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Strong Hall & Associates Ltd.

SOCIO-ECONOMIC IMPACT ASSESSMENT:

A STRATEGY FOR PLANNING

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Syncrude's Professional Paper series consists of reports which are not scheduled for publication as Environmental Research Monographs, but which would be of interest to researchers working in related fields outside Syncrude.

part 1

socio-economic impact assessment:

STUDY PROGRAM

PART 1

CONTENTS

SUMMARY

Purpose

This study, initiated by Syncrude's Environmental Affairs Division, was undertaken:

- to specify the objectives and structure of a socio-economic impact assessment program;
- to determine information required to satisfy existing and anticipated requirements of government agencies and socio-economic impact assessment and to serve Syncrude's internal planning needs:
- to review the methodology of socio-economic impact assessment;
- to broadly assess the availability of information for socio-economic impact assessment.

Conclusions and Recommendations

- It appears that a socio-economic impact assessment is expected of Syncrude by Alberta Environment as part of their outstanding requirement for an overall impact assessment.
- The Northeast Alberta Regional Commission has transmitted to Alberta Environment a comprehensive list of requirements for socio-economic impact assessment for review and possible incorporation into a set of impact guidelines to be administered by Environment. These may provide the basis for the expected socio-economic impact assessment referred to above.

- The effectiveness of Syncrude's planning for the contemplated expansion of its base plant could be enhanced by initiating a program for socio-economic assessment at an early date. Such a program would provide: (a) a means for coping with uncertainty in the future socio-economic invironment of the oil sands region; (b) a frame-work for developing Syncrude's social policies and programs; and (c) a vehicle for coordinating its socio-economic planning activities with those of the Northeast Alberta Regional Commission and other governmental agencies.

- Five alternative socio-economic impact assessment programs were evaluated from the viewpoint of their value for planning.

The program recommended in this report would provide:

An overview of socio-economic impacts experienced during the Syncrude base plant construction phase.

A detailed socio-economic impact assessment concerned with predicting impacts resulting from the transition period (wind-down of construction and build-up of operations) and operations phase of the base plant.

A preliminary socio-economic impact assess-ment of the contemplated Syncrude expansion.

- In order that the output from the program can be effectively used for planning purposes, it is recommended that these studies commence in late 1977. The estimated duration of these studies is approximately nine months.

- The estimated budget required to conduct the recommended program is $145,000.

1. INTRODUCTION

1.1 Purpose

Syncrude Canada Ltd. retained the firm of Strong Hall & Associates Ltd. to design a program for socio-economic impact assessment that would meet the existing and anticipated requirements of government and contribute to Syncrude's planning function where this interfaces with the socio-economic environment.

The study addresses itself to the following tasks:

a) To specify the objectives and structure of a socio-economic impact assessment program.

b) To determine the information required to satisfy existing and anticipated requirements of government agencies for socio-economic impact assessment and to serve Syncrude's planning needs.

c) To review the methodology of socio-economic impact assessment.

d) To broadly assess the availability of information for socio-economic impact assessments.

1.2 Approach

To delineate the relevant concerns that should be included in a program of socio-economic impact assessment, it was necessary to establish the usefulness of the information that would be generated from such an assessment for diverse potential users in both Syncrude and government. This was

achieved through a series of informal discussions between the consultant and key Syncrude and government representatives.

The main thrust of these discussions was, firstly, to determine the nature of existing or proposed mandatory information requirements with which Syncrude may be expected to comply and, secondly, to elicit suggestions from within Syncrude management regarding specific concerns that could be usefully addressed in an impact assessment.

In formulating the study program, current methodologies and approaches to socio-economic impact assessment were reviewed and appraised.

An implementation strategy was developed to make explicit the time frame required for this program in light of anticipated requirements imposed by regulatory agencies. The appropriate depth of a socio-economic impact assessment necessary to satisfy such agencies and provide useful information for community, regional and corporate planning purposes is reflected in the budget estimate.

1.3 Report Structure

Chapter 2 provides an overview of socio-economic impact assessment which is viewed as an integral part of a comprehensive planning process involving both the private and public sectors. The limitations of methodology, theory and data are considered in determining what is possible and useful in an impact assessment. Chapter 3 considers existing and anticipated statutory requirements of government for socio-economic impact assessment. In addition, it presents the views of Syncrude and government representatives with respect to socio-economic research priorities associated with Syncrude's current and proposed oil sands development activities.

Chapter 4 presents a study program which is based on the concepts presented in Chapter 2 and attempts to satisfy the general government and corporate requirements outlined in Chapter 3.

Chapter 5 indicates the professional requirements, phasing and order-of-magnitude budget for the recommended impact assessment program.

2. SOCIO-ECONOMIC IMPACT ASSESSMENT AND ITS APPLICATION TO SYNCRUDE

2.1 Introduction

This chapter provides an overview of socio-economic impact assessment as it applies to Syncrude.

Section 2.2 defines socio-economic impact assessment and outlines its content and purpose. This section treats assessment in a general way and for more detail and a critical review, the reader is referred to Part 2 of this document, "Socio-Economic Impact Assessment - A Critical Review".

Section 2.3 relates Syncrude's planning requirements and problems to socio-economic impact assessment and points out some difficulties in application of the standard assessment approach to an oil sands plant.

The final section suggests a planning approach which would include updating of important recommendations and forecasts as significant changes in the project or the environment are anticipated.

2.2 Socio-Economic Impact Assessment

The evaluation of private sector projects has, until recently, been based largely on assessments of engineering and financial feasibility from a private sector point of view. The fact that the proponent has been required to obtain various permits and licenses from regulatory bodies has, to a limited extent, ensured that certain social concerns, particularly those related to some aspects of environmental quality, have been considered in private assessments of project feasibility. What has been lacking, however, is any systematic and comprehensive assessment of the desirability of private projects from

a social perspective.

Impact assessment seeks to fill this gap. The emergence of impact assessment stemmed from a growing awareness and concern that altering the socio-economic and biophysical environment may have unexpected and, often, unwanted consequences. The prime focus of impact assessment was initially the biophysical environment but the socio-economic considerations have received increasing attention recently. The subsequent discussion will concentrate on the socio-economic rather than the biophysical aspects of impact assessment.

Socio-economic impact assessment seeks to provide a broad base of assessment by asking: What are the socio-economic factors that will be affected by a particular project? Will its effects be adverse or beneficial? Who will be affected? What will be the extent, both geographically and over time of these effects?

An impact assessment may be conducted either prior to, during or after the implementation of a project. An assessment undertaken prior to implementation would concern itself with the prediction of impacts and attempts to reduce uncertainty about the future.

During or following the implementation of a project, it may be useful to assess impacts on an on-going basis. In this case, impact assessment performs a monitoring function. Monitoring may provide input into future impact assessments, and the planning process generally, and thus becomes part of a learning process.

The monitoring of socio-economic impacts associated with large-scale projects has recently attracted considerable interest from government regulatory agencies and may become an integral part of impact assessment requirements in the

future. However, few such monitoring programs have been implemented and none, to our knowledge, has been evaluated in any formal way.

An impact assessment may be conducted as part of an evaluation to take stock of the socio-economic environment at a specific point in time following the implementation of a particular project. The results of such an evaluation would further contribute to the learning process that underpins planning and decision-making.

Predictive impact assessment has become an integral part of the government approval procedure for selected projects in Canada. This assessment requirement generally precedes submissions to secure the various permits and licenses required before a proposed development can proceed. Although supported by legislative authority, the requirement for an impact assessment in Canada is discretionary, with the exception of Ontario, where the requirement is mandatory.

A recent trend is for both private industry and government to regard socio-economic impact assessment as a useful planning tool for implementing social policy and meeting corporate goals, rather than simply a project appraisal measure applied by governmental regulatory bodies. There are several benefits to be gained from impact assessment by industry. Impact assessment is a useful aid for dealing with uncertainties in the socio-economic environment, which is important in view of industry's enlarged responsibilities for certain aspects of socio-economic planning. It also provides a framework for coordinating and integrating this planning effort. Industry's involvement in the impact assessment process serves to promote its public image through the display of social responsibility and provides a vehicle for emphasizing the social benefits of industrial development.

In the section below, a typical set of socio-economic guidelines will be outlined. This is based on the published guidelines of various governmental agencies in Canada and the United States and is considered to be representative of what is currently required in terms of socio-economic impact assessment.

The general requirements of a standard impact assessment would include the following:

a) A description of the proposed project with reference to alternative design features, locations and scheduling.

b) An inventory of the existing socio-economic environment in the study region.

c) Forecasts, or scenarios, of those attributes of the socio-economic environment which are relevant for the evaluation of socio-economic effects.

d) An evaluation of predicted socio-economic effects with respect to their magnitude and their incidence over time, among specific social groups, economic sectors, and communities in the study region.

e) The development and evaluation of alternative measures to deal with adverse effects through mitigation, compensation, and conflict resolution.

Within the framework of the general content requirements outlined above, there are specific concerns to be addressed in a socio-economic impact assessment. Although these will,

to some extent, be tailored to each individual project, there is a fairly standard set of requirements that would be relevant for most large-scale industrial developments. Any such list of questions should attempt to achieve a balance between selectivity and comprehensiveness.

The list should be selective in that only those questions which are relevant to the assessment at hand are included, but sufficiently comprehensive to ensure that no important factors are left out. The difficulty is that what is considered relevant is largely a matter of opinion and there is, perhaps, a tendency towards over-comprehensiveness on the part of government agencies who design impact assessment guidelines. There is a temptation to include items which may satisfy the curiosity of government officials but which have little practical value or which would require research above and beyond what the proponent could be reasonably expected to undertake.

Some examples of the kinds of questions that would be addressed in a typical socio-economic impact assessment are presented below. For a more detailed discussion of the content of such an assessment, the reader is referred to Chapter 4 of Part 1 and to various sections in Part 2 of this report.

Examples of the questions regarding socio-economic effects are as follows:

(i) How many jobs would be created, directly and indirectly, by the project during its construction and operating phases?*

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* Indirect employment is that which can be attributed to the increased regional demand stimulated by a particular project. This additional demand which gives rise to indirect employment emanates from several sources: Purchases of goods and services by the project; local spending out of the payroll associated with the project; and increased requirements for publicly provided services.

(ii) What would be the occupational and income structure associated with the new set of direct employment positions?

(iii) What credentials, for example, education, trade certification, union membership, would be required for these positions?

(iv) Are existing training programs adequate to enable local people to fill the direct jobs that would be created? If not, what kinds of programs are envisaged?

(v) What are the sources of labour from which the project's work force will be drawn? What economic sectors? What geographic areas? What 'target groups', for example, Metis, Indians, women, the unemployed, income assistance recipients, high school dropouts, youth?

(vi) What would be the likely volume of in-migration resulting from employment creation?

(vii) What would be the distribution of population increments within the region as between existing communities and any proposed new communities?

(viii) What would be the demographic, socio-economic and cultural characteristics of the in-coming population?

(ix) What would be the cost of additional service requirements? What would be the division of responsibilities for these additional costs among the municipality, senior governments and the proponent?

(x) What is the projected demand for housing?

(xi) What mortgage funding and housing assistance programs, both public and private, would be available?

(xii) What would be the supply of and demand for land by type of use, that is, residential, commercial, industrial, and institutional?

(xiii) What is the current financial situation of the local government in terms of revenue base, debt load, and borrowing power?

(xiv) What social problems, such as alcohol and drug abuse, family breakdowns, crime and mental health problems, might accompany development, and who will be affected?

(xv) Would there be problems of adjustment and integration as the result of the migration of Native peoples from rural to urban areas?

(xvi) What would be the effect of any project induced changes in wildlife populations or fisheries on existing local commercial and subsistence uses?

Governmental requirements for impact assessments, both socio-economic and ecological, have been largely accepted by private firms and public works agencies and have been applauded by certain segments of the academic community and the general public. There is, however, a growing body of criticism from private industry, and other sources, which calls into question the usefulness of impact assessment.

Private industry has criticized impact assessment on the grounds that it represents an unnecessary extention of governmental regulations which have to be accommodated in project planning, but serve little purpose. The expense and additions to lead time incurred through the preparation of an impact assessment are regarded as unwarranted.

