge Rate	233				265			

1.2.2 Identify candidate zone for subsurface fluid emplacement inside and outside of the project area for the case of hydraulic connection between Basal Aquifer and Methy Aquifer.

Answer

In the event that subsurface disposal of saline waters becomes necessary, the Applicant anticipates that either the Methy or the La Loche formation would be the candidate reservoir.

1. Methy - on the basis of airlift pumping tests on two Methy holes at Lease 13 (Nos. 1481 and 1489), theoretical calculations show that 32 to 36 l/s of brine could be injected into a Methy well. This is considered to be the potential, but the actual injection capacity of the reservoir would have to be determined by additional test work.

2. La Loche - located 50 to 75 m below the Methy aquifer, immediately overlying the Precambrian. Knowledge of this potential reservoir in the project area is limited. Holes drilled in the vicinity of the Athabasca River have encountered porous, salt water bearing sandstone up to 40 m in thickness, whereas two holes in the vicinity of the mine (Nos. 1717 and 1240) did not encounter significant reservoir development in this interval. Additional information on reservoir development and injection capacity would be required before plans could be formulated for waste water disposal in the La Loche formation.

As noted in responses to 1.2.4 and 1.9.4, respectively, the Applicant considers the chance of a hydraulic connection with the Methy highly unlikely, but has developed a contingency (temporary tailings pond disposal) for dealing with

it if this occurs. Additional research on deep disposal zones would be undertaken during the interval provided by the contingency.

1.2.3 Provide information on the quality, quantity and the flow regimes of groundwater in the Shallow Aquifer within the four areas referred to in 1.1.1 above, and discuss monitoring during the first five years of operation.

Answer

In the Alsands project area, a shallow groundwater flow system exists within the surficial materials overlying the McMurray oil sands formation. This shallow flow system is essentially perched on top of the relatively impermeable McMurray formation. Groundwater flow within the shallow system is controlled by the nature of surficial materials and by the surface topography. The surficial geology of each of the four areas, that is (a) the area between the proposed tailings pond and Athabasca River, (b) the proposed tailings pond site, (c) the proposed plant site, and (d) the proposed granular resources area, has been described in the response to 1.1.1. The mining project facility layout is shown on Map 1.1.1 in relation to glaciofluvial meltwater channels.

Within the project area, the groundwater table is generally at or close to the ground surface as reflected in the widespread occurrence of muskeg. The configuration of the groundwater table broadly reflects the surface topography.

Because of the shallow nature of the materials, the predominant direction of groundwater flow on a local scale is parallel to the slope. The vertical component is, in general, small. As a result, uplands generally behave as areas of groundwater recharge and lowlands, such as along the major drainage courses, and are areas of groundwater discharge. Both the Muskeg River and Hartley Creek are effluent throughout their respective reaches within the Alsands project area.

Within glaciofluvial meltwater channels (Map 1.1.1) the general direction of groundwater flow is down valley. The meltwater channels are infilled with sands and gravel, and are of relatively high permeability. Therefore, they contribute substantially to the total outflow from the Muskeg River Basin. No data are available on the hydraulic transmission and storage characteristics of the aquifers or on quantities of flow.

The groundwater divide separating the Muskeg River drainage from the adjoining catchments is believed to closely coincide with the surface drainage divide. There is no known or suggested evidence to indicate that there is significant intrabasin transfer of either surface or groundwaters.

Additional information on groundwater will be provided in support of application for approvals to undertake surface drainage.

Water quality within the surficial materials varies spatially and seasonally. The maximum observed chloride and total dissolved solids contents are 145 and 849 mg/l, respectively. The water within the shallow aquifer conforms to the acceptable limits as defined by the Canadian Drinking Water Standards and Objectives (Department of National Health and Welfare, 1968). It is noted that the groundwater chemistry in the overburden and bedrock is similar to that observed in shallow units throughout Alberta; waters are typically hard and bicarbonate rich (F. Swartz, University of Alberta, personal communication).

Groundwater flow within the area between the tailings pond and the Athabasca River is towards the Athabasca and controlled to a large extent by the low relief.

The groundwater flow regime within the surficial materials of the proposed tailings pond area is also controlled to a large extent by its low relief. Low relief and high water table conditions are manifested in the widespread occurrence of muskeg and wetlands. Although the permeabilities of the surficial materials are moderately high, rates of groundwater flow are low due to the low gradients.

The proposed plant site is located close to the drainage divide between the Athabasca and Muskeg River Basins and on a bedrock high (McPherson and Kathol, 1977, Figure 10). The direction of groundwater flow within the plant site area tends to be predominately toward the south and toward the Muskeg River. There is also a local westward component of flow, toward the tailings pond and the Athabasca River.

The present course of the Muskeg River closely corresponds with the trend of the infilled meltwater channels below the identified granular resource area. On the basis of topographic controls, groundwater movement within the glacial meltwater channel would be down valley, towards the Athabasca.

Monitoring Requirements

Of the four areas discussed, the area between the tailings pond and the Athabasca is the most critical with respect to monitoring. Specification of the monitoring requirements and the number, depth and location of observation wells will be based on the results of additional test drilling which is also required to define foundation and subsoil conditions along the proposed dyke alignment. The spacing of groundwater observation wells would be closest in areas of thick or more permeable sands and gravels. The wells would penetrate the entire thickness of overburden materials and the borehole cased using either well screen or perforated casing to

permit periodic sampling of water chemistry. The monitoring wells would be located in close proximity to but outside of the interceptor ditch around the perimeter of the tailings pond.

The program would be established at the time of starter dyke initiation and be carried on through the life of the project.

Corrective action will be taken if contamination of ground or surface waters in the vicinity of the tailings pond is detected. If required, remedial action in the form of deepening the interception ditch, installation of relief wells or an impervious cut-off to bedrock could be implemented to prevent seepage of tailings pond fluids into the surrounding area.

1.2.4 Provide information on the geographical distribution of the Basal Aquifer in the proposed development area. The claim has been made in the E.I.A. that it is unlikely that a hydraulic connection exists between the Basal and Methy Aquifers. Provide the base information and the interpretation used to substantiate that no connection, hydraulic or otherwise, may be expected. Provide cross-sections of the geologic strata extending below the Devonian erosional surface and map the surface topography of the aquifers. Information outlined above is in addition to Figures 3.3.1 and 3.3.2.

Answer

Maps are now available showing the distribution and thickness of the McMurray net basal aquifer sand and the structural configuration at the top of the basal aquifer in the project area (see Maps 1.2.4 and 1.2.4A attached). The zone ranges in thickness from 5 to 30 m in the initial mine area. The peizometric head in the aquifer will be within 5 m of the ground surface.

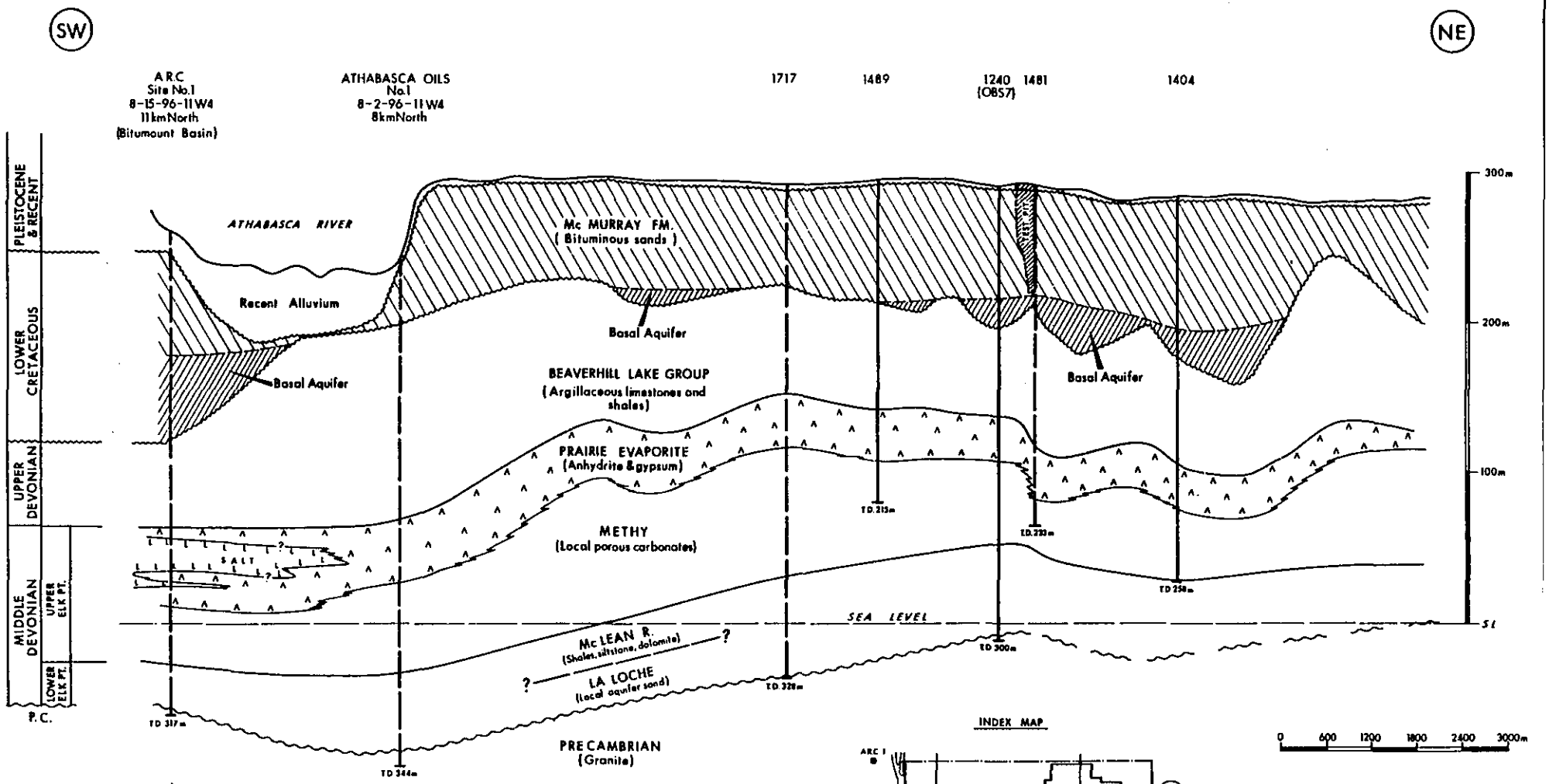
In the Alsands project area, the Methy formation and the basal McMurray aquifer are separated by some 100 m (320 ft.) (see Figure 1.2.4B attached). The intervening strata, consisting of argillaceous limestone, shale, and anhydrite are relatively impermeable. On the basis of existing information, there is no evidence, either direct or indirect to suggest that a hydraulic connection exists between the two zones. Further, as detailed in the Alsands Application to the ERCB (p. 22,70) and in the Environmental Impact Assessment, piezometric levels within the Methy formation were monitored during the test pit program and during depressurization of the McMurray basal aquifer. No response in piezometric levels within the Methy formation has been detected. Further monitoring of groundwater chemistry during depressurization of the basal aquifer has not shown any deterioration in water quality with time as would be

anticipated if a direct hydraulic connection existed between the two aquifers. It is noted that an improvement rather than a deterioration in water quality occurred within time during depressurization operations. The total dissolved solids contents in the basal aquifer and Methy aquifer waters are substantially different, being in the order of 4000 mg/l and 22 500 mg/l, respectively.

Further support for this position is provided by the fact that in the mine area, the hydrostatic head of the Methy aquifer is consistently some 18 m lower than the head of the basal McMurray aquifer.

The Applicant believes that the weight of evidence indicates that this hydraulic discontinuity will be maintained throughout the mining operation. However continued monitoring of the Methy aquifer is planned during future depressurizing operations of the basal aquifer.

In the unlikely event of connection occurring between the McMurray and Methy aquifers, indicated by a drop in the piezometric head within the Methy aquifer and/or a substantial increase in the chloride level of the water pumped from the basal aquifer in conjunction with depressurization operations, the effects on mining and water disposal will be assessed at that time and appropriate action taken. Contingencies and methods of disposal are discussed in 1.2.2 and 1.9.4.



ALSANDS PROJECT GROUP

GEOLOGICAL CROSS SECTION DEEP HOLES

FIGURE 1.2-4B

1.2.5 Support the claim that the groundwater table will be re-established (page 172). Identify the relationship of groundwater re-establishment with surface waters.

Answer

As detailed in the Alsands Application to the ERCB, the materials handling plan provides for the mined-out portions of the open pit to be backfilled, in part by overburden and plant reject and in part by tailings sand. This general plan will not apply to the final mining area unless the project is extended. If not extended, the final mine area will remain unfilled after abandonment.

Backfill materials in the mined-out portions of the pit will possess interstitial porosity as well as permeability. In general, this porosity and permeability will be greater than within the pit limits prior to mining.

As a result of both lateral inflow from surrounding areas and incident precipitation, the mined area will gradually fill with water. Groundwater within the backfilled portions of the mining pit will be contained to a large degree by the low permeability of the McMurray oil sands deposits which form the walls of the pit. Over a number of years, the groundwater table will build towards equilibrium between rates of groundwater inflow and outflow and the prevailing climatic conditions.

Prior to application for approval to develop the mine, the post-mining hydrologic condition will be mapped and discussed in terms of final topography. At that time, the expected relationship between groundwater re-establishment and surface waters will be reviewed.

1.3 SURFACE WATER QUANTITY

1.3.1 Provide base data on physical characteristics and water quality for the lakes and ponds in the mine area. (The report indicates (page 169) that lake numbers 13 and 14 will remain intact; yet map 3.4.1 shows these to be covered by the tailings pond -- this requires explanation.)

Answer

Reference to Lakes 13 and 14 (page 169) was incorrect. Those lakes will be included within the tailings pond. The correct reference is to Lakes 20 and 21 which will remain intact.

Alsands proposes to undertake a program of lake and pond survey during 1979. The survey will include bathymetric measurements (contoured to 1 metre intervals) and water quality information including measurements of dissolved oxygen, phosphorus, nitrogen, sulphates, chlorides, alkalinity, T.D.S., pH and total hardness at regularly spaced intervals for each of the four seasons.

The lake study will be in conjunction with a fish distribution and movement study to determine species of fish present (if any) and to define any ingress or egress of fish to and from ponds (see 4.2.1).

Findings will be made available as results are analyzed and interpreted. A full report will be finalized and submitted upon project completion in 1980.

Alsands feels that sufficient information is known about the lakes and ponds in this area to warrant general approval of the project during 1979. Details acquired by additional study will allow refinement of mitigation opportunities or will provide a baseline for measuring changes in water condition or fish numbers.

1.3.2 The report notes that the Muskeg River relies almost entirely on recharge from the shallow aquifers for its winter flow. Provide information to adequately determine the effect of the elimination of these aquifers in the development area on the winter flows in the Muskeg River.

Answer

A shallow groundwater aquifer exists within the surficial materials overlying the relatively impermeable McMurray oil sands formation. This shallow groundwater system is local in nature and effectively perched on top of the McMurray. The recharge area for the shallow aquifer approximates the catchment of the Muskeg River (see 1.1.1 and 1.2.3).

As described in the Alsands Application to the ERCB (p.59), all areas to be developed will be cleared and surface water will be drained from the plant and mine areas on a sequential basis (Table IV-1) through a series of shallow ditches. Drainage will be directed to surrounding muskeg and ultimately to the Muskeg River. Interceptor ditches around the entire site will be used to prevent water in the adjacent muskeg from entering the dewatered areas. These interceptor ditches will redirect flows from above the project area towards the original receiving body - the Muskeg River.

The maximum area proposed for possible surface drainage comprises approximately 4 percent of the total recharge area for the shallow aquifer system and is assumed to contribute 4 percent of the Muskeg River flows. There is no evidence to suggest a larger contribution associated with depth of surficial materials.

In their pre-development condition, the groundwaters within the plant site and mine area are recharged both by

rainfall and snowmelt events and by lateral inflow from upslope areas. Lateral inflow of groundwater from upslope areas and its subsequent movement across these areas following development would be changed by the presence of the interceptor ditches. The net effect of this interception and diversion of groundwater flow would be to "short-circuit" the flow path and to improve local drainage efficiency. The quantitative impact of this on the flow regime of the Muskeg River would be minimal. Over the long term, the rate of groundwater inflow to an interception ditch would be comparable to the rate of lateral inflow to the mine areas and plant site. In this regard, the conditions that govern the rate and quantity of groundwater flow in the upstream direction will not be changed by the proposed development or by construction of an interceptor ditch. Further, as the water carried in the interceptor ditch will be diverted to the surrounding muskeg and ultimately reach the Muskeg River, the net contribution to surface runoff will not be significantly changed. Similarly, the timing of runoff will be only marginally changed.

There would be a marginal increase in high flows in the Muskeg River and also a marginal decrease in low flows during the winter months. It is suggested these changes would be in the order of a few percent and within the natural range of variation in the Muskeg River.

At the conclusion of mining, the disturbed area will be reclaimed. Following reclamation, runoff will be greater than that before mining due to reduced evapotranspiration losses, but less than during mining.

In summary, the overall effects on both high and low flows in the Muskeg River will be in the order of a few percent.

The magnitude and extent of expected runoff changes will be further addressed in a conceptual master drainage plan to be submitted at a later date (See 1.8.1).

1.3.3 Provide average values for Muskeg River Water Analysis parameters (pages 153-161). Substantiate the claim that the surface aquifer is fresh and can be pumped to the Muskeg River without consequence.

Answer

Muskeg River water chemistry varies seasonally as indicated by the ranges in values for the different constituents presented in the tables on pages 153-161 of the EIA. In general, the concentrations of dissolved solids are highest in winter and lowest in spring - summer. Station M, approximately 3 km down from the Alsands lease boundary, was sampled frequently in 1976 and 1977. "Midpoint values" from that period are presented in Tables 1.3.3A and 1.3.3B.

Shallow aquifer waters in the lease area contain less than 150 mg/l chloride and 900 mg/l total dissolved solids (T.D.S.) (Chapter III, Application). According to the Venice System of Salinity Classification, 1958, waters with salinity less than 500 mg/l are considered "fresh" (Reid, 1961). Waters from deep muskegs have values similar to those of the shallow aquifer, while surface waters show reduced values.

Shallow aquifer waters will be drained, and not pumped from the project area. As a result, these waters will be diluted by mixing with muskeg and surface waters in all seasons, but particularly in spring, summer and fall. In winter, Muskeg River ion levels are normally high because of the natural contribution of shallow aquifer waters. As a basis for remedial action if required, ion levels in the Muskeg River will be monitored.

Note: Sulphide levels in the Athabasca River at Fort MacKay were given in the EIA. on pages 160 and 324 to range between 16 and 32 ppm. Correct values should read as < 0.05 ppm.

TABLE 1.3.3A

MIDPOINT VALUES - MUSKEG RIVER WATER ANALYSES

Station M (7/76 - 10/77)

(From Table 3.4.5, E.I.A.)

PARAMETER	VALUE
Calcium	49.2
Magnesium	11.5
Sodium	21.7
Potassium	1.5
Chloride	15.7
Sulphate	9.6
Total Alkalinity	320.0
pH	7.7
Carbonate	0
Bicarbonate	215.5
Total Hardness	170.3
Fluoride	0.10
Silica	13.6
Conductance	323
Threshold Odor No.	9
Colour	65
Tannin & Lignin	1.2
Total Filtrable Residue	222.5
Total Filtrable Residue Fixed	216.5
Total Non-Filtrable Residue	5.2
Total Non-Filtrable Residue Fixed	3.2
Turbidity	8.8
Surfactants	0.08
Humic Acids	5.0
Total Organic Carbon	21.5
Total Inorganic Carbon	35.5
Total Dissolved Organic Carbon	20.5
Nitrate and Nitrite Nitrogen	0.16
Ammonia Nitrogen	0.29
Total Kjeldahl Nitrogen	1.0
Total Phosphorus	0.05
Phenol	0.01
Ortho-Phosphorus	0.01
Oil and Grease	1.8
Sulphide	0.05
Cyanide	0.01
Chlorophyll A	0.002
Chemical Oxygen Demand	61.2

All results except pH expressed in ppm, unless otherwise stated.

TABLE 1.3.3B

MIDPOINT VALUES - MUSKEG RIVER TRACE METAL ANALYSIS

Station M 7/76 - 10/77

(From Table 3.4.6, E.I.A.)

PARAMETER	VALUE
Cadmium	0.001
Hexavalent Chromium	0.003
Copper	0.014
Iron	2.15
Lead	0.012
Manganese	0.96
Silver	0.003
Zinc	0.05
Vanadium	0.001
Selenium	0.0006
Mercury	0.0003
Arsenic	0.0006
Nickel	0.01
Aluminum	0.01
Cobalt	0.004
Boron	0.18

All results except pH expressed as ppm, unless otherwise stated.

1.3.4 The report notes (page 149) that the last 12 km of the Muskeg River has a steeper gradient (than the upper reach) at 3.4 m/km. Assess the impact of higher peak flows associated with the steeper gradient on the regime of this lower reach.

Answer

The gradient of the Muskeg River downstream from the mine area varies from 0.03 percent to 0.47 percent in lower reaches (See EIA Figure 3.4.3). The latter value is low in comparison to that for streams in hilly or mountainous terrain. The stream in its steepest reach follows a meandering channel, indicative of the low gradient.

For the period of record (1974-1978) the maximum annual mean monthly discharge varied by 440 percent -- from 4956 l/s in 1977 to 21 948 l/s in 1978 (Table 1.2.1C). In contrast the discharge of depressurization water to the Muskeg would increase mean monthly flows by approximately 6 percent.

The net effect of the proposed drainage work would be to improve the surface drainage efficiency on less than 4 percent of the Muskeg River drainage basin. This would result in a marginal increase in high flows in the Muskeg River and also a marginal decrease in low flows during the winter months (See 1.3.2).

The combined effect of drainage and release of depressurization water is not expected to increase channel scour or flooding.

At the conclusion of mining, the disturbed area will be reclaimed. Following reclamation, runoff will be greater than that before mining due to reduced evapotranspiration losses, but less than that during mining. Analysis of the post-mining flow regime will be provided.

1.4 WATER QUALITY

1.4.1 The potential effect of the temporary disposal of saline effluent to the Muskeg River during the initial two years of the project should be reassessed. (Check statistics on Table 3.4.5 and on page 169). Safe dilution level of the saline effluent in the Muskeg River should be based on acute lethal fish bioassay studies.

Answer

Basal aquifer waters in the lease area are slightly brackish, but not saline (Inland Waters Branch, 1972). The effects of their disposal to the Muskeg River for an initial period of one to two years have been addressed in the response to 1.2.1. A tolerance level of 500 mg/l T.D.S. has been used in calculating safe disposal rates. Acute lethal fish bioassay studies will be used to monitor the disposal program.

1.4.2 Assess the impacts, if any, of fertilizer upon water quality (pages 66 and 133).

Answer

The reclamation plan, as developed provides for the periodic application of fertilizers in conjunction with revegetation of disturbed areas. Application rates and frequency of application will depend on existing fertility (nutrient) levels and requirements for plant growth. In the above context, application rates for fertilizer would be sufficient only to satisfy growth requirements and in general would be comparable to or less than those associated with agricultural lands.

The applied nutrients would largely be incorporated in new vegetative growth or become fixed in the soil (i.e., in association with the Cation Exchange Capacity of the soil). In general, only small amounts would be available for leaching.

Leaching potential is greatest on tailings dykes because application rates will be greater. Drainage from dyke surfaces will be collected in a perimeter drainage collection system and re-circulated back to the tailings pond, thereby preventing escapement to receiving waters.

Elsewhere, a natural "buffer" zone will occur between reclaimed areas and the Muskeg River. For the most part this buffer zone supports muskeg which is effective in removing nutrients from surface and groundwaters.

1.5 TEST PIT DISCHARGE

1.5.1 The report states (pages 169, 229) that the test pit discharge to the Muskeg River has had only minimal effect. Support this statement with data. Page 168 indicates that Table 2.4.3 provides data for the volumes pumped from the pit, however the table does not give these, and we would request that they be shown.

Answer

Average flows during test pit decantation have been in the order of 50 l/s, a function of onsite pumping capacity. Reference to pumped volumes in Table 2.4.3 (EIA) was in error. Measured changes in Muskeg River chloride levels (taken immediately downstream from the discharge point) ranged from 8 mg/l in June, 1977, to 26 mg/l in September of the same year. River flows in that year were approximately 2 1/2 times higher in June than in September. The maximum recorded Muskeg River chloride level as a result of decantation was 35 mg/l (September, 1977).

Although slightly above recorded background levels (1.7 to 29.7, Table 1.2.1B) a significant detrimental impact upon stream biota as a result of decantation effects on water quality is considered unlikely.

1.6 SETTLING POND SEEPAGE

1.6.1 Assess the impacts of seepage from the settling ponds, especially those where the saline water will be stored.

Answer

Storage of depressurization waters from the McMurray basal aquifer has been addressed in the response to 1.2.1. The pond(s) will be located either within the limits of the tailings pond until the tailings pond is operational or within a designated future mining area. Areas with reclaimable soils will be avoided.

Basal McMurray aquifer waters are slightly brackish, not highly saline. More saline Methy aquifer waters, even if they were encountered, would not be allowed into a temporary pond. The temporary storage pond would be lined if necessary using natural soil materials such as clay.

The design, construction and operation of ponds of the required dimensions is common in engineering practice, and therefore failure is not anticipated.

The storage pond will function primarily during winter months when surface drainage is limited and then only for a maximum of two years. Seepage into shallow aquifer materials, if it occurs, would be diluted first by aquifer water and later by surface water in drainage or interceptor ditches. Significant impacts on soils, vegetation or receiving waters are not expected.

1.7 RUNOFF QUANTIFICATION

1.7.1 The proponent feels that "only minor effects are expected" upon the timing and volume of runoff (see pages 169 and 172). Quantify the effects of the project, during construction, operation, and during and after reclamation and abandonment.

Answer

Effects upon run-off are addressed in responses to 1.2.3, 1.3.2 and 1.3.4. In summary, the proposed development area will directly affect an area of approximately 5000 ha within the Muskeg River drainage basin, representing less than 4 percent of its total area. The tailings pond will collect and retain precipitation over an area approximately 2040 ha in size, about 40 percent of the area to be directly affected, while the remainder will continue to contribute run-off.

Over a period of years, surface water will be sequentially drained from the plant, storage and mine areas through a series of shallow ditches to the surrounding muskeg areas and ultimately to the Muskeg River. Over the life of the project, additional interceptor ditches around the entire site would prevent water in adjacent muskeg from entering the dewatered areas.

Because of the widespread occurrence of muskeg and its effect on the retardation of runoff, drainage efficiency is low. The net effect of the proposed drainage network would be to improve the surface drainage efficiency on less than 4 percent of the Muskeg River drainage basin. There is no evidence to suggest that the effect on river flows will be greatly disproportionate to the surface area, but this possibility will be further reviewed, taking into account

overall muskeg depths and amounts of Pleistocene and Recent materials.

Quantitative effects of the project upon timing and volume of run-off will be addressed in a master drainage plan (See 1.8.1).

1.8 SURFACE DRAINAGE PLAN

1.8.1 Provide a conceptual master drainage plan. Include information in relation to (especially during the early stages) sediment transport to the Muskeg River and the Athabasca, additional water volumes and the ability of the Muskeg River to pass them. The report does state there will be "increased intensity of flood peaks". Provide information on the increased intensity and the increased peaks on the regime on the Muskeg River.

Answer

Alsands undertakes to provide a drainage plan based on locally obtained hydrological data as a step in the orderly progression towards applying for and receiving approval to undertake surface drainage. The plan will form a basis for application to drain a portion of the total project area - the plant and camp site - in the winter of 1979-1980. Design level detail based on a 1979 hydrological study will be provided for that portion, with the remainder of the area discussed at a conceptual level.

The entire development area will be the subject of a detailed drainage plan to be submitted at a later date.

Flood peaks and their effects are discussed in the answer to Question 1.3.4.

1.8.2 Assess the impact of construction and operation of a settling pond adjacent to the Athabasca River. This pond will be situated behind the natural river levee. Provide information regarding the impact of the pond on high river flows and conversely impact of high river flows on the pond, the stability of the structure and consequences if the structure should fail. The fresh water settling basin may be a significant special environment. It is not comparable in scale to the usual cutoffs and lagoons along the Athabasca River north of Fort McMurray. This site should be examined in a regional context with respect to vegetation and habitat diversity, extent of specialized habitat type, concentration of individual floral or faunal species, species diversity, and occurrence of significant provincial or regional species before it is allocated to industrial use.

Answer

The fresh water settling lagoon location uses an existing pond that probably originated as a river oxbow (see 4.2.9). Similar ponds and meander channels occur along the Athabasca River and therefore the existence of a unique habitat or community in this area is viewed as remote. The size of the pond may not be an indication of the presence of unique habitats or communities. Nevertheless, a field reconnaissance will assess the status of this area. It will be examined in a regional context with respect to vegetation and habitat diversity, extent of specialized habitat types, species diversity, and concentration of individual species.

The embankment structure will cut-off a settling area consisting of the downstream third of the existing waterbody, leaving approximately two-thirds untouched and still subject to the original regime of periodic flooding during high water.

The structure partially incorporates a natural levee and will be only occasionally exposed to river ice or flood waters. As evidenced by stable, forested conditions on the levee, flow velocities will be low with little if any ice scouring. The structure will be rip-rapped as required to prevent erosion.

The intake of water will not be sufficient to affect river flows in an observable fashion, nor will river navigability be affected.

The consequences of failure of the freshwater impoundment would be negligible. The impoundment will contain fresh water obtained from the Athabasca River. If failure of the structure should occur, the pond would empty through the natural backwater channel into the Athabasca River. The volume of water contained within the proposed freshwater impoundment is small compared to the discharge in the Athabasca River.

1.9 TAILINGS POND

1.9.1 It is noted that part of Lake #22 is scheduled to be filled in for use on an overburden storage area. Provide rationalization. It seems that Alsands proposes to leave several large new lakes formed by the mine pit remaining after abandonment (page 59). Further elaborate on the expected water supply and quality of the lakes and discuss their long term stability.

Answer

Lake 22 has been tentatively identified for use as an overburden storage area because it is in a depressed area central to the three primary facility sites - tailings pond, mine area, and plant and camp site. Lake 22 would disappear at any rate as it is intersected at its northeastern extremity by the initial five year mine operation, necessitating its drainage.

It is proposed that the final pits be left unfilled at the end of the first 25 year operating period. Should a second operating period be applied for and approved those pits would be filled in the course of mining and be reclaimed in the manner of other pits. Should an extended operation not take place, the pits would be left to fill with water from surface runoff and intra-orebody and basal aquifer sources.

In the event that the pits will be left, research will be undertaken during the first 25 year operating period towards development of a treatment technology that may eventually allow the sustainance of a reasonable level of biological productivity.

The long-term stability of the lake formed by the abandoned mine pits depends on prevailing groundwater

conditions. Over the long-term, groundwater inflow, surface runoff and incident precipitation will accumulate within it and the low permeability of the surrounding McMurray formation will ensure containment. A degree of hydraulic containment will also be provided by the residual piezometric pressures in the basal and intra-orebody aquifers.

The direction of groundwater movement will be into the lake but the trend could be reversed by filling first with fresh water as part of the final reclamation and abandonment process. Either way, water levels will reach a dynamic equilibrium with groundwater levels in adjacent post-Cretaceous overburden materials. The water level in the lake will, in time, be a manifestation of regional groundwater levels.

Initially, the water quality of the lake is expected to be similar to that of the test pit - primarily a reflection of the chemistry of the basal McMurray aquifer (Table 1.2.1A). Inflow from the intra-orebody and basal McMurray aquifers will decrease, however, with rise in lake level. Contributions due to incident precipitation, surface runoff and groundwater inflow from surficial materials will become relatively more important. The net result will be a "fresher" waterbody, closer in water quality to natural lakes within the area.

The time frame over which this change in water quality would naturally occur is unknown, but is presumed to be in the order of tens or even hundreds of years. Filling with fresh water at the time of abandonment may speed the process.

1.9.2 Clarify the statement on page 168 (fifth paragraph) regarding erosion control.

Answer

Mechanical means of erosion control will be part of the Muskeg River bridge design. This statement refers to the use of such measures as rip-rap, soil cement, tackifers, etc. which provide physical protection against erosion. Also included in this category are commercially available products such as filter fabrics and erosion control mats. These products can be used to prevent washing out of fines (e.g. silts and fine sands) on, for instance, rip-rapped slopes exposed to wave action and to protect disturbed soil surfaces which may be susceptible to erosion.

The bridge will be designed and constructed so as not to restrict flows within the Muskeg River. Design will be based on stream flow data, soil surveys at potential sites, and standard engineering practices. Bridge site selection will take into account any potential for persistent bank erosion. Final selection will minimize that potential.

During road construction, care will be taken to impede ditch flows and therefore minimize the transport of fine, silty or organic materials.

Final design of roads and the bridge will be the subject of permit approvals at a later date. Specific procedures for minimizing sedimentation of aquatic habitats will be identified at that time.

1.9.3 References to the tailings pond (pages 15, 34, and 60) do not seem to provide plans for its reclamation and abandonment, indicating it may be left in a "natural state". Provide a detailed discussion of the expected problems to be overcome in the reclamation and abandonment of the tailings pond. Provide a conceptual outline of the proposed reclamation and abandonment procedure for the tailings pond.

Answer

A conceptual approach to tailings pond construction, maintenance, reclamation and abandonment, was outlined in appropriate sections of the EIA. That material is summarized and expanded upon in this response.

The external tailings pond will cover 2050 ha (5064 ac). As the pond fills, the dyke will be raised in increments to the maximum height of 55 m. The starter dyke will be constructed with coarse fill from a large area of land unit 6 within the pond boundary. The remainder of the dyke will be composed of the tailings sand material. On completion of each level of the dyke, the outside of that level and the top bench will be available for reclamation. In the first eight years of operation a total of 360 ha of tailings dyke surface will be reclaimed.

After approximately three years of operation a mature tailings pond will develop with a zone of clarified water at the surface which is of suitable quality for recycle. It is envisaged that the mature pond will consist of a 3 m (10 ft) depth of clarified water overlying a 3-5 m deep transition zone of fines in suspension which in turn overlies the accumulating sludge layer.

Studies will be undertaken to determine the expected condition of the tailings pond after abandonment and to

evaluate preferred objectives and methods of reclamation. A detailed approach to this study program will be provided in the course of continued project planning.

With respect to possible overtopping of the dam due to imbalance between precipitation and evaporation, the following comments are worthy of note:

i. In view of evaporation/precipitation and anticipated seepage losses from the pond, the pond level is not expected to rise with time.

ii. The engineering and hydrological data available at this time with respect to precipitation/evaporation is rather limited to draw firm conclusions. There will be, however, sufficient time during the life of the mining operations to obtain sufficient data for final design. If necessary in view of this data, adequate spillway capacity could be incorporated into the construction of the dyke to avoid the possibility of overtopping.

The tailings pond should not represent a hazard to public safety because of its structure and general unavailability. Access to the pond will be by ascent of high dyke slopes and then across a broad sand beach to very shallow water at the edge. Public access to the tailings pond area as well as other facility areas will be limited during project operation and signs to that effect will be erected along access roads.

Tailings dyke slopes are designed to be stable for long term conditions. The downstream slopes must, however, be adequately protected against erosion. In the design concept it is assumed that a proper grass and vegetative cover will be established on the dyke slopes before the conclusion of the mining operations. Moderate success has been realized to date

in grassing of tailings slopes and further research and development of surface preparation techniques is expected to develop suitable approaches to establishing proper self-sustaining vegetative cover.

Grassing of slopes is an acceptable method of providing protection against water and wind erosion. This technique has been successfully used for many years, for instance, on highway cuts and fill slopes.

All dyke construction will be completed by the end of year 8 after start of the project. This should allow sufficient time during the remaining seventeen years of mine operations for establishing proper grass and vegetative cover on the dyke slopes. In fact, in the proposed dyke building procedure, grassing of slopes could commence almost immediately after start of project.

With the establishment of proper vegetative cover, the dyke slopes will not run the risk of a serious failure. In the design concepts proposed, after year 25 the dyke slopes will remain essentially stable provided a self-sustaining vegetated cover is established. Only minor maintenance may be required. It is also logical to assume that operations may not cease after 25 years since there are reserves sufficient for a total of 70 years of mining within the project area. This would provide additional time to observe the long-term stability of the dykes.

Seepage control measures in the form of internal gravel drains will be installed to minimize the potential for buildup of pore pressure within the dykes and the potential for failure. The proportions of fine textured soil material that will be carefully and thoroughly mixed with peat into the tailings sand will result in a surface texture approximating a loam to sandy loam. Seepage control measures together with

texture and the porosity provided by the organic matter, should result in no buildup of pore pressure in the toe slope portions of the dyke.

Some seepage will occur from the sand tailings dykes. The source of this seepage includes water from the clear water zone near the pond surface, minor amounts from the sludge as it consolidates, and sluicing water during hydraulic placement of sand tailings. This seepage is to be collected by filter drains constructed in the downstream slope and then conveyed to the ditch excavated parallel to the downstream toe of the dam. From the ditch the water is pumped back into the pond. The strip filter drains are required to maintain the phreatic surface within the sand embankment and thereby meet stability requirements.

The shallow perimeter ditch which collects water from the filter drains will also intercept seepage flows in the foundation soils. This 3 to 4 m (10-13 ft) deep ditch will have much of its base excavated into lean oil sand, thereby intercepting flows along the interface between the surficial soils and impermeable lean oil sand layer. The water level in the ditch will be maintained below the local groundwater table in the surrounding area. This establishes a positive flow into the ditch in those areas where the ditch bottom is not excavated into the lean oil sand.

Within the interior of the tailings pond where there is direct contact between the foundation soils and deposition of sludge, a relatively impermeable clay liner is developed. Upon initial deposition, the sludge layer has a permeability of 1×10^{-5} cm/s but consolidates as deposition continues, forming a liner with a permeability of 1×10^{-7} cm/s. This self sealing process minimizes percolation from the interior of the pond upstream of the compacted dyke section. This seepage will flow along the interface of the surficial soils and lean oil sand and will be collected in the interception ditch.

A monitoring system comprised of observation wells will be implemented to observe the direction of groundwater flows and water quality. Remedial action in the form of deepening the interception ditch, installation of relief wells in the ditch bottoms or installation of impervious cut-offs could be implemented if required to prevent tailings pond fluids from escaping into the surrounding area. The final layout and depth of groundwater observation wells around the outside perimeter will be provided on the basis of test drilling and detailed geologic assessments.

The reclamation plan calls for the replacement or use of soil as an amendment during reclamation of land surfaces only. The surface of the external tailings pond may be left as a permanent waterbody. Therefore soil amendments will not be required for this area nor will they be stockpiled. If the final disposition of the tailings pond surface changes, the reclamation plan will be modified to meet any changes in requirements for amendment materials.

A special problem will involve the need to create a permanently oil free surface so that aquatic birds are protected after abandonment. Research will be undertaken to develop a suitable approach to this problem.

1.9.4 Provide information on the rise in the tailings pond water salinity during the life of the project and the effects, if any, on the recycle rate, and possible alternatives to the temporary disposal of saline effluent to the Muskeg River.

Answer

Alternatives to the temporary disposal of aquifer depressurization water in the Muskeg River are discussed in 1.2.1. They are, in order of preference, a) piping to the Athabasca River, and b) disposal into a suitable geological formation.

Disposal of basal McMurray aquifer depressurization water into the tailings pond will add to the availability of suitable water for recycle and allow a reduced rate of Athabasca River water intake. In the quantities expected, sufficient dilution will occur to ensure maximum recycling. The slightly saline water may also enhance the settling rate of clay minerals in the tailings.

In the unlikely event of aquifer communication, limited amounts of saline Methy water could also be disposed of into the tailings pond. Based on the favourable test pit experience, it is reasonable to assume that for at least the initial nine months of the 18 months premining depressurization period, no saline water would be recovered. If it is assumed that after nine months a breakthrough occurs, and a flow of 75 l/s begins to come from the Methy (11 000 mg/l Cl^-), then such a flow could be directed to the tailings pond and tolerated for about the next fifteen months before a critical salinity would be reached. During the first three years of the extraction operation, before recycling begins, tailings water would dilute the pond water salinity to an acceptable Chloride level of about 300 mg/l.

During this hypothetical period of salt water flow, alternative disposal methods would be investigated and an acceptable system developed. A variation on the above scenario would include the disposal of a portion of the saline water into the Athabasca River, depending on the volume and salinity. This would effectively increase the amount of depressurization that could be accomplished before reaching the critical chloride level in the tailings pond.

2.0 LAND

Alberta Environment's "Guidelines for the Reclamation of Land Affected by a Surface Disturbance" identifies seven components for lands to be mined:

a) Site analysis and determination of post disturbance land use,

b) Surface hydrology analysis,

c) Overburden analysis,

d) Mining plan analysis,

e) Post mining land use plan,

f) Materials handling plan, and

g) Revegetation plan.

Specific details for information required to support an application for development and reclamation approval are contained in A.R. 159/76.

The E.I.A. presents the proponents initial reclamation and abandonment concepts. The discussion addresses, in varying degrees of detail, the seven components of a reclamation plan outlined above. The reclamation plan is a central mitigative measure in the environmental protection planning and requires further elaboration.

2.1 POST DISTURBANCE LAND USE

2.1.1 Outline the development and reclamation approval process and the proponents role in the process as it relates to

the determination of post land use and resolving land use conflicts.

Answer

Information required to support an application for development and reclamation approval is outlined in A.R. 159/76. The Applicant's role within the development and reclamation approval process is as follows:

- discussions with government officials and review agencies to determine requirements

- provision of an initial reclamation plan within the EIA - a plan that outlines in conceptual terms the information available in the following seven components:

  a. site analysis and determination of post-disturbance land use

  b. surface hydrology analysis

  c. overburden analysis

  d. mining plan analysis

  e. post mining land use plan

  f. materials handling plan

  g. revegetation plan

- provide additional information at the pre-design level of detail as the next step in the orderly progression towards final engineering design of the project

- preparation and submission of a final development and reclamation plan, discussion of that plan with appropriate authorities and amendment as required.

The Applicant has discussed development and reclamation concepts in considerable detail within the EIA and has expanded upon some of those concepts in these answers to questions posed by government review agencies. The Applicant believes that sufficient information has been submitted to form a basis for general approval of the project, subject to satisfactory completion of later stages in the process.

A detailed outline of the Applicant's proposed final development and reclamation plan is provided within Appendix 2.6.6 of the EIA. Specific comments on this outline have been requested by the Applicant, as a guide to further planning and analysis.

As a result of discussions with the Development and Reclamation Committee, additional drilling surveys were undertaken in 1978 to determine physical and chemical characteristics of the overburden materials within the Alsands project area, for the purpose of identifying and describing their reclamation properties. As a result of this survey, and examination of other data, it has been determined that sufficient quantities of suitable mineral and organic material are available on the Alsands project area for reclamation purposes. A detailed soil survey is planned for 1979 as an aid in determining the specific locations of useable soil materials within the mine area.

The Applicant will use soils and overburden information, results of reclamation research undertaken to date, and other site analysis information including patterns of

existing land capabilities use, together with regional considerations of current and projected land and resource use, to recommend a post land use plan. That plan will be offered for consideration as further elaboration on the reclamation plan.

In general, the objective of reclamation will be to achieve a level of productivity equal to that which existed in the project area prior to mining and other site development.

It is understood by the Applicant that the final resolution of land use alternatives is a responsibility of government. The Applicant will assist in the determination of the final land uses through provision of plans and supporting information.

2.1.2 Map the post mining land use concept clearly indicating topographical features and drainage patterns, vegetation, water bodies etc. on the scale of 1:25,000.

Answer

The Applicant agrees to provide a map at a scale of 1:25,000 indicating post mining topographical features, drainage patterns, vegetation patterns, and waterbodies, as further elaboration on the reclamation plan presented in Part 2.6 of the EIA.

2.2 POST MINING SURFACE HYDROLOGY

2.2.1 Discuss the post mining surface hydrology, indicating the relationship between surface drainage and groundwater patterns, runoff patterns, expected flow rates, etc. based on the above map.

Answer

Post mining surface hydrology has been discussed in 1.2.5 and 1.3.2, 1.3.3 and 1.3.4. Detailed review of expected relationships between surface drainage and groundwater patterns, runoff patterns, expected flow rates and anticipated water quality considerations will be provided as further elaboration on the reclamation plan. These considerations will be partially based on an onsite hydrological survey to be undertaken in 1979.

2.3 OVERBURDEN

2.3.1 Present in map and text formats information pertaining to location and volumes of soils which have been evaluated in terms of their potential for reclamation.

Answer

Overburden materials on the Alsands project area have been evaluated in terms of their reclamation potential through a drilling survey undertaken especially for that purpose in the summer of 1978. Results of that evaluation are presented in the EIA (pp. 138-141). Volumes of evaluated material are shown in Table 3.3.6 (EIA). Locations of evaluated material are referenced to a large scale landform and soils map (Map 3.3.2). Physical and chemical parameters of sampled materials were measured and used as a basis for determining suitability for reclamation (see 2.3.3).

A detailed soils survey will be undertaken on the mine area in 1979 for the purpose of confirming initial predictions of soil type availability and usefulness in reclamation. Results will be used as a basis for a detailed report and map to be provided as further refinement of the initial reclamation plan.

The organic soil types of land units 1a, 1b, 1c, 1d and 5 have potential as an amendment to sandy materials. They would improve water holding capacity and organic matter content prior to revegetation. With over 50 percent of the study area covered with these soils, the supply will be more than sufficient to meet probable requirements during all stages of reclamation.

The silt and clay textured Gleysolic soils and Orthic Gray Luvisols of units 2b and 6 may have potential as an

amendment to tailings sand to ameliorate the water holding capacity and the cation exchange capacity. From preliminary estimates there is a sufficient supply of these soils in all mine blocks, except one, the final block. However, excess from other blocks can be stored for use (if required) in final reclamation over the last five years of the project.

Among overburden materials, the silt and siltstone strata showed promise as a useful amendment to uniform fine sand tailings.

2.3.2 Evaluate the physical and chemical characteristics of suitable fine-textured materials intended for reclamation.

Answer

Surficial materials (other than pedologic soil) were evaluated in 1978 to determine their physical and chemical suitability.

From sixteen bore holes a total of 42 samples of surficial materials and bedrock were analyzed. Most of the samples ranged from neutral to basic in reaction and showed no evidence of excessive salinity or sodic conditions that would limit plant growth.

Acceptable limits for saline and sodic soils are presented on pages 139 and 140 of the EIA and are the same as those discussed in the USDA Salinity Handbook. Almost all the soils and surficial material identified have some potential to improve the surface conditions of tailings sand for revegetation. The relative merits of the most common materials are discussed on pages 62, 63, and 138 to 140 of the EIA.

To meet requirements for development and reclamation approval the above information will be supplemented by additional bore hole samples from the mine area. Physical and chemical parameters of soil samples obtained in the 1979 survey (see 2.3.1) also will be measured.

2.3.3 Present in map and text formats information pertaining to the location and volumes of overburden which may be toxic.

Answer

Overburden samples obtained in the 1978 drilling program were analyzed for saline and sodic properties. Heavy metal analyses were not undertaken because no visual evidence of toxicity to plants has been shown at other locations. The data are presented in Appendix 3.3.5 (pages 318a - 318i) of the EIA and the results discussed on pages 138 to 141. Toxic limitations are summarized in Table 3.3.5 (EIA). Most of the samples range from neutral to basic in reaction.

Some clayshale samples showed sodic characteristics (SAR > 10) that may limit the usefulness of this material for reclamation.

A number of samples were taken in each of the dominant landform map units (Map 3.3.2 EIA). Locations of strata with toxic properties can be seen through their application to the large scale landform map.

As additional data are accumulated through drilling for mine preparation, a map will be prepared showing locations of toxic material.

2.3.4 Present in map and text formats, including appropriate cross-sections, the overburden following mining, clearly indicating the likely profile of the root zone.

Answer

Post-mining overburden profiles will be projected and described as information is gathered and assessed in the orderly progression towards application for development and reclamation plan approval. Likely profiles of the root zone will be shown in cross-section for each major reclamation zone.

Criteria for using soil material as an amendment to tailings sand are discussed on pages 62 and 63 of the EIA. It is noted on pages 63, 67 and 69 that studies to date have had success in using peat in tailings sand reclamation. However, there is no long-term evidence to show conclusively that a vegetation cover can or cannot be self-sustaining with such treatment. Alsands proposes to use a combination of peat and fine textured mineral soil that will be mixed into all tailings during final reclamation. This technique is similar to that used by Syncrude and will provide both the benefits of using peat alone and provide insurance in the event that added organic matter in the soil is lost from the system in significant amounts over the long term.

A mixture of peat and silt and/or clay soil will be mixed into the top 15 to 20 cm of all tailings sand surfaces on the tailings dyke.

As each level of the dyke is reclaimed, mineral soil, then peat, will be hauled from the stockpile sites with end dump trucks and piled on the dyke bench. Bulldozers will then distribute the materials over the dyke, aiming for a 15 cm depth of mineral soil and 15 cm of peat over the tailings sand. A bulldozer with rototiller attachment will then mix the peat

and silt/clay material into the tailings. Tailings surfaces in the mine pit will be reclaimed in a similar fashion with mineral and organic soil from the stockpiles being hauled and spread to a 15 cm depth each.

Overburden and soil will also be hauled to the coke/ash lagoon during reclamation. At least 120 cm of overburden (preferably silt or clay) will be placed over the dry lagoon surface before a minimum 15 cm of soil is spread on the top.

2.4 MINING PLAN

2.4.1 Present information through maps, charts, graphs and conceptual diagrams showing the sequential schedule of all activities in opening up, operation, abandonment and reclamation including the timing for each stage and the sequence of activities and the concurrent activities of opening up, operation, abandonment and reclamation. The first five years of activities should be shown on an annual basis, with remaining years shown at five year intervals. This is an elaboration of the figure 2.6.1.

2.4.2 In presenting the information requested in 2.4.1, above, particular attention is to be paid to the determination of the total volume of overburden to be mined, the location and volume of overburden to be stored for backfilling and root zone development, and the volume of overburden that will be placed in discard areas.

Answer

A sequential schedule of 25 year mining activities has been presented in Chapter V of the ERCB Application, upon which a coordinated sequence of reclamation activity was developed and described (Part 2.6; EIA). Maps and diagrams have been provided to illustrate stages of activity and procedures that will be employed.

The Applicant believes that sufficient information has been supplied to provide an understanding of the concepts involved.

Additional maps, charts, etc., with the level of information requested, will be supplied in the normal course of preparing for development and reclamation permit application.

Particular attention will be paid to overburden handling.

2.5 MATERIALS HANDLING

2.5.1 Selective salvage and storage of materials with reclamation potential is to be provided through a conceptual materials handling plan indicating the procedures to be used to select, salvage and store materials, and procedures for re-establishing a suitable root zone.

2.5.2 The conceptual materials handling plan should account for the use of all mined and/or excavated material on the site, including material used for backfilling, site construction, dyking, and reclamation.

Answer

From preliminary assessments of the distribution of organic and fine textured mineral soil in the mine area, there are sufficiently large areas of each throughout to adequately support selective handling and storage procedures. Distribution and amounts of each soil type will be determined during a detailed soil survey planned for 1979.

It is recognized that to complete the data base for reclamation planning a detailed soil survey of the project area is required to determine the location, amounts and types of mineral soil saved for reclamation. Part of this process is an assessment of the relative suitability or potential of each soil series and groups of similar soil series for use in reclamation. This would be followed by estimates of volumes and scheduling of soil to be saved and used for reclamation.

Amounts of materials that will be stored at any one time are expected to be minimized because of the sequential nature of reclamation (see 2.4.1). The amounts required and the location of storage sites will be defined during elaboration upon the initial reclamation plan and as final mine

plan sequence and logistics are developed. The organic soil stockpile location is likely to be the largest of the reclamation material stockpiles. The height (15 m) is specified (p. 59; EIA) while the location and area (60 ha) are shown on Map 2.2.2 (EIA).

A materials handling plan will be prepared as a guide to procedures to be used to select salvage and store materials and for re-establishment of suitable root zones. The plan will account for materials excavated on the site.

2.6 REVEGETATION

2.6.1 Using the information provided above, especially the end land use map and profiles of the expected root zones, outline the proposed program of revegetation.

2.6.2 Describe the suitability of the root zone created for specific plant species to be used, including special methods of seed bed preparation, seeding time, rates and methods, and requirements for fertilization or irrigation.

Answer

Criteria and procedures for surface preparation, creation of soil profiles and soil treatment have been described in the EIA (pp.65-68). Revegetation procedures have been identified on pages 63-65 and site specifications listed on pages 68-70. The site specifications are derived according to expected surface condition.

A site specific program of revegetation based on detailed land use and materials availability and handling data will be provided during the course of preparation for reclamation plan approvals.

2.7 GENERAL CONCERNS

2.7.1 Timber volumes given (page 62, volume 2) and annual timber supply and demand (page 63) must be checked.

Answer

This comment refers to the Regional Socio-Economic Impact Assessment document and has been addressed in 6.5.1.

2.7.2 The potential for agricultural land use following reclamation has not been assessed. The company is requested to provide in mapped or other form their assessment of this potential land use following reclamation.

Answer

Agricultural production in the oil sands area was discussed in the Regional Socio-Economic Impact Assessment report (pp. 61-62). Capability of the Alsands lease area for agriculture (C.L.I. system) was reviewed in the EIA (pp. 57 and 137). The landform and soil units found in the lease area (Map 3.3.2 EIA) were classified in terms of agricultural capability within Appendix 3.3.3 of the EIA.

Climatic conditions preclude any high class (1-3) land for agriculture or forestry in the area. Except for a small area of elevated alluvial soils (unit 2a) along the Athabasca River, all the mineral soils fall into class 5 to class 7 for agriculture. Class 5 soils have the potential to support those perennial forage crops (grasses and legumes) that are tolerant of the severe climate of the area. Class 7 soils are regarded as unsuitable for agriculture. The class 6 land in the study area is currently under forest cover and can thus be considered as class 7 land until the forest cover is removed. At that time, the cleared land could be considered class 6 with the capability for use as unimproved permanent pasture only. Undisturbed organic soils which cover the majority of the study area are unsuitable and therefore not included in the capability classes for agriculture.

Common major limitations on the capabilities of land within the study area for both agriculture and forestry are severe climate, wetness of the soil and a deficiency of plant nutrients in the soil.

Agriculture has not been specifically identified in the EIA as a post-reclamation land use in the project area but will be considered in the end land use plan to be provided (see 2.1.1) as part of the reclamation approval process.

2.7.3 Provide a map of a scale similar to Map 3.3.2 which defines soils sensitive to erosion and instability. Describe the manner in which the soils in the project area have to be handled to minimize soil erosion and slumping.

Answer

A map showing sensitivity of soils to erosion and ratings according to stability will be provided on a scale similar to map 3.3.2 of the EIA - a large fold-out photomosaic.

A detailed overlay showing the project layout will be superimposed on this map.

In the EIA, soil type, terrain conditions and topography are mapped in relation to water bodies (Maps 3.3.2 and 3.4.1). Criteria for prevention of soil movement are discussed on page 168 of the EIA.

The Applicant's responses to 1.9.2 and 4.2.6 address the subject of erosion control. Methods of handling soils at a Muskeg River bridge site and during road construction are identified.

2.7.4 Discuss dyke abandonment alternatives and measures required to assure its long term stability.

Answer

Dyke and tailings pond abandonment concepts are discussed in 1.9.3. In summary, the Applicant and its consultants believe the dyke slopes will not run the risk of serious failure after year 25, providing that a proper vegetative cover is established. Although not believed necessary at this time, spillway capacity could be incorporated to avoid possibility of overtopping.

2.7.5 No particular attention has been given by the applicant as to how he proposes to control "off highway and other all terrain vehicles" on the lease. From an environmental point of view this could become a potential problem area.

Answer

To the extent that it is operationally feasible, Alsands traffic will be confined to designated rights of way within the lease area.

The Applicant expects that the lease area would be posted "no trespassing" as with other, similar, operations.

2.7.6 It appears Alsands have not developed a policy as it effects trapping, even though a statement on trapper welfare is given. The proponent is required to outline their policy.

Answer

This comment refers to the Regional Socio-Economic Impact Assessment document. The Applicant's policy on trapping and statements on trapper welfare are discussed in 6.5.7.

2.8 HISTORICAL RESOURCES

2.8.1 Provide a historical resource impact assessment on the mine site, tailings area, granular resource zones, settling ponds, and any other area to be subject to on site disturbance; and provide a preliminary survey for historical resources of the proposed new townsite and the transportation and utility corridor.

Answer

A historical resource assessment was provided in Part 3.8 of the EIA. Appendix 3.9.6 comprises an archaeological site inventory data file.

Proposals have been requested from consultants recommended by the Archaeological Survey to carry out a second field program in 1979 designed to further identify and evaluate archaeological and historic sites in the Alsands project area. Survey methodology will generally follow that outlined on pp. 242-243 of the Alsands EIA. In addition, the survey will include the settling basin adjacent to the Athabasca River, the project access transportation/utility corridor and the townsite. It will also cover the water pipeline corridor near the Athabasca River and areas within 500 m of permanent stream banks which have not already been examined. Sites not destined to be disturbed by project activities will be noted, but left undisturbed.

A 500 m strip along the east bank of the Athabasca River will be surveyed for historic sites, including buildings and old oil well drilling sites.

2.9 UTILITY CORRIDOR

2.9.1 Additional information is required regarding major impacts and their mitigation for the utility corridor, with particular emphasis on reclamation of muskeg and sand dune areas.

Answer

As outlined in the EIA, the Applicant proposes that all utilities required for both the plant and townsite will generally be located in a corridor between 0.75 and 1.50 km from the Athabasca River. Facilities in the corridor would be a two lane, all weather highway, synthetic crude pipeline, gas pipeline, power line and waterline. Primary environmental concerns and mitigative measures are discussed in Section 2.7 of the EIA. Specific impacts associated with development of the corridor and the operation, maintenance and eventual abandonment of facilities therein, will be addressed by the companies or agencies responsible for such development or operation. However, Alsands is working with the various parties to ensure that a coordinated corridor plan is achieved.

Specific impacts and mitigation procedures for the short corridor connecting the plant and camp site with the main corridor are reviewed in the EIA and responses to other questions.

3.Ø AIR

3.1 SULPHUR EMISSIONS

3.1.1 Damage to lichens and mosses can be expected within 5 to 1Ø km of the plant and some increased acidification of soils may be expected over the long term, although it cannot be ascertained at this time if measureable damage will occur due to increased soil acidification.

The impacts and expected excesses could be more prevalent as a result of a combination of: a) increased SO_2 emissions due to one SCOT unit being down, b) increased SO_2 emissions due to one CLAUS unit being down, c) superimposition of background SO_2 levels resulting from SO_2 emissions of other operations in the area, d) increased SO_2 emissions due to higher than average sulphur content in the bitumen and/or coke, and e) the frequency of occurrences of limited mixing conditions with the mixing height extending to approximately the plume height being greater on the average than indicated during the November 1974 to October 1975 study period. In other words, how typical or "average" were the meteorological conditions identified during the study period?

Expand the assessment to deal with the impacts related to items a), b), c), d), and e) above and the impact of operational upsets in general.

Answer

a), b), and d: Operational upsets and bitumen/coke sulphur content

The assessment was expanded in this section to evaluate the significance of items (a), (b) and (d). These items concerned the effects of operational upsets and higher sulphur contents of the bitumen/coke. Dispersion calculations

were performed for the following annual emission scenario: (1) maximum anticipated emission rate of 92 tonnes/SD, (2) 112 tonnes/SD during the weeks of January 8 to 15 and July 11 to 17, reflecting operational upsets, and (3) 46 tonnes/SD for the periods April 9 to May 13 and August 27 to September 30 due to partial plant shut-down.

The calculations were performed on a 20 km square grid (spacing 1 km) with the source approximately at the center.

Results of the new scenario are compared in Table 3.1.1 with results of the dispersion calculation performed for the EIA. The portion of the 20 km grid affected by concentrations in excess of the ground level concentration objectives is much smaller for the new scenario and the frequencies of concentrations in excess of the objectives are slightly lower. The operational shut-downs eliminate many of the fumigations in spring and autumn. The operational upsets result in an increase of the frequency of concentrations in excess of the objectives at locations to the southwest of the source. However, the latter was not sufficient to increase the overall maximum frequency of predicted excesses.

c) Superimposition of background SO_2 levels

Walmsley and Bagg (1977) estimated annual average ground level concentrations of SO_2 in the AOSERP study area due to the GCOS and Syncrude sources. Maximum concentrations of about 8 ppb were predicted at two sites about 2-3 km from GCOS - one to the north-northwest and a second to the south-southeast. Predicted annual average concentrations of SO_2 for the Alsands plant with a 76 tonne/SD sulphur emission rate are less than 1 ppb at these points. Even assuming that concentrations due to the different sources are additive, the Alberta objective of 10 ppb would not be exceeded.

The area used by Walmsley and Bagg did not extend to the points of maximum concentration predicted for the Alsands source alone. However, the highest values on the northern boundary of their grid are 2 to 3 ppb. Values of that magnitude added to the Alsands maximum of 4 ppb, would again not produce a concentration greater than 10 ppb.

The CDM model used by Walmsley and Bagg does not treat the inversion breakup fumigation process and is therefore not applicable to the prediction of the occurrence of concentrations for the one half to three hour averaging periods. Hence, they present no results or conclusions regarding short term concentrations.

A limited amount of information on short term background concentrations is available from the Shell - Fort MacKay SO_2 monitor about 4 km southeast of the Alsands plant site (See EIA Table 3.2.1). During the period of record, only one plant was operating, and no information is readily available on SO_2 emission levels at that time. All the excess concentrations (21 half hour periods in 13 months) except one in February 1976 were associated with light southeast, south or southwest winds. Most incidents occurred in the morning hours, indicating the incidents were likely due to fumigation of a plume from a source south of the Alsands lease. In this wind regime, the Alsands plume would also travel to the north, precluding an overlap of plumes at the monitor. The frequency of excess concentrations would be additive at this monitor. Thus, 0.3 percent of the half hour concentrations may exceed 0.2 ppm rather than the 0.2 percent due to the Alsands source alone. Plume overlap would be a possibility to the north of the Alsands source. Lack of monitoring data in the area prevents the estimation of cumulative figures.

e) Representativeness of meteorological data

How typical or average were the meteorological conditions identified during the study period? The only available published long term data on mixed layers relevant to the area is that of Portelli (1977). He presents the mean values of mixing height, mixed layer wind speed and ventilation for the radiosonde stations at Edmonton, Alberta and Fort Smith, N.W.T. for the period July 1965 to June 1969.

A comparison of the lease area mixing heights for the study period with these data are shown in the following table:

	J	F	M	A	M	J	J	A	S	O	N	D	Ann.
Edmonton	227	295	696	1578	2396	2185	1954	1563	1322	998	420	208	124
Ft. Smith	208	324	547	1025	1499	1779	1610	1537	1009	578	283	231	93
Lease Stn.	343	482	692	1043	1076	1665	1683	1857	1204	763	283	300	94

The mean annual mixing height for the lease area is close to the long term mean for Fort Smith. The lease area values for the winter months are generally higher than both the Fort Smith and Edmonton values. Hence, the frequency of occurrence of limited mixing conditions with mixing height extending to approximately the plume height was probably greater than what would occur over a longer period.

Fort MacKay and the New Town

For a sulphur emission rate of 76 tonnes/SD, no 'events' were predicted where the ground level SO_2 concentrations exceeded 0.2 ppm on a half hour average at either Fort MacKay or the proposed town site. The closest grid point to Fort MacKay with a predicted 'event' was 7 km to the north-northeast and the closest grid point to the proposed new town with a predicted 'event' was 14 km to the south-southwest.

Fort MacKay and the proposed new town site were both outside the boundaries of the grid used for the 91 tonnes/SD sulphur emission rate. With the similarity in ground level concentration patterns for the two cases of emission level no 'events' would be predicted for either site at the higher emission rate.

Therefore, the Applicant does not expect any 'events' where ground level SO_2 concentrations will be in excess of Ø.2 ppm at either Fort MacKay or the proposed new town site for either the 76 tonnes/SD or the 91 tonnes/SD sulphur emission rates. The Applicant proposes to monitor those locations to confirm the predictions.

TABLE 3.1.1

COMPARISON OF SO_2 DISPERSION CALCULATIONS -

E.I.A. AND NEW SCENARIO

Ground Level Concentrations	% Frequency		Number of Grid Points Affected	
	E.I.A.	New Scenario	E.I.A.	New Scenario
> 0.2 ppm (½ hour)	0.5	0.4	193	105
> 0.17 ppm (1 hour)	0.6	0.5	202	117
> .06 ppm (24 hours)	0.6	0.6	34	15
Maximum Average Annual Concentration	4.8 ppb	3.7 ppb		

3.1.2 The Alberta Clean Air Regulations pertaining to ambient air quality objectives do not make provisions for excesses as a result of plant emissions. Since excesses were identified as likely and possibly further excesses can be expected as a result of the consideration identified in 3.1.1, and some flora and fauna damage is expected, what value can be put on this damage and how does this value compare with increased costs incurred by choosing upgrading alternatives that emit less SO_2? What costs will be incurred in meeting air quality objectives set by government?

3.1.3 Discuss regenerative type flue gas desulphurization processes.

Answer

Excesses above the Alberta Clean Air Regulations may not occur under actual operating conditions. It is the objective of the Applicant to avoid such excesses insofar as it is reasonable to do so through operational planning and project design. Concentrations of SO_2 and other atmospheric parameters will be monitored as part of the network of regional stations in which Alsands will participate.

As a planning exercise, dispersion calculations have been undertaken using as a basis an annual SO_2 emission scenario considered most likely at this stage of project planning (see 3.1.1). Results of those calculations suggest that some change in species composition of the arboreal lichen flora could occur within 5-10 km of the plant. Also possible is some injury to terrestrial lichens and mosses closer to the plant. Less likely, but still possible, is temporary acute injury to vascular plants on a sporadic basis in areas close to the plant - probably on the lease area. It is important to point out that various survey and monitoring systems employed by AOSERP and operators of other developments in the Athabasca

Oil Sands region have not registered plant damage or injury, even though similar annual emission regimes have been in effect.

No impact on wildlife populations has been predicted as a result of air emissions from the Alsands plant. It is considered unlikely that pH changes will occur in any lakes within the oil sands region as a result of the Alsands plant operation. A possible relationship between lichens and caribou around the Alsands plant site has been explored. The conclusion has been reached that lichen impact, even if it were to occur at the level indicated by preliminary examination, would not affect existing caribou populations.

In view of the hypothetical nature of impact predictions arising from model dispersion calculations, it is considered unrealistic to attempt to evaluate injury to flora at this time. Injury to vegetation that may occur under the hypothetical conditions examined would obviously be of limited economic significance.

It should be noted that the predicted injury to plants is not based upon, or related in any direct quantitative sense to, hypothetical excesses above Alberta Clean Air Regulations. Rather, it has been predicated upon the possible occurrence of sporadic ground level concentrations considered harmful by Dreisinger (1967) and others (See Part 3.5, EIA).

Costs of reducing SO_2 emissions so that dispersion scenarios produce environmentally safe ground level concentration estimates must take into account environmental and social costs of alternatives and process operational viability/reliability as well as development, capital and operating costs of the selected technology. Environmental and social costs could include such items as expense for disposal of deleterious by-products and increased energy consumption or

land utilization. Chapter VIII of the Application to the ERCB contains a review of upgrading alternatives that were considered and gives reasons for the eventual process selection.

Three major factors were considered in evaluating alternative upgrading process configurations - operating viability/reliability, project economics, and environmental impact. A proper selection cannot be made on the basis of one to the exclusion of the others. The process configurations based on fluid coking, although not resulting in the lowest sulphur emissions, were the only configurations which satisfied all three requirements. The rate of sulphur emissions to the atmosphere from the selected process configuration while on normal plant operations is shown in the Application to the ERCB to be 61-91 t/SD. The latter emissions correspond to a ratio of 4.3 to 6.4 t SO_2/1000 m^3.

Recent information based on actual experience with fluid cokers processing similar feedstock now indicates that plant sulphur emissions will be in the range of 76-91 t/SD. Further fluid coker operating experience and testing is required to specify emissions more definitely.

Sulphur emissions come from three main sources:

1. Sulphur Plant: The overall sulphur recovery efficiency has been increased to 99.9% by incorporating "best practicable technology" tailgas cleanup units. Consequently, emission from this source is reduced to a minimum (1 t/SD).

2. Plant Fuel: Plant fuel gas is treated to a very low sulphur content. Supplemental plant fuel is low sulphur gas oil with a sulphur

content of Ø.2%. Consequently, emissions from the plant fuel have been reduced to a very low level (2-4 t/SD).

3. Fluid Coker: The fluid coker is internally heat balanced by combustion of coke in the coker burner. The sulphur content of the burner flue gas has been reduced by incorporating external sour water stripping facilities.

For the design of the sulphur plant and plant fuel systems, proven and reliable technology is available and has been applied. Further reduction of the sulphur emissions would involve sulphur removal from the fluid coker burner flue gas.

The Application does not include removal of sulphur before combustion of the CO gas for several reasons:

- The SO_2 content of the gas stream, as reported by the process licensor, would result in an unacceptable rate of reagent consumption, i.e., Stretford solution.

- Cooling of the gas stream before treating would be required and would result in a major degradation of high level energy.

- Reheating of the treated gas stream would be required to ensure complete combustion of the CO to CO_2 before releasing to the atmosphere. The addition of support fuel would be necessary due to the extremely low heating value of the cool gases.

Therefore, for both technical and energy conservation reasons it has been concluded that the more feasible location for sulphur removal would be downstream of the CO boilers via flue gas desulphurization.

A review of the flue gas desulphurization processes that are presently both proven and potentially reliable has produced four possible candidates. Three are of the "throw-away" type: Limestone, Lime and Double Alkali, and one is of the "regenerative" type: Wellman-Lord. All processes involve counterflow contacting of the flue gas stream with a cool reagent solution which absorbs approximately 90 percent of the SO_2 from the flue gas; the flue gas is subsequently reheated before entering the stack.

The "throw-away" systems would involve the development of a limestone mine (100 000 to 150 000 t/y capacity) in addition to sludge disposal sites (200 000 to 300 000 t/y capacity) with associated environmental difficulties. Electrical power consumption for these processes are in the range of 5 to 10 MW.

The Wellman-Lord process would involve the disposal of 6000 to 10 000 t/y of water soluble sulphate waste by-product. In addition, the energy consumption of the process is large: electrical power - 7 to 13 MW and regeneration steam - 50 000 to 75 000 kg/hr.

While it is recognized that these processes are operating, there is no operating experience in a winter climate comparable to the Athabasca region. Even in more temperate climates, it is generally accepted that all these processes have serious drawbacks with regard to operations, maintenance, energy requirements and by-products disposal. The problems would be compounded when coupled to the already complex upgrading and utilities systems.

The approximate cost of sulphur reduction by flue gas desulphurization using current technology would be as follows:

Plant Sulphur Emissions		Capital Cost	Operating Cost	Cost per Tonne of Sulphur Recovered
		($ MM)	($ MM/yr)	($/Tonne)
t/SD	t SO_2 1000 m^3			
46	3.2	50-75	7-9	900-1200
23	1.6	75-100	10-13	900-1200

Notwithstanding the above, the Applicant points out that flue gas desulphurization is an area of rapidly developing technology, especially in the United States, due to the increasing use of large quantities of coal in thermal power plants. Many projects involving new desulphurization processes are in the pilot plant or demonstration plant phase. With the level of effort and funding involved it can be expected that development of this technology will provide a better means for reducing sulphur emissions in the future. The Applicant will continue to monitor these developments.

3.1.4 Discuss provisions for preventing hydrocarbon losses from tankage

Answer

Control of emissions of volatile hydrocarbon vapours is a standard practice in oil refineries, and consequently methods of vapour segregation and containment at source have been developed. Floating roofs are the main method for prevention of hydrocarbon losses. Where seal limitations or other technical problems do not permit the use of floating roofs, other techniques such as inert gas blanketing together with vapour recovery systems would be utilized.

4.Ø FISH AND WILDLIFE

4.1 WILDLIFE

4.1.1 Discuss the process that the proponent intends to follow to determine probable end land uses and resolving conflicts among forestry, wildlife, agricultural, recreational and other land uses.

Answer

The approach to determination of final land uses on disturbed areas within the lease is discussed within 2.1.1. In essence, the Applicant intends to identify a feasible set of possible end land uses based on known capabilities and regional plans for resource allocation and development. The Applicant anticipates that alternatives will be chosen by Government in consultation with the Applicant.

4.1.2 Provide an assessment of the project's indirect (off site) effects on ungulate habitat.

Answer

The estimate of a potential crop of five moose lost per year to the project through direct habitat loss is a conservative one, i.e., the number would not likely exceed five. The figure was based on moose density estimates of 0.24 animals/km^2 (Hauge et al., 1970), a culling rate of 20 percent and a total loss of 8000 ha of moose habitat within the project area. Of this 8000 ha, construction of facilities will remove vegetation from a land area of only 6000 ha.

Project machinery and equipment will be designed to meet acceptable noise levels at lease site boundaries. It is doubtful that project associated noise will have a major effect on the use of ungulate habitat outside of the project area.

Increased fire incidence resulting from project operations, which could result in temporary loss of surrounding ungulate habitat, is not expected. The potential for fires will be evaluated and adequate protection measures established in cooperation with the fire protection officer of the Athabasca forest. The presence of fire-fighting equipment and manpower should improve local fire suppression capability.

Interceptor ditches will affect drainage patterns adjacent to construction sites, and minor changes in plant community composition will occur where the water regime is changed. Soils may become drier below the drainage interruption as local water tables are lowered. This drying may improve tree growth in areas of muskeg but cause loss to certain bryophyte and vascular species which depend upon wet conditions. These potential impacts are rated minor due to their localized extent and the fact that changes towards drier

conditions will be within the range of natural variation. Little change in ungulate habitat in the surrounding area is expected as a result.