It appears that this view of impact assessment may be changing. With the private sector's growing acceptance of certain responsibilities relating to social policy, for example, the hiring, training, and adjustment of Native people, it is becoming evident that impact assessment provides a useful framework within which the planning of such programs can be undertaken. In addition, the impact assessment process can provide a basis for the more effective integration and coordination of public planning and programming activities at all levels.

There is also a growing realization by the private sector that social values have changed considerably in recent years. It is now widely expected that private firms demonstrate a high degree of social responsibility in undertaking investment projects and thus the burden of proof for establishing the desirability of a particular project is considered to lie with the proponent. This change in the operating environment is profound and can be dealt with more effectively through accommodation than through resistance.

2.3 Uncertainty and Oil Sands Development

This section considers those features of Syncrude's projects and socio-economic environment which make all planning difficult and shows how they affect impact assessment.

Uncertainty is common to all social and economic planning. However, in Syncrude's case, uncertainty pervades the planning process to an uncommon degree.

1) There is an unusual degree of uncertainty with regard to anticipated manpower requirements for operating the present plant or for expanding it simply because there is so little experience with large oil sands projects.

2) There is a great deal of uncertainty about the existing socio-economic environment in the northeastern region because the population is in a state of extreme flux during the transition from the construction phase to the operation phase.

3) There are major uncertainties with respect to other developments in the oil sands region which could affect Syncrude's

operations through their influence on settlement patterns, population densities, and manpower availability.

Resolving these uncertainties would fulfil the first three general requirements of a standard impact assessment as described in Section 2.2. However, in addition, the magnitude of Syncrude's present plant or any likely new plant or plant expansion means that unavoidable errors in forecasts would probably have significant implications for plans to manage impacts.

Therefore, any application of impact assessment to Syncrude's operations must have an inherent flexibility.

2.4 Socio-Economic Planning

The above discussion of uncertainties indicates that better socio-economic information is mainly a function of time - more oil sands experience, a more stable operations work force, more precise plans announced with respect to other developments in the oil sands region. However, it is necessary to balance the data requirements for planning against the immediate information needs of decision-makers.

A flexible, incremental impact assessment process could accommodate the needs of both decision-makers and planners. For instance, a series of increasingly refined assessments would allow for continuous updating of plans and forecasts while at periodic intervals producing self-contained reference documents. Preliminary or overview assessments identify the most important impacts associated with alternative project configurations and identify the significant data gaps. Full or detailed assessments gather more data when considered necessary, examine the significant impacts

and their interaction in depth, and suggest management measures. Further planning studies carry to the point of implementation the impact management alternatives selected from among those examined in the assessment.

Anticipating future events in the oil sands region is a sophisticated guessing game. However, it is important from Syncrude's viewpoint in order to ensure that the requisite flexibility is retained in its plans. For instance, if the Shell plant were to be built and a new town were to be located as far north of Mildred Lake as Fort McMurray is south, a significant proportion of Syncrude's work force might decide to live in a new town and so Syncrude would want to avoid an overcommitment to residential development in Fort McMurray.

Systematic data gathering is complicated by the questions - by whom and for whom are data to be collected. A preliminary impact assessment should address itself to these questions.

3. PRELIMINARY IDENTIFICATION OF GOVERNMENT AND SYNCRUDE NEEDS

3.1 Introduction

To determine whether or not a socio-economic impact assessment will be required in the near future by agencies having the appropriate discretionary powers, it was necessary to have discussions with such agencies. Should such an impact assessment be required, it would be useful if the needs of other concerned agencies and the corporate needs of Syncrude could be simultaneously satisfied through such an assessment process.

The approach employed to identify these statutory requirements and other associated information needs was to hold informal discussions with individuals and groups in various government departments and with Syncrude management. These agencies and the names of the individuals participating in discussions are listed in Appendix 1.

Of the seven external agencies interviewed, only two were in a position, at this time, to articulate specific requirements and concerns which might usefully be incorporated into a socio-economic impact assessment.

The following sections summarize the perceived needs of Alberta Environment, Northeast Alberta Regional Commission, and Syncrude Canada Ltd.

3.2 Alberta Environment

Alberta Environment has discretionary authority to request an environmental impact assessment report (Section 8 of The Land Surface Conservation and Reclamation Act) from the proponent of a project. Recommendations to Alberta Environment that an impact assessment report be requested may emanate from a variety of sources such as the public, elected representatives at the local

or provincial levels, or other government departments and agencies. The Environmental Impact Assessment Guidelines state that "The onus is on the proponent to seek clarification from Alberta Environment as to whether or not an environmental impact assessment report will be required for any particular project".

The above guidelines document in some detail the procedure that proponents will be required to go through if an impact assessment is requested. They are, however, weak in terms of detailing the substantive content requirements, particularly in regard to socio-economic impacts. These are currently being developed and, while it is uncertain what their requirements for socio-economic impact assessment will be, it would seem reasonable to assume that they will be modelled on existing guidelines being applied elsewhere in Canada and in the United States. An example of such guidelines was assembled by the Northeast Alberta Regional Commission and is presented in Appendix 2.

If Syncrude chooses to proceed with a socio-economic impact assessment of the company's current and expected developments, the assessment should conform with the government's existing or anticipated impact assessment requirements. Discussions between the consultant and Alberta Environment were held in an attempt to elicit direction in this regard.

There is currently a requirement outstanding for Syncrude to provide an environmental impact assessment to Alberta Environment. Although not stated explicitly, it is understood that a socio-economic component was implied in the overall environmental impact assessment. The request for an impact assessment was transmitted to Syncrude by Alberta Environment in mid-1973. It was indicated that the assessment cover three phases: Planning, construction and

operation*. The impact assessment was also to incorporate a public involvement program to provide an adequate exchange of information.

With respect to Syncrude's proposed expansion, no requirements are outstanding. When and if Syncrude informs Alberta Environment that it intends to seek approvals for this development, a request for impact assessment studies will then be transmitted to Syncrude.

Alberta Environment representatives conveyed interest on two specific questions which are, in fact, considered integral parts of the impact assessment which already has been requested. These are:

a) An historical review of socio-economic conditions experienced as a result of Syncrude's existing operation. Such documentation may provide insight in anticipating impacts caused by similar developments in future.

b) An assessment of the socio-economic impacts on the northeast region during the transition between construction and operating phases of Syncrude's present operation and of the construction wind-down effects. Interest in this latter concern is directed primarily toward the ability of the construction sector to absorb this labour force.

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* While only the planning document has been submitted to date, a construction phase environmental impact assessment document is scheduled for mid-1978. To date, Syncrude has not activated a program to undertake the socio-economic component of this intended submission.

The consultant's view of the first of these suggestions is that a review of past development experiences may provide better insights into the possible impacts of future activities in the oil sands region and, specifically, with respect to Syncrude's proposed expansion. In attempting to project impacts, researchers usually rely heavily upon the experiences of similar developments elsewhere. In assessing the impacts of future oil sands projects, heavy reliance would be placed on past oil sands development experience.

A comprehensive compilation of information on social and economic change in the oil sands region of Northeast Alberta over the past decade may provide a rational basis for research into possible future impacts by allowing relevant socio-economic factors to be identified.

The second suggestion made by Alberta Environment representatives is concerned with assessing the socio-economic impacts which may be experienced in Fort McMurray and the northeast region as a result of Syncrude's transition from construction to operation phases. This transition is now in progress and, for the current Mildred Lake development, will largely be complete by late 1978. Such an impact assessment could not be completed in time to be useful for planning purposes, so its usefulness is questionable. With respect to the construction labour force wind-down, it is doubtful whether it is possible to provide estimates of the probable geographical distribution of the out-migrating work force with any degree of reliability for social planning purposes. The consultant suggests that these two research objectives could be achieved in a planning-oriented, longer-term assessment within which the current transition period would be an integral part.

3.3 Northeast Alberta Regional Commission

This agency has perhaps the most direct interest in future oil

sands development in that one of its key functions is to provide a planning role for the whole oil sands region. Of all the agencies encountered, the Commission indicated considerable concern with respect to the information void within which it was attempting to carry out its planning function.

The Commission has, during the past year or so, been developing a regional plan which attempts to accommodate future growth in the area resulting not only from Syncrude's developments but other major activities that are contemplated for the 1980's. The plan is currently being reviewed within the provincial government prior to its release as a public document.

One of the major concerns expressed by the Commission is that there has been a general information deficiency and, as a result of this deficiency, the Commission's ability to anticipate future events has been impaired considerably.

The Commission has taken the initiative in providing, as a first step, a list of socio-economic "need to know" considerations which would encompass both construction and operation phases of oil sands development.

These "need to know" considerations have been transmitted to Alberta Environment for their review and possible incorporation into a set of comprehensive socio-economic impact assessment guidelines to be developed and administered under the auspices of that department. The specific components of the Commissions' suggested form of socio-economic impact assessment are, to a large extent, drawn from British Columbia's "Guidelines for Coal Development", a set of statutory environmental impact requirements developed by the Environment and Land Use Committee. These guidelines are intended to provide the basis for a rational approach to managing community impacts, preferably prior to the making of the final decision on whether or not to proceed with a major project. The Commission's suggested information requirements

for their planning purposes are presented in Appendix 2. While this list contains items whose value for planning purposes is questionable, it indicates the level of comprehensiveness which the Commission is seeking.

3.4 Syncrude

As discussed in Part 2, socio-economic impact assessment is an integral part of the project planning process and can be relevant to the private firm as well as to the public sector. Hence, it was necessary to determine from Syncrude personnel the kind of information which may be generated by a socio-economic impact assessment that would be useful for their planning function.

Informal discussions were held with 16 Syncrude representatives. Two recurring socio-economic concerns were identified which are of considerable importance in terms of overall corporate efficiency and may be addressed in an impact assessment framework. These were, firstly, the magnitude of manpower turnover experienced in the construction phase and anticipated in the operation phase and, secondly, the general quality of the human or community environment in the oil sands region. These two concerns are closely interrelated.

With respect to the community environment, the following observations were made which provide additional insights in developing a program of study:

a) Improving future provision of housing which is dependent in part on better forecasts.

b) Improving community cohesion to avoid further segregation of Syncrude, GCOS, Native, and service sector families.

c) Improving the relatively uncoordinated social service

delivery system that now exists in Fort McMurray.

d) Estimating the current ability of local government to finance required community services and infrastructure requirements.

All of the above items would usually be considered in a socio-economic impact assessment and, hence, would provide the mechanism to address these corporate planning-related concerns in a systematic fashion.

4. PROGRAM

4.1 Introduction

This chapter presents the objectives and structure of a socio-economic impact assessment program for Syncrude.

The comprehensiveness, depth, and content of the suggested program are indicated in a general way, the approach is outlined, and order of magnitude estimates of manpower and funding are provided. A more detailed specification of the proposed program is not considered appropriate at this stage.

4.2 Objectives and Focus of the Program

The following list of concerns or needs abstracted from Chapter 3 constitute the objectives of the proposed impact assessment program:

a) To satisfy current and anticipated statutory requirements for socio-economic impact assessments relating to current or proposed Syncrude operations.

b) To provide suitable input information for the planning function of the Northeast Alberta Regional Commission and other relevant planning bodies.

c) To provide Syncrude with information on social policy questions such an manpower stability, Native social adjustment, settlement, housing, etc.

d) To generate factual information to inform the public through Syncrude's Public Affairs Division and government agencies.

A typical impact assessment as outlined in Part 2 should satisfy the above objectives with the exception of the third which would be better achieved by more intensive study than would ordinarily be undertaken in an impact assessment.

The suggested program would have as its focus the transition period between the construction and operating phases of the existing Syncrude plant. The impact assessment would, however, extend back in time to the commencement of construction and forward to the contemplated Syncrude expansion. These phases would be covered in less detail than would the transition phase of Syncrude I (base plant).

The output from this study program would, in our opinion, satisfy any requirements for a socio-economic impact assessment of the existing operation that could be reasonably expected to emanate from Alberta Environment and would provide a preliminary assessment of any expansion of the Syncrude operation. This latter assessment would put Syncrude well ahead in its planning if it is decided to proceed with the expansion. There should be flexibility in the recommended impact assessment program to take into account the contemplated Shell oil sands plant to ensure that Syncrude's project planning is relevant in the context of such "likely" developments. This would involve a change of scope in the study which would have implications for study phasing and budget (see Appendix 3).