Processing of oil sands deposits will necessitate the emission of SO_2 to the atmosphere. Vegetation types downwind within 5 km of the project area are primarily mixedwood forests consisting of white spruce, jackpine and aspen. Upwind of the project area the vegetation is mostly coniferous and deciduous scrub forest. Muskeg is also present. A well developed bryophyte and lichen ground community is present in many of the coniferous forests. Ground level concentrations of SO_2 within 10 km of the stack may affect arboreal lichens. Similarly, there is a possibility of some impact upon terrestrial lichens and mosses within a few kilometres of the plant site. Isolated incidences of SO_2 injury to trees or shrubs could occur within a kilometre or two of the plant but recovery should be complete.

Terrestrial and arboreal lichens form an important food source for caribou in the winter months. However, populations of caribou have been found only in the Birch Mountains and the extreme southern portion of the study area during recent years (AOSERP, 1978) and it is therefore unlikely that SO_2 will have major effect on important habitat.

Neither acute nor chronic damage to vascular plants has been demonstrated in the area surrounding the GCOS plant. Nevertheless, the Applicant will cooperate with industry and government on biomonitoring programs.

4.1.3 "The potential for creating habitat of value to important wildlife species is limited by the state of technology and the significant cost involved when related to expected benefits." (page 207) Please elaborate.

Answer

The Applicant is planning to create wildlife habitat on at least part of the reclaimed land. Final end land uses will be shown in a plan to be submitted at a later date. Resolution of end land use alternatives will be approached according to the procedure outlined in 2.1.1.

Habitat for certain important wildlife species may be recreated to a level at or near that existing prior to mine development. In fact, the characteristically low nutritional value of the area's moose forage may be improved upon through the creation of suitable soil profiles on well-drained reclaimed lands.

A program of research designed to produce suitable methods of habitat development will be considered. This research would include the development of techniques, the demonstration of approaches, and the monitoring of pilot projects. Examination of the state of technology for creation of Boreal forest wildlife habitats, and associated costs, will be included in the final reclamation plan.

4.2 FISHERIES

4.2.1 Define the existence and distribution of fish within the study area. Particular attention should be paid to ponds one to nine. Information which should be supplied on all ponds includes: a) whether fish are present, b) what species of fish are present, c) bottom contours of the pond relative to a legally defined bench marks (one meter intervals), d) water quality information, especially as it pertains to dissolved oxygen, phosphorous, nitrogen, sulphates, chlorides, alkalinity, T.D.S., pH and total hardness at three regularly spaced intervals for each of the four seasons, and e) definition of any ingress or egress of fish from the ponds, direction, timing and magnitude of movements.

Answer

Preliminary sampling studies of lakes and ponds in the Alsands study area indicate that most of these waters do not constitute important fish habitat. Most ponds are shallow, generally being less than 2 m (6 ft) in depth. Lake 24 has an approximate depth of 3 m (10 ft) and Lake 7 could be as deep as 6 m (20 ft). In the granular resource area, where bedrock is close to the surface, Lakes 5, 8 and 6 occur clustered together in rolling terrain. They have maximum depths of 14 m, 15 m and 20 m (45 ft, 50 ft and 65 ft) respectively. Lake 9 is an oxbow lake within the floodplain of the Athabasca River. Lakes 22 and 20 are shallow and provide localized drainage for the surrounding muskeg.

Two of three lakes examined in the granular resource area (5, 6 and 8) were found to contain longnose and white suckers. Field studies will be initiated during the 1979 season in order to provide additional baseline data regarding the chemical, physical and biological conditions of potentially affected lakes and ponds. Studies will be designed to determine:

a. the presence of fish
b. fish species present
c. bottom contours of ponds relative to legally defined bench marks at one meter intervals
d. water quality information, including measurements of dissolved oxygen, phosphorous, nitrogen, sulphates, chlorides, alkalinity, total dissolved solids, pH, and total hardness at regularly spaced intervals during each of the four seasons
e. direction, timing and magnitude of fish movements.

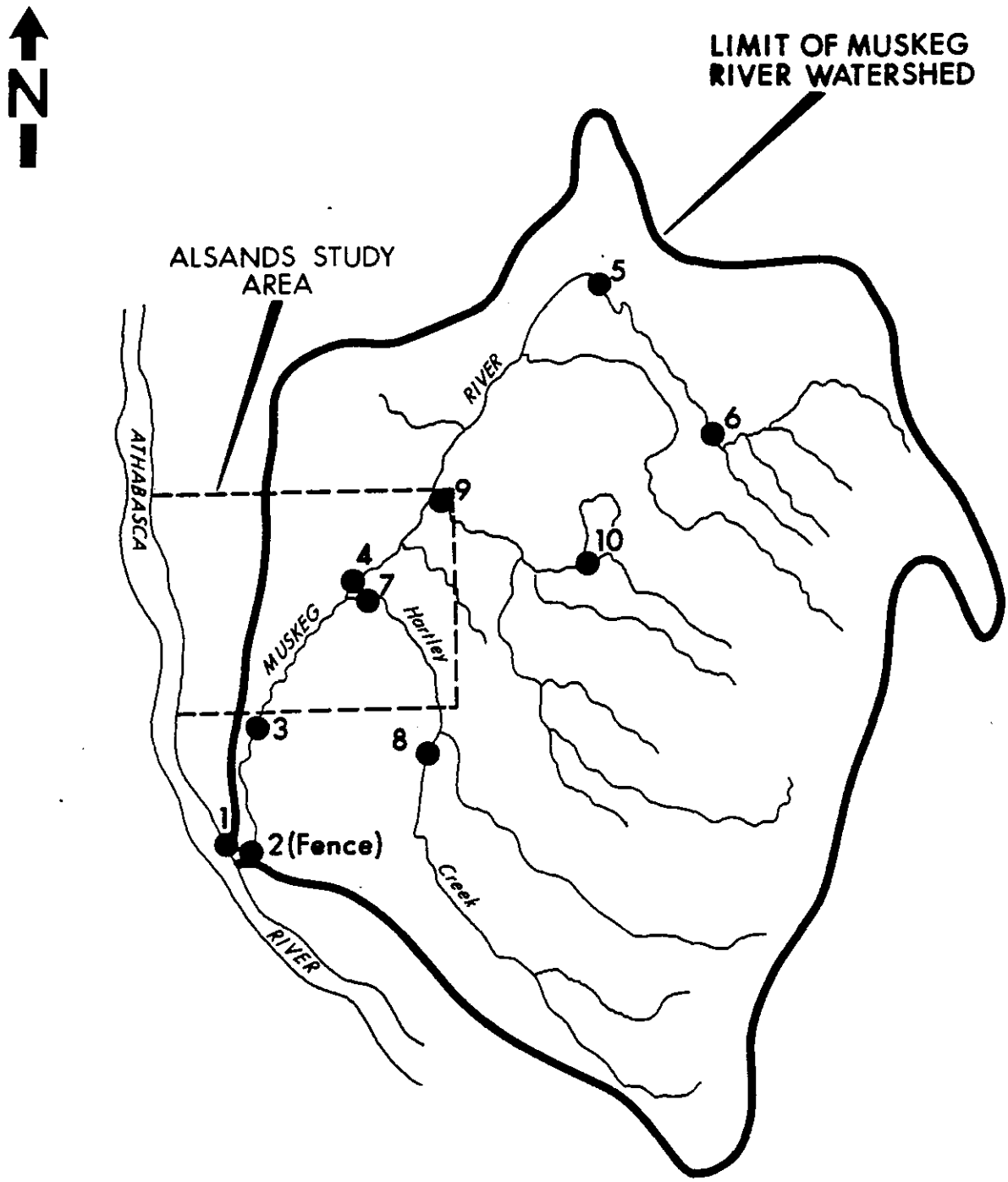
4.2.2 Substantiate the claim that the upper Muskeg River and Hartley Creek are poor fish habitat (page 226) and the statement that the Muskeg River may be an overwintering or rearing stream (page 224-230).

Answer

The statement on p. 226 (EIA) requires clarification. Fisheries resources of the Muskeg River watershed have been studied intensively by Bond and Machniak as part of the Alberta Oil Sands Environmental Research Program. Results from these studies were included in Appendix 3.7.12 of the EIA but an accompanying map was omitted. Map 4.2.2 is now provided in support of that Appendix. The data show that the upper reaches of the watershed (fish sampling sites 5, 6, and 10) are restricted to brook stickleback and lake chub. Middle reaches provide habitat for a few more species and have considerable value. The lower reaches of the Muskeg River, however, are important habitats for many fish species of the region and represent an important segment of the home range of a number of them.

On the basis of fish movements in 1976 and 1977, the Muskeg River is believed to provide rearing areas for longnose and/or white suckers. Data on the seasonal distribution of young-of-the-year Arctic grayling indicate that these fish apparently use the Muskeg River for both rearing and overwintering. The life history of mountain whitefish, northern pike, and trout-perch in the Muskeg River is not well understood; however, fish movement data indicate that the Muskeg River also provides rearing areas and overwintering sites for juveniles of these species.

The understanding of the importance of the Muskeg River watershed as an overwintering area will be further enhanced by a lake and pond fisheries survey to be conducted by the Applicant.



ALSANDS PROJECT GROUP

MAP 4·2·2

FISH SAMPLING SITES

SOURCE: BOND AND MACHNIAK (1978)

4.2.3 Identify all possible sources of gravel and rank them according to their impact on aquatic habitats. The impacts should be identified for each site.

Answer

Two potential sources of gravel aggregate have been identified in the project area - one south of the Muskeg River, and one north and west of the plant site. A gravel survey will be initiated in 1979 to assess the suitability of both areas. The area or areas considered most suitable for development will be ranked according to potential for impact on aquatic habitats, with impacts identified for each site. At this time, the northernmost site has less potential for detrimental effect upon fish inhabited waters.

A plan for gravel extraction will be provided in support of an application to develop whichever source is selected.

4.2.4 The Alsands E.I.A. identifies a major gravel source existing in communication with lakes (ponds) 1-8, but does not identify the plan for gravel extraction and therefore the reasons for destroying lakes 1-8. This plan should be provided and the reasons given for destroying the lakes. The company should identify the measures they are prepared to take to reduce the impact to aquatic habitats.

Answer

Plans for gravel source evaluations are discussed in 4.2.3. Even if the southern source is developed, Lakes 1-8 would not be destroyed. A fisheries survey in 1979-80 will collect information on water quality, physical conformation and fish presence and movement (see 4.2.1). The information will provide a basis for development of protection plans. The gravel would be removed so as to avoid the destruction of lakes sustaining important fish species. Protective berms, settling ponds or other devices would be employed. Their location and use would be described within a gravel use scheme provided as a basis for permit application and approval.

4.2.5 The Alsands E.I.A. identifies the need to discharge saline waters to the Muskeg River until such time as the Tailings Pond is built (page 6, 28, 170). However, there is a paucity of information on the tolerance of aquatic flora and fauna to acute and chronic dosing of saline waters (page 230). Identify the alternatives for disposing of these saline depressurization waters and rank them according to their impact on aquatic habitats. The impacts should be identified specifically as they pertain to the surface waters likely to receive the depressurization waters.

Answer

The alternatives for disposing of basal aquifer depressurization waters have been discussed in 1.2.1. Disposal into a suitable geological formation contains the least potential for impact on aquatic habitat. This is dependent, however, on the direction and distance that depressurization water may have to be transported to a suitable disposal location. Transport to the Athabasca River by above ground pipeline carries a limited potential for impact upon aquatic habitat. Only minor and localized effects would be expected in the Athabasca River itself, but pipeline breaks, however unlikely, could result in contamination of drainages leading to the Muskeg River. Suitable contingency plans would reduce the possibility of significant impact on biota. The described method of disposal - to the Muskeg River with temporary winter storage and/or dilution by surface water - holds the least potential for significant impact on aquatic habitats.

4.2.6 Identify the location of all proposed roads, excluding those on the mine area proper (page 23). The impacts and mitigative action for each road as it affects aquatic habitats should also be identified.

Answer

Proposed major roads have been identified on Map 2.2.2 of the EIA. No additional roads can be plotted at this time although it is conceivable that access between facilities will be required in a number of additional areas as the project develops. Most additional roads or trails will be associated with the site preparation phase of construction. The locations of such rights-of-way will be indicated to the appropriate government officials before proposed construction dates. Approvals will be sought, based on protection planning to minimize drainage disruption and the transport of silt to fish inhabited waters.

Much of the access for drilling purposes takes place in winter in order to minimize impacts on terrain and hydrology. Additional drilling for reserve determination, etc., is required but will essentially occur on areas to be cleared, drained and stripped for eventual development.

The access corridor to the plant site will include a road, pipelines, communication and power lines. Most of the corridor is over relatively flat terrain covered by scrub forest with a high percentage of poorly-drained peat lands. Culverts will facilitate drainage across the right-of-way and minimize ponding on the upslope side of the road. Roadcuts through upland soils, backslopes and backfill will be grassed where necessary to control erosion and the consequent introduction of sediment into the runoff. The culverts will be correctly sized and placed. While some sedimentation is unavoidable care will be taken during construction to impede

ditch flows with mechanical barriers. Revegetation will take place as soon after disturbance as possible. Even without these precautions, access corridor construction represents little threat to otherwise unaffected fish inhabited waters over much of its length because of the generally flat nature of the terrain. At its western end, it slopes to the Athabasca River. The proposed access road from camp and plant sites to the airstrip passes near Lakes 22 and 24 which will be drained.

Access across the Muskeg River to the proposed granular resource area requires a bridge. Muskeg River habitat protection criteria are discussed in 1.9.2. Within the area of potential gravel development, road construction will be subject to conditions of a development plan (4.2.4).

4.2.7 The Alsands E.I.A. should identify the long term and additive effects of its and other plants SO_2 emissions on surface waters (page 7).

Answer

The susceptability of surface waters in the oil sands region to air borne sulphur is discussed in 4.2.8.

The combined effect of the Alsands plant and other current or planned developments of a similar nature is beyond the scope of the Applicant to evaluate in precise terms. The Alsands Project Group will participate in regional monitoring programs to obtain quantitative information on this issue.

4.2.8 The E.I.A. identifies the susceptibility of Namur and McClelland Lakes but no mitigative action is identified (page 165). The E.I.A. should address the matter in more detail especially as it might affect fish bearing lakes (ponds).

Answer

The question of potential acidification of lakes due to sulphur emissions has been addressed in the Alsands Environmental Impact Assessment (see e.g., pages 126, 142-144 and 165).

Hesslein (1977) studied lake acidification potential in the AOSERP Study Area. His work has shown that the sensitivity of lakes to acid loadings from the atmosphere is essentially determined by the amount of dissolved carbonate materials which act as buffers in assimilating hydrogen ions. Similarily, additional buffering is provided by calcareous materials in the soils. The Calcite Saturation Index measures total alkalinity, an indication of a lakes ability to handle acid impact. Namur Lake is an example of the type of lake which is potentially susceptible to SO_2 impact, with a high Calcite Saturation Index. Even so, there is no evidence to suggest it would be significantly affected by emissions from the Alsands Project. The shallow eutrophic lakes of the study area are of a type similar to McClelland Lake, with a Calcite Saturation Index of 0.0, and therefore a low susceptibility to acid loading. Negative impacts on lakes of this type are not expected.

4.2.9 The proposed freshwater impoundment site (pond #9) is identified without any reference of alternative sites. Identify the alternative means or sites available to meet the water demand of the Alsands plant and rank the sites according to the impact on aquatic habitats. The impacts and mitigation to aquatic habitats should also be identified for each alternative. Describe the consequences and mitigation necessary to handle the rest of pond #9 if the water impoundment is built there.

Answer

The proposed freshwater impoundment site is located on the east side of the floodplain of the Athabasca River, behind a natural levee and at the downstream end of a backwater channel. It is addressed also in 1.8.2. The levee separating the backwater channel and the Athabasca River is forested, indicating its inherent natural stability. Although the levee may be overtopped during extreme flood events, it has not been subjected in recent time to extensive erosion during high flow periods or as the result of ice forces during breakup.

Flooding of the backwater channel occurs as a result of backwater effects and not, except during extreme flood events, by overtopping of the levee. The rise in water levels in the backwater channel occurs by water backing up into the channel from downstream.

The freshwater impoundment, by virtue of the fact that it is located within the floodplain of the Athabasca River, could restrict flows in the river during an extreme flood event. The same is true for any structure built within the floodplain of any river. The effect of the impoundment on flood levels, however, will not be significant. In this respect, the impoundment is located near the margin of the floodplain in an area that may be flooded during extreme flood

events but does not contribute significantly to the total flow. As evidenced by the fact that the area is forested and stable, the flow velocities within the impoundment area during extreme flood events are very low.

Exposed surfaces of the containment dykes will be rip-rapped as required to provide protection against erosion during flood events.

A fisheries survey will be undertaken in 1979 as part of a lake and pond study. Acceptable alternate sites have not been identified along the Athabasca River, but a search will be undertaken if pond #9 is found to contain important fish populations that would be threatened by settling basin development.

4.3 DISPOSAL OF SALINE WATER

4.3.1 Given the rates of drainage of the basal aquifer in the mine site listed in the report, it appears it will be necessary to store this saline water over the winter months, and dispose of it at a time of higher river flow. Discuss the methods of storing this saline water, including the location of the storage site, and protection of the surrounding area from leaks in the saline storage facility.

Answer

Treatment of basal aquifer depressurization water has been discussed in detail within 1.2.1. It is slightly brackish, not saline. A storage site could be constructed within the boundaries of the external tailings pond. It would be used before tailings would accumulate. One could also be constructed in an area planned for mining at a later stage in project development. In both cases, seepage would be diluted by shallow aquifer water and later by mixing with surface runoff in drainage and/or interceptor ditches. Dissolved solids levels, including chlorides, would probably be insufficient to present a major threat to fish.

4.3.2 Where is the recharge area for the shallow aquifer and what effect will its drainage have on regional surface flows outside the project area, particularly on the Muskeg River? Depletion of these flows could have an adverse effect on fish, beaver, and muskrat populations in the river due to potential winter freeze outs (also it is possible that drainage could result in a loss of water from McClelland Lake).

Answer

The effect of shallow aquifer interception on flows in the Muskeg River is discussed in 1.3.2. The Applicant and its consultants contend that the project will have only a minor impact on regional surface flows outside of the project area, and particularly on the Muskeg River.

McClelland Lake is located within a drainage basin to the north of the Muskeg River Basin. The two drainage basins are separated by the Fort Hills which forms the divide between the two basins. In view of physical and also "hydrologic" separation of McClelland Lake from the proposed development, drainage of the shallow aquifer will not affect water levels or drain McClelland Lake.

4.3.3 Discuss existing trapping patterns in the vicinity of the Shell lease. The area where the fresh water settling basin would go is trapped for either beaver or muskrat. The proposed fresh water settling basin would render the habitat useless for aquatic furbearers.

Answer

Trapping patterns in the vicinity of the Shell Lease are discussed in Volumes 1 and 2 of the Regional Socio-Economic Impact Assessment Report (see 6.5.7). The Applicant sees no reason why trapping would not continue in the project area, particularly the remaining portion of the lagoon used for development of a fresh water settling basin. The presence of aquatic furbearers in this lagoon will be the partial focus of a reconnaissance survey to determine any unique environmental characteristics that the water body may possess.

4.4 VEGETATION AND FLORISTICS

4.4.1 Undertake sufficient floristic work to establish the occurrence of stands of locally or regionally scarce or rare species and proposed appropriate mitigating measures.

Answer

The presence or absence of rare species in the Alsands Area was assessed in the EIA (p. 178) on the basis of published species lists and community information. The Applicant recognizes, as indicated by Packer and Bradley (1978), that "significant" species may occur in the area. However, significance must be defined in each case and may not always be synonymous with a rare or endangered status.

The status of the species listed in Table 4.4.1 will be investigated by field survey to assess the probability of their occurrence on areas slated for development.

Table 4.4.1

PROVINCIALLY SIGNIFICANT PLANTS OF NORTHEASTERN ALBERTA

(Packer and Bradley 1978)

Botrychium multifidm
Lycopodium inundatum
Lycopodium selago
Isoetes muricata
Potamogeton obtusifolius
Scheuchzeria palustris
Arctagrostis arundinacea
Danthonia spicata
Elymus arenarius
Phragmites australis
Spartina pectinata
Carex capitata
Carex chordorrhiza
Carex houghtenii
Carex pauciflora
Scirpus hudsonianus
Scirpus cyperinus
Juncus brevicaudatus
Cypripedium acaule
Myrica gale
Spergularia marina
Nymphaea tetragona
Sarracenia purpurea
Drosera linearis
Drosera anglica
Potentilla multifida
Astragalus bodinii
Polygala paucifolia
Rhammus alnifolia
Hypericum majus
Cicuta mackenzieana
Monatropa uniflora
Ledum palustre
Primula mistassinica
Apocynum medium
Lycopus uniflorus
Utricularia cornuta
Utricularia minor
Lobelia dortmanna
Aster pauciflorus
Erigeron hyssopifolius
Eupatorium purpureum (not rep.)
Tanacetum huronense

5.Ø MONITORING

5.1 MONITORING PLANS

5.1.1 Since monitoring is a major component of the environmental protection plan for the project, the E.I.A. should include a separate section which discusses the proponents plans for monitoring project effects. Recognizing that details of the monitoring program are the subject of detailed licencing and permitting processes, the requirement at this time is to outline the monitoring programs at the conceptual level. Where monitoring will be undertaken by the company, present plans regarding the type of monitoring proposed, the area to be covered, the density of monitoring networks, the frequency of sampling, etc., are requested to be included in the E.I.A. The monitoring section should discuss all impacts categories, including air emissions, water quality, groundwater quantity, vegetation, aquatic habitats, etc.

Answer

A major measure towards the mitigation of adverse environmental impacts will be the institution of programs to monitor project activities. Environmental input to project planning and operation through monitoring will continue on a regular basis for the life of the project. Monitoring programs will be developed in the following impact categories:

- air emissions
- soils
- surface water and aquatic habitat
- groundwater
- vegetation
- terrestrial fauna
- reclamation

Air Emissions

Air quality monitoring programs will be established early in the construction period and continued through the operating period. Continuous atmospheric contaminant ground level concentration monitoring will begin at least one year before plant operation. Siting of monitors will be determined on the basis of plume dispersion maps drawn from projected SO_2 concentration frequencies. The monitor locations will be coordinated with those of other projects and agencies.

Fugitive dust and dust from the handling and stockpiling of sulphur, coke, gravel and other aggregates will be monitored to determine the need for mitigative action.

Soils

A comprehensive soils monitoring system will be established if baseline studies of soil sulphur conditions indicate that the addition of sulphur from the Alsands Project could cause detrimental soil conditions.

Surface Water and Aquatic Habitat

To record the results of drainage and facility development, a flow and water quality monitoring program will be instituted on the Muskeg River based primarily on the stations previously used by Shell and currently operative under government programs. Discharge rates will be monitored continuously and water chemistry and total dissolved solids

levels periodically. Water disposed of to the Muskeg River will also be monitored periodically for water chemistry and total dissolved solids levels. Specific concerns associated with the monitoring of water quality and quantity will be:

- to determine impacts as they affect aquatic habitat by periodic monitoring through benthic survey and live fish lethal bioassays
- to ensure against excessive sedimentation due to erosion during road and bridge construction, and during mine development
- to ensure a sufficient dilution of chlorides during disposal of basal aquifer water to the Muskeg River before tailings pond availability
- to provide information on quality, quantity and flow regimes in the shallow aquifer during the first five years of operation
- to determine if drainage of the shallow aquifer before mining significantly changes flow or chemical properties of the Muskeg River, and
- to determine negative impacts on surface waters surrounding sanitary landfill sites.

Lake 9 will also be monitored for water quality.

As addressed in the response to 1.2.1, the disposal of depressurization water produced from the McMurray basal aquifer into the Muskeg River would be regulated on the basis of the discharge in the river and its dilution capacity. The requirements for monitoring, therefore, include:

1. Continuous measurement of discharge rates into the Muskeg River,

2. Regular determination of water chemistry and total dissolved solids levels in the Muskeg River,

3. Periodic determination of water chemistry and total dissolved solids levels in the depressurization waters to be disposed of into the Muskeg River,

4. Measurement of Muskeg River flows, and

5. Periodic monitoring of biotic impact through live fish lethal bioassays.

Control of the rate of disposal of depressurization waters to the Muskeg River would be determined and modified on the basis of the monitoring results.

Groundwater

Monitoring programs will be instituted as follows:

- a system of observation wells will be implemented to observe flow regime water quantity and water quality in the shallow aquifer around the tailings pond. The final layout and depth of groundwater observation wells around the outside perimeter of the tailings pond would depend on the results of test drilling and detailed geologic assessments.

- seepage collected around the tailings pond will be monitored and pumped back into the pond.

- to determine negative impacts on groundwater surrounding sanitary landfill sites.

- to determine aquifer conditions within the Methy reef during the planned deep well pumping of the McMurray basal aquifer prior to and during mining.

Vegetation

Effects of air emissions on vegetation will be determined as follows:

- a comprehensive vegetation monitoring program may be established if it appears from baseline soils data and final sulphur deposition projections that addition of sulphur from the Alsands Project may cause problems to plant growth due to long term buildup.

- the Alsands Project Group will participate in regional biomonitoring systems for use in determining the potential for harmful long term, chronic effects of air contaminants.

- lichen communities will be surveyed near the plant site as an indication of satisfactory air quality.

The Alsands Project Group will also work in cooperation with the fire prevention officer of the Athabasca Forest to develop an on-going fire detection and control plan.

Terrestrial Fauna

- Waterfowl use of the tailings pond area, mortality and/or effectiveness of operational programs will be monitored throughout the life of the project.

- The Applicant will consider a monitoring program to determine possible buildups of vanadium and nickle in the local environment, as these elements may be of potential significance to wildlife.

5.2 CONTINGENCY PLANS

5.2.1 The proponent should identify all areas and subjects where contingency plans will be required, the general content of each plan and the procedures to be followed in the preparation and adoption including likely scheduling as related to stages of project engineering definition.

Answer

Contingency plans will be required for the areas and subjects identified in Table 5.2.1. The content of each plan has not been developed; however, each plan will address as a minimum:

- the nature and possible severity of an upset or hazard
- the potential degree of disturbance to vegetation, soils, water, fauna and people
- the physical terrain including access to affected area(s) or site(s)
- proposed upset or hazard monitoring and detecting systems
- availability and location of emergency control and repair facilities, equipment and materials
- emergency contact lists such as police, government agencies, operations personnel
- mitigation and repair methods and procedures.

The detailed contingency plans dealing with emergencies will be specific to location and risks, and

therefore, will necessarily be derived as final project design develops. All plans will be subject to the approval of appropriate agencies as they are prepared.

Table 5.2.1 also shows the expected date of operation of each affected area or subject as well as the expected effective date of plan approval. For operations not under the direct control of the Applicant, such as the oil pipeline and truck/rail transport, Alsands anticipates that the appropriate agencies will use existing contingency plans or develop their own; however, Alsands will co-operate as necessary with these other agencies in the preparation of their plans.

TABLE 5.2.1

CONTINGENCY IMPLEMENTATION PLAN

	Contingency Subject**	Expected Date of Operation	Expected Date of Plan Approval
1.	Oil Pipeline Failure*	End 1985	End 1984
2.	Gas Pipeline Failure*	End 1980	Mid 1980
3.	Water Pipeline Failure	Mid 1985	Mid 1984
4.	Sewage Facilities Failure - Construction - Plant Operations	 End 1980 Mid 1985	 Mid 1980 Mid 1984
5.	Bulk Transport accidents carrying dangerous products*	In accordance with current legislation.	
6.	Onsite operations spillages	End 1985	End 1984
7.	Liquid waste seepage - tailings, sewage sludge, toxic waste waters, coke/ ash sludge	Mid 1985	Mid 1984
8.	Sulphur pile acid run-off seepage	End 1985	End 1984
9.	Methy aquifer water disposal	-	Mid 1983
10.	Excess sulphur emissions	End 1985	End 1984
11.	Fire Hazard - Plant - Forestry	Mid 1982 Mid 1981	Mid 1981 Mid 1980
12.	Air traffic*	In accordance with current legislation	

* Contingency plans developed by outside parties, with co-operation of Alsands. Alsands to incorporate or adopt portion of plans applicable to Alsands onsite construction and operation.

**Other contingency plans may be identified as detailed project design proceeds.

6.Ø COMMUNITY

6.1 GENERAL

6.1.1 Alsands should elaborate upon their role and responsibilities towards the region and its communities in relation to the development process; especially as they relate to the role and responsibilities of Alsands towards the mitigation of the community and social impacts resulting from the development. The E.I.A. should direct special attention to elaborating upon the concepts of the Alsands Project Development Agency, the Employment Opportunities Program, the Business Opportunities Program, the community facilitators; and upon the role and responsibilities of the company towards those mechanisms.

Answer

Alsands believes that it has a responsibility to do all in its power to maximize the beneficial consequences and to minimize the adverse impacts that will derive from this project. Some of these can be accomplished by Alsands alone, while others can only be realized by Alsands' working jointly with appropriate departments of the Provincial Government, with communities in the region and with local agencies. Finally there are areas where the Provincial Government alone has responsibility to act and to safeguard the interests of those who may be affected.

There are a number of areas where Alsands has sole responsibility. A very important one has to do with planning all aspects of the construction process with such care and accuracy that there are not needless delays which would prolong some of the inevitable turmoil of the construction phase. Alsands is committed to maximizing the efficiency of this process for many reasons, including the desire to avoid morale problems among its employees that unnecessary delays would

create, and the immense added expense that delays in a very large and complex project of this kind would induce.

Another important area where Alsands alone is responsible has to do with the recruitment of the operating work force. Here Alsands is committed to attempting to design personnel policies which will attract and will retain the kinds of people who will make the proposed new town a good place in which to live. Importantly, this will involve seeking to maximize the number of local people, who are accustomed to living there, and who will be able to help orient immigrant employees to the ways in which maximum satisfaction may be derived from living in this area. It will involve providing employment opportunities for women, and recruiting to ensure that a maximum number of women are employed. It will involve seeking to employ mature and older workers to make for a more normal age structure in the community, to increase the maturity of perspective of the community, and to augment the stability of the work force.

Alsands believes that it shares with many Provincial Governmental departments the responsibility for participating in the very complex planning process which would lead to the design of a new town that may be built. This design must articulate all of the functions of a town into a physical plan which will provide for maximum efficiency in the activities of daily life and in town operation, which is maximally adapted to environmental conditions and constraints, and which is aesthetically pleasing, tending to lighten the spirits of those living there, and to make them proud of their new home community. In seeking to accomplish these ends Alsands is of course prepared to provide information from its work force studies, to participate in discussions of the many issues that must be addressed, to consider suggestions as to ways in which its policies might be modified to make for more vital and interesting community life, and serve to enhance the quality of life in the community and in the region.

Alsands is aware that the government alone bears statutory responsibility for the provision of many facilities and services which have significant implications for the life satisfactions and the life chances of community residents. Alsands is committed to doing all that it can to facilitate and expedite government efforts to meet these responsibilities so that they can be in place and available to the public at the earliest date that they might be needed. To this end Alsands reaffirms its commitment and desire to enter into discussions as soon as possible with government agencies, and to consider modification of its own plans and schedules, where this would minimize the delays in completion of important government facilities or in inauguration of important service delivery systems.

The concepts of the Alsands Project Development Agency, referred to in the Application as the Development Authority, and Employment Opportunity Program and the Business Opportunity Program are described in the Regional Socio-Economic Impact Assessment Volume 2 (pages 426 and 427). Further development of these concepts can be found in many of the following responses to Alberta Environment Review.

6.1.2 Within the E.I.A., Alsands should further define the argument for the development of a new town, by outlining possible alternatives, presenting an evaluation of each of the alternatives, and by providing a substantive argument in favour of its preferred alternative.

Answer

The two alternatives for housing of Alsands staff are the development of a new town or the expansion of Fort McMurray. It should be emphasized at the outset that Alsands is able, and is prepared to operate its proposed oil sands plant using a work force housed in either location. Alsands is aware that there are a variety of benefits and of costs which would be generated by construction of a new town. Alsands believes that there will be significant advantages both to Alsands, its employees and the residents of Fort McMurray from building a new town. Alsands also believes that the decision on whether or not to build a new town must be made in the light of the general public interest. It is in this spirit that the following discussion is presented.

Alsands' consultants sought to evaluate the question of whether or not a new town should be built, on pages 73 and 74 of the Environmental Impact Assessment and on pages 7 to 10 of Volume 2 of the Regional Socio-Economic Impact Assessment. In making their evaluations the consultants drew on two prior studies, one made by Ekistic Design Consultants commissioned by Alberta Municipal Affairs (1973), and the other made by Underwood McLellan and Associates Ltd. commissioned by Shell and others (1973). Both of these studies recommended in favour of a new town. The Ekistic Study cited as reasons that this was "the urban growth alternative which will best serve the requirements of industrial development contemplated by a growth scenario which anticipates development of three more bitumen extraction plants. This conclusion is supported by the dramatic transportation cost savings it will achieve and the

qualitative improvements it will contribute to life in the Northeast Alberta Region". The Underwood McLellan and Associates Ltd. study concludes that "to attract and retain a competent, stable work force for mining activity in the northern portion of the oil sands region, a new town must be established". Alsands believes that these are valid conclusions.

Alsands believes that there are few arguments in favour of expansion of Fort McMurray hinging on advantages to this community; most relate to disadvantages of the new town. The Fort McMurray option would require expanding the facilities in that community to provide for an additional 13,500 people during a four or five year period, with consequent serious disruption of the life of the community. It would also probably again place the town in a catch-up position as far as many facilities are concerned. Many of the economic advantages it would seem to gain will be obtained under the new town option as well, because of the significant stimulus this will provide to the emergence of Fort McMurray as a regional centre.

There are a number of initial disadvantages to the new town. They relate to problems inevitable in the start-up of instant communities, in communities having restricted shopping and other service facilities, and in northern single industry towns.

The advantages of a new town relate to reduced travel time for Alsands' workers, sparing Fort McMurray the full impact of a new stressful and disruptive construction boom period, eliminating the "end of the road" dissatisfactions among Fort McMurray residents, the friendly rivalry that would become established with the new town, and the lessening of certain pressures on Fort MacKay, in addition to other considerations mentioned above. The advantages to Fort McMurray of the new town option are the hastening its

development as a regional centre, and establishment of certain facilities appropriate to such a centre, without renewal of the chaotically rapid growth that it experienced in the recent past, are felt to be particularly important.

Alsands believes that these considerations in favour of a new town quite clearly outweigh those to the contrary. In addition, as an organization representing the judgements of its owner companies following many years of extensive oilfield and oil processing operating experience, Alsands has judged that the disadvantages inherent in employee dissatisfaction resulting from abnormally long commuting distances are highly detrimental to employee stability.

6.1.3 Alsands should provide substantiation for their use of the classification of minor, moderate and major importance of impacts within the E.I.A.

Answer

As Alsands' consultants noted in Regional Socio-Economic Impact Assessment Volume 2, the assessment of the economic, and particularly of the social impacts of a large development process is more an art than a science. There are several broad categories of reasons. Because some of the impacts interact with diverse human natures there are numbers of occasions when we do not know enough to anticipate what some of the possible social impacts of a development on people might be. There are impacts that are understood, but cannot be accurately measured, and there are impacts that are understood, and can be reasonably accurately measured.

Ideally all of the impacts of the Alsands development that have to be discussed would be in the latter category, but clearly they are not. Accordingly it was decided that in order to facilitate economy of communication, categories for impact assessment should be identified as minor, moderate, or major, and definitions of these three categories were provided on page 317 of the Regional Socio-Economic Impact Assessment Volume 2. There were in effect two different sets of definitions. The first set defined minor impacts as impacts which produce no more than a 15 percent increase in the phenomenon under consideration; moderate impacts as impacts which produce an increase ranging from 16 to 30 percent, and major impacts as those which induce an increase of more than 30 percent. Because in many cases it would not be possible to measure increases with such precision, the second approach to definition was provided. This approach was used when projection of the impact could only be a matter of judgment, made on the basis of knowledge of the situations under

consideration and of knowledge of other relatively similar situations. Under these conditions, the effort is made to identify impacts as minor, moderate, or major in conformity with the preceding definitions. Thus the assessment process is judgmental, rather than the result of more precise calculations, and the validity of these assessments depends on professional judgment.

It is to be emphasized that all definitions are arbitrary, these as much so as any others. The decision as to where the cutting points should be established between minor, moderate and major impacts is certainly arbitrary, and can only be justified in terms of the professional judgment of the consultants, though it should be noted that the same cutting points have been used by others in evaluating the impacts of other large scale projects.

In conclusion, we would emphasize that qualitatively evaluating impacts in terms of these three categories is a very common procedure, because to use more categories would imply greater precision than the state of the art justifies, and to use only two would be to use categories which are unnecessarily gross. However, because such evaluations are often based only on professional judgment, it is not uncommon to find disagreement between professionals as to whether an impact will be minor or moderate. Such disagreements are inevitable, given the problems in identification and in measuring relevant variables described at the outset of this section, and result from different assessments of the relevant variables, of their strength, and of their significance.

6.1.4 Alsands should re-examine their portrayal of the region, in the assessment, as being able to cope with the Alsands development with few major impacts because the region has already been through similar developments; and indicate if that viewpoint is shared by those individuals and agencies who will be required to deal or live through those impacts. The E.I.A. should address the cumulative impacts upon the communities within the region which will result from the Alsands Project in conjunction with future developments, such as the GCOS and Syncrude expansions.