Four alternative programs were examined which would satisfy, to a greater or lesser degree, the requirements for socio-economic impact assessment discussed in earlier sections of this report. These alternatives are presented in Appendix 3.

The recommended study option assesses impacts associated with four clearly identifiable phases of Syncrude's oil sands

development:

- Syncrude 1 (base plant) Construction Phase
- Syncrude 1 (base plant) Operations Phase
- Syncrude 2 (expansion) Construction Phase
- Syncrude 2 (expansion) Operations Phase

The rationale for selecting these phases for study is that, to a large extent, they are interactive. For example, while the Syncrude 1 Construction Phase is nearing completion and impact assessment can no longer be used to mitigate or avoid detrimental effects, the experiences of the past do provide valuable insights into our ability to predict actions in the future.

The assessment of impacts associated with the base plant operations phase is important in order to anticipate the adjustments required to establish a suitable human environment in the long-term.

The planning required to mitigate the impacts of the operations phase cannot be viewed in isolation from the anticipated impacts associated with the construction and operation of Syncrude's contemplated expansion. It is suggested that these and other developments be assessed in a closely integrated manner to assure that the interactions between phases be explicitly identified.

4.3 Major Study Components

A comprehensive impact assessment framework has been developed which comprises six major components. These are:

(i) Economic and Demographic Aspects
(ii) Social Environment
(iii) Community/Regional Services and Infrastructure

(iv) Resource Impacts

(v) Indian/Metis Studies

(vi) Scenarios of Other Developments

The first three components are considered central to any socio-economic impact assessment since they encompass the salient factors in economic and social change.

The fourth component - resource impacts - relates to changes in the natural resource base as it affects the human environment. Typical examples of such resource impacts are:

- Changes in the availability, assessibility or quality of outdoor recreation (as a function of relative crowding, degradation, etc.)

- Changes in the fishery or in small mammal populations (as it may affect the subsistence or trapping activities of Natives)

- Changes in air quality (as it may affect community life styles)

This component is rarely evaluated in a standard socio-economic impact assessment framework and it is suggested here as a useful component.

The fifth component - Indian/Metis studies - like the study of any minority group, would ordinarily be incorporated as an integral part of components (i), (ii), (iii) and (iv). However, because of the keen interest shown by both Syncrude and the Department of Indian and Northern Affairs related to the influence of oil sands development on Native people, it is suggested that the Native component be extracted from the general studies in order that it may receive an appropriate

level of attention from professionals with a knowledge of, and sensitivity toward, Native adjustment problems. It is proposed that the sixth component - scenarios of other developments - be given particular prominence in Syncrude studies because of the uncertainty of other oil sands developments and their potentially great impact on Syncrude's present or expanded operations.

The following provides a general description of the make-up of each component and an understanding of the interrelationships between the elements is discussed below. (Figure 4.1 presents a schematic presentation of these interrelationships).

4.3.1 Economic and Demographic Aspects

The assessment of Syncrude's impacts on the regional economy of Northeast Alberta should have three main analytical elements - employment, income and population.

Employment impacts should be assessed in terms of the level and structure of employment changes which would result from the transition from construction to operation phases of the current Syncrude facility and employment changes due to the proposed expansion program. Income impacts should be quantified in terms of changes in income levels and the possible effects on income distribution and local inflation discussed in a general manner.

The above analysis of employment and income forms the basis for estimating changes in the growth and character of the region's population. These population estimates should, in turn, be utilized for estimating impacts throughout other components of the impact assessment process. Population estimates should include relevant socio-cultural characteristic descriptions.

Having estimated the likely employment, income, and population

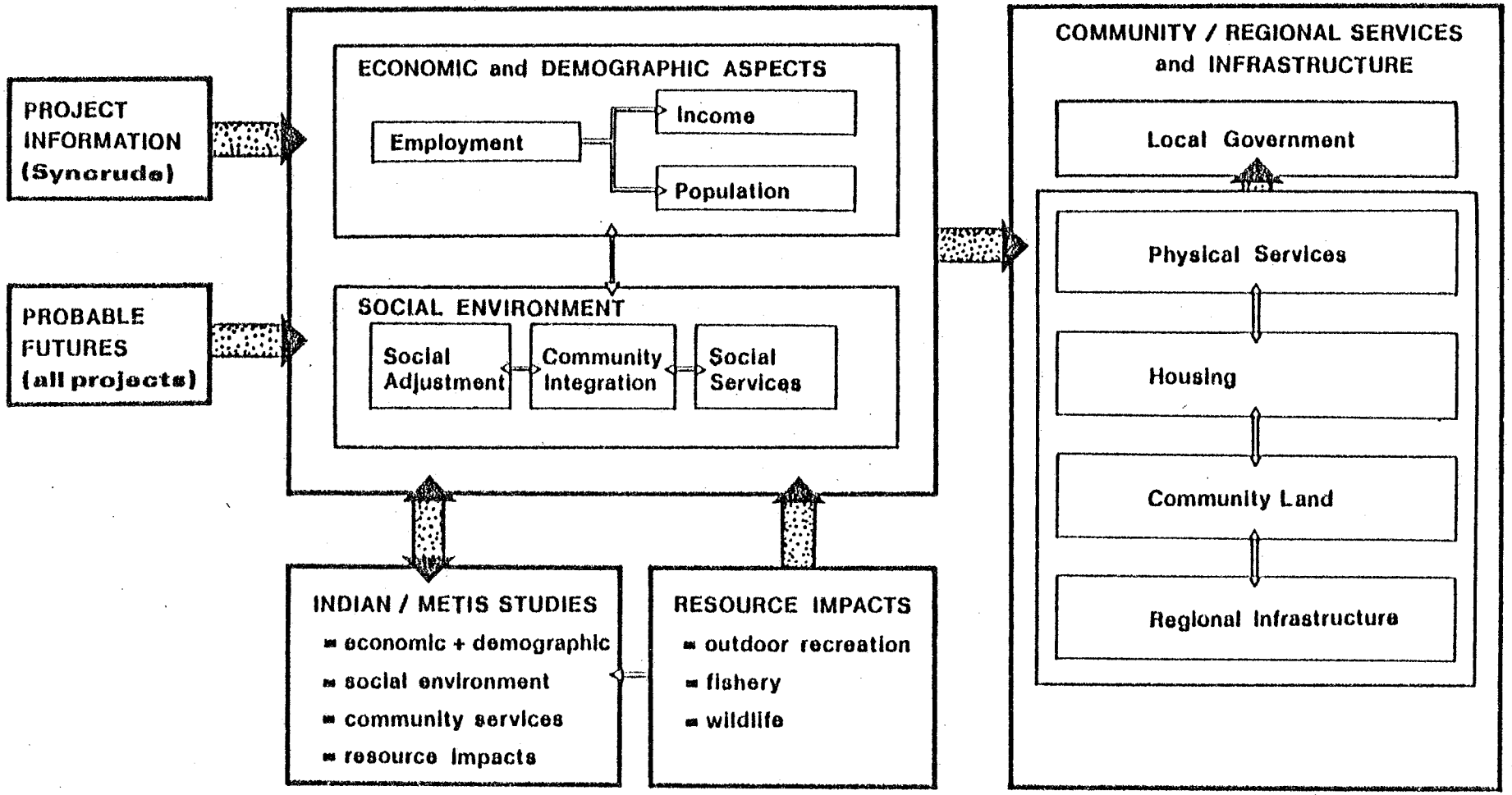

Figure 4.1 CONCEPTUAL FRAMEWORK - SOCIO-ECONOMIC IMPACT ASSESSMENT

impacts resulting from changes in Syncrude's activities, mitigation alternatives should be presented and recommendations developed to minimize the negative, and maximize the positive effects of future oil sands development.

4.3.2 Social and Community Environment

Assessment of impacts on the social environment should include the following elements:

- A description of the people living in a particular area
- A study of the communities they have established and range of life styles they have created
- An assessment of how economic developments would influence social options and vice-versa
- Some understanding of the social forces that produce different levels of community cohesion and social disorganization

The description and analysis of the social environment would begin with a review and analysis of existing documentation. Then information gaps would be filled by field work. This would involve interviewing individuals with particular roles and responsibilities and obtaining information on the perceptions, attitudes and values of community residents. Round table discussions with local community groups and personal interviews with a cross-section of the population are perhaps the most useful means of communication because they allow for discussion of both community and individual concerns. Public meetings, open house

forums and other formats for dialogue which may be part of a public information or consultation program are alternative or supplementary approaches. The net result of these exchanges should be an understanding of the dynamics and goals of the community. If it is deemed important to know how widely given attitudes are held, a sample survey can supplement the information gained by dialogue.

To assist in the prediction of the likely impacts of Syncrude's projects, these should be compared, in terms of implications on the social environment, with other major projects that have been built in North America. Specifically, a review of the documented social impacts of these other projects should be undertaken in order to ascertain the similarities and differences in terms of the social environment between other experiences and Syncrude's developments.

Recommendations should be developed from the above analysis as to the specific initiatives that could be undertaken by Syncrude and by different levels of government to minimize social costs and ensure that maximum benefits are enjoyed locally and regionally.

4.3.3 Impacts on Community Services, Infrastructure and Housing Development

Housing

Any expansion of the area population through Syncrude or other developers' activity will result in an increased housing demand in Fort McMurray. It will be necessary to undertake a housing market analysis in order to translate this incremental population into requirements for housing units for suggested future scenarios.

An inventory of existing housing stock, recent trends in residential and construction activity, and the availability of serviced land in the community should be examined.

An issue of considerable importance which should be studied is the effect of further developments on local house prices and rents, as well as the ability of persons or families to pay for required housing and the availability of funding for housing.

Various alternative housing programs should be examined, relating to short-fall housing such as prefabs and mobile homes. Stimuli to investment in the local housing sector should be discussed. To provide a basis for maximizing local benefits, the potential for the local construction sector to meet project-induced housing demands should be assessed.

Community Services

Existing community service systems should be described, using baseline data, and should include social, commercial and industrial support services in the region. Social services normally include, among other things, recreation, parks, schools, civic facilities, fire and police protection, medical services and provincial services.

A matrix should be designed for the organization and display of indicators, distributions, and other factors for all service sub-elements. Relevant demographic and social environment information from Sections 4.3.1 and 4.3.2 will be utilized, along with planning objectives identified by service planners for Alberta Northeast Region Commission, Municipal Affairs and Municipal agencies.

In each service sub-element, quantitative and qualitative changes should be noted in projecting service demands of the proposed development. Implications of social problems and possible areas of need in community integration which may result from the project should be considered in developing these projected service and facility demands.

In conjunction with the Social and Community Environment component (Section 4.3.2), programs for dealing with project-induced conflicts and problems will be presented and analyzed for both construction and operating phases.

Settlement Patterns and Land Requirements

The relative advantages and disadvantages of fostering expansion in existing communities versus establishing a new community should be discussed in light of current theory and practice. Recent studies undertaken by Provincial Government departments, including the Alberta Northeast Region Commission, will be reviewed relative to projected oil sands developments.

Existing and potential settlement patterns should be examined under various systems of local government. The effectiveness of these forms of government should be appraised in light of pressures resulting from population increases. Settlement should be examined in the context of the total region and not be limited to those areas in the immediate proximity of Fort McMurray.

Community Land

An inventory of land should be undertaken within and adjacent to existing municipal boundaries based on

accessibility, serviceability, and suitability for various land uses.

Constraints to development of community land should be identified on the basis of the foregoing and projections prepared to reflect land requirements for industrial, commercial, institutional, and residential uses. The alternate roles to be played by both private and public sectors in ensuring an adequate supply of serviced lands to meet the anticipated staged demand should be examined in detail.

Community Infrastructure

Community infrastructure includes sanitary and storm sewers, domestic water, roadways and other street improvements and public utilities. A detailed inventory of the existing infrastructure should be compiled from available records to provide a base from which to project future requirements. Working from the inventory base, the physical and financial aspects of upgrading infrastructure to accommodate population growth should be determined.

Capital and operating cost summaries for, say, a 10-year period should be prepared. Current financial assistance from senior levels of government should be identified and included.