Answer

It appears that three different but related issues are being raised in this stipulation. The first relates to the accuracy of Alsands' assessment of the impacts that the communities of the Study Area will experience if the Alsands were housed in a new town. The second relates to whether these assessments are seen as reasonably valid by individuals and agencies which will have to deal with, or to live through the project impacts. The third raises the question of what the cumulative impacts would be as a result of overlap between the Alsands project and the proposed expansions of the GCOS and the Syncrude operations.

Alsands' response to the first issue, in brief, is that we are confident of the validity of our overall assessment, though it is quite possible that it may prove to be inaccurate in particular points. Further discussion can be found in 6.1.6 and 6.14.7 of this document.

To the second issue we would reply that during the course of the many interviews with people in Fort McMurray which were conducted by Alsands' representatives and consultants we have probed a series of questions. How did this community cope with the Syncrude construction period? What

were the adverse impacts of the development and how could these have better been mitigated? What adverse impacts would they anticipate, in the light of their experience as a result of the Alsands project? We were told again and again that agency and other responsible people had learned much about how to cope with "boom" development from the Syncrude experience. We were told that while it had been "rough" in many ways, those who found it most distressing had tended to leave, and some who remained found it challenging. Generally our informants gave the explicit impression they believed that although there would no doubt be some adverse consequences of the Alsands development, these impacts would seem mild by contrast with the Syncrude experience. The "we know a lot more about how to handle it next time" was a very general response.

There is now in existence a Fort McMurray Project Impact Committee (Alsands) in Fort McMurray which is reviewing the various Alsands impact assessment documents. It is requesting more information from Alsands, from the Fort McMurray Planning Team, etc. and is forming its own assessment of the validity of the Alsands' analyses. Alsands continues to provide assistance to this committee and believes the committee will make its views heard at the Alsands Project Hearings.

Fort MacKay currently has a Fort MacKay Committee assessing the Alsands documents, and Alsands representatives have had a number of discussions with them. They have asked Alsands for additional information relating to the Alsands development, and this has been supplied to them. Alsands is confident that they, like their sister committee in Fort McMurray, will make their concerns and their points of agreement and of disagreement heard at the Alsands Project Hearings.

The third issue relates to the cumulative impacts of the Alsands and the GCOS and Syncrude expansion developments.

During the period that Alsands' consultants were collecting information for the regional socio-economic assessments in the spring and early summer of 1978, no firm data were publicly available on either of the expansion proposals. The GCOS expansion which is now proceeding is expected to add little to the impacts of the Alsands.

Alsands has no specific information concerning the anticipated timetable for the Syncrude expansion. Accordingly Alsands was not able to take this possible development into account when it was projecting the impacts of its own development. To attempt to assess the cumulative impacts of the three possible developments at this time, in the absence of a Syncrude expansion proposal, would be pure conjecture.

Alsands assumes that the relevant government departments will address the question of the cumulative impacts of currently undefined developments on a timely basis as reliable information is received concerning these projects in the area. Within the context of current information about the possible expansion developments, Alsands believes that most of the contribution for a cumulative impact on Fort McMurray would come from the proposed Syncrude expansion.

6.1.5 The E.I.A. should provide a systematic discussion of the past experiences of other developments, especially in the Fort McMurray area indicating what problems and impacts were encountered, and what mitigative measures were successful. Alsands should indicate which of those problems may also occur with their project, and what measures they intend to take to alleviate those problems if they occur. Special attention should be directed towards providing both physical and social services on a timely and affordable basis, building a community both physically and socio-psychologically, and assisting it to become functional.

Answer

The Governmental requirement that formal and comprehensive analysis of the socio-economic impacts of development projects be made are so recent that there are very few to review, and fewer yet which are precisely relevant to the Alsands development. The analysis which Syncrude published as the Syncrude Canada Ltd. Environmental Impact Assessment Addendum to the 1973 Report, Volume C - Socio-Economic Aspects (1978), has become publicly available during April, 1979. Alsands commissioned its consultants to review this document since it is the only one which deals with the Fort McMurray area. On the basis of this document the consultants have identified a number of major impacts of the Syncrude Project. In the following pages these impacts are first listed and then discussed in terms of how Alsands may alleviate the problems identified.

The major adverse impacts on Fort McMurray identified in this Syncrude assessment may be listed as follows:

1. Rapidly escalating costs in provision of public services, coupled with increasing shortfalls in municipal revenues.

2. Shortfalls in community services, including hospitals and physicians, retail trade and services, classroom facilities and school operating funds, recreational and cultural facilities and police services.

3. Some inadequacies in the road system.

4. Over-utilization of the Gregoire Lake Park.

5. Division of authority between the Town Board, several Provincial agencies, and the Northeast Alberta Commissioner's Office.

6. The rapidly changing environment which placed greater demands on government agencies.

7. Community stress.

8. The high level of town transiency.

In discussing which of these problems may also occur in the Alsands project and ways in which they could best be mitigated, two critical distinctions between the Syncrude and the Alsands projects must be noted. First, in respect to the nature of the town which is impacted, the major impacts of the Syncrude project were felt by an established town, Fort McMurray. By contrast, it is expected that the major impacts of the Alsands project will be felt in a new town built to house the new work force. Second, in respect to the town of Fort McMurray, the Syncrude construction impacts were first felt when it was a town of only 8,000 inhabitants. It had very little lead time to cope with the massive development which was to triple its population in the course of six years. By contrast, the relatively minor impacts of the Alsands project will be felt by Fort McMurray after it has reached a size of

almost 30,000 people, which is expected to absorb less than 2,500 project related people during the peak year, 1985.

The major implications of this contrast are that during the Syncrude construction phase in Fort McMurray a small established population had to endure the dislocations and stresses resulting from a sudden, very large increase in population. This increase placed near impossible demands on facilities designed for very much smaller numbers, at a time when the town was convulsed by a great deal of rapidly instituted construction activities, both of which it was very ill prepared to cope with. In the case of the Alsands development, a new town must be built from scratch, and it is obvious that most of the necessary facilities and services must be in place and operating before it is possible for people to move into the town. Hence we must reiterate a key assumption of the Alsands' Regional Socio-Economic Impact Assessment Volume 2, that necessary facilities and services will be in place in the new town before permanent residents start to move in.

We proceed now to comment on how Alsands intends to alleviate the problems identified above.

1. The high costs of providing public services, coupled with shortfalls in municipal revenues.

Both Alsands, and the Provincial Government are aware of the numerous difficulties and complications that the financial difficulties of the town of Fort McMurray have caused. Alsands assumes that it will be to the benefit of the residents of the new town, and the Government, and of Alsands to try to ensure that the new town does not experience similar difficulties. Accordingly Alsands is prepared to enter into discussions with the Government which will seek to find ways to ensure that these difficulties will not surface in the new town. The task will be made very much easier by the facts that

the facilities will have to be in place and the financing for them taken care of by the time that the new residents move into town, and that the flat topography of the new town site will minimize the costs of providing and maintaining the physical infrastructure (sewage and water systems, roadways, sidewalks, etc.).

2. Shortfalls in community facilities and services.

As indicated above, Alsands believes that the possible problem with respect to facilities will be prevented by means of adequate, realistic planning, and implementation of plans which will ensure that the needed facilities will be in place prior to the arrival of the new town residents. Responsible business interests will be motivated to establish retail trade and service businesses in the new town in a timely fashion, appropriate to the build-up of the new population. In respect to the provision of public, social, and community services, Alsands would welcome the opportunity to enter into continuing discussions with relevant government departments which will ensure coordination of the planning of these agencies with the planning and the staging of new town growth. The coordination of these activities could best be accomplished through the formation of the proposed Development Agency.

3. Inadequacies in the road system.

The response to this is essentially the same as the response to #2 above.

4. Division of authority between the Town Board, several provincial agencies, and the Northeast Alberta Commissioner's Office.

The formation of a Development Agency would be the most effective means of resolving this problem.

5. The rapidly changing environment which placed great demands on government agencies.

The Alsands project has the advantage of a larger lead time and the benefit of recent experience of rapid growth to allow for planning, so that the agencies can staff appropriately. Alsands believes that the coordination and the discussions which would take place routinely under the aegis of a Development Agency might be of considerable assistance in the planning process.

6. Community stress.

Considerable attention was given to the indications of community stress in Fort McMurray during the Syncrude construction period, and to the most effective ways of mitigating it. These include appropriate preventative recruitment efforts, planning efforts, and mitigative efforts. The first will involve seeking to recruit (1) residents of the region, who would not experience the "regional shock" inevitable to those arriving from other parts of the province and the country, (2) women from the families of workers in order to minimize the stresses of housewives who often feel isolated and trapped in their homes when they arrive in a new community where they know no one, and (3) mature and even older employees who bring stability and well seasoned experience and judgment to a new community, thus counteracting the more volatile elements.

The planning efforts will involve coordination of the build-up of facilities and services with the build-up of population, so as to minimize frustrations and stresses from inadequate and overcrowded facilities and services.

The mitigative efforts will involve ensuring the timely availability of community mental health, alcohol and drug abuse programs, public health, and preventive social services in the community. It will also involve the activities of community social facilitators to promote the speedy involvement in neighbourhood and community activities of new arrivals, thus counteracting the feelings of social isolation that exacerbate the consequences of stressful experiences. The AID, and the Neighbourhood Aide and Helpline programs in Fort McMurray have been particularly effective, and similar programs should be speedily introduced into the new town.

Normally, initiation of the Preventive Social Service (PSS) programs is a municipal responsibility, and the municipality must contribute 20 percent toward the costs of the programs they decide to initiate. However, the relevant regulations do permit the Preventive Social Services Branch of Alberta Social Services and Community Health to initiate programs and to provide 100 percent of the funding, in areas where there are no well constituted local authorities.

Alsands believes that the Provincial Government should instruct the PSS Branch to initiate advance planning of appropriate programs for the new town, as soon as Alsands application is approved and the decision on housing the Alsands work force has been made. Implementation of these plans should proceed as soon as an appropriate number of people have moved into the new town with the PSS Branch supplying all needed funding, as current regulations permit. Only in this way will it be possible to ensure that all important preventative programs for the new town, discussed elsewhere in these deficiency responses, will be adequately planned and implemented in a timely manner.

All of these efforts are particularly important because they are the ways, and the only ways, in which the

building of community participation, involvement, and spirit can proceed. To the extent that they are successful initially, community life "takes off", and the continuing processes of incorporating new people into the community thereafter take place naturally. To the extent that they lag initially, turnover in the community will be particularly high, thus further frustrating the development of a real community. Careful planning and early implementation of efforts to promote community involvement are very important, and the success of these efforts should be monitored carefully, particularly during the initial period of settlement in the new town.

7. The high level of town transiency.

A high level of transiency is a chronic problem in all isolated and new towns and Alsands anticipates that it could be a problem in the new town. The preventive and the mitigative efforts to try to minimize this problem are those discussed under #6 above. There is no need to provide further elaboration here.

6.1.6 The E.I.A. sections dealing with the impacts of the project upon the region need to be re-examined to ensure that the discussion of project impacts follows from the base line data project description and the discussion of past development experiences. Particular attention should be directed towards the discussions regarding Fort McMurray, Fort MacKay and the new town. Alsands should provide additional details of the data gathering methodology used in the E.I.A. outlining whether or not those discussions and interviews were limited to data gathering, or if the public was also involved in validating the data and the impact evaluations, and in establishing recommendations for mitigative measures. Alsands is required to validate the information in the E.I.A. through a public involvement program, and provide documentation in the E.I.A. to indicate that it has been done.

Answer

This query instructs Alsands to re-examine its discussions of the project impacts on Fort McMurray, Fort MacKay and the new town, and to provide additional details on the data gathering methodology, and on the nature of public involvement in validation of the data gathered and the impact evaluations.

In response to the first item Alsands would emphasize that the approach that Alsands' consultants took from the outset involved the following assumptions. Past development impact experience was taken as a model. It was assumed that despite the best efforts to the contrary, many of the social impacts of the Alsands' development on the new town would be very similar to the earlier development impacts. The impact evaluations were written with this assumption explicitly in mind.

The major exception to this assumption was based on the belief that many of the difficulties experienced in Fort McMurray stemmed from 1) lack of adequate facilities -- schools, recreational, and retail trade facilities, 2) lack of programs at the time that they were needed -- community mental health, alcoholism and drug abuse programs, promotion of community involvement in the new tract developments, and 3) shortages of personnel -- police, mental health workers. With the lessons of Fort McMurray clearly learned, it was felt that it should be possible to mitigate many of the problems that these shortfalls had induced in Fort McMurray, in the new town.

In respect to Fort McMurray, Alsands would emphasize that this town is now very much larger than at the onset of the Syncrude construction phase, and the Alsands impacts on this community would be very much lighter than Syncrude's impact were.

In respect to Fort MacKay, there is good reason to believe that the community is now much better integrated than it was in 1973, as well as better informed concerning how to cope with some of the impacts of a high level of wage employment among its residents.

Accordingly the tone of the Alsands' Regional Socio-Economic Impact Assessment was designed to be generally cautious, seeking to avoid underestimating the adverse impacts and to avoid overestimating the effectiveness of mitigative measures. At the same time the assessment is perhaps optimistic (but not, we believe, overly optimistic) in believing that people can learn from past experiences and mistakes.

In support of the assertion that our approach has been generally cautious, Alsands would call attention to the following in the Regional Socio-Economic Impact Assessment, Volume 2 regarding:

> The New Town: Unavoidable Impacts (Pages 417-418) and on The Older Communities in the Study Area: Unavoidable Impacts (Page 418).

The second issue raised in this stipulation is related to the data gathering methodology and the nature of the public involvement process. The more than 100 interviews that were conducted by Alsands' consultants were essentially directed toward data gathering. The people interviewed were all experts of one kind or another, typically by virtue of their occupations but in some cases because of their political positions, as when they were members of the Fort McMurray Town Board. The consultants asked them about the specific impacts which they were best qualified to describe, and they were asked to describe the significance of these impacts and to suggest the kinds of mitigative measures which in their experience had been, or would be most effective. In addition, after the first few interviews, the consultants soon began asking these persons interviewed to confirm or deny some of the formulations, in respect to both the nature, and the significance of impacts and the effectiveness of possible mitigative measures, that the consultants were already considering. Thus there was some validating discussion with many of these experts.

Alsands is currently engaged in an ongoing process of validating the information in its Regional Socio-Economic Impact Assessment volumes with citizen groups in both Fort McMurray and Fort MacKay. In Fort McMurray the Fort McMurray Project Impact Committee (Alsands) has been organized and is critically reviewing the impact assessments. It has asked both Alsands and the Fort McMurray Planning Team for additional information, and this information is being supplied.

In Fort MacKay the Fort MacKay Committee has been supplied with copies of all of Alsands' documents and it too has raised questions and expressed concerns which are being responded to.

Alsands representatives are meeting with both of these committees on a regular and continuing basis. Alsands expects to continue this dialogue as appropriate not only for the duration of the application procedures, but throughout the life of the project.

6.2 PROJECT DESCRIPTION

6.2.1 Within the project description section of the E.I.A., Alsands should provide details of the manpower requirements, phasing of staff build-up and wind down, occupational breakdown, and skill and training levels required of employees.

Answer

The Project will have substantial employment impacts on Alberta during the construction of the facilities. The number of workers required for construction of the plant, new town and infrastructure will become significant in 1980, build to a peak requirement of approximately 9600 workers in the winter of 1983-1984 and then decline, slowly at first, until the requirements become small in 1986. Some 1100 workers of the plant construction labour requirements will be located at the marshalling yard near Edmonton. The special skills required are shown in Figures A 3.1 thru A 3.19 (page 90 through 108) of the Social Impact - Benefit/Cost Analysis.

The operations of the Alsands' plant will create 2800 direct jobs, of which 2500 will be at the plant-site, and the remainder located elsewhere in Alberta.

Further information is provided in the Alsands Social Impact - Benefit/Cost Analysis document, Section V - (pages 31, 32 and 33), including Tables V-3 and V-4 (pages 39 and 40).

6.2.2 Details should be provided in the E.I.A. Project Description section, regarding the services, facilities and amenities to be provided at the construction camp and the description of the marshalling yards in Edmonton, along with a discussion of manpower requirements and timing.

Answer

Accommodation at the site will be provided for all manual workers, both male and female, on a single status basis in accordance with the Alberta Building Trades Council requirements. Provision will be made for a peak camp requirement of 6500 people. Phasing of the camp build-up and decline is shown in Figure 2.4.4 (page 88) of the Environmental Impact Assessment. In addition a separate camp for 1500 will be provided for the new town construction workers.

Suitable dining and kitchen complexes will be provided to support the projected number of people in these camps. The job-site will be as complete and self-sufficient in leisure and recreation facilities as possible, including an appropriate lounge.

A marshalling yard of approximately 40 ha will be required. The Edmonton area has been selected due to labour availability higher productivity, lower overall labour cost, and minimum impact on the community. The yard will contain an office building, covered warehouse, covered prefabrication shops, laydown and storage area and fabrication erection area.

The marshalling yard construction workforce is expected to peak at 1100 at the beginning of 1983.

Further information is provided in the references noted above and in The Application on pages 194, 195, 199 and 200.

6.2.3 Alsands should outline the recruitment, hiring and employment policies the company intends to adopt for the project, and include information regarding the support services or programs including transportation the company would adopt for new or transferred employees, for local residents who may obtain employment with the project, and especially for Indian and Metis peoples.

Answer

Alsands will develop competitive wage and benefit programs and develop other policies such as moving assistance in order to recruit and retain a competent and productive operating work force. This will include a housing purchase/rental assistance program. Major emphasis will be placed on recruiting locally, in Alberta, and in Canada. Insofar as possible, the effort will be made to attract applicants who are women and mature workers in order to develop a well-balanced and stable work force. Local people will be hired through local facilities. Employees outside the region will be hired using Alsands recruiters and government manpower services.

Alsands will provide orientation training and support for the new operating work force and will provide considerable on-the-job training and development for this group.

Transportation programs are being developed to allow local people to commute to work from their homes for work on the project.

6.2.4 Some dissimilarities appear to exist with regard to the construction period, timing, and manpower phasing of the Alsands and Syncrude projects. Alsands should clarify the reasons for those variations.

Answer

Based on Syncrude published data, the Alsands Project would appear to have a construction period which is approximately 4 months longer than Syncrude. It may be explained that Syncrude experienced good weather conditions at the peak of their construction activity, a stable work force, and was purchasing materials and equipment during a period when suppliers and manufacturers were not at full capacity. Without having direct access to detailed Syncrude schedule data it is difficult to make any additional statement with regard to schedule differences. We believe the schedule included in our Application to be realistic and it was our best estimate of the Project timing.

With regard to manpower phasing, Alsands plans to level manpower as much as possible, and has therefore shown a relatively flat peak occuring over a one and a half year period. Again without having access to detailed Syncrude data it is difficult to comment any further.

6.2.5 Alsands should elaborate on the pre-construction aspects of the development, what activities Alsands would be undertaking prior to the construction period and the impact of those activities on the region. The E.I.A. should also indicate what activities they intend to undertake prior to construction, what number of people and what accommodation and services will be required for those persons. In addition, more information is required regarding the numbers of workers, the timing of arrival, and the proposed accommodation and services required for those persons who will be involved in assembling the construction camp.

Answer

The following are field activities associated with plant construction which will be required prior to the beginning of effective construction (plant site preparation) at the end of 1980.

1. Muskeg probing of mine and plant site.
2. Plant site clearing and drainage.
3. Soils investigation at plantsite and tailings pond.
4. Availability of definition of resources (sand, gravel).
5. Begin construction of temporary facilities (camp, buildings)
6. Construct of temporary roads and new airstrip.

Approximately 200 people will be employed on the job site during the latter part of 1980.

A temporary 200 man construction camp complete with electrical generator, potable water treatment and sewage pump out facilities will be provided for those persons who will be involved in assembling the construction camp. We estimate that this temporary camp will be required by mid 1980 and that between 50 and 100 people will be required for assembling the camp.

All of the workers will be housed in camps or in their existing housing in the case of workers hired locally. This phase of the operation is not expected to have measurable advance impact on the region. However this work will present employment opportunities for local people.

6.3 EMPLOYMENT AND TRAINING

6.3.1 The discussion within the assessment of the existing employment and training situations appears to be adequate with the exception of two points. Firstly, the E.I.A. should describe the skill, training and educational levels of the unemployed persons within the region who may be available for employment with the project. Secondly, the assessment should be validated through a public involvement process.

Answer

There is no recent information available on the skill, educational and training achievements of unemployed persons in the Study Area. However, research which is now nearing completion will provide answers to these questions.

The public validation process is already underway. The information about those unemployed in Fort Chipewyan is being obtained from an employment self survey jointly conducted by the local Treaty Indian Bands and the local Metis Association, and will be critically reviewed by them.

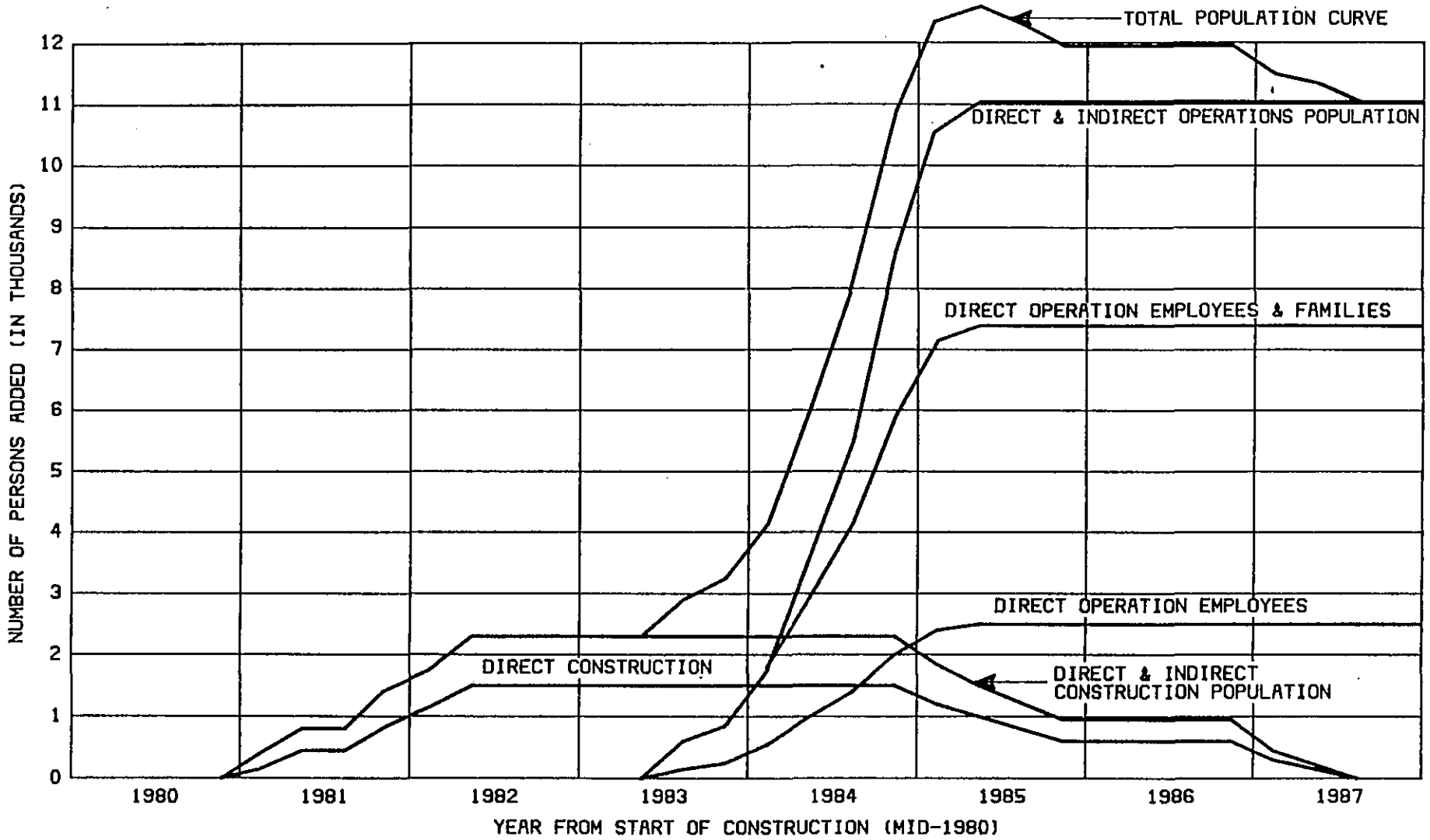
In the case of Fort MacKay and Fort McMurray, the necessary information has been requested from Canada Manpower. It will be discussed with the Fort MacKay and the Fort McMurray Project Impact Committee (Alsands) when it is available.

6.3.2 Alsands should provide tables similar to IX-2 and IX-3, for the operations phase, perhaps for the 1987 fourth quarter. Alsands should also provide individual graphs similar to Figure IX-1 (page 385) for the new town, the job site, and for Fort McMurray.

Answer

The operations phase employment population table for the fourth quarter of 1987 is included in the original EIA as Table X-1.

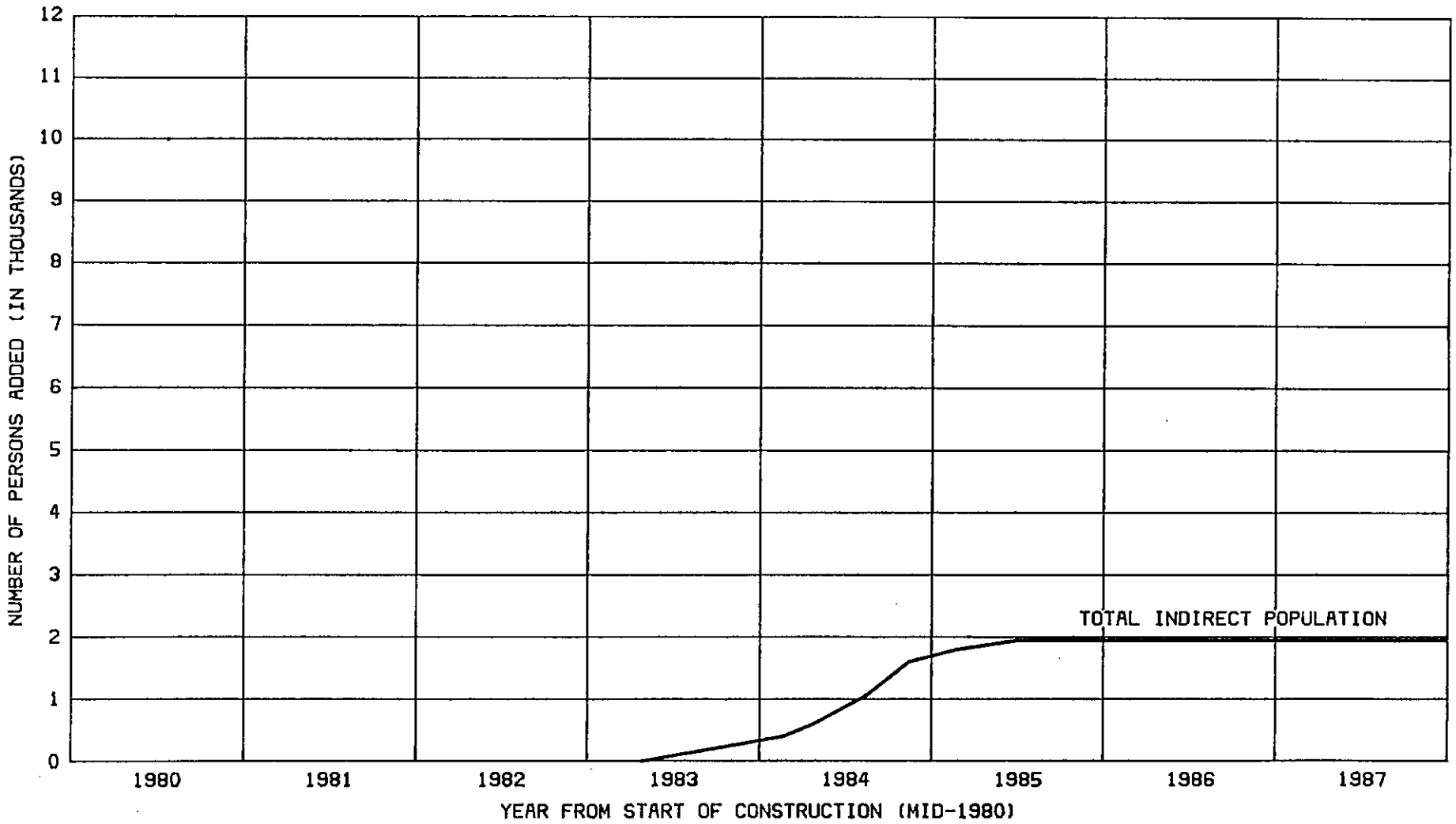
The separate tables for the new town, the job site and Fort McMurray follow. (Tables 6.3.2 A, B, C).



ALSANDS PROJECT GROUP

NEW TOWN
POPULATION GROWTH

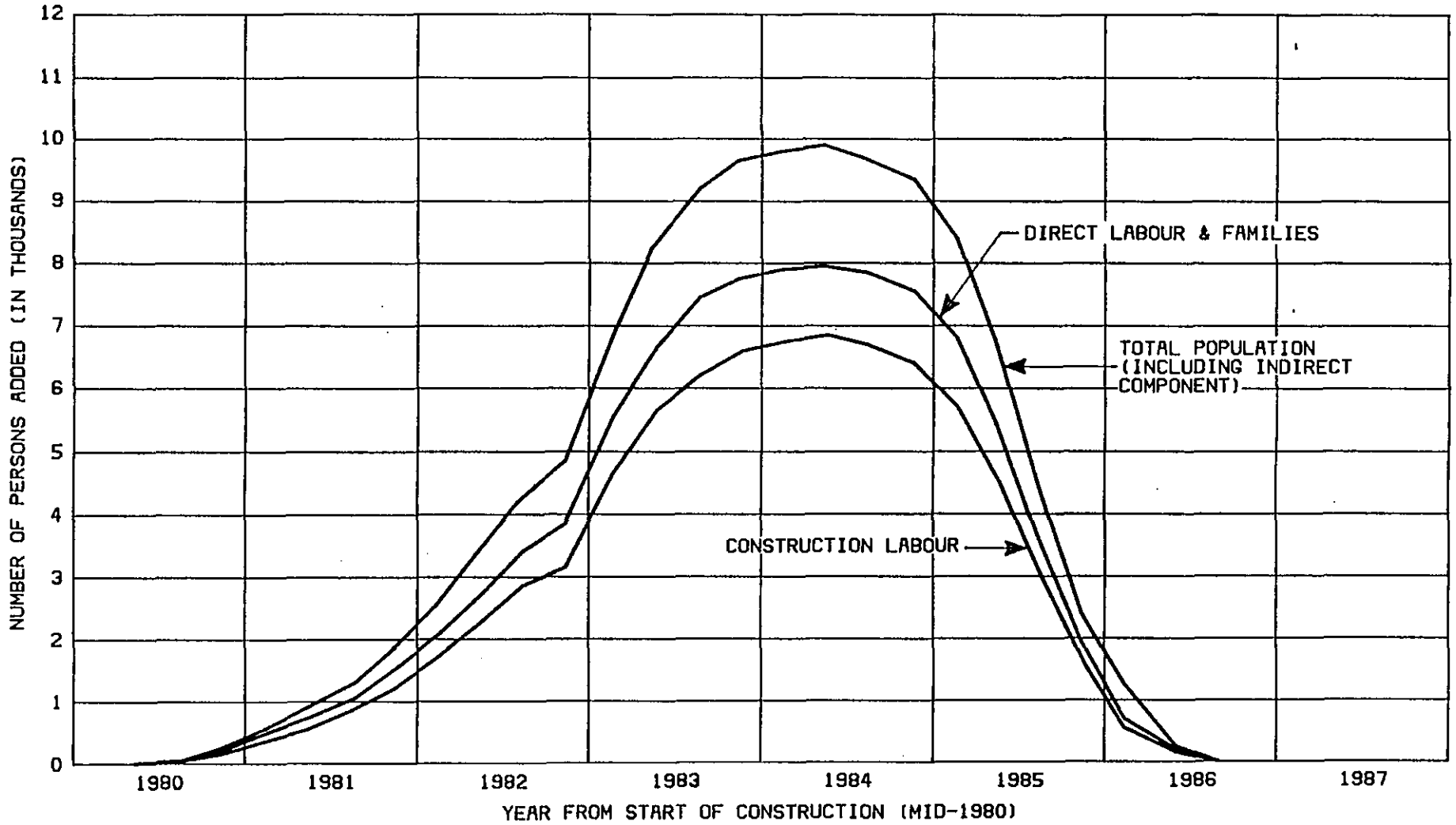
FIGURE 6.3.2A



ALSANDS PROJECT GROUP

FORT MCMURAY POPULATION GROWTH

FIGURE 6.3.28



ALSANDS PROJECT GROUP

ALSANDS JOBSITE
POPULATION GROWTH

FIGURE 6.3.2C

ACT

6.3.3 Alsands should compare the direct and indirect employment and population figures resulting from the Syncrude development to those provided in the E.I.A., and indicate if any significant differences occur, and what the reasons for those variations are.

Answer

Alsands does not have sufficient data from the Syncrude development to compare the direct and indirect employment and population figures with the forecast in the EIA.

We note, however, on page 18 of Syncrude Canada Ltd., Environmental Impact Assessment Addendum to the 1973 Report - Volume C - Socio Economic Aspects, that Syncrude anticipates the same multiplier, with some differences in phasing and calculation of indirect employment. In addition the Alsands forecast of direct employment is similar to that of Syncrude.

6.3.4 The E.I.A. should address the role regional training institutions may provide relating to training for the Alsands project, the capability of those institutions to handle the increased role from the project, and the impact of the project upon their services. Alsands should also indicate their policy towards those institutions regarding employment training.

Answer

Since Alsands is committed to maximizing local employment, we believe that the technical training institutions in Northeast Alberta will have a critically important role to play during both the construction and the operating phases of the project. Alsands will work with those institutions to identify the kinds of courses that will be needed. Many local people lack job skills, at least appropriate to their level of potential.

Specifically these institutions may be asked to provide the following kinds of training opportunities.

- life skills courses
- training courses at the construction or plant site
- academic upgrading courses for those who need and want them
- formal apprenticeship training courses
- other vocational training courses

Turning to the issue of the project-created impacts, the two vocational centres which would be heavily affected by expansion of enrollments and specialized training requests originating from the Alsands Project are Keyano College in Fort McMurray and the Adult Vocational Centre in Lac La Biche. Both schools were contacted in order to determine their ability to cope with the project related increased demands, assuming that these demands would be twice the increased demands induced by the Syncrude development, at a maximum.

The Principal of Keyano College supplied the following information relating to the ability of the College to respond to the increased and new demands for training that might be placed upon it as a result of the Alsands operation. A new downtown campus of the College is now under construction which will be completed about the end of 1981. The Principal stated that the College will have adequate classroom capacity to handle the presumed maximum level of enrollment increase. It would no doubt require some changes in the way classes are now scheduled, with some overlapping of classes and some double shifting, but these would pose no significant problems, he reported.

The main constraint which the Principal anticipated was a shortage of residence facilities for students. The College now has accommodations for about 200 students, including both single and married accommodations. The Principal estimated that if the induced demand conditions were as assumed above, there would be the need for additional accommodations to provide for 100 students. He reported further that in anticipation of such a possibility additional sewage and water capability was installed in the second campus of the College which is to the south of the town. This additional capacity would permit installing bunk trailer units there to provide temporary housing for students, if this should become necessary. The infrastructural facilities are more than adequate to provide for the units necessary to accommodate 100 students.

It would be possible to feed the additional students housed in that way in the dining hall facility at the downtown campus. The kitchen for the new dining hall which is being built has more than enough capacity to handle the level of increase, and the dining hall itself would be adequate as well.

The Supervisor of the Adult Vocational Centre (AVC) at Lac La Biche provided information on the physical capability of this institution if it were to receive training demands during the Alsands construction phase equal to twice the volume of those demands during the Syncrude construction phase.

The Supervisor implied that he thought the question should be answered assuming that they received such demands for the Cold Lake in-situ project as well, because AVC expects heavier demands from that project than from the Alsands development. He went on to report that the current facilities of the AVC are not fully adequate to meet the expected training demands for the Cold Lake project alone and would be barely adequate for the Alsands project alone.

However, he indicated that the AVC has been hoping and planning for a significant expansion of the campus and has discussed this matter with the relevant government personnel. The AVC requests are in the context of a time frame that would see completion of this expansion by 1984, which is subject to government approval.

In addition, Advanced Education and Manpower and other Provincial educational institutions will have a role to play in providing training for Project employees, and will be kept advised of Alsands planning and requirements.

6.3.5 The assessment should discuss what impact the Alsands project would have upon already existing businesses and industries in the region regarding employees and competition for skilled workmen.

Answer

As is discussed in the EIA it is expected that small businesses throughout a broad spectrum of the goods and services sector will generally experience increased demand during both the construction and operations phase. To ensure adequate information is provided to local businesses about the expected increase in consumer demand the proposal for a Business Opportunities Program has been made. This Program would establish on-going liaison and specifically would provide information about project progress and any changes in projections that would be of significance. This would allow local interests to plan adequately and would give Alsands a co-ordinated look at the supply they might expect to be locally available.

The major adverse impact anticipated would be possible localized wage inflation and competition for skilled employees. Obviously this effect must be recognized and will occur. However, several mitigative measures may be suggested. Wage scales for Alsands employees will not be significantly different from other similar industries in the region.