Critical population thresholds should be discussed as they relate to the provision of these services. A basis should be provided so that the costs may be evaluated by comparison to cost summaries for similar services in other Alberta communities and municipalities.

Regional Infrastructure

Regional infrastructure includes services located outside municipal boundaries as well as services within the boundaries provided by extra-municipal agencies. Consequently there will be some overlap between community and regional infrastructure. It is suggested that these services be appraised on the basis of the body responsible for funding of the service. For example, recreation may be principally a local municipal concern and, as such, would form part of the community infrastructure.

Other services which should be considered in the regional as well as local municipal context are: Planning, hospital, airport, and surface transportation.

The assessment of regional infrastructure and service impacts will require the same analytical process as community infrastructure.

Local Government Impact

In terms of study sequence, this account should become a concluding section of the Community Services and Infrastructure components, logically following an examination of settlement patterns, land requirements, and community infrastructure requirements.

This analysis will provide a basis for assessing the financial and administrative capabilities of the local and regional governments to accommodate the anticipated growth associated with future oil sands development.

The fiscal analysis will bring together previously estimated increases in local and regional government costs for providing

services and accommodating the increased population. Projections of increases in the assessment base, as a result of the growth in economic activity and population expansion, will then be required to determine the tax levels that the overall population will have to bear in order to finance the required service expansions. Senior government subsidy programs will be included to properly identify costs that will be borne by local regional and provincial residents.

An analysis of local administration should be undertaken to assess the capability of the existing local government agencies to deliver the service requirements identified. Consideration should be given to the relative functions and responsibilities of the Department of Municipal Affairs, the Northeast Region Commission, the Town of Fort McMurray and the administrators of other settlements in the region.

4.3.4 Indian/Metis Studies

As part of the total community, Native people are included in the socio-economic assessment studies, but the uniqueness of their lifestyle, and its special sensitivity to industrial development, make it both desirable and appropriate that a separate Native study be undertaken.

Industrial development and Native development are not mutually exclusive, but in order to optimize their interaction, it is necessary to have a clear understanding of the objectives and concerns of all involved parties. Further, having identified programs and measures that offer the opportunities to maximize mutually beneficial impacts, and to minimize adverse socio-economic impacts, it is necessary to examine the willingness and ability of industry, government, and the Native people to participate in, and commit themselves to, those courses of action.

Syncrude has already established a group concerned solely with Indian/Metis participation in its current operations.

One part of the study would be to determine the role of this group, the basis on which its policies and actions were, and are, formulated, and to identify the strengths and weaknesses of the present operation. In order to do this effectively, it will first be necessary to carry out the independent, first-hand studies proposed herein.

The following steps describe the general approach and sequence of activities for these studies:

First, it is necessary to define the Native people and communities that are affected by the development through discussions with potentially affected Native people. Through this process, potential impacts can be identified in relation to the special lifestyles of the local Native people.

It will then be necessary to identify and evaluate the objectives of the concerned parties vis-a-vis Indians/Metis and the existing and proposed Syncrude development. This includes the objectives of the Indians/Metis themselves (both individually and on a group/community basis), of Syncrude Canada Ltd., of the Department of Indian and Northern Affairs, and of other relevant bodies.

The next step should be to examine in depth the present status and lifestyles of the Indian/Metis populations in Northeast Alberta and in specific communities. This will involve an examination of social and economic development patterns and include an assessment of the current dependence of the Indian/Metis people on the land and water resources of the area, to obtain the proper understanding of the Native economy.

Having taken the above steps, it will be possible to define project impact areas, both positive and negative, and to develop

alternative strategies for mitigation, compensation, and enhancement measures as relevant.

These may include special training and employment programs, social and economic counselling programs, and changes in social infrastructure, all designed to meet the specific objectives identified here.

4.3.5 Resource Impacts

Resource impacts, where they have direct influence upon regional human activities, should be assessed.

Those biological and physical resources which exhibit change as a result of direct effects (such as that of mining activity) or indirect effects (such as incremental use of resources brought about by a project-induced population) are the relevant resource changes to be measured.

Examples of such resource changes having effects on the human environment are changes in outdoor recreation opportunities, due either to physical disruption of the resource base or to more users competing for the same recreation resource; changes in the small mammal population disrupting established traplines; or changes in the fishery which may have implications for Native subsistence fishing.

Resources impacted should be identified by reviewing existing environmental reports. Resource changes, resulting from new oil sands development should be assessed (with the assistance of environmental scientists) in terms of future resource supply and demand. The social scientist should then attempt to relate these resource changes to changes in community well-being in the region.

Where possible, these relevant resource changes, attributed to oil sands development and other associated activities, should be evaluated in monetary terms to provide the basis for recommending measures to avoid or mitigate resource losses.

4.3.6 Scenarios of Other Developments

The prediction of future developments with and without the project proceeding is a standard feature of impact assessment. However, in Northeast Alberta, there are order-of-magnitude differences between the numerous and almost equally probable scenarios of oil sands developments. Analysis and planning based on any one scenario might be misleading in the context of different permutations and timing of new plants. Therefore, a special study component is suggested to identify possible oil sand projects, their probability and timing, and the nature of their impact on Syncrude's operations.

To a large extent, depicting alternative futures for the oil sands is a guessing game. The interplay of economic and political factors will determine the number, timing, and location of new oil sands plants.

In order for Syncrude to be able to determine the implications of other projects on its own operations, it is necessary to predict future urban development within the company's area of influence. The role of Fort McMurray as a regional center, its probable population, and the future location of rival communities, are key questions which are jointly determined by the construction of new oil sands plants, and by government decisions on new towns, transportation links and other policies affecting the location of business and industry. Since it is unlikely that anyone will be able to predict with confidence what developments affecting Syncrude will occur, the only reasonable course is to examine a number of probable alternatives and to estimate the sensitivity of Syncrude's operations and

impacts to environmental changes caused by external developments.

The governments of Alberta and Canada are examining the oil sands from the perspective of energy supply, investment and environmental impacts, while the Northeast Alberta Regional Commission is looking at urban and regional development for Northeast Alberta. Developing scenarios which are useful to Syncrude should be done in cooperation with these bodies. The extent to which this is done as a separate study or as a component of socio-economic impact assessment will need to be decided.

4.4 Program Information and Data Gathering

4.4.1 Existing Data Base

The type and level of data that must be specifically generated for a socio-economic impact assessment are obviously dependent on the appropriateness, timeliness and reliability of existing available data. For any reasonably sized area of Canada, Statistics Canada provides a comprehensive, although often out-of-date, source of demographic, economic and in some cases, social characteristics data. The Northeast region of Alberta is no exception. Local governments can be expected to provide recent data on housing, infrastructural facilities and fiscal management. Provincial governments and local service authorities can be expected to provide some data on community service facilities, use, and costs. These data are often inadequate, however, to meet the level of requirements specified in impact assessment guidelines.

Because socio-economic impact assessment is a system of analyses which attempts to measure the change resulting from an identifiable set of circumstances, such as the expansion of Syncrude's facilities, the resulting impacts from such activities and the parameters of the activities have to be reasonably explicit.

While there is a reasonably large body of economic and social information assembled at the Northeast Alberta Region Commission, the Oil Sands Information Centre, the University of Alberta Library, and the library of the Boreal Institute, it is unlikely that any will provide the specificity of information required to address many of the issues requiring assessment.

The two major components which suffer most from limitations in current data are the social environment and Indian/Metis components. Information dealing with the social structure and its relation to development is largely absent or is temporally, spatially, or categorically inadequate. In light of these limitations it is unlikely that past research in this area will provide an accurate basis for the assessment of anticipated change in the social environment due to the Syncrude development. Experience has shown that primary data and information gathering activities are usually required.

In view of the anticipated difficulties of determining the initial social environment in Northeast Alberta and of predicting its evolution, it is desirable to monitor the changes as they actually occur and to use this information to adjust projections, plans and programs. This feedback process could prevent errors in prediction from becoming gross errors in execution.

However, monitoring is a difficult undertaking. There is a tendency to initially overspecify data collection requirements, with the result that the whole monitoring system often becomes unmanageable and falls short of expectations.

Studies of social and personal adjustment in the oil sands region are currently being initiated by Alberta Oil Sands Environmental Research Program. These studies will monitor many of the social and economic considerations discussed in this chapter.

4.4.2 Data Availability

A vast amount of socio-economic data is collected by various government agencies for a variety of purposes and in many different forms. These data are frequently not available to outside users or are not generally compiled in an appropriate format.

To inventory and evaluate all the sources of data that might be relevant for a socio-economic impact assessment involving the oil sands region would be a major undertaking and is beyond the scope of this study. Nevertheless, it was considered useful to review some of the more important sources.

This review is concerned only with statistical material. Although no review of existing reports and surveys dealing with the oil sands region was undertaken, a select bibliography of such material has been identified which will be accessible to future researchers conducting studies in this area.*

The data collected for a socio-economic impact assessment serve several purposes: Provide a baseline against which changes in the socio-economic environment "with" and "without" the proposed development can be compared; provide input to the construction of social and economic indicators; and, given adequate time series, permit the dynamics of socio-economic variables to be explored and projected.

The Census

The 1971 Census is the most comprehensive, detailed and accessible source of demographic, socio-economic and socio-cultural data. Data stored on the Statistics Canada "User Survey Tapes"

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* Bibliography supplied by Northeast Alberta Regional Commission.

are coded by enumeration area (EA) and thus statistics and demographic, socio-economic profiles can be obtained for any specified aggregation of EA's. A listing of data on tape and definitions of EA's are available from Statistics Canada or the Population Research Laboratory at the University of Alberta.

The main problems with the Census are: The considerable time lag between data collection and its availability and the lengthy gap between each Census. Also, certain data may not be comparable from Census to Census due to definitional and boundary changes and the variations in scope between the decennial and quinquennial Census. (The 1976 Census, for example, does not provide any information concerning income or occupations). Despite these shortcomings, the Census is an important source of baseline data.

Manpower Related Statistics

The Economic Analysis and Forecasts Branch of Canada Manpower compiles certain useful labour force data which are only available with authorization from the department. These data, compiled for the department's administrative regions, might not always suit the purposes of outside users.

There are four main categories of data that are of interest: Job search statistics; job search success statistics; occupational shortage statistics; and general manpower statistics.

Job Search and Vacancy Statistics:

Data pertaining to individuals looking for work who are registered with Canada Manpower are compiled monthly for every Canada Manpower Centre Area (CMCA). Clients are classified by sex and by the occupation and industry in which they are seeking work. Job vacancies are recorded by occupation and industry. As an indicator of unemployment, this set of data

has a grave weakness - not all unemployed individuals register with Canada Manpower. (Registration is no longer obligatory for Unemployment Insurance recipients. The statistics that are available do, however, distinguish employment seekers with work and those without work). The ratio of individuals looking for work to employment vacancies provides a rough measure of labour market activity and imbalances.

Job Search Success Statistics:

These statistics record Canada Manpower clients, by sex, successfully placed in a job according to the occupation and industry in which the individual was placed. Again, data are compiled monthly by CMCA. These data provide a useful indicator of labour market conditions.

Occupational Shortage Statistics:

Manpower shortages are documented monthly, by occupation, wage/salary, job location, and credentials required by CMCA. Although not all employment vacancies are registered with Canada Manpower, the most critical occupational shortages would be recorded and thus the data are useful for analyzing labour market imbalances.

General Manpower Statistics:

A set of general manpower statistics concerning the population of working age, the labour force and the unemployed, is produced monthly, with quarterly summaries by CMCA. These figures are estimates only and are not currently being released to outside users.

Income Statistics

The Department of National Revenue is able to produce special

runs giving aggregate personal income and income distribution at both the community and regional levels. Any request for these data would require strong official backing to obtain their release.

Unemployment Insurance Commission Data

The Unemployment Insurance Commission is able to provide data on the number of claimants in individual communities (subject to confidentiality constraints); by age and sex, occupation, the number of weeks on claim, and amount of benefit received. An adjusted claim count is provided which approximates the actual number of unemployed. These figures are readily available for any current month, but time series data are limited and more difficult to obtain.

Public Assistance

Public Assistance statistics are compiled by the Department of Social Services and Community Health. Recipients are classified according to category of assistance, that is, aged, persons with dependents (single parents), physical illness/disability, mental illness/disability, and unemployables.