It is felt that with proper planning these negative impacts can be minimized. It is in everyone's best interest to avoid precipitating further inflationary pressures. One of the benefits of construction of the new town is to minimize this local impact in Fort McMurray.

6.3.6 The E.I.A. should identify the range of skills, education and training local residents would require in order to participate in the Alsands project, along with an outline of the responsibilities and role of Alsands in that provision.

Answer

It must be understood at the outset that during both the construction and the operations phases there will be employment possibilities at levels ranging from floor sweepers to professionals and others with highly trained abilities. Alsands recognizes that many of the native people who predominate among the life long residents of the Study Area have had little opportunity to develop skills to levels that they are capable of mastering. However Alsands is also aware that many of these people want, and need, immediate employment, and would not be interested in programs requiring that they complete training before they would be given full time jobs.

In view of the above conditions, Alsands believes that on-the-job training programs offer the best prospect of providing many local people with the levels of employment which are appropriate to their interests and abilities. During the construction phase there will be employment for virtually all local residents who want work, at levels appropriate to their skill attainments, and Alsands contractors will be required to maximize the job training opportunies for local residents.

In addition, however, Alsands believes that the construction period will provide an excellent opportunity to give many local people on-the-job training so that they may come to qualify for employment during the operations phase at skill levels beyond their earlier attainments. Thus where local people show interest and appropriate commitment, the construction phase will provide them with both income, and further training while working, which will enable them to qualify for more desirable operations phase employment.

Because many native people in past years have dropped out of school at an early age, many do not have the educational qualifications for job advancement beyond relatively low levels. Alsands recognizes this fact, and is prepared to assist local employees to obtain necessary academic upgrading, where the employee has demonstrated his commitment to industrial employment, and wants the upgrading training.

6.3.7 The E.I.A. should provide additional details of the Employment Opportunities. Additional information is required on what the program would attempt to accomplish; how it would accomplish its objectives; what role the various actors, especially Alsands, would play in the program; what commitment Alsands has, or will have, to the program; and what the programming implication of the program would be.

Answer

The Employment Opportunities Program has as its goal

"to ensure that the local residents will be able to take full advantage of the employment opportunities which the project will provide, during both the construction and the operations phases."

This follows from the stated criteria of maximizing economic benefits to regional residents.

Alsands proposes to work with educational institutions, community groups and project contractors to design and implement appropriate upgrading and training programs.

In addition, the Applicant will provide information, through regional groups, on basic job and training opportunities and the timing and duration of these opportunities.

Initiation of this program must take place in advance of the onset of construction. The program must be flexible and responsive to a rapidly changing social and economic environment. Alsands is committed to establish ongoing liaison to make the Employment Opportunities Program successful.

Details of the range of skills and required education and training will be provided as plans are developed.

6.3.8 Alsands should indicate what they would be prepared to do to enhance the likelihood of employment among the resident population of the region, or what role the company would have in relation to the various training agencies within the region in providing employment training to prospective or actual project employees.

Answer

This question has been adequately answered in previous questions in this section.

6.3.9 Lastly, Alsands should indicate whether or not they would be prepared to disclose information relating to job vacancies, descriptions, technical skill and educational requirements to residents of the region and training institutions in order to promote the hiring of local residents. The company should also indicate whether or not they would be prepared to work with the relevant government departments and agencies in the training and placement of local unemployed and handicapped persons.

Answer

Alsands is committed to working closely with Keyano College and the Adult Vocational Centre in Lac La Biche as well as other technical training institutions in order to maximize the employment and the promotional opportunities of local residents. This will involve providing information relating to job vacancies, and description of educational and technical skill requirements to these institutions so that they can design appropriate courses of study where necessary, and provide informed guidance to their students concerning the kinds of vacancies that exist, and the positions for which particular students might be best qualified. Alsands would hope that an ongoing exchange of information might be established such that Alsands could provide "feedback" concerning the appropriateness and effectiveness of the training given to graduates of these institutions whom it hires. To this end Alsands' personnel training division will liaison with these institutions, to promote and sustain this mutually beneficial exchange of information on an ongoing basis. In addition Alsands intends to work with local government manpower offices and educational institutions in listing job vacancies and in promoting training and employment of local residents, including handicapped persons and the unemployed.

6.4 POPULATION

6.4.1 The discussions on the existing population appear adequate.

Answer

No response is required.

6.4.2 Alsands should provide a detailed discussion of the population projection technique used within the assessment. The established phenomena in resource towns of a shadow population should be examined in more detail in relation to the potential impacts of the Alsands development. The ramifications of the shadow population upon the communities, human services and resources in the region should be dealt with in more detail.

Answer

Refer to Figures IX-1, IX-2 and IX-3 of Volume 2, Regional Socio-Economic Impact Assessment.

The population projection technique that was used to generate the data found in the following steps.

a) We began with a summation of Alsands projected requirements quarter by quarter for manual construction, non-manual construction and operations phases. This gave a total direct employment figure.

b) Following this we obtained an estimate of the extra population associated with the direct construction labour force. Using appropriate multipliers determined from literature and the Syncrude experience we obtained an estimate of the families of the construction employees for both manual and non-manual occupations.

c) An estimate was next determined for the indirect employees in support of the construction labour force. Fifty percent of this was considered to be supplied by present residents so they do not represent a net addition to the region. For the new residents it was estimated that two thirds wanted to bring their families.

d) To the above was added the construction labour force working in the new town, also adding the indirect component and their families, using the same ratios as were used for the project labour force.

e) A similar process, quarter by quarter, was followed for the operations employment. We started with the Alsands employment requirements. Family population in this case was estimated to be much higher, with the Syncrude experience showing 80 percent of the workers having families.

f) Indirect employment was estimated using an employment multiplier of 1.0. It is estimated that 70 percent of this component will be in support of the new town and the rest will be found in Fort McMurray. By making an empirically based assumption as to the family size (3.7) a total indirect population for the New Town and Fort McMurray was obtained.

Turning to the subject of the "shadow population", Alsands is very much aware of, and concerned about the impacts of the "shadow population" -- the large number of people who come into the area, stay briefly, and then move on -- on the service delivery agencies in the Study Area. Unfortunately, the departments of the Provincial Government are unable to provide figures on the numbers of these transients in the Study Area during the Syncrude construction phase, and even the Fort McMurray Planning Division does not have an estimate of the numbers of these semi-transient residents during this period. The Co-West Social Planning Implications Volume (1978) discusses the impacts of this shadow population in general terms, but makes no attempt to estimate its size, though giving it the central place in their assessment of the impacts of the Syncrude development on the health and social service delivery systems of the area.

The Alsands Regional Socio-Economic Impact Assessment Volume 2 did attempt to estimate the size of this shadow population by obtaining information on the number of new telephone installations and disconnections in Fort McMurray during January 1, 1976 through May, 1978, as presented on page 52 and discussed on page 36 of the Volume 2. On the basis of the figures and the assumptions specified there, it is estimated that in 1976 the number of semi-transients who came and settled in the community, had a telephone installed and then left, amounted to 25 percent of the total population of the community. During 1977 this semi-transient shadow population is estimated at 30 percent of the total population, and during the first five months of 1978 this estimating procedure suggests that the proportion may have been 34 percent.

These figures are only suggestive, and the procedure probably under-estimates the actual proportions. However the proportions are broadly comparable with the current Syncrude turnover rate given that some proportion of the population of Fort McMurray is composed of longer term residents with very much lower turnover rates.

In brief, Alsands is aware of the shadow population problem, and has tried to obtain information on the size of this component. It is aware and has tried to emphasize that this will considerably exacerbate the demands placed on the health, law enforcement, educational and social service delivery systems both in Fort McMurray and in the new town during the Alsands construction phase, and to a lesser extent, during the initial years of the operations phase.

The complete lack of accurate information on the number of people in this population, the sex ratio, age structure and socio-economic characteristics, the risk characteristics that it represents in respect to various kinds

of problems, and the fact that no data are available on their consumption of services, makes precise assessment of the impacts of this shadow population upon the communities, the human services and the resources of the region difficult. However, further qualitative discussion of these problems is provided below, in the appropriate contexts in Sections 6.7.1 and 6.10.4.

6.4.3 Additional information should be provided in the E.I.A. regarding the expected characteristics of project related immigrants to the region: income, demographic profile, social and family characteristics, attrition rates, etc.

Answer

The characteristics of the project construction and operating force immigrants must be discussed separately.

As stated on page 318 of the Regional Socio-Economic Impact Assessment Volume 2, "The construction force recruited for the Project is expected to have the same general characteristics as the Syncrude construction force." The Syncrude EIA 1978 Addendum Volume C (Syncrude, 1978) indicates that a "high proportion of the in-migrating population" was comprised of single, young, male adults. The Alsands Regional Socio-Economic Impact Assessment Volume 2 report provides the available information on the 1,274 construction force personnel living in the town of Fort McMurray in June, 1977 when the Fort McMurray Census was taken, on pages 318 and 319. This information shows that by contrast with other workers in Fort McMurray, proportion of married was 50 percent higher, they were about five years older on the average, and were over-represented in managerial and professional occupations by 20 percent. About 85 percent were members of family groups, the remaining 15 percent were boarders, members of cooperative living groups or single people. About 29 percent of the wives of these construction workers were working and there was on the average only .69 children per family, two-thirds under ten years of age.

Unfortunately, there is no information on the income characteristics of these construction workers, but generally income would vary between high levels during periods of employment when high levels of overtime were being worked, and low levels during periods of unemployment.

In respect to the operations phase as well, Alsands assumes that generally the work force at the Alsands plant will be very similar to that now found at the Syncrude plant. In its EIA Addendum Volume C (Syncrude, 1978) Syncrude only presents information on the age and sex characteristics of its current operating force. Female employment accounts for about 12 percent of the total, which is somewhat higher than the level of female involvement in other mining operations. No less than 63 percent were in the 20 to 35 year age bracket, and only 11 percent were over 45 years of age. Unfortunately, neither Syncrude nor any of the government departments report on the proportion married, average family size, or other social and demographic characteristics of interest here.

Alsands is presently developing demographics, wage profiles and affordabilities and computer models to test various sensitivities related to the projected permanent operating work force.

6.4.4 The assessment should address the possible effects of the company's recruitment policies upon the characteristics of the immigrant population. Alsands should outline recruitment or hiring policies which might serve to lessen the impact of the project upon the region by altering the characteristics of the immigrating population.

Answer

There is no doubt from the relevant literature that younger populations are more prone to deviancy and other social problems than are older, more mature populations. Accordingly, it should be possible to design recruiting strategies to minimize the problem potential that a work force will offer. This possibility is evaluated with regard to first the construction work force, and then the operations work force.

During construction emphasis in recruiting should be placed on hiring locals, women and more mature workers. To the extent that the proportion of female and mature workers is maximized the adverse impacts of the construction force will tend to be reduced.

It seems probable that there may be a number of large construction projects in Western Canada at the time that the Alsands plant is being built. The result will probably be that construction workers will be in short supply, and that contractors will not be able to be as selective as they may wish. On the other hand, to the extent that unemployment rates are elevated in the rest of Canada, Alsands contractors may be able to be more selective in the kinds of workers whom they employ.

In respect to the operations work force, the mitigative measures open to Alsands are essentially the same as those specified for the construction phase. There are two

broad sets of constraints that must be identified at the outset. The first is that the flexibility available to Alsands in attempting to select certain kinds of employees will be relative to employment levels in the rest of the country. Higher unemployment levels will make possible more selective recruiting of people making for a minimum of adverse impacts. The second constraint is that it will be the obligation of Alsands to recruit a full complement to staff the plant, so that recruits from those categories deemed to be more desirable may not be available.

Within these constraints Alsands recognizes that adverse impacts will be minimized to the extent that several workers can be recruited from the same families, and that local workers can be recruited, thus reducing the demands for housing and all other goods and services. They will also be reduced to the extent that the number of female and of mature and older workers can be employed, because the tendencies toward deviancy and other kinds of problem causation among them are distinctly weaker than among young male workers.

Alsands is of course aware that employment in new, high growth, resource development communities typically is more appealing to young males than it is to women or to more mature workers. However Alsands is currently actively trying to develop recruitment strategies which would maximize the employment of local female as well as male workers, would maximize the participation of women generally, and would tend particularly to attract couples from which both the husband and the wife would work for Alsands.

Successful and consequential implementation of these policies would have at least four consequences.

1. It would minimize the number of immigrants who would come into Northeast Alberta.

2. Accordingly it would reduce the amount of housing, medical, educational commercial, protection, social, recreational, etc. facilities and services which would have to be provided for them, and the impacts they would have on the environment generally, and on regional and Fort McMurray recreational facilities.

3. To the extent that many wives were gainfully employed it would reduce the dissatisfaction, demoralization, and the incidence of mental health and alcoholism problems which housewives in development towns often experience.

4. The increased equalization of the sex ratio resulting from a policy of maximizing female employment should tend to reduce turnover rates somewhat, since common reasons for high turnover include the dissatisfaction of housewives lacking adequate involvements as noted above, and the dissatisfaction of single men in areas where they heavily out number eligible women.

6.5 REGIONAL ECONOMY

6.5.1 The assessment of the potential for forestry in the region as outlined in the E.I.A is incorrect. Alsands should further discuss this issue with the Department of Energy and Natural Resources and revise the E.I.A. accordingly.

Answer

From our discussions with the Director of Timber Management it is apparent that our initial assesment was based on less current information than is now available. Further assessment of a more specific nature will continue. From personal communication it is obvious that there is much greater potential for timber supply than was stated in the Regional Socio-Economic Impact Assessment Volume 2. Swanson Lumber Company Ltd. have undercut their quota recently for the reasons stated in the EIA and local markets have remained small, but there is marketable timber available. It is not economic presently to compete with timber supplies in the south for southern markets. Given that a stable market evolved in northeast Alberta it is seen as very likely that part of demand could be met locally. It could be a function of the Business Opportunities Program to enhance the local market for this industry.

Further study is on-going at this point and more specific information will be forthcoming. At this juncture it must be seen that the earlier more pessimistic statements were inaccurate, particularly the first statement of the section on overall perspective on page 63 of the Regional Socio-Economic Impact Assessment Volume 2. The constraints listed are still valid concerns however.

6.5.2 The impact of the Alsands development upon forestry resources needs to be re-examined, especially with respect to potential supply of building products from the region to meet the increased need for housing and other construction resulting from the project.

Answer

There will certainly be an increased demand for timber and lumber in the region as a result of the Alsands project. Local suppliers will have the opportunity to participate in this market. We are unable to assess the impact upon forestry resources at this time.

6.5.3 The Business Opportunities Program discussed in the assessment appears to indicate a positive approach to assisting the various existing and future businesses gain benefits as a result of the project. Alsands should, however, provide additional details of the program, and potential business opportunities resulting from the project; and outline Alsands' commitment and role in relation to the Program.

Answer

As stated previously in the EIA, Alsands is committed to maximize economic benefits at the local and regional level. The Business Opportunities Program would have the goal of facilitating involvement of the existing and new businesses in the Alsands Project, during both the constuction and operational phases.

Alsands envisions that the program would involve the proponent in providing to local contractors and associations information on the timing and length of contracts to be let, providing as much lead time as possible.

Alsands needs local input to determine the most useful form for this agency, the frequency of contact, and appropriate timing. Alsands final responsibilities would be administered through existing departments of the company. Community input should be decided by the local communities, but it should include private interests independent of both Alsands and local government. This could develop out of presently existing impact committees or otherwise. Alsands believes this consultation process should start in the near future.

6.5.4 The E.I.A. should address the possible negative effects of project demands upon the local economy in terms of increased competition for employees, increased competition among regional businesses and outside businesses to satisfy demands resulting from the project, and the capability of existing businesses to satisfy the project and population related demands. In the discussion of the experience of other developments, Alsands should elaborate on the past history and the negative and positive effects those developments have had upon regional business, the characteristics of businesses in resource towns generally, and the mechanisms which have been used to mitigate negative effects.

Answer

Three questions are posed in this stipulation. The first concerns the possible negative effects of project demands upon the local economy in terms of increased competition for employees. The second relates to the capability of existing businesses to satisfy the project and population related demands. The third question relates to the positive and negative effects of previous development on regional business, the characteristics of businesses in resource towns generally, and the mechanisms which have been used to mitigate negative effects.

It seems appropriate to address the last, historical question first. Relevant information from other development projects was reviewed by Alsands' consultants prior to writing the appropriate sections of the Regional Socio-Economic Impact Assessment Volume 2. Volume 2 of the Regional Socio-Economic Impact Assessment presented information on the effects of the Syncrude development on the businesses in the region. There is also relevant material in the Syncrude Impacts Analysis (Syncrude 1978 Volume C). However, Alsands believes that this material has relatively little relevance to the Alsands

development because the very great increase in the size of the population of the Region, and in the number and size of businesses in the area, means that the Alsands development impacts will be relatively smaller than those of Syncrude.

Turning now to the first question, there is no doubt that the Alsands project could result in competition with local employers for some categories of employees. This could pose problems for some local businesses, and may accordingly contribute to some local inflation. However, several mitigative aspects may be noted. Wage scales for Alsands employees will not be significantly different from other similar industries in this region. Moreover, the movement of new construction and operations personnel into the region would bring in surplus workers in the form of wives and perhaps other family members who would not have employment when they arrived.

A further mitigating measure would be increasing the number of new local employees through appropriate training programs. Descriptions of the various training programs that Alsands will seek to promote and assist are found elsewhere in these deficiency responses.

Alsands will further seek to minimize competiton through consultation with relevant local groups, to facilitate full and open participation in the planning process by the communities and region. Thus in an organized manner Alsands would attempt to arrive at economic projections and manpower requirements for the region and by working with the various proposed liaison committees, to establish the appropriate extra-regional hiring requirements. Hence last-minute competition for potential employees should be minimized.

Turning to the question relating to the capability of existing businesses to satisfy the project and population

related demands, it is clear that these existing businesses will not be able to satisfy all of these demands. This is indicated in the Regional Socio-Economic Impact Assessment, Volume 2. Alsands anticipates the need to encourage the establishment of new businesses and plans to do so by helping create an environment which will be attractive to new business enterprises.

6.5.5 Alsands should clarify if their responsibility in the event of an economic turnaround, would be more than to notify local business and the region, of the situations or only that.

Answer

As with the responsibility Alsands recognises in providing information to employees regarding the nature and tenure of job opportunities, the same commitment exists to local independant business. Particularly through the Business Opportunities Program, information as to the Alsands industrial needs will be available. This would need to be far in advance of possible changes in order to be useful.

It is the purpose of the Business Opportunities Program to help provide this information exchange. It will allow independant businesses to make marketing decisions and help Alsands to understand in advance the portion of their requirements which can be met locally, and the extent to which they must turn to outside suppliers. Alsands remains committed to the use of local and regional human and physical resources to the maximum possible.

6.5.6 The E.I.A. should address the effects of the Alsands project upon localized inflation and the cost of living in the region, for the total population, and especially for the poorer segments of the population.

Answer

Localized inflation cycles precipitated by the two previous developments have already increased local wage scales. Wage scales and contract fees to be offered by Alsands will be comparable with those offered by similar industries in the Northeast Region.

It is expected therefore that Alsands inflationary impacts will be relatively less than those experienced previously. Cost of living increases should be offset by significantly increased job opportunities in industry related activities.

That portion of the community limited to fixed incomes is always stressed in such a cycle if no member of such a family is involved in income producing activity. Although this segment diminishes as the expected increases in income and employment mutipliers occur, adequate social assistance must be provided through recognized service discounts or direct income supplements. At some point the general benefits of the new economic activity must be understood to be of enough general good to outweigh negative effects of the activity. Social services are then adjustable to provide mitigation when necessary. This becomes a community responsibility. However, Alsands is prepared to do as much as possible to enhance community life and provide a healthy, fulfilling lifestyle to its employees and to the region in general.

6.5.7 Alsands appears to have only considered the impacts upon trapping in the development area. The E.I.A. should be re-examined to include any areas which may be affected, but which are outside of the development. The assessment should outline the potential significance of the effects, and possible mitigative measures. In addition, comments regarding Fort McKay trappers' positions regarding compensation are not appropriate.

Answer

A recent study has been published conducted by the Alberta Oil Sands Environmental Research Program entitled Todd A., 1978, Analysis of Fur Production Records for registered traplines in the AOSERP study area 1970-1975, prepared for AOSERP by Alberta Recreation Parks and Wildlife (AOSERP Report 42, 17 pp.)

This document undertakes similar analysis to the EIA for a more limited time period but extends it over a greater geographical area. The qualitative results are similar to those in the EIA. The fur production and its economic value have fluctuated greatly and much evidence is presented to show that many traplines were greatly underutilized. The potential economic value of the fur resources were much greater than presently realized.

No direct biophysical diminution of trapping potential outside the immediate development site is expected. Significant employment opportunities available to most employable regional residents may decrease further the economic incentive for trapping, subject of course to fluctuations in the market value for fur. Cultural influences and desirability of the more traditional lifestyle will no doubt provide sufficient reason for some trapping to continue.

6.5.8 The assessment has assumed that the provision of the necessary goods and services for the new town will be in place for the development. The Fort McMurray experience, as outlined in the report, and elsewhere, indicates that there were a large number of problems with the provision of the necessary economic goods and services and with the establishment and stability of businesses during the development of Syncrude. The E.I.A. should address itself more realistically to that assumption, and discuss the role Alsands will be playing to ensure the timely provision of those goods and services.

Answer

Proper planning and staging of the supply of economic goods and services is essential to this project and every conceivable effort will be made to ensure it proceeds as planned. It is Alsands' objective to ensure that the timing and sequence of development in the new town provides adequate essential goods and services facilities and related management personnel at least six months prior to permanent moves of Alsands' operating staff. This is required for orderly town development as well as the stability of Alsands staff. If delay should occur in establishing such services, initial operating staff personnel would be housed at the main construction camp for the delay period.

The proposal to design and have in place a functional new town is the principle form of mitigation for possible shortfalls in goods and services. Methods of ensuring an attractive business environment to essential small business and supply interests may include provision of attractive leases for property and reasonably assured sales volume.

6.5.9 Alsands should review past development experiences in Fort McMurray and elsewhere to identify what problems were encountered, and what mitigative measures were successful in ensuring the provision of the necessary economic goods and services, and with the establishment and maintenance of business stability.

6.5.10 After that review the E.I.A. should indicate those areas where the potential for problems exist with the Alsands development.

Answer

Specific problems encountered during the rapid development of Fort McMurray have included:

1. A shortage of a range of professional services.
2. A lag in facilities to transport and distribute various commodities and services.
3. A lag in the growth of most aspects of retail trade and services, except in areas directly relating to the mining development.
4. A shortfall in the supply of most personal services.

Mitigation has been largely successful to this point and has mostly been a function of external recognition of market potential in the area and in some cases aggressive recruitment by local residents and also by the government and business sectors in general.

As noted in the Regional Socio-Economic Impact Assessment Volume 2 the original development had massive impact on the community. Very little infrastructure existed at the scale needed and there was very little extra transport or service capability. This situation has now greatly improved and the new demands due to Alsands instigated population

increases will be more easily met. Externally it is recognized as a high growth area with major opportunities. This will continue.

Problems may arise with transport and the supply of goods and services if these cannot be increased to meet new demands. All indications suggest that they can, given adequate recognition of the potential opportunities well in advance of the project related population increases. This further reinforces the need for more specific planning in the private sector along the lines of the Business Opportunities Program. It will be useful to encourage, as much as possible, a business environment that is perceived as being a relatively secure risk, not only relating to the specific needs of Alsands but also for the general business community.

6.5.11 Alsands should outline its role and responsibility towards the Business Opportunities Program, and its role and responsibilities towards the local business and economy.

Answer

As stated in 6.5.3 Alsands officials will participate in a Business Opportunities Program, which is designed specifically to mitigate against serious disruptions of local business, and to enhance the sector devoted to the supply of goods and services. This program will provide a vehicle for active, ongoing, and wide ranging economic planning by local business.

6.5.12 Focusing upon the Business Opportunities Program and other policies, Alsands should indicate measures to mitigate, where possible, the negative effects of the development upon the regional economy in addition to providing benefits to the region, and what the company's role will be regarding those measures.

Answer

Alsands believes that this deficiency has been adequately addressed in answers to the previous questions in this section.

6.6 PHYSICAL INFRASTRUCTURE

6.6.1 Generally, the discussion of the existing physical infrastructure and housing situations in the assessment appeared satisfactory. Alsands however should contact the N.E. Commissioner's office and Alberta Housing and Public Works directly regarding clarification of the statements regarding lot cost differences between Athabasca Realty and Alberta Housing Corporation, and they should be clarified in the E.I.A.

Answer

Alsands does not have sufficient information to clarify these statements, and does not believe the reasons for the lot cost difference has relevance to our Application.

6.6.2 In the E.I.A., Alsands should examine the Syncrude experience in Fort McMurray with respect to the provision of housing and physical infrastructure, identifying where problems occurred, what measures were developed to deal with problems in the timely and affordable provision of housing, and what problems resulted if those requirements for physical infrastructure were not met.

Answer

Alsands has reviewed recent developments in relation to providing new housing and physical infrastructure in Fort McMurray and has identified several items (below) which must, and will, be addressed in the detailed planning process relative to the new town development.

1. Resident affordability studies must reflect a realistic assessment of the inflationary impact on capital and operating costs of new town housing and infrastructure facilities.

2. Potential variations in resident demographics in the new town must be considered to ensure the development plan is flexible enough to respond to probable variations from the 'expected' case.

3. Mechanisms to ensure effective expediting procedures for required development approvals should be in-place before construction of the new town starts.

4. Development planning must address and define an effective 'management' mechanism to ensure effective coordination of the various construction and ownership groups which will be involved.

5. The new town development program must provide for completion and 'shake-down' of essential goods and services before other permanent residents start to arrive. Also, close control is required on the population build-up to ensure adequate facilities are available upon the arrival of new residents.

6. In general, the planning, organizing and controlling effort relative to the new town development is extensive and critical; it is a major project in its own right. Alsands intends to ensure that an effective vehicle is in place to provide this overall management responsibility as soon as possible following project approval.

6.6.3 Alsands should address the likelihood of physical services and housing falling seriously behind schedule, and the effects that that situation would have upon the project and upon the communities.

Answer

This item has been adequately discussed in 6.5.8.

6.6.4 Alsands should re-examine their estimates of the numbers of construction staff who will be housed in the construction camp, as compared to those who resided in Fort McMurray with the Syncrude development.

Answer

It will be Alsands policy to encourage immigrant workers to live in the camp. Accordingly, Alsands will not provide living out allowance to the work force. Furthermore the distance between the plant and Fort McMurray will discourage commuting.

As a result the number of construction staff living in Fort McMurray will be less than during the Syncrude Project.

6.6.5 The government review has indicated that the ratio of persons per household used in the Alsands E.I.A. may be too high.

Answer

The ratio used was chosen since it was the ratio found in Fort McMurray by the 1978 Fort McMurray census, according to advance information supplied by the Fort McMurray Planning Team. It is apparent, after examining the Syncrude experience, and the various planning documents, that the average household size is not a static figure, and has varied both above and below the 3.7 value used in the EIA. As has been experienced previously, this figure is likely high for a construction phase, and may be low for a long term stable operation population. It is likely a reasonable aggregate average for preliminary planning purposes.

6.6.6 Alsands should contact Alberta Housing and Public Works regarding that ratio, and the possible effect upon the estimation of housing demands for the project population, and include any additional information within the E.I.A.

Answer

The Application material has reflected initial concepts of the housing requirements (bedrooms) on the basis of the foregoing ratio. Final planning for term development will define details of expected demographics, family sizes and affordabilities, and the housing mix and sizes will reflect these requirements and constraints.

6.6.7 Alsands should re-examine the capability of Fort McMurray to accept additional population. That assessment should take into consideration the projected growth for Fort McMurray from any other major resource developments during the same period as the Alsands development, including the 1984-6 period. The assessment should address the potential impact upon physical municipal services, water supply, sewage and water disposal, and housing.

Answer

Alsands believes that Fort McMurray physical municipal services are adequate to handle the projected Alsands population impacts as well as the GCOS expansion impacts.

Alsands has no detailed information on the population impacts of other possible projects, and therefore cannot discuss the ability of Fort McMurray to absorb them.

6.6.8 The Alsands E.I.A. should outline company policies regarding housing for the project related population, provide details as to how housing will be supplied on a timely and affordable basis, and what Alsands role would be regarding that provision.

Answer

As established elsewhere, it is Alsands' preference to have its permanent operating staff housed in the new town. The development schedule for the new town will be coordinated with the plant project schedule to ensure that all essential goods and services sector facilities, as well as adequate numbers of housing units are in place (see 6.5.8) about 2 years prior to plant start-up, when selected permanent staff are brought to the site.

Current planning is directed at defining the preferred housing stock, resident affordabilities, and selective assistance programs which will ensure the greatest possible and practical satisfaction and stability to the residence and the community. Alsands considers effective coordination of these planning developments with designated Alberta Government representatives to be essential.

6.6.9. The report indicates that 80% of Fort McMurray households pay less than 28% of their income for housing. That statement may be misleading however, because, as indicated possible 2/3 of the shelter payments are subsidized, some by as much as $25,000/unit. Alsands should clarify whether it is suggesting ensuring similar affordability levels by providing similar levels of subsidization.

Answer

As point out in 6.6.8, current planning programs are directed toward defining the levels of housing assistance which will likely be required from Alsands.

6.6.10 Alsands policy on housing should be discussed in relation to vital issues such as the effects upon recruitment, turnover, movement of workers from other companies and industries, and elsewhere, and the impact upon non-oil company workers. Alsands should also provide information relating to the company's preference regarding housing mix and price.

Answer

Alsands recognizes the importance of a viable housing policy in attracting and retaining a suitable and stable work-force and the role of this policy in creating a livable family community. Alsands is currently reviewing anticipated employee wage profiles, demographics, and affordabilities against housing mixes and costs in order to develop suitable housing policies and assistance programs.

It is Alsands intent to develop a housing mix to suit the demographics, expectations and affordabilities of the projected work force. The success of the Alsands operation depends on recruiting a stable, career oriented, balanced work-force.

As previously stated, Alsands recognizes the need and importance of an effective goods and services sector in creating a viable community and will work with government and local employers towards ensuring that non-oil company workers obtain the appropriate support to ensure their presence.

6.6.11 Alsands' comments regarding the impact of the Syncrude construction workers does not indicate that many people were not forced to camp in tents, but chose to, partly because of high rents, but also because of lack of action by appropriate authorities to remove squatters as well as the "living out allowance" policy of the managing contractor who provided workers $15.00/day not to live in the camp. Alsands should clarify those points in the assessment, and also indicate its position regarding living allowance payment to construction staff and the manner in which that position will be relayed to their managing contractor.

Answer

A major consideration in designing Alsands' program is directed toward minimizing negative impacts on Fort McMurray. All construction labour, other than established residents of Fort McMurray and other local communities who will live at home, will be housed in camps at the new town and plant construction sites, and permanent operating personnel will be housed at camp sites until the basic new town requirements are in place (see 6.5.8). A number (up to 500) of familied construction supervisory personnel may choose to locate their families in Fort McMurray during the construction period. Alsands will not establish "living allowance" policies which would encourage migrant construction workers to locate outside of the main construction camps.

6.6.12 The assessment should more adequately examine the extremely dangerous highway transportation problem which was created by the weekend exodus of construction workers during past developments. The approach to evaluation of traffic impacts for Fort McMurray and Highway 63 in the assessment should be re-examined. An evaluation of the number of vehicles, and an assessment of the noise, exhaust, congestion as well as flows are required because of the potential for significant impacts. Alsands should indicate if it anticipates that normal enforcement mechanisms will be satisfactory, or will the company need to implement extraordinary measures to cope with the traffic volumes.

Answer

Alsands recognizes that the weekend exodus and return of construction workers is a serious issue to the residents of Fort McMurray and to the construction workers themselves. It is Alsands' intent to work with the local/Provincial authorities and the managing contractor to fully assess the potential volume and impact of this traffic peak and develop and implement measures to cope with the volumes.

The prime mitigative measures to control highway traffic volumes to and from Edmonton will include work scheduling, special busing arrangements on weekends, as well as normal air transportation. A wide variety of solutions will be explored to spread the volume and mitigate the peak impacts.

6.6.13 Alsands needs to provide a statement regarding their role in relation to the timely and affordable provision of housing for the project related population increase to the region; the potential measures that could be adopted in the event that the necessary housing is delayed is also required.

Answer

Alsands current thinking has been described in 6.5.8 and 6.6.11.

6.6.14 Alsands should futher discuss the potential mechanisms to mitigate the traffic problems associated with the development.

Answer

This question has been addressed in 6.6.12.

6.7 HUMAN SERVICES

6.7.1 The Alsands E.I.A. should re-examine the effects of the Syncrude development upon human services and their delivery in the Fort McMurray region. Special emphasis should be placed upon the phenomena of shadow populations, staff turnover and stress.

Answer

Alsands is well aware of the extent to which many human service delivery systems were inundated with demands for services beyond their capabilities of responding. Many of the interviews that Alsands consultants held were with people in these systems and they were eloquent in their descriptions of the overburdening that they and their agencies had experienced during recent years. People in the social service systems also often indicated that they were aware that numbers of people who probably needed their services had stayed away because they knew about the existing press of demand.

As discussed and elaborated in Section 6.4.2 above, Alsands is also very much aware and concerned about the implications of the "shadow population" and has done its best to assess the volume of this semi-transient population, as noted earlier. The extent to which this component exacerbated the burdens of the human service delivery systems was elaborated to the Alsands' consultants during their interviews. It appears that as a group these people were more frequently in need of services than others who are less transient. They posed the constant need to fill out new application forms, to send for record files from elsewhere, and to forward files to new addresses after these people had moved on.

Schools had to learn to cope, not only with a highly mobile student population, but also with higher frequencies of behavioral, emotional and learning problems. Social service agencies were frequently faced with coping with multi-problem families who wished only short-term contact. Medical personnel were limited by the failure of patients to follow through with treatment. Frequently it was the very people most in need of help who did not follow through.

Lack of appropriate referral sources often impeded successful outcome of treatment in all types of services. For example, police often were forced to overlook the delinquent acts of teenagers in need of help because of a lack of referral facilities. This type of frustration undoubtedly added to job dissatisfaction, low morale, and high stress levels of many human service staff.

There are discussions in the Regional Socio-Economic Impacts Assessment Volume 2 which reflect Alsands' awareness of the fact that overburdening of the staff precipitates higher turnover rates, and this, together with the amount of time it often takes to recruit, select, and hire staff replacements, increases the stress both on the remaining staff and the clients who must wait longer for needed services. Alsands' awareness of this is reflected in pages 417 and 418 of Volume 2 of the Regional Socio-Economic Impact Assessment.

Alsands believes that the lessons of Fort McMurray are so clear that the relevant government departments and officials will certainly put them to use in the new town. Moreover three governmental agencies, including the Department of Social Services and Community Health, commissioned a comprehensive, and detailed study of the "Social Planning Implications for Health and Social Services" of the Syncrude construction phase (Co-West Associates, 1978). This study devoted much attention to elaborating the impacts of the shadow population on the

service delivery systems of the Study Area. Alsands is committed to aiding in the preventive planning process in every way that it can and believes that early organization of the proposed Alsands Project Development Agency would be an important step in facilitating comprehensive planning.

6.7.2 The E.I.A. should indicate if problems regarding social service delivery still exist in the region, what type, and to what extent.

Answer

The latest information available to Alsands indicates that as of the winter of 1978 there were still shortages of physicians, of permanent classsroom facilities, and of mental health workers. The availability of physicians is improving gradually as the area becomes a more attractive one in which to live.

Permanent classroom facilities are presently being built. In the interim temporary portable classrooms are filling the gap.

Several important treatment facilities such as an alcohol and drug detoxification and treatment centre, and halfway houses are also in short supply. A Youth Assessment Centre for the treatment of problem youths is almost completed.

6.7.3 The E.I.A. bases the discussion of project impacts on the assumption that all human services that will be required will be in place for the project. That assumption again, ignores the reality of the history of the Syncrude experience, and the history of most other developments. That approach also seriously constrains the process of service delivery planning for the development by not providing any indication of the types of demands that will be present as a result of the development. Alsands will be required to further examine the Syncrude development impacts upon Fort McMurray, and elaborate upon the types of demands that were placed on a human service in the region. The E.I.A. should then re-examine and assess the potential impacts of Alsands upon those services.

Answer

Alsands' consultants have sought to document the conditions during previous developments both in the course of interviews with many relevant experts, and with the most comprehensive data from Government records that were obtainable. As the Volume 2 of the Regional Socio-Economic Impact Assessment notes, the latter effort was frustrated, relevant data were usually not available before 1976. However many of the experts were in a position to describe the earlier conditions in qualitative terms, and they did so for us.

Accordingly Alsands believes that it has already presented the most comprehensive picture of project impacts that is available in terms of statistical and non-statistical sources, including the material from the government's own recent and comprehensive study made by Co-West Associates (1978). Alsands believes that in many respects the human service needs in the new town will be similar, when adjusted for population size differences, to the needs in Fort McMurray during the Syncrude construction period. These needs are reflected in the government's own study made by Co-West

Associates (1978) and further detailing is provided in additional statistical data which was obtained and analysed by Alsands but was not dealt with in the Co-West report. The eloquent accounts of overburdening and its consequences which were heard by Alsands' consultants from government service delivery personnel must certainly have been communicated "up the line" within the relevant departments.