The demographic and certain socio-economic characteristics of recipients are recorded, as is length of time on assistance. Individual files are recorded by postal code and therefore any geographic aggregation of files is theoretically possible, subject to disclosure constraints. A month-end statement of caseloads and the characteristics of recipients could be provided. Three years of historical data are available. The above information is stored on computer tape.

Crime Statistics

The RCMP compiles annual statistics of reported violent and non-violent crimes for municipalities and unincorporated areas. Official authorization is needed to obtain these statistics. The question remains as to whether "reported crimes" are sufficiently reliable to calculate the real crime rate, since there are factors contributing to both upward and downward bias in the series which may or may not cancel out.

Mental Health Statistics

Mental Health Services compile information concerning in-patient and out-patient admissions to, and caseloads of, regional mental health facilities. The demographic and occupational characteristics of individuals are recorded. The information is stored in machine-readable forms and can be aggregated for any specified geographic area from postal codes. Data are not available prior to June 1976.

Statistics Relating to Native Peoples

There is a notable lack of data compiled on a regular or consistent basis concerning the Status Indian population and there are none for non-Status Indians and Metis.

The Department of Indian and Northern Affairs compiles annual population statistics for Status Indians by place of residence (on reserve, off reserve, and on Crown Land) and provides age and sex breakdowns of the reserve populations. The Department also constructs band profiles which cover: Population, housing, education, income, resources, social assistance, labour force (employables and unemployables), etc. Such profiles have been prepared for bands in the oil sands region. These profiles are strictly confidential and will not be released without

written permission from the bands concerned. According to the community planner at DIAND's Edmonton office, the reliability of the information contained in these profiles is low.

Another possibly useful source of baseline information relating to Native Peoples on reserves is the Joint NIB/DIAND Socio-Economic Study for the Alberta Region (May 1977).

A major difficulty encountered in attempting to fill these data gaps through collection of primary data is that the Native population has all too frequently been surveyed and researched, and, understandably, they are increasingly reluctant to cooperate in what they perceive to be "curiosity research".

In summary, the data base relating to the Native population is extremely weak and those statistics that are compiled are difficult to obtain.

AOSERP Human Environment Studies

AOSERP is about to embark on three major field studies in the oil sands region. These are:

1. A history of the region which will deal with its economic development, relations between people and government, migration, man - environment relationships, and land use;
2. A study of Native employment patterns which will look at the adjustments of Native Peoples to industrial work patterns;
3. A series of 'longitudinal' studies which will focus on Fort McMurray and will deal with changes in the social characteristics of the town's population and the adjustment of people to life in the town.

It is intended that the results of these studies will provide insights into the causal relationships involved in the social and economic development of the oil sands region and thereby a sound basis for predictive assessment of possible oil sands developments in the future. A copy of the detailed terms of reference has been requested from AOSERP and will be forwarded to Syncrude's Environmental Affairs Department.

In conclusion, there is an abundance of socio-economic data, some readily available, but much which are relatively inaccessible, that could be useful for impact assessment. The problem is not so much that there are gaps with respect to routinely compiled socio-economic data, but that these are widely dispersed and not consistent either over time or geographically. Even if a comprehensive data base can be compiled, the problem remains of attempting to determine what the various social and economic statistics mean.

Other Available Information

A large body of information related to the social environment of the oil sands region is contained with several hundred reports and working documents which have been produced during the past decade. A review of these documents to determine their possible contribution to the study program suggested in this report was not possible, given the time and budget constraints of this study.

A complete 65-page bibliography of available documents related to the oil sands region is available through the office of the Northeast Alberta Regional Commissioner.

Topic areas covered in this bibliography include the following:

Community Development
Education
Employment
Health and social services
Housing
Land development
Manpower
Municipal finance
Population projections
Quality of life/well being
Recreation
Rural land development
School services
Services and infrastructure
Townsite location and selection
Training
Transportation
Wage rates

5. IMPLEMENTATION

5.1 Professional Requirements

The skills of economists, social planners, municipal engineers and planners will be required to conduct a comprehensive program of socio-economic impact assessment as outlined in the previous chapter. The complementarity of the various study components also requires an able coordinator to ensure that appropriate information flows are effected.

Economists with a good appreciation of impact assessment practices, regional development, multiplier analysis, and resource economics would be required to adequately meet the needs of the Economic and Demographic Aspects and Resource Impact components. Similarly, social planners experienced with impact assessment, social indicator theory, monitoring programs, and community consultation practices would be appropriate to undertake the Social Environment component and community services element contained in the Community Services component.

The Community and Regional Infrastructure component would best be undertaken by municipal engineers/planners who have familiarity with infrastructure needs of small communities. Local government financial implications could be handled either by the planners or the economists previously identified.

Indian/Metis studies would require the skills of probably one key individual with considerable experience in, and empathy for, Native adjustment problems and aspirations in the region. The ability of the individual to establish rapport with the Native population is most critical. Appropriate back-up from relevant social scientists should be available.

A critical component of a complex undertaking such as suggested by this report is coordination. There is a considerable degree of complementarity between the study

components and elements. The fact that, by necessity, various disciplines are engaged in these interrelated activities makes the coordination component one that cannot be stressed too strongly. Figure 5.1 presents an organizational framework through which responsibility can be effectively delegated from the coordinator to each of five components.

5.2 Recommended Study Program Phasing

The correct phasing of the recommended study program is important to ensure that the information generated in one phase is available for integration into subsequent phases.

Figure 5.2 presents a realistic time frame for the socio-economic impact assessment phases of Syncrude's oil sands development schedule. It is recommended that Syncrude 1 Construction Studies commence approximately two months prior to the Syncrude 1 Operations Studies and four months prior to Syncrude 2 Studies, in order to establish an historic data base which will contribute to these latter studies.

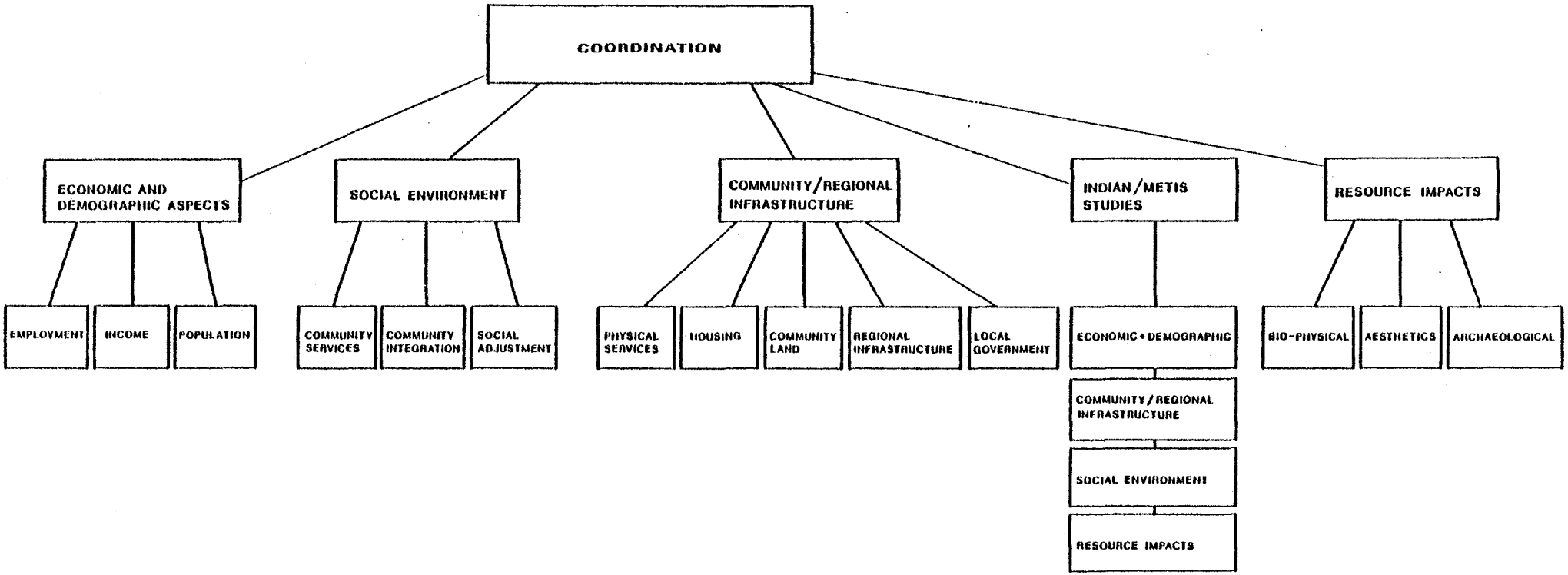
The total time estimated to conduct the recommended study program would be of the order of nine months.

Figure 5.3 presents a study component flow diagram for Syncrude 1 Operations and Syncrude 2 Construction and Operations Phases combined.

5.3 Program Budget Estimates

The following estimates are broad order-of-magnitude ranges based on the experiences of various agencies and their consultants who have undertaken similar assessments.

Consistent with the study component framework outlined in Chapter 4, order-of-magnitude costs have been estimated for



Syncrude Canada Ltd.

Figure 5.1 ORGANIZATION OF SOCIO-ECONOMIC IMPACT ASSESSMENT STUDY

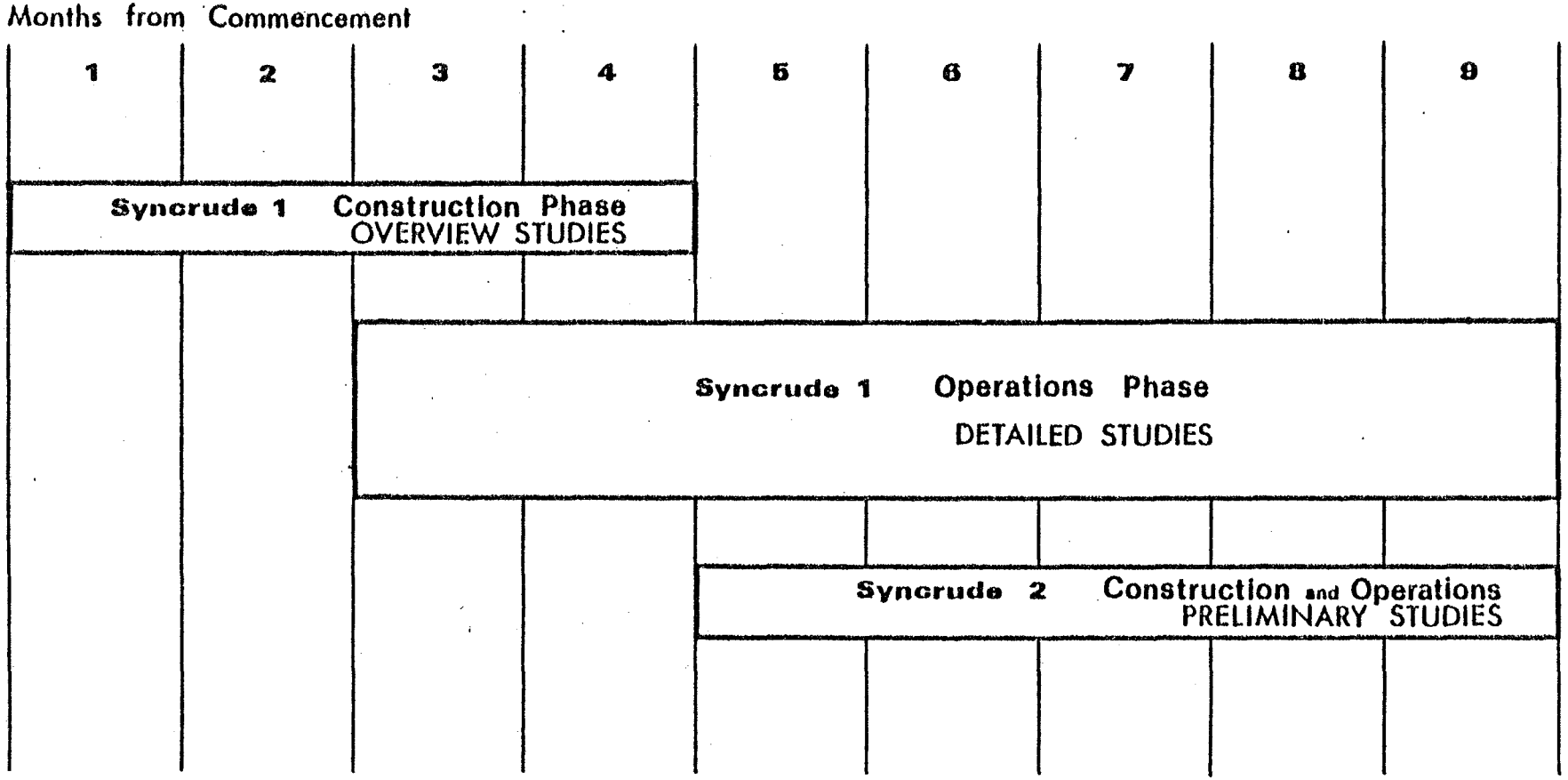


Figure 5.2 SOCIO-ECONOMIC IMPACT STUDIES - GENERAL PHASING

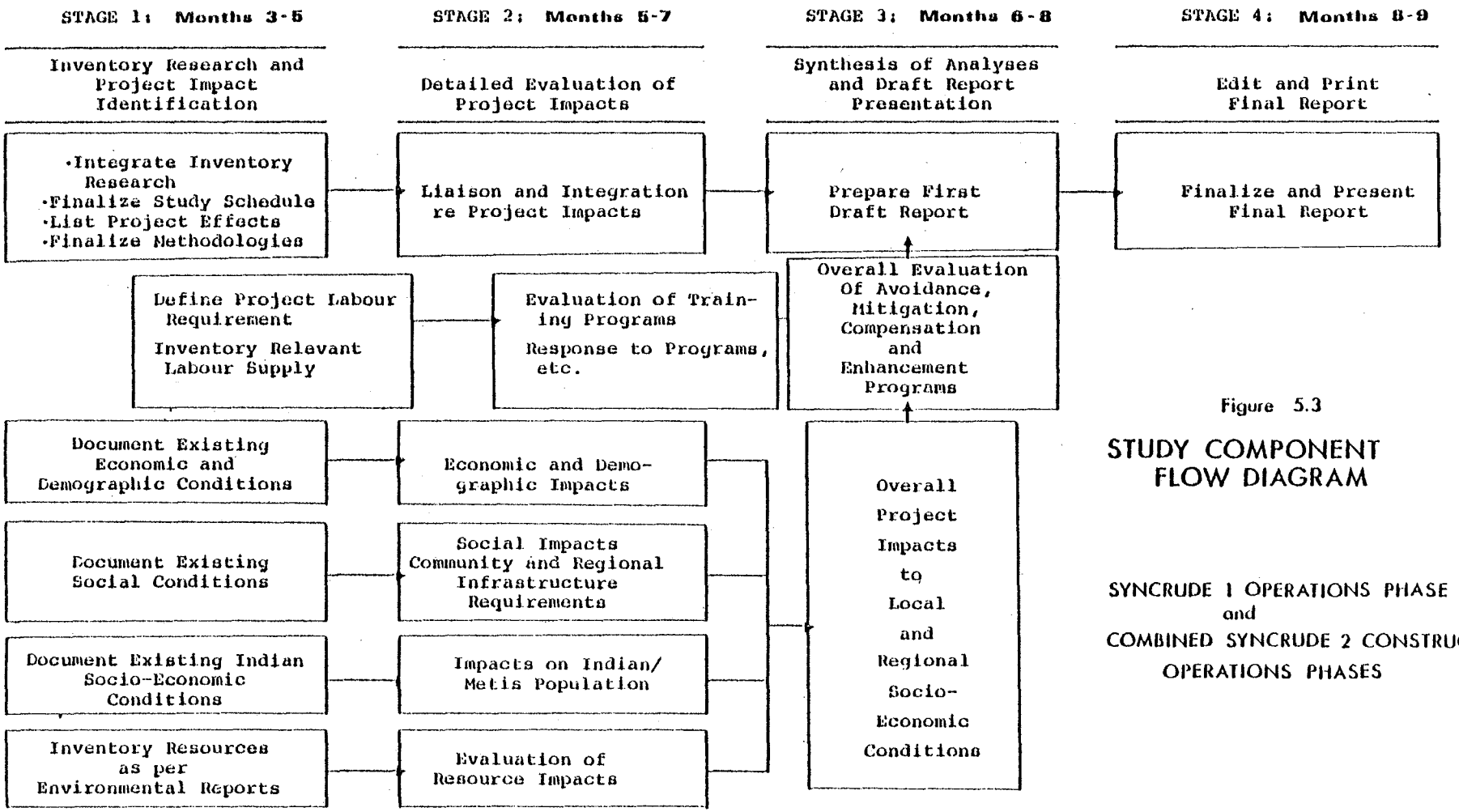


Figure 5.3

STUDY COMPONENT FLOW DIAGRAM

SYNCRUDE 1 OPERATIONS PHASE
and
COMBINED SYNCRUDE 2 CONSTRUCTION/ OPERATIONS PHASES

each major component. The depth and sophistication of research is assumed to meet at least those standards which are acceptable to federal and provincial regulatory agencies in Canada. Also, the output of the assessment would be presented in a manner suitable for use by regional and community planning agencies.

The approximate costs for each component are presented in Table 5.1.

TABLE 5.1

RECOMMENDED SOCIO-ECONOMIC IMPACT ASSESSMENT PROGRAM

ESTIMATED STUDY COST

	Syncrude 1 Construction Phase (Overview Studies)	Syncrude 1 Operations Phase (Detailed Studies)	Syncrude 2 Construction/ Operations (Preliminary Studies)	Total Component Cost Estimates
	$	$	$	$
Economic and Demographic	6,000	10,000	4,000	20,000
Social Environment	10,000	28,000	12,000	50,000
Community/Regional Services and Infrastructure	5,000	18,000	7,000	30,000
Resource Impacts	4,000	6,000	5,000	15,000
Indian/Metis Studies	5,000	18,000	7,000	30,000
TOTAL ESTIMATED COST BY PROJECT DEVELOPMENT PHASE	$30,000	$80,000	$35,000	$145,000

appendices

APPENDIX 1

GOVERNMENT AND SYNCRUDE STAFF PARTICIPATION

LIST OF PERSONNEL INTERVIEWED

SYNCRUDE

J.P.C. Elson
J. Dunstan
W.N. Sande
E.R. Reeves
D.R. Simmonds
R. Schutte
V.P. Kaminsky
F.K. Spragins
J.C. Howard
J. Lynn
C.V. Davies
C.N. Lund
M. Farries
J.C. Bjornson
J.J. Barr
F.J. Werth

OTHER AGENCIES

Gordon Young, Coordinator, Plans and Programs, Northeast Alberta Regional Commission

H. Thiessen, Assistant Deputy Minister, Alberta Environment

K. Smith, Director, Interdepartmental Relations Division, Alberta Environment

A.F. Belyea, Executive Coordinator, Interdepartmental Relations Division, Alberta Environment

R. Prieston, Environmental Coordinator (EIA) Interdepartmental Relations Division, Alberta Environment

A.E. Seifried, Head, Resources Coordination Branch, Alberta Environment

C. Johannesson, Public Relations Coordinator, Alberta Environment

Ralph Evans, Energy Resources Conservation Board

M.D. Rasmusson, Assistant Deputy Minister, Alberta Housing and Public Works

Gerry Archibald, Northern Development Branch

Bill Gillespie, Planning and Services Division,
Alberta Municipal Affairs

Rob Andres, Advisor, Social Affairs,
Petro-Canada

APPENDIX 2

NORTHEAST ALBERTA REGIONAL COMMISSION "NEED TO KNOW" LIST

1. EMPLOYMENT

1.1 New Basic Employment

a) the number of new direct positions created by the project during its phases of construction, operation and post-operation.

b) the impact timing curves of new positions during each phase.

c) projected employment by type.

d) projected educational and skill levels.

e) union arrangement by phase.

f) projected income levels by phase.

1.2 New Service Sector Employment

a) projections regarding possible service sector jobs by category (public vs private) - include analysis and assumptions.

b) what levels of commercial, retail and industrial support are envisaged to support the base employment.

1.3 Source of Labour Force and Training Requirements

a) corporate requirement plans.

b) origin of labour supply.

c) envisaged labour profile (family size, life style expectations).

d) effects on existing regional labour pools.

e) effects on educational dropout rates.

f) plans for participation by indigenous groups.

g) projected participation by women.

h) what existing training programs can be employed locally, regionally and provincially to meet employment needs.

1.4 Income

a) estimate of total personnal income generated by project over its anticipated lifetime.

b) effect and distribution of income on community and region.

c) projected "cost of living" index using Edmonton as the base 100.

d) projected net incomes before and after housing.

e) disparities, if any, between traditional wage levels in the region and wages associated with the new resource development and the anticipated effects this may have.

2. POPULATION

2.1 Totals

a) based on 1.1 a) and 1.2 a), predict total populations of existing and projected communities.

b) distinguish between direct and indirect employment populations.

2.2 Demographics

a) age - sex characteristics.

b) household size.

c) dependent population:

(i) children
(ii) wives/husbands
(iii) senior citizens

2.3 Socio-Cultural Characteristics

a) educational levels.

b) skill levels.

c) debt levels.

d) ethnic backgrounds.

e) mobility records.

f) life style expectations.

g) anticipated deviancy patterns.

h) projected annual turnover.

3. HOUSING DEVELOPMENT

3.1. Aggregate Housing Requirements - Company

a) cost affordability analysis of corporate work force.

b) resultant affordable housing mix.

c) projected required housing mix.

d) financial plans to resolve housing requirements to what can be afforded.

e) required housing mix by type. (Note: Housing mix by type should be specific: single family 900 - 11,000 sq ft; 11 00(- 15 00(sq ft, etc; multiple family should be broken down to town housing by type, condominioms by type and size, link housing, apartments by type and size, and mobile homes.)

3.2 Aggregate Housing Requirements

a) cost affordability analysis of service sector.

b) resultant affordable housing mix by type (see 3.1 e)).

c) if corporate subsidy is envisaged from company work force, identify resultant net income disparities.

d) views as to resolve of disparity.

3.3 Special Housing Requirements

a) demand for Native housing.

b) inventory of existing government programs.

c) neighborhood integration plans.

4. COMMUNITY SERVICE

4.1 Education

a) number of school age children expected.

b) existing educational physical plant, if any.

c) physical plant requirements.

d) timing of physical plant.

e) anticipated costs.

f) administrative recommendations.

g) availability and demand for adult education.

4.2 Medical and Health

a) projected demand for:

(i) doctors (by type)
(ii) dentists
(iii) mental health personnel

b) projected demand for:

(i) hospital beds
(ii) outpatient care
(iii) ambulance service
(iv) emergency services

c) projected demand for:

(i) counselling services
(ii) AADAC
(iii) public health facilities
(iv) marriage counselling
(v) foster homes
(vi) women's centers

4.3 Cultural

a) projected demand for:

(i) libraries
(ii) theaters (live and motion)
(iii) churches
(iv) service groups
(v) arts and crafts

b) projected demand for:

(i) child care centers - relate to age structure of population and projected number of women in the work force with children requiring child care.

c) perceived corporate role in achieving above demand.

4.4 Protection

a) Fire:

(i) physical plant requirements
(ii) rolling stock requirements
(iii) operating personnel requirements

b) Police:

(i) physical plant requirements
(ii) rolling stock requirements
(iii) operating personnel requirements

4.5 Administration

a) physical plant requirements:

(i) town hall
(ii) public works
(iii) recreation administration

b) perceived administrative procedures.

4.6 Recreation

a) anticipated demand for:

(i) swimming pools
(ii) arenas
(iii) community facilities
(iv) golf courses

b) corporate levels of support.

5. PHYSICAL SERVICES

5.1 Sewage Disposal

a) predicted demand for new or additional sewage disposal systems.

b) environmental and cost considerations.

c) development responsibilities - corporate, municipal, provincial, federal, others.

5.2 Water System

a) predicted demand for new or additional water systems.

b) environmental and cost considerations.

c) development responsibilities - corporate, municipal, provincial, federal, others.

5.3 Subdivision Standards

a) what standards are subdivisions to be built to?

b) what impact will these standards have on the cost of accommodation?