In addition to this risk of overburdened services the development of the new town will produce some particularly challenging demands in terms of type and quality of service required. Because this will be a new town involving lack of community ties, stranger status of residents, separation from family and friends, lack of supportive neighborhood groups, lack of a system of informal social control, severe climatic conditions and all the other stresses involved in a new frontier community, it will be extremely important that human services emphasize fostering positive community processes and not be content with ameliorating fully-developed problems. However, because of the high stress level in the area and because of the seriousness of the problems many of the newcomers will bring with them, early intervention will not always be possible and there will certainly be a need for treatment approaches as well.

Unique demands on the type of service offered will occur as a result of the limited local environmental supports available to many clients of social service agencies. The types of problems presented to mental health agencies, alcohol and drug programs and psychological counselling agencies will not necessarily be responsive to traditional individual counselling approaches. Rather in some cases there will be a need for greater intervention in the clients immediate environment.

Because of the large transient population there will be a demand for utilization of short-term treatment approaches. Unless the challenge of some of these somewhat unique demands is met, staff will not only be overburdened but also feel particularly ineffective. The result will be a drop in staff morale and greater degree of staff turnover.

Alsands suggests that the relevant government agencies should give particular attention to these unique opportunities, needs, and demands that the new town will present in planning the services to be offered and the most effective complex of special skills in the staff be assigned to the new town.

6.7.4 The assessment should consider the possibility that Fort McMurray services and facilities may bear an increased demand as a result of the new population moving into the region, and residents of the new town. Given that Fort McMurray will likely remain as the regional service center for the region for many services, Alsands should assess if the town will receive increased demands from the entire region for good services and facilities as a result of the Alsands project; what type and to what degree.

Answer

These matters were discussed by Alsands' consultants with the relevant experts whom they interviewed. What was learned was incorporated into Chapter 8 and 9 of Volume 2 of the Regional Socio-Economic Impact Assessment, in the section dealing with impacts on local services. These discussions indicate that there is continued overcrowding in the schools, and shortage of some social service facilities. The Syncrude Impact Assessment (Volume C, 1978) reports that there is a continuing shortage of doctors, in terms of provincial rates of numbers of physicians per 1,000 population. There is a shortage of recreation facilities, but this will be rectified by completion of the Macdonald Island recreational complex. There is concern, however, relating to the ability of the town to pay the operating expenses on this ambitious complex, once it is completed and in use.

In terms of social service facilities, Volume 2 of the Regional Socio-Economic Impact Assessment notes on page 364:

> The social service delivery system has shown the slowest rate of recovery from the rapid population growth of recent years. Many social services were very slow in being established in the area. Unless they have been augmented and brought up to full

> strength by the onset of the construction season, further overburdening of these services must be expected, particularly during the peak population period. Critical services such as detoxification centres for alcohol and drug problems, treatment centres for youth, and programs for women have yet to be developed. As of 1978, when programs have been developed they have generally been under-staffed and over-taxed in trying only to meet the most critical of demands. Thus even a modest population increase of 2,500 could place added strain on these agencies. (Alsands, 1979).

Some of the increased demands that Fort McMurray will experience as a regional service centre are expected to be as follows.

- Demands on the hospital as a regional hospital. The hospital currently under construction which is scheduled for completion in 1979 will be able to cope with these demands.

- Demands for a detoxification centre for people with alcohol and drug problems cannot now be met, and will have to be.

- Demands for a treatment centre for problem youth cannot now be met but will be shortly with the impending completion and staffing of the new Youth Assessment Centre.

- Increased demands on Keyano College.

This assessment is not definitive, nor can it be, since there is no firm indication as to how rapidly the population of the region will grow, and how large it will become in view of the possible GCOS and Syncrude plant expansions. It is clear that the larger the population base, the more specialized become the demands for services and facilities.

In summary, Fort McMurray will definitely expand as the regional service centre. Both its location and its presently developed infrastructure dictate this. As such it will definitely receive increased demands, particularly from the new town. Even with a developed service industry located in the new town, the supply and transportation sector accompanying this would be partially staged in Fort McMurray. This expansion as a regional center will be of benefit to the region and to the residents of Fort McMurray.

Since some services will be in the new town, the pressures on expansion of Fort McMurray service industry would tend to be less severe than if a new town were not built.

6.7.5 The assessment should further address the potential effect of the lack of volunteers upon community services including preventative social service programs, and upon community activities such as the provision of foster homes for children.

Answer

High turnover rates and lack of commitment to community are traditional characteristics of resource communities, particularly in the early years of development. These characteristics make it difficult to recruit volunteers for community service projects, preventive social service programs and other responsible community service activities such as the provision of foster homes for children. This has clearly been the case in Fort McMurray, where we are told by the local director of Child Welfare that it has been difficult to find local foster homes for most of the children needing them.

The answer to the question implied in this stipulation -- what happens to these programs when there is a dearth of volunteers -- is simple: the programs languish. While it is likely that in the new town there will initially be no readily available group of volunteers for such programs, we believe that volunteer programs can be stimulated by Alsands and by relevant government agencies.

Alsands involvement in this process will begin with selection where possible of employees having the demographic characteristics and the personal interests contributive to emergence of a stable and socially functional community.

Government should provide agency personnel in the preventive programs who are trained in skills necessary to successfully facilitate community involvement, and to elicit

willing volunteers. This will simultaneously provide support for the community development processes that is profoundly important for prevention and for early intervention in those problems to which resource development communities are prone.

6.7.6 Alsands should also provide an evaluation of whether or not Edmonton and Fort McMurray will be used as a staging point for potential project employees, and what impact that would have upon those communities.

Answer

Edmonton will likely be used as a staging point for Alsands employees during the construction and the operations phases of the Alsand development. The use of Fort McMurray would be limited to transportation staging and this use is expected to decline as soon as a jet-worthy air strip is completed near the site. Alsands does not believe that its staging area impacts will be significantly discernible in Edmonton.

6.7.7 The discussion of mitigation of the impacts of the project and its related population services in the area has been seriously hampered by the approach the assessment took to impact assessment. Because the assessment assumed human services would for the most part be in place for the development, it seriously underplayed the potential impact upon those services, and consequently underplayed the need for mitigation. In the E.I.A., Alsands will be required to elaborate on what mitigation will be required for the negative effects of the development upon human services in the region.

Answer

Alsands wishes to make two points in defense of the basic assumption that is criticized here. The first is that Alsands will certainly not be moving people into the new town until certain basic services are in place, including schools for families who have children, adequate minimum medical facilities, adequate police protection, adequate retail store facilities, and at least minimally adequate recreational facilities. If services required are not in place on schedule, the Alsands employees affected would be able to live in the camp facilities at the plant site, and their families would remain in their previous locations until the needed facilities are available.

The second point is that generally it should be possible to realize the conditions assumed. In respect to needed facilities this will involve scheduling their completion to correspond with completion of the first block of housing. In respect to personnel for human services there is now an abundance of lead time to accomplish the necessary planning, budgeting, recruiting, selecting, training, etc. so that personnel can and should be on hand by the time that they are needed.

The most important considerations in respect to mitigation of impacts on the human service systems in the new town relate to establishing a set of priorities relating to goals and the methods of achieving them, as well as effective means of monitoring results.

It is suggested that foremost priority be given to preventive services, namely those facilities which will maximize the well-being of the community. In the social services area priority should be given to preventive programs such as neighbourhood aid, family life education, aid centers and other volunteer programs. Preventive service personnel should act as facilitators in providing the public with information about needs, assisting information of citizens groups and generally working towards involving residents in their community. Recreational facilities and schools should also work towards maximumal involvement of residents.

Next to prevention, early intervention should be stressed with efforts focussed on the early identification of individuals and families at high risk of developing social and emotional problems.

The effectiveness of early intervention techniques will depend to a large extend on the willingness of various community elements to work together and utilize community resources.

Provisions of treatment facilities for fully developed disorders will, of course, also be necessary. As a means of coping with environmental stress (poor family relationships, poor friendship ties, unsatisfactory working and living conditions) a community reinforcement type of treatment approach might be utilized wherein direct assistance is given the client in changing his environment and finding more effective reinforcers of his needs.

Such approaches are made more difficult in most communities by the traditional fragmented approach wherein each agency works in their own identified area of expertise. A multi - disciplinary community approach would offer an innovative approach to the provision of social services more conducive to meeting the challenge of the high stress characteristics of resource towns. It is suggested that a top priority of the agencies concerned with delivery of human services in the new town should be to devise ways of achieving multi-disciplinary coordination at the community level in order to maximize their individual and their combined effectiveness.

Alsands believes that responsibility for monitoring the effectiveness of efforts made by human service delivery systems could be accomplished by a central agency such as the Alsands Project Development Agency. Alsands suggests that government representatives on this agency should be sufficiently senior that when the monitoring process indicates that changes are needed, these representatives will be able to ensure that they are made.

6.7.8 The mitigation and problem avoiding process alluded to on page 332 of Volume II are very positive recommendations. Alsands should indicate in the E.I.A. what commitment they have, and what their role and responsibilities will be towards the process.

Answer

Alsands commits itself to the following in respect to mitigating adverse impacts on the population which will be moving into the new town during the construction phase.

1) Alsands will make every effort to keep construction of physical facilities on schedule so that they will be available when needed by the incoming residents.

2) Alsands will keep the relevant government departments informed of changes in their projections and plans, and of any changes in expected completion dates of facilities, so that these departments will be ready to staff the service delivery systems in the new town when the population begins to move in.

3) If needed facilities and services are not in place in the new town at a time when Project personnel and their families are scheduled to move in, Alsands will assign the workers to accommodations in the construction camp, while their families remain in their previous places of residence until the needed facilities and services are in place.

6.8 EDUCATION

6.8.1 The assessment provides a reasonably comprehensive overview of the current educational services and programs in the Fort McMurray region. Some inaccuracies which appear regarding enrollment for the Composite High School should be corrected in the E.I.A.

Answer

The following information, supplied by the Vice Principal of the Fort McMurray Composite High School elaborates somewhat on the information presented in page 24 of Volume 2 of the Regional Socio-Economic Impact Assessment. In terms of the enrollment at the high school, there were 950 students enrolled in September, 1978, and by April 1, 1979 the number enrolled had fallen to 833.

In terms of the capacity of the high school facilities, the core building of the high school was designed to serve an enrollment of about 650 to 700 students. In addition there are now 11 portable classrooms attached to the core building, each having a capacity of 30 students. Accordingly the capacity of the current complex of core building plus portable classrooms is about 1,000 students.

6.8.2 Although the report does mention the past conditions of overcrowding in schools in Fort McMurray, the report does not present an adequate assessment of the problems which occurred in the schools during past developments. Alsands should elaborate upon the rate of turnover of population in the Fort McMurray area during past developments (the shadow population mentioned within the report) and its effects upon school programming, planning and staffing.

Answer

Some of the most serious problems in the Fort McMurray school systems have derived from the rapid increase in the number of students enrolled, the diversity of cultural and regional backgrounds from which students came, the emotional state of some students, the very rapid turnover rates in students as a result of moving into and out of the school district and the funding problems of the schools. Each of these is discussed in turn.

Indication of the rapidity of growth in the numbers of both teachers and pupils is found in Figure 6.8.2. The same pattern was experienced by the Separate School district where enrollments rose from 15 to 20 percent on the average each year from 1975 through 1977. While these increases did not affect teacher/pupil ratios and expenditures per pupil which are comparable with ratios for the rest of Alberta, there were many other problems. The need to use portable classrooms, to bus students to schools outside their residential areas and to schedule split-shifts has already been mentioned earlier in this document. More upsetting to some students, and accordingly to some teachers, was the need to split some classrooms in mid-year because of the rapid increases in enrollments in these classrooms. As an example, some children were changed to three different classrooms during the course of a single school year, as the splitting of successive classes became necessary.

Unfortunately there were few accurate forecasts of population buildup and potential school enrollments, so little long range planning could be done. Administrators could only respond to the evolving situations as aspects of it became so critical as to require action. But such a "crisis management" approach hardly left time or energy for critical assessment of the quality of education that was being offered, or for creative planning to try to better provide for the education of the many somewhat upset pupils. It also meant that it was periodically necessary to hire another teacher mid-year to staff another classroom, and under these circumstances it was uually not possible to be very selective in hiring.

The "diverse geographic, cultural and academic backgrounds of students arriving in Fort McMurray" was another source of strain on the school system, according to one school district spokesman. Syncrude reports that one-half of their operations employees are from outside of Alberta, and the situation during the construction phase was comparable. This situation made it necessary to provide the additional teachers necessary to give more specialized assistance to students. It meant that instead of teaching the lesson in a certain basic way, and knowing that it would be understood by a generally homogeneous class, the teacher had to work toward a much more varied approach in order to try to communicate the lesson to the broadly heterogeneous students often found in a single classroom. This inevitably increased both the strain and the frustration of teachers in this situation.

One school psychologist who has worked in the Fort McMurray school district for several years reported that the proportion of emotionally disturbed children was much higher than in any other school that he was familiar with. He attributed it to the long hours that fathers were away from home, the difficulties that many mothers had in adjusting to their new situations, and the family conflicts which result.

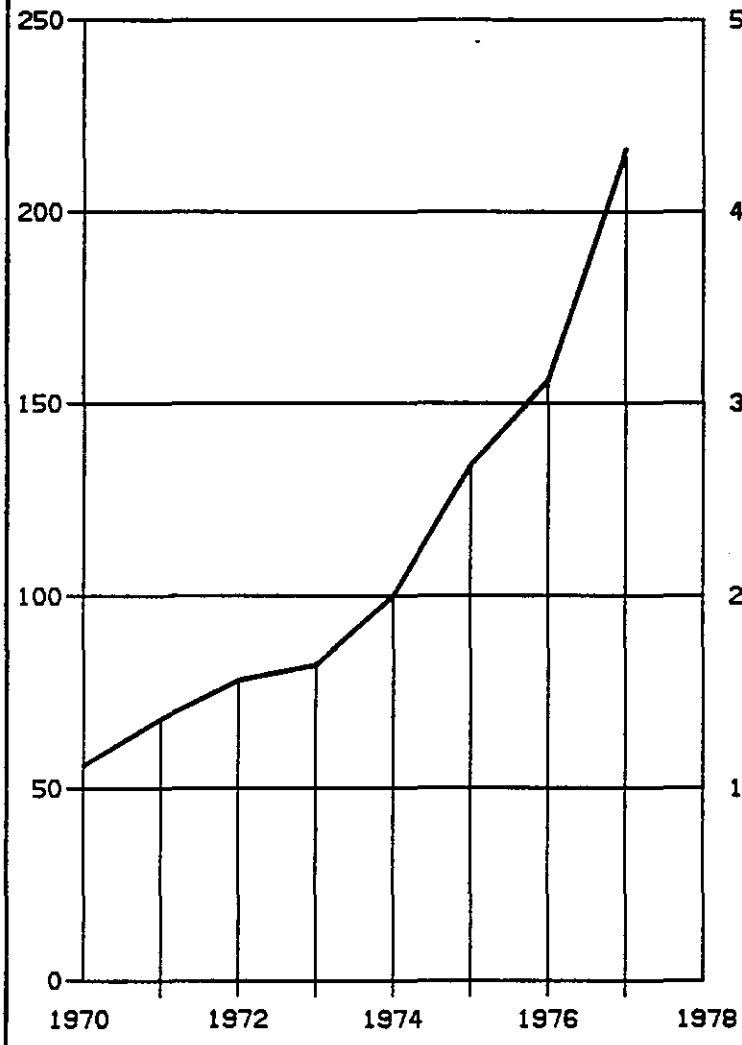
The consequence again is to make the teacher's job a more difficult one, and create problems in interpersonal relationships between students.

Another condition detracting from the quality of education that the schools are able to offer in Fort McMurray has been the large number of transfers into and out of the school system. In November of 1977 alone, there were 152 students who transferred into the district from other communities, and 117 students who left Fort McMurray to go elsewhere. This further compounds the problems caused by the rapid increase in the enrollment, because it means that there is not a stable core of students which the immigrant students might join. Syncrude reports that 29 pecent of their employee terminations occur within the first 30 days, and another 29 percent occur within the first 90 days (Syncrude, Volume C, 1978). Thus in many of the classrooms of the new areas of Fort McMurray there might be relatively little continuity, with the teacher teaching a somewhat different mix of students every two or three months. This not only made the job of teaching very much harder, it tended to rob these teachers of the satisfactions of seeing improvement in many of their students during the course of the school year, satisfactions which would have compensated to some degree for the many other frustrations they experienced.

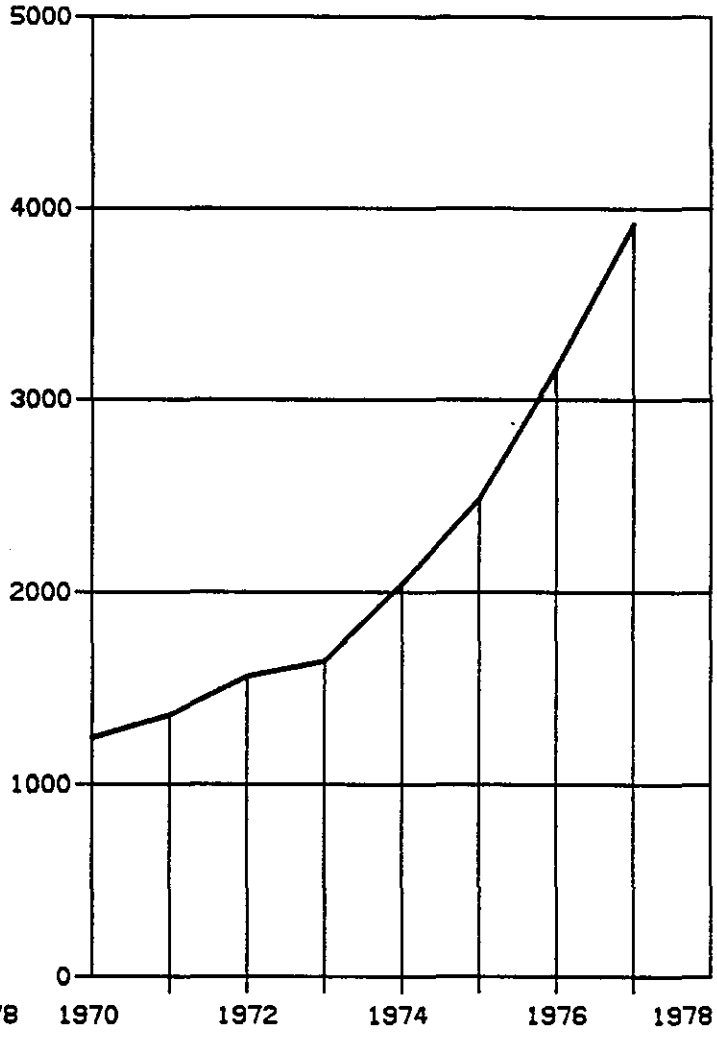
Allusion has been made earlier to the funding problems of the Fort McMurray schools. These problems are aggravated by the fact that the prospects for overcrowding in the system still exist, since classroom facilities are just catching up with present levels of enrollment. Moreover the level of spending in both school systems is rising. The Northeast Alberta Regional Plan concludes that these costs will create financial difficulties in the near future. The debt load and the operating deficits in the systems have risen so high that the Alberta Education Ministry is reviewing the finances. A

five year operating forecast drawn up by the School Board anticipates that the accumulated deficit will begin to decline in the early 1980's. However while tax revenues from the Syncrude operation will be reviewed only some time in 1979, the children of new Syncrude employees continue to swell the school enrollments.

NUMBER OF TEACHERS
(INCLUDES COMPOSITE HIGH SCHOOL FROM 1976)



NUMBER OF STUDENTS
(INCLUDES COMPOSITE HIGH SCHOOL FROM 1976)



SOURCE: FORT MCMURRAY SCHOOL DISTRICT,
"REPORT TO THE ANNUAL MEETING-1977"

ALSANDS PROJECT GROUP

FORT MCMURRAY
SCHOOL DISTRICT NO.2833
SCHOOL STAFF/STUDENT NUMBERS

FIGURE 6.8.2

6.8.3 The assessment assumed that virtually all necessary educational services and facilities would be in place in time for the project. The project related impacts upon the educational system within the Fort McMurray region were therefore not discussed in any detail in the assessment.

Answer

Alsands assumes that the Department of Education will plan and provide the school facilities that will be needed to serve the population of the new town. As stated above, Alsands will not proceed to relocate families which have members of school age to the new town if the schools are not ready to receive them. Alsands will cooperate in every way possible with the Department of Education so as to enable the latter to ensure that its planning, and the implementation of its plans are as timely and as precisely relevant to the projected incoming population as possible.

6.8.4 The assessment should provide a discussion of the provision of educational services for the future, and the project related future demands for educational services. In providing that assessment, Alsands should provide a calculation of the project related school age population, and discuss the likely characteristics of those children, as they would relate to education.

Answer

As noted in the preceding section, Alsands assumes that the responsibility for planning the school systems in the new town, designing the facilities, letting contracts, staffing, etc., are all the responsibility of the Department of Education. Alsands will keep the Department of Education informed as it continues to update its plans and projections.

In calculating the project-related school population in the new town, Alsands makes the assumptions that the total population of the new town at the peak of the development activity in the first quarter of 1985 will be about 14 000, and that the age distribution of that population will be roughly that of Fort McMurray today. Accordingly, about 2.5 percent of the population would be of kindergarten age, or 350 children. About 16 percent of the population would be of elementary school age or 2200 children. About 5.7 percent of the population would be of junior high school age or 800 children, and about 5.2 percent would be of high school age or 700 young people.

By the time that a stable full operation phase was achieved after 1988, it is assumed that the population of the new town will be about 11 500. The most appropriate assumption about the age composition of that population is that it will again be roughly the same as Fort McMurray today. Again using the same percentages stated in the preceding paragraph, this

yields projections of 300 kindergarten children, 1800 elementary school students, 650 junior high school students, and 600 senior high school students during the early years of the full operations phase.

Alsands assumes that during the construction years in particular, and to a lesser extent during the early operations phase years, the characteristics of the school age children in the new town, and the educational problems that they present will be very similar to those described in 6.8.2 above. That is, it is assumed that turnover rates will be high among the children that the school enrollments will grow at very rapid rates during 1984 and 1985 in particular, that the children will come from diverse geographical, cultural and academic backgrounds, that there will be elevated rates of emotionally disturbed children, and that turnover rates among teachers will be elevated.

The educational consequences of these pupil characteristics and problems described above, were also discussed earlier in section 6.8.2. It was noted that programming, planning and carefully selective staffing are all rendered difficult by rapid but not precisely predictable growth in the school age population. The educational process in the classroom is rendered very much more difficult by the turnover of students, the diversity of their background and the incidence of children with psychogenic learning problems resulting from the upset homes from which they come. These, in turn, make the job of the teacher much more frustrating and more difficult and make for low teacher morale.

Alsands believes that it is urgently important for the government to plan for the timely completion of classroom space in advance of realized demand so as to avoid the problems of overcrowding, busing, split shifts, and use of portable classrooms which have further added to the educational difficulties and frustrations in Fort McMurray. Alsands further believes that since the rapid growth of the school age population is predictable (though not precisely on a month to month basis) during the 1983-1985 period, that the Department of Education should consider planning to overstaff - by having low teacher/student ratios in the classrooms at the beginning of the year. This would serve to break in teachers new to this situation gradually, under optimum conditions. More important, it would render unnecessary the mid-year splitting of classrooms that was so disturbing in Fort McMurray.

6.8.5 Alsands should provide additional information regarding the history of development associated effects upon the educational system in the Fort McMurray region, and the propensity for problems regarding other aspects of family life to manifest themselves in the schools. Alsands should then provide a re-assessment of the potential for impacts to the educational system related to the Alsands development. In particular, special attention should be paid to education in the new town.

Answer

Alsands has responded to this statement in sections 6.8.2 and 6.8.4 above.

6.8.6 Lastly, the assessment appeared to indicate that because the region had already experienced past development effects, it would be more capable of handling those associated with the Alsands project. The E.I.A. should re-examine that issue, and consider the potential cumulative effects of possible developments.

Answer

Alsands consultants based the judgment alluded to in this directive on the testimony of a number of educational experts with years of experience in the Fort McMurray school system. The directive to re-examine this issue in the light of the potential cumulative effects of possible developments is somewhat difficult to respond to because, as noted earlier, Alsands has no factual information about any of the possible future developments other than the relatively modest-sized GCOS expansion proposal. Accordingly, we believe that this issue can only be dealt with in principle.

The relevant principle appears to be simply that multiple developments will bring more rapid growth of the school-age populations in Fort McMurray. It would again mean the high turnover rates among students, the diversity of backgrounds and the elevated incidences of emotional problems that were discussed in 6.8.2 and 6.8.4 above.

However, Alsands believes that it would not be possible for the incidence rates of these problem conditions to exceed those experienced in Fort McMurray between 1975 and 1978. The reason is that in the six years of maximum Syncrude impact on Fort McMurray, between 1973 and 1979, the population of this community increased three fold, from about 9,000 to about 25,000. This is a rate of growth that Fort McMurray will not likely see again. As a result, the incidence of school-related problems would not be expected to reach such high rates, despite the cumulative effects of possible developments.

Nevertheless, there is a further reason to believe that even if the growth rates should again reach those known in 1973-1979, the problems would not be so severe. That reason is that many of the personnel of Fort McMurray school system have learned from the experiences of the rapid growth period. They, and the Provincial Department of Education people as well, would better know how to plan and how to respond in such a way as to minimize the problems that would materialize.

6.8.7 In the E.I.A., Alsands should discuss the mitigation of negative project related impacts upon the educational system within the region, discussion was provided relating to the mitigation of negative effects.

Answer

It is Alsands' contention that there are four main possible sources of educational problems which may result from the Alsands development: inadequate planning, failures to provide needed facilities and staff in time, problems originating in the characteristics of the students and problems originating in the lack of experience of the staff.

The only mitigations possible of problem conditions resulting from deficiencies in planning and shortfalls in the provision of facilities and staff are to make up the deficiencies as speedily as possible. Alsands believes that there is adequate lead time and that the education authorities have learned enough from the experiences of Fort McMurray during the Syncrude construction phase that there is no need for problems to originate from these sources.

It seems clear that little can be done to significantly reduce the problems that pupils will bring with them. As mentioned earlier, Alsands will try to recruit employees who will tend to contribute minimally to these problems. Also, as discussed earlier, Alsands believes that much can be done, in the speedy development of good neighborhood relationships and is dedicated to aiding in this. Support and expansion of programs such as AID, Neighbor Aid and Helpline programs which were operative in Fort McMurray will tend to promote good interpersonal relationships in neighborhoods, and these should result in less emotional disturbance among school children.

Despite these valid points, Alsands feels that it must conservatively anticipate that the school population in the new town during the construction and the early operations years will demonstrate the same kinds of problems, and in the same proportion as did the Fort McMurray school population, as described above in section 6.8.2.

Accordingly, the only way to mitigate these problems originating in the high turnover rates, the rapid growth, and the characteristics of the students, is to recruit as many as possible of teachers and administrators who have had prior experience in coping with these problems. They will be able to plan appropriately and to provide relevant advice and encouragement to the less experienced teachers, so that the system as a whole can more effectively cope with the problems which the students will tend to present.

6.9 MEDICAL SERVICES

6.9.1 The assessment appeared to provide a reasonably adequate assessment of the medical services within the region. The government review indicated that an error appeared in that the report indicated that the capacity of the new hospital in Fort McMurray was 400 beds instead of the correct 300.

Answer

The error is acknowledged.

6.9.2 The inclusion of data from the Co-West Report on problems which occurred with medical services during past developments was of assistance.

Answer

No response is required.

6.9.3 Again the basic assumption made regarding medical services in the assessment was that the necessary services and facilities would be available in time for the development. The assessment needs to address itself to the possibility that may not be the case in evaluating the potential impact of the project upon the region. In addition, as indicated in the discussion of past development impacts upon medical services in the region, many of the potential problems are ones which would have occurred regardless of whether or not the services were in place on a timely basis. Alsands should provide an evaluation of the impacts upon medical services which may result from the project in the E.I.A.

Answer

Several issues are raised in this item, which will be considered in sequence.

The first issue related to the possibility that necessary medical services and facilities would not be available in time for the development. Alsands would not relocate its staff to the new town in the absence of emergency and at least modest in-patient hospital facilities. To do so would entail the possibility of risks to which Alsands is not prepared to ask its employees to expose themselves.

As in the case of educational facilities, Alsands maintains that there is plenty of lead time in which to plan, build, equip and staff appropriate facilities prior to the arrival of permanent community residents.

In respect to the second issue, the medical impacts of a development are a result of the numbers and kinds of people who are drawn into an area by the development, and the risk conditions which they experience. Alsands believes that all three of these sets of variables, as they relate to the Alsands

project, are relatively well modelled by the parallel phases of the Syncrude development. Accordingly Alsands anticipates that the large number of disproportionately young people and young families which will be drawn into the area will induce medical impacts involving somewhat large than normal numbers of maternity, pediatric, accident, and to some extent mental health patients.

As in the case of the educational service impacts discussed earlier, since it is not possible to mitigate the impacts by trying to change the characteristics of the service-seeking clients, it is only possible to mitigate by adapting the service provided to the needs presented by these clients. Alsands believes that in the case of its project this should involve adequate provision for the numbers of maternity and pediatric patents, and adequate initial care for the numbers of accident and mental health patients which can be projected for the new town population, on the basis of the experience of the Fort McMurray population. Alsands believes that planning in respect to the size and the nature of the medical facilities and the medical personnel for the new town should be governed by these considerations.

Alsands proposes to give all of the assistance that it can by providing the relevant government departments with timely information on its own updating of plans and projections.

6.9.4 The suggestion in the E.I.A. that hospital facilities would be developed in the new town based upon facilities presently provided in Fort McMurray may not be correct. Alsands should discuss those aspects with the Department of Hospitals and Medical Care elaborating upon the conclusions in the E.I.A. Alsands should discuss the air and ground ambulance services, and appropriate secondary and tertiary referral patterns that may be established for the new town.

Answer

Alsands believes that an appropriate, primary care hospital would be built in the new town, given its projected size of 11 000 to 12 000. There is not to our knowledge another town in Alberta having 11 000 of population, 100 km, distance from the nearest hospital which does not have some kind of hospital facility. Alsands is very greatly concerned by the implication that there might not be one in the new town. Many discussions which Alsands consultants have held with many people in frontier resource development towns have shown that there are two facilities which are of central concern to these people: adequate medical and adequate high school facilities. Accordingly Alsands continues to assume, and to urge the government to plan for the establishment of an appropriate primary care hospital in the new town.

Clearly an adequately large and well equipped regional hospital is now in the process of being completed in Fort McMurray, and large hospitals providing the latest in specialized treatment facilities exist in Edmonton. These would provide the secondary and tertiary patient referrals for patents who could not be provided for in the limited primary care hospital facilities in the new town.

Once again Alsands believes that the new town will be in relatively the same position, in terms of the numbers of patients per 1000 population and the kinds of care they will require as Fort McMurray was in during the early years of the Syncrude construction phase, for the reasons noted in 6.9.3 above.

We understand that at that time the Fort McMurray hospital was generally lacking in secondary treatment facilities. Accordingly, given access to the records which were kept of patient referrals and transfers to other hospitals by the Fort McMurray hospital at that time, it will be a relatively easy matter to project the kinds of secondary and tertiary referrals that will need to be made in respect to new town patients. It will accordingly be possible to project the availability of the air and ground ambulance services that will be needed on these bases.

6.9.5 The Alsands assessment should provide additional information relating to the type and degree of demand the project would create upon health services during the development before evaluating the project effects upon medical services.

Answer

As stated in 6.9.3 and 6.9.4 above, Alsands believes that the types and the "mix" of people attracted to the new town will be very similar to the types who were attracted to Fort McMurray at comparable stages of the Syncrude development. Alsands would suggest that the relevant departments of government use their data resources and expertise to make projections from Fort McMurray population to the expected new town population in respect to medical demands. However, Alsands has an ongoing study which may be of assistance and will provide copies of the final report to these departments when the study is completed.

6.9.6 Alsands is required to address the above comments, and follow-up with proposed methods of mitigating the negative effects along with a statement of the company's role and responsibilities regarding those measures. In particular, Alsands needs to outline the medical services they or their contractors will be providing during both construction and operation phases for project workers.

Answer

As discussed in 6.9.3 above, Alsands believes that it is not possible to mitigate the health care impacts by successfully trying to change the characteristics of the service needing clients, though as noted earlier, Alsands will try to recruit more female and more mature employees. Accordingly, it is only possible to mitigate the health care impacts by adapting the service which is provided to the needs presented by these clients. As discussed in 6.9.4 and 6.9.5 above, Alsands believes that this can be relatively easily done, given the relevant Fort McMurray experience, and that government departments should proceed in this way. Alsands pledges itself to give all of the assistance that it can by providing the relevant government departments with timely information on its own updating of plans and projections.

Medical facilities at the job site will include a centralized clinic for handling minor accidents, and first aid facilities at the camp and at least two other locations. Nurses and first aid attendents will be located on site as required.

6.10 SOCIAL SERVICES

6.10.1 The assessment of existing conditions provided a wealth of data regarding social services in the region. However, although the assessment displayed statistics from the Department of Social Services and Community Health, it did not appear to reflect the complex meaning behind these statistics. The assessment demonstrated little understanding of the term "caseload" and its relation to numbers of clients served, or of the meaning of child welfare statistics. Volume II, page 125 indicates that "delinquency rates may continue to decline in the Fort McMurray Region". District office statistics of recent months indicate juvenile problems are on the increase; the report does not allow for police discretion in charging juveniles in that police frequently give only warnings for less serious offences due to lack of resources in the town. The expectation of Fort McMurray district office staff is that the opening of the YAC in Fort McMurray will result in increased charging of juveniles when detention facilities are available to police. The report also appears to ignore the population breakdown which shows a large number of 6-10 year olds who will be entering their young-mid teen years just as the Alsands development is to occur. Alsands should contact the Department of Social Services and Community Health directly and clarify those points in the EIA.

Answer

This stipulation raises three issues. The first relates to the use of the term "caseload". The second relates to the child welfare statistics. The third issue relates to future delinquency in the Fort McMurray area. These three are considered in order.

The stipulation relating to the use of "caseload" involve Table VII-12 on page 170 of Volume 2 of the Regional Socio-Economic Impact Assessment, and the discussion of these and other data which are found on page 132 of Volume 2. The difficulty originated with the table which Alsands reproduced from the Co-West 1978 Report, Table IV-30, p. 91, which was commissioned and released by Alberta Social Services and Community Health. This same table was incorrectly labled, the word "caseload" having been used where the word should have been "cases". Alsands consultants neglected to make the needed correction when the table was reproduced, and the same substitution was made in the discussion of the data in that table in the fourth and fifth paragraphs of page 132. The table and the brief discussion based on it are accurate if the word "case" is substituted for the word "caseload" in every case.

The second issue relates to the child welfare statistics, found in Table VII-20 and discussed on pages 133 and 134 of Volume 20. Alsands consultants were able to discuss the data in Table VII-20 with Alberta Social Services and Community Health (ASSCH) personnel to whom access was not provided at the time that the data for Volume 2 were collected and written up. According to these officials with whom we have now discussed the matter, there are significant sources of invalidity -- under-reporting and inconsistencies in reporting between districts -- in respect to child welfare statistics, including those presented in Table VII-20. Accordingly, the indication in the table which is based on data provided by ASSCH that child welfare case rates per 1000 population were declining in the Fort McMurray region is spurious. The situation is that the usual way of handling relatively serious child neglect cases would be for the ASSCH to assume custody of the child and place it in a foster home. However there are very, very few such homes available in Fort McMurray, far fewer than would be needed to handle local cases. As a result

children have to be sent away to foster homes, some as far away as Lethbridge, thus removing the child from his friends, school, etc., the whole social environment in which he has been living. This is an extremely drastic move to take, and one that case workers are typically very reluctant to invoke. As a result the case worker may often conclude that, risky though it may be, it is better to leave the child in its (neglecting) home, and try to monitor the situation carefully and work to change the parents, than to disrupt the life of the child by sending it to a foster home that may be a great distance away. Thus the indication of declining child welfare case rates seen in Table VII-20 is simply spurious, reflecting the lack of adequate, easily accessible foster homes in which neglected children could be placed. Similarly, the statement at the top of p. 134 "This (decline in rates) may be explained by the increasing prosperity in the Region" is a mistaken suggested interpretation.

The impact implications of this changed understanding of the (misleading) child welfare statistics is that there are sizable numbers of children in Fort McMurray in home situations that the case workers feel are inadequate. Attempting to monitor the situations in these homes, and to work with the parents in order to increase their adequacy as parents, is consuming of the case workers' time and emotional energy, and adds substantially to their workload.

Turning to the second issue, relating to future delinquency, Alsands is aware that the number of people who appear in statistics relating to "caseloads" "delinquents", etc., are relative in four senses:

1. Relative to the conditions existing among the population to be served.

2. Relative to the programs which may be available; thus more flexible, or more numerous social service programs, or more specialized kinds of policing divisions or sections, will result in more cases, clients, delinquents, or other offenders becoming identified.

3. Relative to the accessibility of these programs to potential clients, resulting from the relative saturation of the existing programs, the extent to which case workers, police, etc., already have their hands full,

4. The discretion of case workers in accepting clients, of police officers in deciding whether or not to charge clients, etc..