6. REGIONAL INFRASTRUCTURE REQUIREMENTS

6.1. Transportation

a) predicted impact on existing transportation needs.

b) predicted additions to existing modes.

c) anticipated costs of additions.

d) financial responsibility for costs.

6.2 Energy

a) power requirements and sources.

b) power line right-of-way.

c) pipeline requirements.

d) thermal requirements.

7. SOCIAL AND ECONOMIC ADJUSTMENT CONSIDERATIONS
(NOTE: Some need-to-know requirements have been dealt with, in part, under Section 1. Employment.)

7.1 Cultural Impact

a) anticipated social problems and deviancy.

b) steps which could deal with them.

c) responsibility for resolve.

7.2 Community Integration

a) predicted areas of conflict between newcomers and existing population.

b) proposals for resolving conflict.

7.3 Relocation Considerations

a) what human relocation might be required?

b) how will this problem be resolved?

c) what traditional land usages will occur?

d) how will this problem be resolved?

7.4 Archological and Historic Sites

a) identification of sites.

b) anticipated impact.

c) plans to resolve.

8. LOCAL GOVERNMENT IMPACT

8.1 Political and Administrative Procedures

a) what relationships are to exist between existing political entities and the corporate developer at each stage of development?

8.2 Economic Considerations

a) what costs are incurred in putting in place supportive infrastructure and who bears the costs?

b) can incurred costs be borne by potential in-migrants or is extraordinary financial aid required?

c) if so, who supplies it?

8.3 Urban Settlement Considerations

a) average travel distance and time.

b) costs and benefits relative to:

(i) expanding existing communities to accommodate operating staff
(ii) creating new urban center

c) other considerations.

9. COMMUNITY DESIGN AND AESTHETIC CONSIDERATIONS

9.1 Settlement Site Factors

a) micro climate.

b) sunlight.

c) orientation to surrounding environment.

8.2 Urban Design Factors

a) environmental.

b) social relationships.

c) circulation patterns.

d) landscaping.

e) preservation of existing vegetation.

f) housing design and finishes.

8.3 Community Land Requirements

a) housing.

b) education.

c) recreation.

d) commercial and service.

e) industrial.

f) transportation.

APPENDIX 3

SOCIO-ECONOMIC IMPACT ASSESSMENT STUDY OPTIONS

Option	Phase	Study Timing Commence/Complete	Level of Study	Output	Man-Days	Estimated Cost
1.	Syncrude 1 Construction	Winter 1977/ Spring 1978	Overview	Post-impact assessment review. Use: Assist in anticipating impacts. Satisfy Alberta Environment request.	150	48,000
2.	Syncrude 1 Construction Syncrude 1 Operations	Winter 1977/ Autumn 1978	Overview Detailed	Construction wind-down assessment. Operations build-up assessment. Long-term operations assessment. Satisfy Alberta Environment and Northeast Alberta Commission.	450	110,000
3.	Syncrude 1 Construction Syncrude 1 Operations Syncrude 2 Construction Syncrude 2 Operations	Winter 1977/ Autumn 1978	Overview Detailed Preliminary Preliminary	As for Option 2 but with increasing levels of refinement in terms of anticipating "likely" future events. Will provide preliminary assessment of Syncrude 2 for planning purposes including avoidance, mitigation, etc. May satisfy Alberta Environment.	600	145,000
4.	Syncrude 1 Construction Syncrude 1 Operations Syncrude 2 + Shell Construction Syncrude 2 + Shell Operations	Winter 1977/ Autumn 1978	Overview Detailed Preliminary Preliminary		650	160,000

part 2

socio-economic impact assessment:

A CRITICAL REVIEW

PART 2

CONTENTS

1. Introduction

This chapter is an introduction to socio-economic impact assessment procedures. It includes some critical evaluations of the concept of impact assessment and will provide a basis for outlining an assessment program as requested by Syncrude's Environmental Affairs Department.

2. Project Evaluation: Perspectives and Approaches

The evaluation of private sector projects has, until recently, been based largely on assessments of engineering and financial feasibility from a private point of view. To a limited extent, the fact that the proponent has been required to obtain various permits and licenses from regulatory bodies has ensured that certain social concerns, particularly those related to some aspects of environmental quality, have been considered in private assessments of project feasibility. What has been lacking, however, is any systematic comprehensive assessment of the desirability of private projects from a social perspective.

However, the decision to undertake a private project should be determined by considerations other than simple profitability. A profitable private project will generate benefits for individuals other than its shareholders. Benefits will accrue to consumers of the project's production, its employees, and, through taxes that will be paid, to society at large.

A social, as opposed to a private, project evaluation is needed for two reasons: The benefits which accrue to, and the costs which are borne by, particular individuals or groups and not necessarily equivalent to the costs and benefits to society as a whole; also certain types of production give rise to positive or negative side effects. These external effects,

generally ignored in a private accounting of profitability, must be included in a social accounting process.

A branch of economic theory known as welfare economics has been developed which attempts to assess the desirability of economic changes from a social perspective. An important analytical tool in this field is benefit-cost analysis.[1] This technique was developed in the United States during the 1930's to evaluate public water resources projects and has since been widely applied in appraising the social profitability of public investment.

The appraisal of a project by benefit-cost analysis is not entirely unrelated to a private accounting exercise but it employs somewhat different concepts of benefits and costs and encompasses a wider set of interests. For example, cost in benefit-cost analysis is defined not as actual costs to the private firm, but as the value society has to forego when resources are committed to the project in question instead of to some alternative use. In addition, certain types of production give rise to side effects to which the private producer assigns no price and thus ignores. For example, the destruction of a fishery by the discharge of industrial effluent is a social cost which would be included in benefit-cost analysis but excluded from a private financial analysis.

Viewed superficially, an attractive feature of benefit-cost analysis is that it reduces all costs and benefits to a single monetary value and thus appears to provide an unambiguous assessment of a project's efficiency. However, the need to express social profitability in terms of a single monetary value is the greatest weakness of benefit-cost analysis. It may result in unquantifiable items being discounted or ignored in the analysis altogether and usually avoids the question of who gains and who loses as a result of undertaking a particular project.

For these and associated reasons, project appraisal based on benefit-cost analysis alone is incomplete and, therefore, possibly misleading. The importance of the monetary yardstick in evaluation is not denied but is by itself inadequate.

3. Socio-Economic Impact Assessment

An approach which seeks to redress the deficiencies in benefit-cost analysis (although not purported to be a substitute for it) is a procedure known as impact assessment. Stemming from a growing awareness and concern about the unexpected and often unwanted consequences of altering the biophysical environment, impact assessment has evolved to include socio-economic considerations. Initially, the function of impact assessment was restricted to project evaluation; however, its underlying premise that social and economic consequences of a project can be anticipated and controlled suggests an even greater usefulness as a planning tool.

Socio-economic impact assessment, rather than concerning itself with "social efficiency", which is the focus of benefit-cost analysis, seeks to provide a broader base of assessment by asking: What are the socio-economic factors that will be affected by the project? Will such effects be detrimental or beneficial? What will be the extent both geographically and over time of the relationships between factors and the impacts upon them? Who will be affected?

The geographic focus of an impact assessment usually differs from that of a benefit-cost analysis. The provincial or national economy normally provides the relevant framework for accounting in a benefit-cost appraisal. An impact assessment generally adopts a sub-provincial framework, concentrating on the individual communities that would likely receive the major effects of a project's impacts. This narrower focus, together with the disaggregation of impacts, provides a

basis for the assessment of a project's desirability and for planning which is not provided by a benefit-cost analysis.

Impact assessment may be conducted either prior to or after the development of a project. An assessment undertaken prior to development would concern itself with the prediction of impacts and attempts to reduce uncertainty about the future. Following the implementation of a project, it may be useful to assess impacts on an on-going basis. This latter function of impact assessment is commonly termed "monitoring". Monitoring may provide input into future impact assessments, and the planning process generally, and thus becomes part of a learning process.

The monitoring of socio-economic impacts associated with large-scale projects has recently attracted considerable interest from government regulatory agencies and may become an integral part of future impact assessment experiments. Nonetheless, few such monitoring programs have been implemented and none, to our knowledge, has been formally evaluated.[2]

It is obvious that the results of any such evaluation would make an invaluable contribution to the learning process that supports advances in planning and decision-making methodology.

4. The Content and Methodology of Social Impact Assessment

Predictive impact assessment has become an integral part of the government approval procedure for selected projects in Canada. This assessment requirement generally precedes submissions to secure the various permits and licenses that must be obtained before a proposed development can proceed. Although supported by legislative authority, the requirement for an impact assessment in Canada is discretionary, with the exception of Ontario, where it is mandatory.

5. Content

The following set of typical socio-economic guidelines is based on the published guidelines of various governmental agencies in Canada and the United States.[3]

The requirements of a typical impact assessment generally include the following:

1) A description of the proposed project with reference to alternative design features, locations and scheduling.

2) An inventory of the existing socio-economic environment in the study region.*

3) Forecasts, or scenarios, of those elements of the socio-economic environment which are relevant for the evaluation of socio-economic effects.**

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* This inventory provides a baseline against which forecasts of socio-economic changes in the region, both with and without the proposed project, can be assessed. A discussion of the project's relationship to existing land use and regional development policies and plans is normally required.

** These forecasts are required both with and without the proposed project. These two sets of forecasts are required to ensure that those effects which would have occurred in any event are not ascribed to the project. The exercise of constructing these scenarios is thus crucial although difficulties arise due to uncertainty and limited data as well as from the inconclusive nature of socio-economic forecasting. Ideally, some 'most likely' scenario can be developed, but this is not always possible when there is considerable uncertainty about the future, in which case, it may be necessary to develop several scenarios.

4) An evaluation of predicted socio-economic effects with respect to their magnitude and their incidence over time, among specific social groups, economic sectors and communities in the study region.

5) The development and evaluation of alternative measures to deal with adverse effects through mitigation, compensation and conflict resolution.*

Within the framework of these general requirements, there are specific concerns to be addressed in a socio-economic impact assessment. Although these concerns will, to some extent, be tailored to each individual project, there is a fairly standard set of requirements that is relevent for most large-scale industrial developments and which strives to achieve a balance between selectivity and comprehensiveness.

The requirements should be selective in that only those concerns which are relevant to the assessment at hand are included, but sufficiently comprehensive to ensure that no important factors are left out.

The difficulty is in establishing an objective measure of relevance, since what is and is not relevant frequently is a matter of opinion rather than a scientifically determined matter of fact; and there is often a temptation to extend the net of concern wider than the given case warrants, simply to avoid later criticisms that relevant factors have been left aside.

In the section that follows, the concerns covered in the typical impact assessment are discussed. These are grouped into four major categories: Economic and Demographic; Community Services and Infrastructure; Social Adjustment; and Resources.

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* See Glossary.

Economic and Demographic

The types of economic questions that a typical socio-economic impact assessment would request the proponent to consider include:

1) How many jobs would be created, directly and indirectly, by the project during its construction and operating phases?*

2) What would the schedule of the direct and indirect labour forces be over time?

3) What would be the occupational and income structure associated with the new set of direct employment positions?

4) What credentials, for example, education, trade certification, union membership, would be required for these positions?

5) Are existing training programs adequate to enable local people to fill the direct jobs that would be created? If not, what kinds of programs are envisaged?

6) How would the availability of new employment opportunities affect the high school dropout rate?

7) What are the sources of labour from which the project's work force will be drawn? What economic sectors? What geographic areas, that is, local vs non-local? What 'target groups', for example, Native Indians, women, the unemployed, income assistance recipients, high school dropouts, youth?

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* See Glossary.

8) Would the labour supply of existing firms be disrupted?

9) What would be the effect on migration out of the region that would have occurred without the project?

10) What would be the rate of job turnover for the new set of direct employment positions?

11) Is the employment structure that would be created vulnerable to cyclical instability?

12) Would firms supplying inputs to the project or processing its outputs be induced to locate in the region?

13) What would be the demographic, socio-economic and cultural characteristics of direct and indirect employees and their dependents?

14) What would be the likely effect of the project on the regional income distribution?