The expectation, quoted from page 125, Volume II, that delinquency rates would continue to decline, was based on the following considerations. The data which were then available to us suggested that delinquency rates were showing a tendency to decline already, that during this same period the extreme shortages of policing personnel which had existed earlier had been mitigated so that relatively adequate police staffing was now available, and that delinquency control efforts were then at "normal and appropriate" levels, and the inference was accordingly that the conditions in the community having a high potential for generating delinquency were on the decline. This conclusion was based on the following considerations:

1. The knowledge that the period of exceptionally high disruption of community life resulting from the very great amount of construction in the community had come to an end,

2. The knowledge that the very high turnover rates and levels of transciency associated with the Syncrude construction period had materially declined, and that thus it should be possible for more stable community life to become established.

3. The knowledge that while recreation facilities, and particularly sports facilities, as well as the neighbourhood sponsorship of sports teams for children and young people and of neighbourhood recreational programs during the Syncrude construction years had been in short supply and often non-existent, the shortages of facilities has now been generally rectified, and the organizing of neighbourhood teams and recreational programs is now proceeding well.

4. The knowledge that the various programs which were designed and aggressively implemented to promote neighbourhood participation and neighbourhood involvement, the AID and the Neighbour Aide programs, were proving to be very successful, so that families which had once felt isolated were now becoming involved in the web of neighbourhood relations, and were gaining support from these involvements.

5. The expectation that the consequence of this increase in availability of neighbourhood support systems would be better relationships within families, less stress and strife and more harmony, and that this would significantly undercut the emotional disturbance sources of motivation for delinquent behaviour in young people, and

6. Lastly and most importantly of all, the expectation that with neighbourhood and community networks becoming established, the informal controls on delinquency would

experience a sharp increase in effectiveness. These are, after all, far more effective than the formal policy controls. As a result it seemed plausible to expect that delinquency would be more effectively contained.

Alsands believes that there are no basic flaws in this reasoning. However, Alsands consultants did overlook the discretionary element which, as the directive (6.1.1) points out, may change and result in higher rates of charges being laid. Alsands does agree that, with the impending completion of the Youth Assessment Facility, the tendency will be for policy to make use of it by arresting and charging juveniles now permitted to go free, and accordingly that the tendency then will be for delinquency rates, as reported, to elevate.

The implication of the above discussion is that while the reported rates of delinquency charges may increase, the incidence rates of actual delinquent behaviour, whether unknown to the policy, or only treated in terms of warnings, is expected to decrease, for the reasons detailed above.

Alsands acknowledges that there is a large cohort of children who will be entering the high risk period, in terms of juvenile delinquency, during the Alsands years. Thus, with the proportion of the population at risk increasing, the delinquency rate may tend to increase as well.

It is most important to emphasize at this point that while the incidence of delinquent behavior may decline, the incidence of delinquents taken into custody will increase. The result will be a very heavy increase in the workload of child welfare workers, and probation officers. As one Provincial Government expert on child welfare problems with whom the problem was discussed put it: "Those caseloads are just going to skyrocket."

The implication of this is to point out the extent to which the control of delinquency and efforts to divert children from the delinquent trend that their behavior is taking have suffered during the Syncrude construction years, as a result of the shortage of both police and child welfare personnel, and of needed facilities, such as a Youth Assessment Centre to which children who got into trouble could be brought by the police.

It must be anticipated that during the Alsands construction period there will probably be some increase in opportunities and in motivation for young people to become delinquent in Fort McMurray, as a result of the increased levels of activity, increased excitement, numbers of strangers in town, and the limited disruption of some pre-existing patterns in the city. On the other hand, the high degree of geographical dispersion found in this city, which is disadvantageous in many contexts, should prove to be an advantage in this context by tending relatively to insultate some of the residential areas of the city from some of the changes in pace, "excitement", etc., occurring downtown.

On balance and in conclusion Alsands believes that it is likely that the actual incidence of delinquent behavior should tend to decline between now and the onset of the Alsands construction period, though the delinquency statistics will almost certainly show a rise for the reasons specified in the directive (6.1Ø.1), and the caseloads of child welfare workers will increase as well. Following the onset of the Alsands construction phase there will no doubt be an increase in both delinquent behavior and in the delinquency rates, as was the case during the Syncrude construction years. Whether the increase at that time will be of minor or moderate proportions will depend upon the effectiveness with which the agencies and the neighbourhoods in Fort McMurray organize to meet the situation that they will face. We believe there is ample time and information to allow proper planning and execution of mitigative measures to meet this possible problem.

Government which are most centrally concerned with the development and the welfare of the people residing in the Study Area. We felt sure that the relevant people in these agencies would be thoroughly familiar with the content of the Co-West Report. The heavy usage which was made of material in this report by Alsands consultants indicates their familiarity with the report and their agreement with its findings and conclusions.

Alsands would emphasize explicitly that it is in accord with the information presented, the process of analysis, the conclusions derived, and the recommendations which are made in the Co-West 1978 Report.

6.10.2 In addition, although some information from the Co-West Report for the Department of Social Services and Community Health and the N.E. Commissioner on health and social service planning for the Fort McMurray region was incorporated into the Alsands report, it was not referenced, and the assessment did not provide a complete review of the information within that document. While many tables were reproduced, the arguments regarding the nature of development, issues in social and health services and the future of those services in Fort McMurray and the region had not been utilized.

Answer

Alsands acknowledges that while all of the material utilized from the Co-West Report for the Department of Social Services and Community Health etc., was cited (Co-West, 1978) the source itself was not included in the Bibliography at the end of Volume 2, through a clerical error.

In respect to the failure of Volume 2 to "provide a complete review of the information within that document" and to utilize "the arguments regarding the nature of development, issues in social and health services and the future of those services in Fort McMurray and the region", Alsands would suggest that it did in fact make use of a great deal of this material. More than 24 pages of material in the Volume 2 document was derived directly or indirectly from this Co-West Report. This reflects more heavy usage of this report in compiling the material for the Volume 2 Assessment, than of any other source, by far. However, much of the material in the Co-West Report was used only indirectly, by necessity; there are a total of 250 pages in the Co-West Report.

Alsands did not believe that it was necessary to reiterate the material that was not used, because this report was produced for the three agencies of the Provincial

The urgency or difficulty of the problems which some of these people faced tended to increase. The alternative resources for help available to many clients tended to increase well beyond levels that the caseload figures accurately reflect because of the "shadow population". This refers to the number of transient clients who came in, caused applications to be taken which had to be processed, had records elsewhere which had to be sent for, etc., and who then left the community after a few days, weeks, or months, their places being taken by new client applicants who often proved to be equally transient.

The ability of these delivery systems to respond to these demands tended to decrease, at least relatively, for the following reasons. The failure of new staffing to keep pace with the increase in demands meant that staff were overworked, and indeed overstressed, and frustrated by the inability to do the kind of job with particular clients that they would normally expect to do, because the overloading prevented it. As a result staff morale tended to be low, and staff turnover increased. Replacement of staff took time, and replacements when obtained were often inexperienced and required orientation to the peculiarities of the Fort McMurray situation and the kinds of problems typically encountered. The problems experienced by service delivery personnel in living in the community: overcrowding and long waiting periods in stores, banks, etc., long waiting periods to see doctors and dentists, the lack of recreational resources and opportunities, and the problems in forming close and supportive friendships in the then highly transient community all tended to reduce their ability to perform with maximum effectiveness on the job.

The preventive approach to these problems will involve promoting the rapid development of normal neighbourhood and community life, including particularly neighbourhood involvement and establishment of contact and friendship networks, so that these informal structures can perform the

6.1Ø.3 Alsands should provide additional discussions of the processes which occurred with social services during the Syncrude experience and in which agencies managed to cope with the development impacts. The Alsands E.I.A. appears to indicate that adding or extending services will meet the problems of living and working in a northern resource town. Alsands should re-examine that assumption in the light of the discussion they will be providing in the E.I.A. on the experiences with past developments.

Answer

It will of course never be possible to know the extent to which "agencies managed to cope with the (actual) development impacts." What happened inevitably was that the level of service deteriorated, clients waiting for attention increased in number and waiting periods increased in length. At times scheduled visits to outlying communities, Fort Chipewyan, Fort MacKay were missed. As a result of all of these circumstances, some people who would have sought and would have obtained help from the relevant social service agencies, came to realize that this help was more difficult to obtain than they had anticipated, or could not be counted on, etc. Accordingly, they failed to come for help, or left after waiting for a time, getting by on their own resources, obtaining some help from relatives, friends and others, or doing without help. Generally, in respect to social services the demand for services is somewhat flexible, responding to the level and kinds of services available.

The experience of social service delivery system during the Syncrude construction phase was typically that the demands for their services increased substantially. The demands increased for a number of reasons. The number of people in the area increased rapidly. The proportions of these people who needed certain kinds of services tended to increase.

services for people that social and other human service delivery systems may otherwise be called upon to provide by default. The urgency of taking the steps which would facilitate the development of neighbourhood and community involvement, and the ways in which these might be done -- community facilitators, AID, Neighbourhood Aides, Helplines, etc., -- have been described before. It must be re-emphasized that early progress toward community involvement will depend on the presence of the trained and experienced persons, community facilitators, etc., who will serve as the catalysts to stimulate the emergence of neighbourhood networks and informal community structures.

Unless this type of approach is taken, efforts of a crisis-response nature attempting to keep up with the demand will not be successful. It is recognized that adding additional staff will never be sufficient as any program is only as good as the people involved in it. In this case not only are trained and skilled staff essential but also an interested and involved community. In the long run it can only be the community processes that determine success in coping with the negative impacts of development. Co-West discuss the futility of a traditional response as follows.

> "The normal response of service agencies, as a rapidly rising population presses in upon them, is to request more resources, i.e, personnel, facilities and funding. Government departments can be guided more easily by precedent than by a new situation and tend to respond accordingly.
>
> The evidence indicates that Ft. McMurray is in fact a 'new situation' in Alberta's history and outside precedent has not been proving adequate as a response model for health and social services. Such a <u>model</u> has made it difficult for service agency requests for more resources to be fully

understood and responded to at departmental levels. When increased funding has been made available it has not answered the need, partly because response was based on outside precedent and partly because population growth has been so rapid that planning and service ratio figures are out of date by the time a budget increase is approved.

Alsands agrees with the Co-West assessment and suggests that planning should be initiated now.

6.10.4 In addition, the Alsands report should more adequately deal with the phenomena and ramifications of the "shadow population", and turnover rates and other effects upon service demands.

Answer

There has been substantial discussion of the problems posed by attempting to assess the size of the shadow population, and the relatively invisible but highly demanding ways in which they exacerbate the demands on service delivery agencies above, particularly in 6.4.2 and 6.10.3. These discussions may be summarized as follows:

1) The shadow population does not show up in caseload statistics because they are typically on a particular case load for such a brief period of time,

2) They add greatly to the work load of case workers, because they do require that the time consuming chores of taking applications, filling out and processing forms, sending elsewhere for prior records, etc. be carried out for them.

3) The problems that they present tend to be unusual in terms of number and severity. It is often for these reasons that they move on after a relatively short time, hoping thereby to escape from some of their problems.

4) Given the severity of their problems, they are demanding of more of the time and the expertise of service delivery workers. Such cases may require time spent in consultation with the Director, or with other more experienced workers.

All of these distinctive aspects of the kinds of cases that members of the "shadow population" present increase the burdens that they pose for case workers far beyond the work required by an average case in a relatively stable population elsewhere in the community. As the Co-West Report (1978) correctly emphasizes, this component of the case population served by the service delivery agencies in Fort McMurray during the Syncrude construction years contributed by far the greatest share of the added workload that these agencies experienced during those years.

6.10.5 The assessment does indicate that the impact of the project related population demand upon social services in the Fort McMurray area will likely be of moderate to major significance. It does not however discuss the potential range and scope of the impacts upon social services resulting from the project. That should be addressed in the E.I.A.

Answer

The impacts on social service delivery systems in Fort McMurray which would occur during the Alsands construction phase must be expected to affect the full range of these systems including public health, child welfare and social assistance, mental health, alcoholism and drug abuse treatment, and the full range of preventive social service programs. On the basis of prior experience in Fort McMurray, it appears that programs catering to women and children, programs dealing with mental health problems, and programs dealing with alcoholism and drug abuse problems will be those most heavily impacted. In the event that unemployment rates in the rest of the country are particularly high and thus that large numbers of people are drawn to the area seeking employment that they cannot find elsewhere, beyond the capacity of the development activity to employ them, social assistance programs will certainly be heavily impacted as well.

Unfortunately, it is not possible to detail the levels of impacts to be expected by these various types of programs. Because of the computerization of data records that was proceeding at the time that the data for this Impacts Analysis were being gathered it was not possible in many cases to obtain statistics on caseloads, program demands, etc., prior to about 1976. Thus it was not possible to establish the pre-Syncrude construction phase levels of demands in order to accurately determine the magnitudes of the increased demands that this construction phase induced.

Alsands assumes that, if necessary, the appropriate agencies will be able to retrieve the relevant statistical data that these agencies felt could not be conveniently provided to Alsand consultants, which would permit accurate assessment of the demands for social services which resulted from the Syncrude construction phase. This would permit projection of the levels of demands to be expected during the Alsands construction phase. Alsands believes that there is now available more than enough lead time to permit these data retrieval and project efforts to be made, so that the needed changes in the service delivery systems can be in place by the onset of the Alsand construction phase.

6.10.6 In addition, the basic assumption made throughout the assessment is that the required services and facilities will be available for the development. Alsands should indicate what impacts will result even if those services were in place. Special attention should be addressed to the impact of staff turnover, both within the service as well as without, the level of stress existing within the region, the presence of a large transient population, the variety of backgrounds and points of origin of the population and how those factors combine to create increased demands upon social services.

Answer

Assessment of the impacts that will result even if the social service systems are in place requires an adequate understanding of the interrelated aspects of the situation in this region which generates the demands for social services, and the extent to which these services will be able to adequately cope with these impacts.

The various dimensions of the impacts generation and mitigation may be identified as follows: the level of stress existing in the area, the distinctive characteristics of the population prospects for recruitment of volunteers, the adequacy of the social services delivery systems -- including their abilities to engage in preventive, and intervention as well as crisis management in respect to the problems of the area, and the problems the service delivery systems experience relating to the adequate staffing in the area. All of these are interactively related to the kinds, range and scope of impacts which may be experienced by the social service delivery systems in both the new town, and in Fort McMurray. We anticipate that the kind of problem complex that may emerge in Fort McMurray as a result of the Alsands operation would be similar to that in the new town but at very much lower level of magnitude in Fort McMurray. Each of the above listed components will be elaborated on briefly.

Level of Stress in the Area: At numerous places in both the Regional Socio-Economic Impact Assessment Volume 2 and elsewhere in these Deficiency Responses we have discussed the numerous and somewhat unusual sources of stress which do, and will continue to exist in this area. These include the stresses caused by the disruption of the rapid development and particularly those induced by extensive new construction, by workers away from home long hours; by lack of opportunities for women to find meaningful involvements outside the home; by the problems of understanding and cooperation induced by the diversity of the population; by the lack or scarcity of sources of primary support family and neighbours which exacerbates the consequences of stress; and by delays in access to social service agencies which could help to alleviate some of the consequences of stress.

Distinctive Characteristics of the Population: The most important of these is the very high turnover rate which induces the "hidden" overburdening of the human services of all kinds and which has been discussed a number of times before. a further characteristic of this shadow population is that it apparently has distinctively high problem rates; this is one of the reasons for its mobility. Other characteristics include the youthfulness of the population which means that it tends to lack the experience and the maturity to enable it to better cope with some of the problems that it faces, the rootlessness of the population, and the diversity of the population, mentioned above.

Recruitment of Volunteers: Some of the difficulties experienced in recruiting volunteers for neighbourhood and preventive programs have been experienced in Fort McMurray in recent years. The rootlessness and high turnover rates make the recruitment of volunteers very much more difficult. This in turn tends to retard the development of the kinds of

preventive programs, and the emergence of the neighbourhood groupings that would minimize stress reactions, or help people better to cope with them when they appeared.

The Adequacy of the Social Services Delivery System: We have earlier discussed the considerations relevant to adequacy of these services. They involve adequate advance planning, budgeting, recruiting and training, relative to the anticipated demands, satisfaction of staff with the life available to them (i.e. the facilities, amenities and services available to them in the new town) and the adequacy of the services they are able to provide. These in turn all relate to, and interact with, staff turnover and the speed with which vacancies can be replaced, and the competencies of these replacements.

All of these are critically related to the effort that the staff is able to invest in preventive and intervention efforts. The most compelling demands, of course are the crisis response demands. If the available staff is very heavily committed in terms of crisis management, there will be very little possibility for preventive and intervention efforts. Under these circumstances the problem generating processes in the region must be permitted to continue unabaited, the prospects for ameliorating the general situation are poor. As a result the agency staffs may well become discouraged with the prospects of what lies ahead.

Problems of Adequate Staffing: These problems are central to the adequacy of the delivery of services, and were adequately suggested in the preceding sections. The point to be emphasized is that for staffing to be dependably adequate, at least during the first year or two in the proposed new town, will require initial overstaffing. This is essential to insure that there are adequate backup personnel to fill in the gaps if the demands prove to be heavier than anticipated, and when the inevitable initial staff turnover is felt.

Clearly all of these interrelate and to some extent compound each other so that the problems relevant processes can spiral down, or spiral up, as noted elsewhere.

In the light of this model, we have briefly suggested it is obvious that there will inevitably be impacts even if the social service are in place; the critical question is how adequate these services are, relevant to the various influences generating the demands. If they are entirely adequate it will be possible speedily to implement preventive efforts, thus forestalling the deepening of problem conditions.

6.10.7 Alsands should indicate their role and responsibilities towards the mitigation of impacts upon social services in the region. The assessment indicated some very positive mitigative measures relating to the recruitment policies and practices of the company, and the proposal for various community facilitators. The company needs to clarify its position and commitment regarding those measures in the E.I.A.

Answer

As indicated earlier, Alsands will endeavour to recruit a work force which will not make unusual demands on social service delivery system in the new town. Alsands believes that the planning and funding of preventive programs is generally the responsibility of the Preventive Social Services Branch, since it has the authority to develop and fund programs in areas where there is no well constituted political authority.

However, Alsands wishes to facilitate and expedite the organization of these programs which it believes to be exceedingly important to the speedy crystallization of a socially functional community. Accordingly it is prepared to enter into discussions with representatives of the Preventive Social Services Branch concerning ways in which Alsands might help in the planning process.

6.10.8 In addition, as a result of the necessary revision of the project impact portion of the E.I.A., Alsands should re-address itself to other possible mitigative measures regarding social service demands and its role, responsibility and commitment to those. Of particular concern are measures to deal with alcohol and drug abuse among employees and the establishment of support services for employees such as day care centers, counselling services, and orientation seminars for workers and their families to ensure as smooth an integration as possible into the region.

Answer

Alsands will be providing orientation seminars and counselling services for Project employees. In consultation with AADAC, Alsands will develop and provide suitable alcohol and drug abuse programs such as are offered by most of Alsands owner companies.

Alsands is currently working to devise policies relating to the support services it will provide project personnel, such as day care centres, realizing that such programs will be essential to its goal of maximizing female employment.

6.11 LAW ENFORCEMENT

6.11.1 The assessment appears to have adequately described the existing conditions relating to law enforcement excepting for those points raised within the previous section on social services.

Answer

No response is necessary.

6.11.2 The assessment has assumed that the impact upon law enforcement during construction of the project could be of major significance. Again however the assessment assumes that the necessary services will be in place for the project. The assessment needs to address the possibility that that may not occur in order to adequately assess the potential impacts of the development.

Answer

Alsands will not move their staff into the new town prior to establishment of effective police protection in that town.

Alsands would emphasize its conviction that the responsibility of providing protection and safeguarding the safety of the residents of the new town will lie with the provincial policing agencies, and its assumes that these agencies can and will begin to plan to assume this responsibility in a timely manner. Alsands will co-operate with the appropriate agencies fully in providing it with updated plans and projections on a continuing basis.

6.11.3 Alsands needs to outline the manner in which they may act, or the measures they may adopt, especially respecting the operation of the construction camp, and recruitment, which would serve to mitigate the negative effects upon law enforcement agencies in the region. A statement of commitment to those measures is also required in the E.I.A.

Answer

Alsands has considered, and as time passes will discuss with its contractors (once chosen), with union and with RCMP representatives, the ways in which recruitment procedures affecting construction personnel might be devised which would minimize the security and the law enforcement problems which some proportion of those personnel will pose.

In respect to operation of the construction camp, Alsands will provide the following:

1. Provision of recreation facilities such as listed in 6.12.4 and a controlled lounge facility serving alcoholic beverages. Availability of these facilities, the Syncrude construction experience shows, will largely eliminate the motivation of construction workers to go into the new town, Fort McMurray, etc., after working hours, hence reducing the potential for additional police work.

2. Patrolling by private security forces who will deny access to unauthorized people, and maintain security surveillance in the camp.

6.12 RECREATION

6.12.1 The discussion of existing conditions respecting recreation appears adequate.

Answer

No comment is required.

6.12.2 Alsands has assumed that most of the necessary recreation facilities will be available for the development. The assessment needs to seriously consider the possibility that recreation facilities in the new town will be delayed, with the result than an increased demand will be placed upon other recreation resources in the region and particularly in Fort McMurray and provide an assessment of that situation in the E.I.A. The assessment needs to consider that many recreation facilities and programs are the responsibility of the municipalities, and in the case of the new town, it may be some time after its development before it is able to put those facilities and services in place.

Answer

Alsands is aware of and very much concerned that the shortages in recreation facilities and programs that were experienced in Fort McMurray during the Syncrude construction phase, and the problems of overuse, not be repeated for the new town. Clearly these shortages would have implications for a range of problem conditions for the new residents and for the existing population in the region.

Alsands acknowledges that this situation could develop in the new town and would be pleased to work with the Departments of Recreation Parks and Wildlife, and of Culture in planning ways in which this situation can be avoided.

In the event that the situation did develop in the new town such that adequate recreation facilities were not available there would no doubt be some impacts on Fort McMurray, although because of the distance separating the two towns, it is doubtful that people from the new town would go to Fort McMurray very often solely for recreational purposes.

Assuming this analysis is correct, the impacts on Fort McMurray would probably centre on: commercial entertainment recreational facilities, and sports activity facilities not available in the new town including swimming, bowling, curling, perhaps ice skating. Given the surplus of facilities that completion of the McDonald Island Recreational Complex will create (projected as adequate for a population of 35,000) it seems likely that this deflected new town demand would not tend to overburden the availability of facilities in Fort McMurray at least prior to 1986.

It may also be assumed that patronage of commercial entertainment and recreational facilities in Fort McMurray by new town residents would be welcome, and would not risk overburdening these facilities, because the distance separating the two towns will keep this patronage quite limited.

In the event that camping facilities were not provided near the new town in a timely fashion it must be assumed that there would be increased use of the Gregoire Lake facilities by new town residents, thus further adding to the overcrowding of those facilities. It would also undoubtedly result in substantial clandestine camping and other recreational use of unauthorized areas, with consequent increased fire hazard, risk of environmental damage, possible disturbance of wildlife habitat, etc.

Alsands wishes to emphasize its concern about the full range of possible adverse consequences from failing to have adequate recreational facilities in place in the new town by the time that the permanent residents move in. It is able, and it plans to negotiate with people interested in the development of commercial recreational facilities in the new town to insure that an adequate number and variety of these will be in place and operating in a timely fashion. In the case of non-commercial facilities and services, including both those

that should be situated in the town and out-of-town, Alsands believes that these are the responsibility of the Provincial Government. However, Alsands proposes to work co-operatively with the relevant Government departments in order to insure that these facilities may be provided, in as complete and timely a fashion as possible.

6.12.3 The assessment needs to more thoroughly examine the possible increased facilities and the need for new or expanded facilities, in addition to providing an examination of the recreation services which will be required as a result of the project.

Answer

It is assumed that this directive refers to Fort McMurray. While a major inventory of Fort McMurray's recreation facilities conducted in 1975 showed some significant deficiencies, the information contained in Table 6.12.3a shows that these deficiencies no longer eixst. This conclusion is based on interviews with the relevant officials and evaluation of existing facilities together with those currently under construction.

The Syncrude Environmental impacts analysis (Syncrude, 1978 Volume C) demonstrates that significant surplus recreational capacity in fact exists or is being created.

> Ice facilities in place and under construction are comparable to those of the larger municipalities of Medicine Hat and Lethbridge. After construction is completed, the number of curling sheets will increase substantially, providing an even higher standard than that recommended by the Parks and Recreation Association. There are abundant sports and athletic fields, including some twenty baseball diamonds and eight soccer fields spread throughout the municipality. In addition, Fort McMurray has one go-cart track and two miniature golf courses which are not included within the comparative analysis of recreational facilities. All facilities listed are over and above after-school facilities which are used extensively by Fort McMurray residents. In summary,

after completion of the major facilities under construction (discussed in section below), Fort McMurray will have recreational facilities which meet Parks and Recreation Association standards (Syncrude, 1978).

The information in Table 6.12.3b shows, however, that Fort McMurray is deficient in cultural facilities when compared with towns of similar population in Alberta and the rest of Canada. Specifically, there are shortages of theatres, both indoor and open air, as well as meeting halls.

On the basis of this information, it seems probable that Fort McMurray will have in place most of the recreational facilities which will be needed during the Alsand cnstruction and early operation phases by the time that all of the facilities currently under construction are completed. This would not be true if there were other concurrent developments. Analysis of the cumulative impacts of such developments can only be made when further information is available which would provide adequate bases for projecting recreational impacts and evaluating the adequacy of existing resources in the light of these projections.

TABLE 6.12.3A

COMPARISON OF RECREATION FACILITIES - FORT McMURRAY & SELECTED ALBERTA MUNICIPALITIES

FACILITY	COMMODITY AND POPULATION I					EXPECTED FACILITY POPULATION RATIO II	FORT McMURRAY		
							1975		Present and Under Construction III
	Lethbridge 65,000	Medicine Hat 30,000	Red Deer 30,000	Grande Prairie 12,000	Canmore 2,000		Existing Facility	Facility Deficiency	
Arenas - Major	Seating 5,000	Seating 5,000	Seating 1,000	2 Seatings 3,600	Seating 2,100	1 after 10,000 with 1,000 seats per 10,000	--	1 Seating 2,000	
- Rinks	3	2	2	2	1	1 per 10,000 in addition to Major	2	--	3
- Skating Ovals	1	--	1	--	--	1 after 30,000	--	--	-
Swimming Pools - Indoor	2	2	1	1	1 proposed	1 after 10,000 1 addit. per 15,000 added	1	1	1
- Outdoor	2	5	1	1	1	1 per 15,000 in addition to Indoor	--	1	-
Curling	10 sheets	12 sheets	9 sheets	6 sheets	9 sheets	1 sheet per 3,000	4 sheets	4 sheets	12
Major Sports Fields	1	1	1	3	1	1 per Region	partial	completion	1
Golf Courses	36 holes	36 holes	27 holes	18 holes	9 present & 18 proposed	1 hole per 1,000	9 holes	18 holes	9 holes +9 under
Skiing - Downhill	1 in region	1 in region	1	2	2	1 in region	1 (poor) condition	--	1 (Temp)
- X-Country	unorganized	unorganized	1	1	1	1 per Urban Center	unorganized	1	
Nature Center	1	proposed	1	1	--	1 per Urban Center	--	1	-
Marina	1 in region	1 in region	1 in region	--	--	1 in region	partial	1 develop	partial
Major Urban Parks	3	5	4	3	3	1 per 1,000	2 (poor) condition	2	2
Rodeo Exhibition Racing	1	1	1	1	1	1 per Urban Center	--	1	-
Theater - Public	1 seats 500	1 seats 500	1 seats 800	1 seats 350	1 seats 800	1 after 10,000 seating 500+ 1 addit. at 30,000 seating 300	--	1 seats 500+	2 under construction
Arts & Craft Center-Program Rooms	12	8	6	10	6	1 room per 1,000	1	6	2 under construction
Gallery	1	--	--	1	--	1 after 30,000	--	--	
Major Community Halls	3	2	9	10	3	1 per 3,000	2	5	none
Museums	1	1	1	1	1	1 per Urban Center	--	1	1 (Heritage Park)
Tennis	8 courts	8 courts	8 courts	8 courts	6 courts	1 court per 3,000	6 courts	1	6 + 6 under construction
Senior Citizens Center	2	1	2	1	3	1 per 15,000	--	1	1
Commercial Theatre	4	2	3	5	2	1 per 8,000	1	2	2 Indoor
Drive-In	1	1	2	1	1	1 per Region with pop. over 15,000	--	1 addit. indoor theatre	1 approved for construction
Bowling	26 lanes	12 lanes	20 lanes	10 lanes	12 lanes	1 per 2,000	--	11 lanes	1
Motor Racing	1	1	1	2	1	1 per Region	--	1	?

I Source: A.R. Shelley Associates, "Recreation Facility Comparative Analysis"
II Per Canadian Parks & Recreation Standards
III Per Interview with Town Administration Recreation Director

TABLE 6.12.3B

COMPARISON OF FORT MCMURRAY CULTURAL FACILITIES

(with towns of 10,000 to 29,999 population)

	Alberta		Canada (excluding Alberta)		Fort McMurray	
No. of Towns	5		23			
	No. of facilities	Average/ town	No. of facilities	Average/ town	No. existing	No. under construction
Museums	5	1	9	.4	1	-
Art Galleries	0	0	3	.1	0	-
Libraries	10	2	29	1.3	1	1
Cinemas						
Indoor	4	.8	11	.5	2	-
Drive-In	4	.8	7	.3	0	1
Theatres						
Indoor	0	0	0	0	0	1
Open-Air	1	.2	2	.08	0	1
Studios	38	7.6	27	1.2	0	0

Source: Syncrude 1978 Volume C

6.12.4 Alsands should provide additional information on how it intends to mitigate the potential negative impacts to recreation resources in the region. Specifically, attention should be addressed to the company's policies regarding facilities at the construction camp, housing and living allowances for employees, and the provision assistance for community recreation facilities and services.

Answer

Regional recreational facility recommendations are presently included in the EIA. Developments in general in the region will have impacts and unless adequate expansion occurs, present facilities will be stressed. New facilities at the provincial level will be needed. Indirect impacts of increased use of biophysical resources will need to be mitigated and appropriate increases in enforcement of environmental and hunting regulations should be planned.

Specific policy with regard to recreational facilities provided for construction phase employees will be forthcoming once the more detailed facility planning occurs.

However, it can be stated at this time that the jobsite will be as complete and self-sufficient in leisure and recreation facilities as possible to maintain good morale on the project.

The following facilities will be considered (but not limited to) in the detailed planning phase

Recreation Rooms - pool tables, table tennis, card rooms, TV rooms, lounge etc.

Gymnasium

Theatre(s)

Arts and Crafts Centre(s)

Arena - Skating, hockey
Swimming Pool
Tennis Courts
Fastball Field(s)
Soccer Field(s)

A competent staff of trained and experienced personnel will be made available to supervise and organize the many and varied recreational programs.

Consideration for housing and living allowances for employees, and the provision assistance for community recreation facilities and services is the subject of ongoing studies in relation to the new town.

6.13 NATIVE PEOPLE

6.13.1 The Alsands study provided a large amount of descriptive material relating to the characteristics of the Indian and Metis peoples inhabiting the Fort McMurray region. The assessment, however, did not discuss the cultural environment the native peoples live in. The assessment should address those issues which relate to those aspects of their cultural environment which would mitigate against their participation in the benefits which would result from the project. Special attention should be directed towards the discussion of the basic life skills, social and organizational skills, technical and educational skills, as well as financial and other resources that those people would require in order to take advantage of the social and economic opportunities of the project. Alsands should also indicate what support services would be needed to ensure native participation in the project. To complete the E.I.A., Alsands will be required to participate in a public participation process involving native peoples directed towards the assessment of their present life and skill situations. The skills, resources and other requirements they will need to possess in order to participate in the benefits acruing from the project; and to outline what responsibility the company has towards those peoples in the provision of skills, resources and opportunities.

Answer

The existing cultural environment of the native people in the Study Area is less well adapted to prepare them for industrial employment than is the cultural environment of most non-native Albertans, even though many of the residents have had industrial employment experience during the Syncrude construction period. The Syncrude Environmental Impact Assessment (Syncrude, 1978, Vol. 3C) reports that during 1976 there were as many as 600 native people working for Bechtel at

e time, though it is not known what proportion of these ... ave come from outside of the study area. Nevertheless ccasional and frequently brief wage employment experiences of his sort do not compensate for the gaps that exist in the typical native cultural environment in terms of preparing native people for more complete involvement in such employment, with good prospects for upward advancement, where they desire it.

In this section we shall discuss first the ways in which the cultural background of native origins people fails to equip them to participate effectively in industrial employment. The discussion is organized into the following categories: basic life skills, social and organizational skills, technical and educational skills, and the financial and other resources and the support services native people will require if they are to take advantage of the social and economic opportunities offered by the Alsands project. This section concludes with a discussion of the programs that Alsands is ready to establish which will aid in the acquisition of the needed skills, and in provision of the needed resources and opportunities.

The most recent and comprehensive review of the available published and unpublished literature on this subject is found in a report by the Canadian Institute for Research entitled Native Employment Patterns in Alberta's Athabasca Oil Sands Region, Canadian Institute for Research, 1978 which was made for the Alberta Oil Sands Environmental Research Program. This section draws heavily on material presented in this report.

Basic Life Skills: The Canadian Institute for Research (CIR) report summarizes the findings from its review of the literature in respect to basic life skills as follows:

> It is claimed that persons who are suddenly faced with a new life style (e.g., employment in an industrial setting;

residence in an urban environment; etc.) will requi variety of new skills and understandings in order survive. These new skills are referred to as "life skil and include such things as acceptance of work hab regulated by the clock and calendar, appropriate attitu towards authority, budgeting and money management skill knowledge and skills related to using household equipme (e.g., telephones, appliances, etc.), knowledge and skil related to using the services of society (e.g. transportation, medical, recreation, etc.), knowledge o diet and food preparation, etc.

In general, the literature reviewed concludes that the "life skills" approach has very limited value as a solution to unemployment. Morrison (1975) points out that the concept for "life skills" implies cultural inadequacy for groups that supposedly lack these skills, and is, therefore, subtly destructive. Emphasis on the acquisition of "life skills" has been replaced by an emphasis on integration of work, life and social skills. The literature suggests that:

1. "Life Skills" should be restricted to job-related tasks and relocation requirements if relocation is necessary (e.g., Wall, 1975). However, La Rusiac (1970) disagrees, claiming that job training should also look at how the system works in order that native people can develop both functional skills and strategies for self-defence.

2. The company's responsibility should extend beyond the place of work. What happens in the work place has a significant impact on a worker's community and family relationships and vice versa. Integrated, comprehensive programs are needed (Heinemann, 1975). Counselling and guidance should be integral parts of training programs (Gemini North Ltd., 1975; Christensen, 1979). (Canadian Institute of Research, 1978, pp. 42, 43).

Social and Organizational Skills: The CIR review of the relevant literature points out that there is substantial disagreement in the literature in respect to the extent to which native people suffer from a lack of managerial and organizational skills:

> Some studies have pointed to a lack of such skills. Christensen and Niederfrank (1971), for example, found that non-native management was required for economic development on the Fort McDermott reserve, although the project stressed native involvement. Duran and Duran (1973) attribute the failure of the Cape Crocker furniture factory partly to a neglect of training in management skills, and accounting and marketing techniques. The Metis Regional Council (1972) recommends that the government provide resources to develop the management skills necessary for native-run business.
>
> Other studies have questioned the assumption that there is a widespread lack of management and entrepreneurial skills among native groups. Native groups and individuals, it is claimed, have often shown considerable initiative when given the opportunity. Further, individuals who show initiative are often absorbed (co-opted) by the larger society, making lack of management skills more apparent than real. (Canadian Institute for Research, 1978, pp. 33).

Educational and Technical Skills: The CIR report summarizes the results of its review of the literature relating formal educational attainments to the employability of native people by emphasizing that the number of completed years of formal schooling of native persons is generally below the Canadian average, and further noting the "most of the studies in the oil sands region reiterate the fact that native people in the area have low educational levels. Schooling

opportunities in the native communities are limited and facilities are poor. However, the native people are convinced of the importance of schooling since the community aspirations include high school and adult education classes taught on the reserve." (CIR, 1978, pp.62).

The CIR review reports that low levels of formal schooling are attributed in the literature to the following influences:

a) difficulties in attracting trained, permanent teachers to isolated communities, and lack of trained indigenous teachers;

b) limited years of schooling available in some communities;

c) church influence in some schools;

d) limitations of curricula (e.g., lack of relevant local materials);

e) conflict in federal-provincial jurisdictions;

f) failure of education systems to adjust the calendar year to traditional hunting and fishing societies; and

g) lack of communication between non-indigenous teachers and administrators, and the local community.

(Canadian Institute for Research, 1978, pp. 34).

The literature reviewed suggests three different solutions to the problem of low schooling levels in employable adults, according to the CIR report. These are described as follows:

a) One proposed solution is adult basic education and upgrading. For example, Pope (1969) describes a basic educational program for adult native Americans at the University of Montana.

Although low levels of formal schooling of native people are recognized, the literature is ambivalent about the extent to which raising formal education levels facilitates employment. De Long (1973) in a study of manpower training programs in South Dakota, found that higher levels of formal schooling improved trainee's chances for successfully completing training programs. However, a number of studies have questioned the usefulness of concentrating on adult basic education as a solution to unemployment. Deprez and Sigurdson (1969) in a study of five Indian Training Programs, conclude that education is effective only if the native persons involved are able to identify with the goals of the program. The study shows that education is not a necessary precondition for economic transition.

Adult basic education programs have often assumed that the primary employment value of formal schooling is adult basic literacy. In instances where adults have not had the benefit of formal schooling, the proposed solution is to raise literacy levels through adult programs. Recent studies, however, have indicated that while literacy may be one important factor, it is not necessarily the most important one for employment acquisition and maintenance. Roberts (1974), Rogers (1969), Wolfart (1971) all note that increased education has not had its assumed benefits. Elias (1975) points out that an important outcome of protracted formal schooling is a tolerance of conditions that may be encountered in the work context (e.g., authority relationships, boredom, alienation, etc.). This

outcome is not provided by short-term adult basic education programs, and hence these programs have limitations in terms of work adjustment.

b) A second proposed solution to low levels of formal schooling is the discountinuation of the employer practice of using grade level of formal education as a screening device. For example, the Manitoba New Careers Program described by Ryant and Proctor (1973) secures entry into the civil service by having usual credentials waived. Elias (1975) points out that credentials or standards are often artificial barriers which have little to do with the ability of persons to work, produce quality products, or derive work satisfaction.

c) A third solution to problems associated with low levels of formal schooling relates to the accompanying lack of acquired tolerance for alienating work conditions. Elias (1975) notes that one possible approach is to alter the forms of production, including patterns of ownership, decision-making, and reward allocation in order to make the work place less alienating.

(Canadian Institute of Research, 1978, pp. 34-36).

The CIR report also reviewed the published and unpublished literature relating occupational and technical training to the employability of native people. The findings from this literature review are summarized as follows:

A frequently identified barrier to employment is lack of skilled trades or vocational training. A major assumption of training and training/employment programs has been that training will reduce unemployment among native persons. This assumption has resulted in a wide variety of programs aimed at increasing the work skills of native people. The literature points out, however, that while lack of

vocational skills may prevent the acquisition of jobs requiring those skills, vocational training programs do not, by themselves, guarantee reduced unemployment. For example, in a 1970 study, Purley notes that although vocational training has increased, the level of unemployment of native people has not been substantially reduced.

Deprez and Sigurdson (1969) note that formal training in industry is not necessary condition for the adaptation of native people to an industrial economic environment. In practice, they found that training often presented problems where none existed and discouraged native people. They emphasize employment first, then training if necessary.

Much of the literature reviewed is directed towards identifying the elements that facilitate the success or failure of different types of training programs. These include:

a) On-The-Job Training

There is a trend in the literature to emphasize on-the-job training in preference to training in an institutional setting. Recommendations that training be conducted on-site, or on-the-job, are made by Wall (1975); Wilson (1975); Ryant and Proctor (1973); and Watson (1976).

b) Job Guarantees

The success of training programs is related, according to Wilson (1975), Ryant and Proctor (1973), Wolfart (1971), and Thos. Owen and Associates (1976), to specific training for existing job opportunities. Successful completion of training is more likely if trainees are guaranteed jobs, or if it is clear that jobs will be available. By itself, training does not lead to employment.

c) Supervision

A key element in the successful completion of training programs (as well as employment maintenance) has been identified as the supervisor. Ryant and Proctor (1973) in an evaluation of the New Careers program in Manitoba, note the importance of the line supervisor and call for the careful selection of supervisors on the basis of their understanding of the goals and objectives of the program, and their support for those goals. Morrison (1975) found that poor inter-personal relationships with the immediate supervisor were a major cause for leaving employment. Wall (1975) in a study of several training programs, notes that supervisory and training staff must be sympathetic as well as qualified. Hobart and Kupfer (1973) urge the careful selection, and orientation of supervisors in native psychology and values. Inservice training of supervisory and other staff working with native persons is recommended by Heinemann (1975) and Adams, et al, (1975).

d) Credentials and Career Paths

Some publications contend that to be successful, training/employment programs must offer legitimate credentials and career paths. The Report of the Manpower Working Group (Province of Manitoba, 1975) describes training as a vehicle to increase the employability of the client by ensuring access to career paths. It is claimed that too many programs are restricted to low paying jobs with little or no chance for mobility. Gemini North Ltd. (1975) suggest that procedures for certifying journeyman status be examined with a view to shortening or modifying requirements.

e) Training in the Community

In some instances it has been found that training is more successful when conducted in the local community than when conducted in a distant location, or in a distant

institutional setting. Heinemann (1975) notes that coping skills may be more readily acquired in one's home community where informal supports are available and trainees do not face too many problems and pressures at once.

f) Native Teachers or Instructors

Some studies suggest that training is more successful when native teachers or instructors are employed. The advantages of this practice are believed to include improved communications, and greater commitment to or identification with the goals of the program (e.g. Heinemann, 1975).

g) Special Counselling Supports

Special counselling supports are deemed to be crucial elements of a number of training programs described in the literature. (See Ryant and Proctor, 1973; Wilson, 1975; Gemini North Ltd., 1975). Readily available assistance with personal problems, with job placement, etc., are considered essential to the success of these programs.

h) Financial Supports

Financial supports, in the form of special allowances or salaries for on-the-job work are regarded as important elements of training programs byy Gemini North Ltd. (1971) who emphasize that support services should include allowances and subsistence, housing, family support, and transportation support.

i) Training Program

No single approach to the presentation of course or program content is identified in the literature as superior. However, several publications describe techniques which appear to have had some success. Jeanneau (1973) recommends an integrated approach to program content rather than the compartmentalization of "subjects," and suggests

minimum lecturing and maximum student participation. Gemini North Ltd. (1975) suggest examining the concept of incremental, achievement-oriented, individualized training units and simulated job circumstances as possible successful model of training.

j) Life Skills

Several publications recommend that life skills training be included as part of the training program (e.g. Watson, 1976). Wall (1975) recommends that life skills training be restricted to job-related tasks, relocation requirements, etc.

(Canadian Institute for Research, 1978, pp. 36-40)

Financial Resources Native People May Require:

Although the CIR report has a section dealing with "Economic Barriers" to native employment it is not very relevant to the present discussion, contending itself with contrasting the advantages and the disadvantages of large-scale industrial development and of "alternative development" for native people.

It is apparent that generally native people may require financial assistance in the endeavors such as:

a) in organizing companies,
b) in relocation housing and furnishing,
c) in connection with taking upgrading or specialized training.

While there are currently some government programs that provide assistance relevant to some of these needs this assistance is not generally available to non-Treaty Indian natives. In the other cases there are currently no programs available which are not tied to accepting employment with a particular company.

Other Support Services That Native People May Require:
The CIR report discusses some other support services that native people accepting industrial employment may require according to the literature they reviewed. Of relevance here are the following three:

a) Pre-Move Orientations
Lloyd (1974), Carr and Associates (1968), and Stevenson (1968) agree that pre-move orientations are crucial to successful relocation. These orientations should include the briefing of native persons on job expectations, rules of social behaviour, new life styles, etc. Stevenson (1968) recommends that information be provided in realistic terms rather than in idealistic terms.

b) On-Going Counselling
There is general agreement that information to, and counselling assistance for, relocated workers should not end with the move. Lloyd (1974) outlines the need for on-going counselling services. Carr and Associates (1968) suggest that relocated workers be met by people able to assist in a variety of ways and able to provide a variety of types of information. He also recommends that bilingual procedure manuals be made available.

c) Provisions for Maintaining Kinship and Cultural Ties both Stevenson (1968) and Carr Associates (1968) recommend this.

(Canadian Institute for Research, 1978, pp. 28)

Based on the above discussion, on advice from our consultants and the substantial experience of the Alsands partners in other areas, Alsands believes that the following arrangements and support services should be made available to local people in order to facilitiate their involvement in the Alsands project.

1. Pre-employment orientations in their home communities about work conditions, pay, rules, etc.

2. Assistance in arranging for transportation enabling them to commute to the work site from their present homes if they so desire.

3. Availability of ongoing work and non-work adjustment counselling to provide help in coping with adjustment problems on and off the job to those wanting to make use of it.

4. Assistance where necessary in ensuring adequate communication between workers commuting on a weekly (or longer) schedule and family members they have left at home.

5. Establishing on-the-job training programs appropriate to the educational backgrounds and the English language mastery of a broad spectrum of the native potential employees in the study areas, so that they will not be relegated to long term unskilled and menial jobs.

6. Establishing programs to assist interested and serious employees to obtain needed upgrading and special technical training so that they may attain advancement appropriate to their ability, their interests and thei motivational level.

Alsands is committed to ongoing consultation with various agencies and local communities to see that appropriate programs are developed and instituted.

6.13.2 The Alsands assessment has inadequately dealt with the potential impacts of their project upon native peoples within the region. The assessment of the projects will affect native communities and especially the community of Fort McKay, needs to be validated through a public participation process, the results of which are documented in the E.I.A. The E.I.A. should elaborate upon the potential negative social and economic impacts upon native peoples in the region if they are unable to participate in the project, in comparison to the potential positive effects if they are able to.

Answer

Based on the local peoples' stated desire to participate in the project and Alsands' commitment to maximizing employment and training opportunities we see no impediment to participation of local people.

The Syncrude experience of a peak of about 600 native people employed in 1976, and the increasing numbers of local people with industrial experience reinforces the conviction that they will participate. Elaboration of a "no participation" scenario is therefore not provided.

With respect to validation of the effects of the project on communities through public participation, this process was started early in 1978. Alsands is committed to a continuing community interface throughout the life of the project, and will report on the results of the process.

6.13.3 Because of the conclusions reached in the assessment regarding the minor impact of the project upon native peoples in the region, few mitigative measures were proposed. After the re-examination of the project impacts upon those peoples, as outlined previously, Alsands will be required in the E.I.A. to re-address the issue of mitigation of the negative effects of the development upon native peoples; and to provide an indication of the commitments the company intends to undertake to mitigate those effects.

Answer

Alsands considers that the potential for adverse impacts is present but that they can be minimized by proper mitigative measures. Alsands has emphasized that Fort MacKay is the most fragile community in the Region and simultaneously the one most vulnerable to a range of dangerous adverse impacts (p. 339 and earlier). It has urged the importance of monitoring the impacts of the project on Fort MacKay, and to indicate when new mitigative measures are required. Alsands has emphasized the vulnerability of this community to incursions by construction workers, to increased drug use, to erosion of mental health, to reduced delivery of needed human services. In terms of mitigative measures, Alsands has urged the importance of establishing an RCMP detachment in the community, of locating a community mental health worker in the community, and of guaranteeing unrestricted delivery of human and other services to this and other native communities.

Alsands believes that all of these mitigative measures are essentially government responsibilities. Alsands will keep the relevant government departments advised of changes in the plans and projections, so that these departments can insure that the required measures are all in place in a timely manner.

6.13.4 Alsands should indicate their policies regarding native employment, occupational and life skills training, and support services for native peoples.

Answer

Alsands is committed to the following policies in respect to native employment.

1) Alsands will endeavour to provide employment/training opportunities to all qualified local applicants during both the construction and operations phase.

2) During the construction phase Alsands will provide on-the-job training opportunities to local residents to enable them to qualify for skilled employment during the operations phase.

3) Alsands will provide assistance to local residents wanting to take upgrading and apprenticeship training in order to quality for more highly skilled employment with Alsands.

4) Alsands will assist in the arrangement of transportation for residents of the region to enable interested residents to live in their home communities and commute to work at the Project.

6.14 COMMUNITY ORGANIZATION

6.14.1 Within those sections of the report which deal with community socio-cultural patterns, and the impacts of the development upon those patterns; a large amount of statistical and descriptive data is presented regarding various aspects of the organization within the communities in the region, the quality of life possessed by residents, and the social problems which exist.

Answer

No response is required.

6.14.2 The assessment however does not present very clearly the manner in which the descriptive data has been gathered in the region. Although the report indicates that some interviews were conducted with region residents, and contains a list of those persons interviewed, no indication is provided for the manner in which the interviews were approached, the material covered in the interview, the purpose of the interviews or their length or depth. There is no indication given that either the consultants or the company used any public participation mechanism to gather and evaluate the information for these areas. Because of the nature of the data, and the importance of the overall context of the discussions, public participation is particularly essential to data within this area. The report provides little indication that the information contained within the report was more than the observations, value judgements and evaluations by consultants, directly or indirectly.

Answer

Alsands' consultants realized that because of the recency of the Syncrude construction experience, which was just ending during the time that the consultants were collecting data for the Volume 2 report, much that was relevant for Alsand about this experience, and many of the lessons that were to be learned from it had not found their way into any published studies or reports. Accordingly they determined that a very important aspect of the data collection process would be to seek out and interview many of the people who were in key positions to observe impacts of the Syncrude construction phase, and whose professional or political responsibilities required them to cope with these impacts, and to evaluate various possible mitigative measures. Their first major goal during the data collection process became to identify as many as possible of these people, and to contact, and conduct often lengthy interviews with them. Alsands owes a debt of gratitude

for the way in which they made their time available to their consultants.

The purpose of each interview was to learn all that the individuals being interviewed could tell us about the impacts of the Syncrude construction phase from the vantage point of his/her typically privileged position and his/her political, occupational, or professional perspective. The people interviewed with only one or two exceptions, cooperated fully in this venture, because they were in all but a few cases very eager to share their knowledge and their insights. They had lived through the experience, were just coming out of it, and in most cases were highly concerned that another town not have to go through the kinds of dislocations that Fort McMurray had experienced.

In terms of length, the interviews lasted from about 45 minutes to over three hours. In terms of depth, the consultants probed repeatedly on the issues that they talked about pushing the subjects discussed to the limits of the consultants' ability to ask fruitful questions about them.

During these interviews, the consultants took the opportunity to check with the people they were interviewing their early formulations concerning the causative processes apparently involved in generating adverse impacts, and possible mitigative measures that might be proposed. The interview subjects were asked to comment on and to evaluate these formulations. To this extent during quite a number of these interviews the consultants were in fact engaged in a public participation process.

6.14.3 In that light, the company should, for the E.I.A., establish a community involvement process which will provide a validation of the information contained within the report regarding these aspects, and attempt to provide a better understanding of the context within which the information relating to community organization, quality of life and social problems can be understood and evaluated.

Answer

Alsands is currently engaged in an ongoing process of validating the information in its environmental impact assessment volumes with citizen groups in both Fort McMurray and Fort MacKay. In Fort McMurray the Fort McMurray Team has asked for additional information, and this information has been supplied.

In Fort MacKay the Fort MacKay Committee has been supplied with copies of all of Alsands documents and it too has raised questions and expressed concerns.

Alsands representatives are meeting with both of these committees on a regular and continuing basis. Alsands expects to continue this dialogue as appropriate not only for the duration of the application procedures, but throughout the life of the project.

6.14.4 The assessment did not adequately address the life style, pace of life and stress aspects of living in a northern resource community. The Co-West Report, and others, have provided some information regarding these aspects, however Alsands through its public involvement program will be able to expand upon those aspects, and will be expected to in the E.I.A.

Answer

In addition to the information found in Volume 2 of the Regional Socio-Economic Impact Assessment, the following aspects of the stress in a resource community can be elaborated. Because of the limited contact with the outside world, isolation is a major problem for most residents. The difficulties associated with this lack of contact with the rest of the world cannot be under-estimated, as Larson (1977) points out, since transportation out of the area is quite difficult for most residents. Perhaps more critical is the sense of social isolation experienced by many who have not established ties in the new community, particularly housewives.

Many personal problems such as mental illness, alcohol abuse, lowered self-esteem and debt are exacerbated in the new environment. Inadequate recreational and cultural facilities, leading to boredom, disillusionment and unsatisfactory fulfillment of values and a feeling of lack of self-determination also add to the stress of northern living.

Studies show that residents often express concern about the high crime rates, illegitimacy, and high consumption of alcohol and drugs. Lack of appropriate services, entertainment, recreational outlets, over-crowded schools and temporary and inadequate housing are often further sources of frustration.

Alsands believes it should be emphasized that the proposed new town will not be a typical northern resource community in two senses. First, it will be larger than most, with a population expected to number 11 500. More importantly, its residents will tend to feel less isolated than those in Fort McMurray since the new town residents will be only 90 km from a regional centre of about 35 000 people. Thus, they can get away "to town" for shopping, entertainment, etc., by driving a fraction of the distance now required of Fort McMurray residents.

Alsands further believes that, although elements of physical isolation remain, the inadequate recreational and cultural facilities which are typically encountered should not be seen as unsuitable. Rather, the planning of this town should be seen as posing a challenge to the government and to Alsands to create and to implement a town concept which will incorporate some feasible resources for an urban life style into this resource community.

This is a challenge worthy of the best efforts of government and of Alsands and one which we believe should begin to engage our efforts at an early date.

6.14.5 The Alsands assessment has discussed the project impacts upon community organization, quality of life and life styles within the Region.

Answer

No response is required.

6.14.6 Many assumptions have been made in the assessment regarding the characteristics of the project related population and their capabilities to deal with problems which will arise throughout the development. The E.I.A. should provide supportive evidence for these assumptions. The assessment should also elaborate in more detail upon the problems which will be an inherent part of developing a new town, and the essential social processes which must be developed as part of that new town.

Answer

In responding to this stipulation we shall first report what is known about the characteristics of resource development workers and their families. Thereafter information is presented relating to the way these people cope with the stresses they experience. Finally we provide the requested elaboration on the problems to be encountered and the essential social processes in developing a new town.

Characteristics of Resource Development Workers and Females

Earlier we have presented information on what is known of the Syncrude construction and operations work forces, based on the limited information that Syncrude itself has released, and from data contained in the Fort McMurray census which are conducted in June of every year.

From these sources it is known that a high proportion of both the construction and the operations personnel have been very young. One-third of the Mildred Lake construction camp residents were under 25 years of age and about two-thirds were under 35 years of age. Similarly, two-thirds of Syncrude's operations employees are under 35 years of age. The 1978 Fort McMurray census shows that only one quarter of the adults, among this predominantly youthful population, are not married.

The transiency of the construction work force is generally reflected in the fact that Bechtel experienced a turnover rate of about 200 percent during the 1974-1977 period, and the average stay per person was four months and one week. Syncrude is currently experiencing a high turnover rate in its operating force. This transiency is reflected in the fact that according to the 1978 Fort McMurray census, slightly more than one-third of the total population moved into town between June 1, 1977 and May 31, 1978. Only 40 percent of the residents are from Alberta, while almost 30 percent are from Ontario or farther east, and over 7 percent are from outside of Canada.

As noted earlier in several places, Alsands has consistently made the assumption that the Alsands construction and operations work forces would be very similar to the Syncrude construction and operations forces. We have emphasized that Alsands would try to implement recruitment procedures which would change the Syncrude pattern somewhat, in terms of hiring more local people, more women, and more mature people. But we have also emphasized that this effort may not be more than marginally successful.

Resource Workers/Families and Stress in Resource Communities

There is a relatively large body of research dealing with the characteristics of frontier resource development towns, the kinds of people who are attracted to them, and how they adapt to these communities. This research has been comprehensively reviewed, summarized and integrated in a study by Larson entitled "The Impact of Resource Development on Individual and Family Well-Being", funded by the Human Environment Committee of the Alberta Oil Sands Environmental Research Program. Many of the studies reported in this literature are spotty and of uneven quality, but they do bear to some extent on the question of the relationship between the characteristics of people residing in resource communities and

their capabilities to deal with the problems of these communities. Larson presents separate discussions of the more general literature, and that dealing with Fort McMurray.

Larson reports that individuals in resource towns are generally similar to other types of migrants. Movers tend to be young married workers with young and growing families. Unmarried migrants are usually single males as few single females migrate to frontier communities. There are typically a high number of native migrants represented. Movers were found typically to be young married couples, small, young families, single males and Canadian residents. There was a higher proportion native than in urban areas.

Weinberg (1955) found voluntary migrants to be more intelligent, more energetic and better equipped for moving than non-migrants. On the other hand, people who move have been repeatedly shown to experience more mental disorders than those who do not. It is not known whether movers are predisposed to such disorders, or whether the moving process precipitates the disorders, or whether the relationship is spurious.

Simply on the basis of the demographic characteristics of movers, it may be argued that they are generally more flexible and adaptable, because of their youth, than the rest of the population. The fact that many of these young people are married, 75 percent of the adults in Fort McMurray in 1978 for example, means that they have a safeguard against loneliness, and a source of support immediately available, if the family does not succumb to move-induced stresses.

In terms of post-mobility adjustment, Larson cites a number of factors that appear to be significantly related to adjustment, including:

1. "The availability of accurate and detailed information prior to a move strongly intluenced satisfaction with the move. The key dimension of adjustment in the new community apparently depended on whether the new neighbors were friendly".

2. "Attributes of individuals which facilitate good adjustment include the amount of training individuals have for dealing with conditions of change, positive reference orientation towards mobility, attitudes of people towards discussing problems with others, and the attitudes of individuals toward strangers and being strangers".

3. Relocation evidence of preparedness for change is the most important tactor in determining post-relocation adjustment adaptation, "dwarfing all other post-location influences".

Larson tound no direct data available on post-mobility family satisfaction, but a number of studies contain materials relevant to the issue. Adjustment of wives to mobility was found to be facilitated by joint decision making with husband to move, being involved in planning of move, making exploratory trips to new community by both husband and wife, wife's friends in new community same as husband's, she was informed of husband's job, having friendships prior to move and ability to establish new triends easily.

Adjustment of children to mobility was facilitated by positive parental attitudes toward new community and positive adjustment of child prior to move.

Larson's review of the literature shows that satisfaction with living in resource communities is associated with having friends in the community, satisfaction with recreation facilities, entertainment options and schools,

having adequate attractive housing, well planned neighborhoods, attractive scenery, satisfaction with neighbors, satisfaction with fellow workers on and off the job, satisfaction with climate and relative isolation, number of years in community, and active social and community involvement. Among professionals, those satisfied were more often older, highly educated, active in voluntary associations, had high work satisfaction, high job security, many things to do, and had adequate shopping facilities. Among women satisfaction with resource communities was associated with satisfaction with the financial situation of family and with psychological adjustment. Among men, satisfaction was associated with lower education levels, introversion and satisfaction with employment.

Job stability was found to be associated with being older, married, Canadian, union members, having short commuting time, and having good wages with favourable working conditions.

Dissatisfaction with life in resource communities and high turnover rates were found to be associated with preceding mobility and job instability, inadequate wages, unfavourable working conditions, climate, unsatisfactory fulfillment of values, higher education level (among miners), geographical isolation, inadequate housing and inadequate services and facilities. Dissatisfaction and high turnover were also associated with a predominance of single men combined with absence of female companionship, limited opportunities for promotion, marriage and family problems, rental housing and inadequate social and community involvement. Among professionals they were associated with plans to have more children and high occupation status and were particularly concerned with recreation, schools and medical facilities. Among women, dissatisfaction was related to psychological dissatisfaction, inadequate social outlets, and inadequate financial situation for family. Among men, it was related to

higher education levels and intelligence scores and introversion.

Larson presents a separate review of findings from studies focusing exclusively on development and adjustment in the Fort McMurray area. Data are extremely limited with only two, somewhat unsatisfactory studies available. In general, the findings from these studies may be summarized along with other evidence as follows.

The satisfactions with Fort McMurray relate to small town atmosphere, closeness to nature, employment opportunities, it is seen as friendly and it is seen as challenging.

The problems identified include inadequate counselling services, geographical isolation, lack of adequate well-planned housing, overcrowding, temporary, lack of planning, overcrowded and inadequate schools, medical facilities, transportation to Edmonton and elsewhere, and entertainment and recreation facilities.

Problems and Social Processes -- Resource Development Community

The stipulation that we provide more detail relating to the problems which will be an inherent part of developing a new town is rather broad and unspecified. On the basis of our interviews and our review of the literature, we would identify the major problems as follows:

1. Negotiation of concensus between the development company and the government in regard to their respective areas of responsibility in developing the town.

2. Agreement between the company and the government in respect to the physical planning of the town.

3. Planning for and co-ordinating the availability of needed facilities and services in the new town so that all will be in place at the time that the first residents begin to move in. These facilities and services include houses, work places, recreational and meeting places, commercial and retail trade and services, and all of the human services.

4. Facilitating community relations and community involvement so that friendly and supportative communities crystalize in the new housing areas.

5. Planning particularly for the meaningful involvement of housewives, for luring them out of their homes into group situations where they can meet others, and where they can have enriching experiences and develop life-enriching interests.

6. Developing a sense of responsibility in the newly arrived residents for <u>their</u> community and for the behaviour of the other people who share the community with them. This is difficult to accomplish, because the degree of control over the decision making processes affecting the community, at least initially, lies so strongly in the hands of government and of the company, that the residents typically feel rather powerless. In addition, many are often very unsure of their commitment to the town, and whether they, in fact, want to remain there very long. However, it is only with emergence of a sense of responsibility that the natural processes evolve which result in 1) spontaneous organization to meet perceived community needs, 2) the individual and small group projects that result in community improvement and beautification, 3) declining vandalism because it is incompatible with the kind of community that is emerging, and 4) the emergence of pervasive informal social controls which minimize the occurrence of delinquency and crime.

The above discussion might be summarized by saying that from a social perspective, the critical problems have to do with a number of social processes that must be achieved if the new town is to become viable and to function effectively as a community. These social processes may be briefly characterized as follows:

1. The promotion of participation, in friendship groups, in the neighborhood, and in various facets of community life.

2. Promotion of involvement in the sense of self-investment, including commitment of time and personal resources, and development of concern, in respect to neighborhood and community issues.

3. The emergence of concensus on both the neighbourhood and the total community levels. This concensus relates to a wide range of issues, all the way from how people should behave as good neighbors, to some common perspectives respecting what the most important issues facing the community are, and what should be done about them.

4. Development of a sense of responsibility, for self and family, for others (in the sense of concern for their well-being and some awareness of obligation to do something about their situations where possible), and for the neighborhood and the larger community.

We do not mean to imply that this comprises a comprehensive listing of the social processes which are pertinent to the growth of a new town. However, we believe that these are the most critical processes which must develop if the new town is to become an organic community.

6.14.7 The government review has indicated that the assessment also underestimates the potential for the project impacts upon other communities and especially upon Fort McMurray and Fort MacKay. The E.I.A. should re-address the potential project impacts upon those communities and include that information in the E.I.A.

Answer

During our continuing reassessment and updating of the impacts projections and suggested mitigative measures, Alsands' consultants have not succeeded in identifying any sections where there appears to be significant understatement of anticipatable impacts, or where feasible and appropriate mitigative measures have been overlooked.

This issue is an important one of concern to Alsands as well as the government and to the people who do and who will live in the Study Area. Perhaps a discussion of how Alsands arrived at the impacts assessment would be of assistance.

First, Alsands consultants assembled the most comprehensive set of relevant data obtainable on the impacts which the Study Area has experienced during the Syncrude development years. It appears that the Government review agencies are generally satisfied with this effort. These data were analyzed to identify the nature and the magnitude of the Syncrude impacts. Finally, the impacts which were to be expected from the Alsands development were projected using the Syncrude impacts as a model, and then modified using the following assumptions and qualifications.

The basic assumption for the assessment was that since the Alsands project would be very similar to the Syncrude project, would be in the same region and would be impacting the same communities, it must be anticipated that the resulting

impacts would tend to be similar in nature. The major qualification on this assumption was that the communities which would be impacted had changed significantly and would respond differently to any new developments, resulting in significantly reduced impact intensity for the following reasons:

1. The communities have experienced major developments, and have learned from that experience.

2. For the case of Fort McMurray the Alsands impacts would be much smaller than in the last development, and would be more easily absorbed in a very much larger community.

3. The Alsands project is being preceded by a carefully designed attempt to assess the project impacts and to plan for mitigation of adverse impacts.

4. Government agencies with responsibility for various aspects of the regional development have the benefit of very recent experiences on which to base their planning.

5. There is ample lead time to develop a meaningful public involvement process. This public dialogue should ensure the help and advice of local people in the planning process.

6. In the case of Fort MacKay, there are indications of a significant improvement in the cohesiveness of community, enabling them to better deal with the impacts. In addition many more of the local residents have recently acquired industrial work experience.

In summary, we consider our assessment to be accurate within the limits of our present knowledge and planning status.

6.14.8 The assessment provides a discussion of the potential for lack of community cohesion in the New Town, and provides positive recommendations for the mitigation of those effects. It also indicates the role that company policies especially relating to recruitment may have in ensuring that the expectations of immigrants to the region are realistic, and consequently that their capability to bear the conditions which will occur with the development are reasonably high. Lastly, the assessment also indicates the role community facilitators could play in building processes and the new community. Alsands in the E.I.A. should indicate what commitment it has to those measures, and indicate what the role and responsibilities of Alsands will be to those measures.

Answer

Alsands believes that the company, the Provincial Government, and the people who will move into the new town will all have a strong interest and a large stake in maximizing the speed with which the people who move into the new town during the first very few years may mold themselves into an involved, self-aware, and prideful community. Alsands believes that Alberta Social Services and Community Health, particularly through the Preventive Social Services Branch and Alberta Recreation, Parks and Wildlife, and perhaps other government departments as well, have programs which will contribute significantly to this process.

Alsands believes that it can make a significant contribution to this process. However, Alsands feels that it is not in a position to make explicit commitments at this time. Its representatives are prepared to begin conferring with Preventive Social Service and Recreation representatives and those from other relevant departments at an early date to try to map out an optimum master plan seeking to stimulate community crystalization and involvement in the new town. Once such a cooperative and integrated approach to this task has been worked out, Alsands will commit itself to assuming its appropriate responsibility for the program.

6.14.9 Lastly, the assessment appears to place a large emphasis upon the position that dissatisfied residents will leave the region to return to a more appropriate environment, and in doing so appears to underplay the necessity for planning and mitigation of those effects and stresses upon the residents of the region. The E.I.A. should clarify Alsands position respecting that issue.

Answer

Alsands does not believe that the material provided in Volume 2 of the Regional Socio-Economic Impact Assessment conveyed the implication that planning and mitigation could be reduced for the reason cited; certainly there was no intention to do so.

All that was meant in this material was to acknowledge that during the earliest years of a new town, the relatively high turnover rates which might be expected, do have some advantageous aspects. The relevant literature is very clear that some people are much more sensitive to the impacts present in a new resource town, and find adjustment to such a situation much more difficult than do others. The former are potentially the most serious "casualties" of the situation. However, in most such cases these people are not trapped in their unhappy situation. They do have other options, and as the discussion in Volume 2 notes, they will typically have very little reason to remain since they lack property, friends, or relatives there, and will speedily leave.

As a result of this "natural" sifting and screening process, those who remain will often be those somewhat better able to cope with the stresses of the situation in which they find themselves.

This statement should not be interpreted to imply that they do not suffer. The stresses they experience are stressful, they induce strain, including disfunctional responses to strain, such as alcoholism, delinquency, etc., etc. Alsands wants to emphasize that this "natural sifting" process did, and is continuing to go on, in Fort McMurray, as the information on high turnover rates that we have cited earlier demonstrates. It must be understood that all of the indications of social disruption, personal maladjustment, mental health problems, etc., emerged despite this sifting process. These various consequences do require mitigation, and careful monitoring of the effectiveness of the mitigative efforts.

While Alsands is aware that more human service delivery personnel is not the only type of mitigation needed, we are sure that in respect to certain kinds of specialized services -- mental health workers, nurses, alcoholism and drug counselors, recreation specialists and many more -- there is no substitute for them. Alsands believes that the planning processes to decide the levels at which service delivery agencies should be staffed must be performed by the government agencies involved. Alsands role here is to provide data on the population build-up, and the demographic and social characteristics of the increasing population which it projects. Alsands appreciates the concerns expressed about the very heavy service demands of the "shadow population", because it appears from our analyses that this was probably the greatest single source of overloading of the service delivery systems in Fort McMurray in recent years.

6.15 PUBLIC INVOLVEMENT

6.15.1 As indicated in the E.I.A. guidelines, Alsands is required to provide for public involvement into the preparation and evaluation of the E.I.A. The documents submitted to date do not indicate that that necessary level of public involvement has been provided. To complete the E.I.A process, Alsands will be required to clarify the public involvement that has been integrated into the development of the present documents, and to complete the involvement process. That process will need to include a validation of the existing data with the affected communities; public involvement in developing a joint evaluation of the project impacts upon the communities in the region, along with the necessary local and government authorities, the joint development of proposals and recommendations to deal with specific project impacts; and the initiation of a process for problem solving and addressing of issues throughout the development process.

Answer

Alsands initiated a public involvement process very early in the planning stages of the Project. This process began with discussion with the regional municipal governments. It has now extended to discussions with various committees set up by the regional communities to address the Alsands Project impacts. In addition Alsands staff have presented information on the project at several meetings of various community organization and service groups.

We expect that validation of this initial public involvement will be accomplished through the public hearing process. Alsands is committed to continue this public involvement process throughout the construction and operations phases.

LITERATURE CITED

SECTIONS 1 TO 5

Alberta Oil Sands Environmental Research Program. 1978. Interim Report to 1978.

Bond, W.A. and K. Machniak. 1978. An intensive study of the fish fauna of the Muskeg River watershed of northeastern Alberta. Report prepared for the Alberta Oil Sands Environmental Research Program. Project AF 4.5.1 (in preparation).

Canada. Department of the Environment. 1972. Guidelines for water quality objectives and standards. A preliminary report. Prepared by the Working Group on Water Quality Criteria of the Subcommittee on Water Quality, Interdepartmental Committee on Water, Inland Waters Branch. Tech. Bull. No. 67. Ottawa.

Canada. Department of National Health and Welfare. 1968. Canadian Drinking Water Standards and Objectives.

Dreisinger, B.R. 1967. The impact of sulphur dioxide pollution on crops and forests. Pollution and our environment. Conference background paper. Vol. 1. Montreal. Can. Coun. of Resource Ministers. Paper A4-2-1.

Hauge, T.M., R.E. Rolley and L. Keith. 1978. Dynamics of moose populations in AOSERP study area in northeastern Alberta. Report for Terrestrial Fauna Research Committee AOSERP Project TF 1.1, (in review).

Hesslein, R.H. 1977. Lake acidification potential in the AOSERP study area. Alberta Oil Sands Environmental Research Program. Project HY2.4.

McPherson, R.A. and C.T. Kathol. 1977.
Surficial geology of potential mining areas in the Athabasca Oil Sands region. Res. Coun. of Alta. Open File Rept. 1977-4.

Northeast Alberta Regional Commission (NARC). 1978.
Northeast Alberta Regional Information Base. February, 1978.

Nyborg, M. and D.R. Walker. 1977.
An overview: the effects of sulphur dioxide emissions on the acidity and sulphur content of soils. Proc. Alta. Sulphur Gas Res. workshop II. H.S. Sandhu and M. Nyborg, eds. Res. Sec. Alta. Environ. Edmonton.

Packer, J.G. and C. Bradley. 1978.
A checklist of the rare vascular plants of Alberta with maps. Prepared for Alberta Recreation, Parks and Wildlife, Provincial Parks Division. Edmonton.

Portelli, R.W. 1977.
Mixing heights, wind speeds and ventilation coefficients for Canada. Climatological Studies No. 31. Atmospheric Environment Service. Downsview, Ontario.

Reid, G.K. 1961.
Ecology of inland waters and estuaries. D. Van Nostrand Company. New York.

Walmsley, J.L. and Bagg, D.L. 1977.
Calculations of annual averaged sulphur dioxide concentrations at ground level in the AOSERP study area. AOSERP Report No. 19.

LITERATURE CITED

SECTION 6

Canadian Institute for Research in the Behavioural and Social Sciences. 1978.
Native employment patterns in Alberta's Athabasca Oil Sands Region. A study conducted for the Government of Alberta, Department of Environment.

Co-West Associates. 1978.
Social Planning Implications for Health and Social Services: Northeast Alberta Region. A report sponsored by the Northeast Alberta Regional Commission, Alberta Department of Social Services and Community Health and by the Fort McMurray Regional Task Force.

Fort McMurray Planning Team. 1978.
New Town of Fort McMurray 1978 Municipal Census.

Hobart, Walsh and Associates Consultants Limited and Quest Consultants Ltd. 1979.
Alsands Project Group Regional Socio-Economic Impact Assessment, Volume 2 in support of an oil sands mining project.

Larson, Lyle E. 1977.
The impact of resource development on individual and family well-being. Prepared for Human Environment Committee. Alberta Oil Sands Environmental Research Program, Government of Alberta.

Phillips, W. 1978.
A socio-economic evaluation of the recreational use of fish and wildlife resources in Alberta, with particular reference to the AOSERP Study Area, Volume 1, Summary and Conclusions. Project TF6.1. AOSERP Report 43.

Syncrude Canada Limited. 1978.
Environmental Impact Assessment Addendum to the 1973 Report, Volume C - Socio Economic Aspects.

Todd, A. 1978.
Analysis of fur production records for registered traplines in AOSERP Study Area, prepared for the Alberta Oil Sands Environmental Research Program by Alberta Parks and Wildlife. AOSERP Report 42.

Weinberg, A. 1955.
"Mental Health Aspects of Voluntary Migration," Mental Hygiene, Volume 39, pages 450-464.