The information concerning manpower requirements and their scheduling, the recruitment of labour from local and non-local sources, and the demographic and socio-economic characteristics of in-migrants, that is, employees hired non-locally plus their dependents, provides the basis for generating population forecasts which are required to estimate additional demand for social and economic infrastructure, and for the assessment of social adjustment considerations.*

Although manpower requirements and schedules do change in the course of project planning, the proponent should provide this

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* See Glossary

information at an early stage in the study since it determines many of the subsequent impacts.

The estimation of 'indirect' employment and income depends on the construction of 'multipliers'*, a methodology which is well developed although there are some rather serious data limitations.

The sum of direct and indirect employment and income constitute the major regional economic benefits of the project. The estimation of aggregate regional income and employment benefits presents few problems; however, the determination of their distribution is quite a different matter. To determine, except in the most general terms, who would likely fill which employment positions, assumes a good deal about the recruitment and training that would be established to involve particular social groups in the work force. It also assumes that the availability of 'target' individuals for employment and their suitability for, and willingness to accept, employment can be adequately assessed. Employment distribution is a social policy question and should be treaded as such in an impact assessment. It is not something that can be 'predicted' in any objectively precise sense.

It is difficult to see how overall changes in the distribution can be met. There is usually no up-to-date information regarding the existing distribution, and the prediction of changes in the distribution is a formidable task. It is unlikely that it could be determined with any confidence whether the effects of an individual project on income distribution would be regressive or progressive.

Similarly, the request to take account of regional inflationary effects of development, presumably so that real income changes can be established, can only be handled in the most cursory way. It would be more meaningful to focus on measures

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* See Glossary.

to avoid possible regional inflation than to attempt to predict its level.

A consideration of demographic factors is also required. Some specific questions to be addressed with respect to demographic aspects are:

9) What would be the likely volume of in-migration resulting from employment creation? This is largely a function of local vs non-local hiring but also relates to speculative in-migration.

2) What would be the distribution of population increments within the region as between existing communities and any proposed new communities?

3) What would be the rate of household/family formation associated with the additional population?

4) What would be the demographic, socio-economic and cultural characteristics of the in-coming population?

The forecasting of these factors is clearly important for community and regional planning purposes because of the implications for future population growth and settlement dynamics, the level and composition of demand for infra-structure and services, and social adjustment. The proponent of the project would also be concerned with some of these questions, such as the settlement alternatives for housing the work force and the implications of these alternatives for commuting, labour turnover and housing demand.

The projections of aggregate population and age-sex characteristics is a fairly straightforward exercise. Computer models

have been developed which facilitate the consideration of a number of alternatives in terms of population age and sex composition, settlement patterns and in-migration. These alternative population projections determine subsequent projections of housing, municipal service and social service requirements.

However, it is not a simple matter to incorporate socio-economic and cultural characteristics into such population models. Knowledge of the relationships between education levels, income levels, ethnicity, and other demographic variables, and demand for various community infrastructure and service items is limited. It is thus not possible to consider these factors in anything but a general way.

Community, Regional Services and Infrastructure

A major area of concern in socio-economic impact assessment is the effect of the project on community/regional services and infrastructure. This factor is important for public sector community and regional planning and, to the extent that community infrastructure and service provision affect labour force stability, for project planning by the proponent. The items to be considered in an inventory and projections of infrastructure and services typically include:

- protection services (police and fire)
- human resource development and social services (health, welfare and education)
- sanitation (water and sewer systems and garbage disposal) and street services
- court and judicial facilities and services
- cultural facilities and programs
- recreation facilities and programs
- transportation and communications systems
- power and utility systems
- commercial services

In addition, local housing, community land, and fiscal impacts of the project are considered in this section.

The questions to be addressed include:

1) How adequate are existing services and infrastructure in terms of existing demand? Is there surplus capacity available or are there backlog needs to be met?

2) What would be the additional demands for services and infrastructure to accommodate projected growth?

3) What would be the cost of additional requirements? What would be the division of responsibilities for these additional costs among the municipality, senior governments and the proponent?

The basic problem in estimating service demand is that provincial standards are usually used to determine the level of publicly provided services required for a given population size. The range of service needs among communities of similar size, however, is not necessarily uniform, and it is extremely difficult to take account of deviations from these standards to reflect the unique characteristics of the population under study in terms of demands and preferences.

Two items that are closely related to community services and infrastructure are housing and land supply.

With respect to housing, the following questions would be asked:

1) What is the existing availability, composition and cost of housing?

2) What is the projected demand, composition and cost?

3) What mortgage funding and housing assistance programs, both public and private, would be available?

4) What would be the capability of the local construction sector to meet the projected demand for housing?

5) Who would assume responsibility for housing development?

A major difficulty in projecting housing requirements is that of relating the characteristics of the projected population to the types of housing that will be demanded so as to adequately reflect preferences and ability to pay.

In terms of land required, consideration is given to the following:

1) What would be the supply of, and demand for, land by type of use: Residential, commercial, industrial and institutional?

2) Are there likely to be land supply bottlenecks such as physical constraints, zoning constraints or boundary extension problems?

3) Who would assume responsibility for land development?

The service and infrastructure assessments provide implications for local government finances. Experience has shown that small communities often have considerable difficulty in financing rapid growth. There is thus the standard requirement that a detailed fiscal analysis for the affected local government sector be provided in an impact assessment.

The fiscal analysis usually considers the following questions:

1) What is the current financial situation of the local government in terms of revenue base, cost structure, debt load and borrowing power?

2) What is the property tax rate in the community?

3) What would the effects of the project be on the government's financial status?

4) What financial assistance would be available from senior governments to finance required expansion?

5) What local tax rate would be necessary to finance the expansion?

6) Would additional financial assistance be required?

An accurate analysis of local government fiscal impacts is dependent upon the population, income, housing, service and infrastructure projections that determine the revenue potential and cost structure. To the extent that the analysis indicates undesirable fiscal impacts, it is often used as a basis for compensation negotiations with the proponent.

The analysis can be readily extended, if desired, to include project effects on senior government finances. This is usually undertaken when either the scale of the project or its settlement implications place significant burden on the Provincial Treasury.

Social Adjustment*

Social adjustment considerations encompass the various social

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* See Glossary

problems that may arise from the dislocations that often accompany rapid growth. The kinds of questions that are asked in this regard include the following:

1) What social problems, such as alcohol and drug abuse, family breakdowns, crime and mental health problems, might accompany development and who would be affected?

2) Would there be problems of adjustment and integration as the result of the migration of Native peoples from rural to urban areas?

3) Would racial tensions arise as the result of the influx of other minority ethnic groups?

4) Would in-migrants experience problems of acceptance in the communities concerned?

5) Would any well-defined communities be completely dislocated by a massive influx of 'outsiders'?

While these kinds of questions are important from a social policy standpoint, it is necessary to point out that the relationship between development and social adjustment is not well understood. Furthermore, the statistics that are available which record the various manifestations of social stress are subject to many limitations and ambiguities which make their interpretation extremely difficult.

Resources

Where a project may change the value or use of natural resources, these changes should be evaluated in terms of their regional socio-economic impact. Some examples of such

considerations are:

1) What would be the effect of any project changes in wildlife populations or fisheries on existing local commercial and subsistence uses?

2) Would any 'heritage' resources, that is, archaeological and historical sites, be disturbed or spoiled?

3) Would outdoor recreation opportunities be affected by physical disruption of the resource base or because more users are competing for the same resources?

4) Would there be any conflicts with, or displacement of, other resource-based activities such as agriculture and forestry?

Resource changes would be assessed quantitatively in terms of regional income and employment losses or gains associated with any such changes, and qualitatively in terms of resulting life style changes. This assessment would be dependent on basic information concerning resource changes, such as the growth or decline of wildlife populations which would normally be supplied by the biophysical impact assessment.

These factors would have to be considered by the proponent and by the relevant government agencies in formulating any mitigation, compensation or conflict resolution measures that may be required before a project could be implemented.

Summary

The above outline of requirements for a socio-economic impact assessment may be regarded as representative of what a predictive assessment would typically include. There are, however, specific considerations that may be relevent to an individual case which are not encompassed in this framework. Any specific requirement should be determined at an early stage by the proponent and the body requesting an impact assessment.

6. An Overview of Methods[4]

There are no handbooks or manuals for socio-economic impact assessment such as those available for conducting financial analyses or benefit-cost analyses, which set forth established definitions, concepts and techniques. The methodology of impact assessment is still in a developmental stage; therefore, it is difficult to make comparisons of project which have been appraised by different analysts.

However, given their limitations, there are several methods commonly used to identify, predict and evaluate socio-economic effects. These are discussed in the following sections.

Identification of Effects

The main methods of identifying socio-economic effects are: Check lists, matrices and flow diagrams.

Check lists, such as those commonly found in governmental guidelines for impact assessment, are simply lists of concerns to be addressed. They are intended to be suggestive rather than definitive, and thus rely on the judgement of the analyst to determine the relevance of each item in the list and to expand the list of considerations as appropriate.[7]

The matrix approach to identification of socio-economic effects juxtaposes various project activities onto a list of possible effects and thus serves to portray cause and effect relationships. A major defect of this approach is that it only identifies the direct effects of a particular activity; the complex chain effects which are instigated in the socio-economic environment are therefore oversimplified.

A flow diagram can be used to identify the relationship between various actions, their effects on the socio-economic environment, and their final impact. This approach is particularly useful for determining the socio-economic impacts of ecological effects which are treated superficially, or even ignored, in many impact assessments. The major difficulty is that of keeping the exercise from becoming over-comprehensive and thus unmanageable, although this is difficult to avoid given the complexity of the systems which have to be dealt with.[5]

Prediction of Effects

Methods of predicting socio-economic effects and impacts comprise a variety of specific techniques and a set of theory about social and economic change. However, neither the techniques nor the theory available for socio-economic impact assessment is well advanced. The prediction exercise in socio-economic impact assessment largely revolves around the preparation of a set of population projections which are applied to certain 'standards' and ratios to derive various population-dependent forecasts, for example, those concerning housing, water and sewer systems and social service requirements.

Evaluation of Effects

The evaluation of socio-economic effects can be achieved in various ways, including a check list or matrix of impacts,

the ranking of impacts and the scaling and weighting of impacts.

The first approach, check lists, involves placing check marks against lists of socio-economic effects, or entering information about these effects, suitably coded, in the cells of a matrix. There are a number of problems with matrices. The most serious problems are: Double counting; the failure to portray interactions among effects; the measurement of effects in non-comparable units; and the failure to provide a summary of overall impact. Also, there is a problem of keeping the displays from becoming bewildering; for example, one approach, the Leopold Matrix, contains 8,800 cells, each of which contains two pieces of coded information![6]

The ranking approach can be useful when comparisons are being made between alternative projects. Numerical rankings are assigned to various impacts for each alternative, but since it is implied that all impacts have equal weight, no overall assessment of the various alternatives is possible. It is possible, however, to determine those alternatives with the lowest negative impact, or highest positive impact.[7]

Scaling involves expressing different impacts in comparable units. An approach which employs scaling is the Batelle System. This system measures effects on a scale which ranges from 0 to 1. To arrive at an aggregate measure of impact, which again would be useful for comparing project alternatives, it is necessary to attach some kind of weight to each impact. Such an aggregation of impacts, while convenient, is considered by some authorities to be highly suspect.

7. Consultation and Public Involvement

Dialogue with the people who are likely to be affected directly or indirectly by a development plays an important role in socio-economic impact assessment and is often an explicitly stated requirement of the assessment process.

A consultation program is useful for two reasons. First, the people who will be affected are in a good position to give information and judgements on how they and their institutions are lilely to be affected and what can be done about it. Secondly, the perceptions, attitudes and values of the affected population are an essential ingredient for evaluating the unquantifiable impacts of development, such as the change in character of a community due to its larger population.

This section looks at community consultation from the point of view of such information gathering. It does not examine the political merit or hazard in informing the interested publics or in involving them in the planning and decision-making processes. Nor does it go into the critical question of how the community should be informed so that those involved in discussions of the impacts of development have all the pertinent facts.

Obtaining Factual Information

Much of the information that is required for socio-economic impact assessment is not published and may not even be recorded. Nonetheless, there are usually people in the community who have unpublished records and personal knowledge which can be enormously useful in assessing the likely secondary effects of predicted project impacts.

Those matters which particularly require local knowledge include:

- The characteristics of the local population, including their availability and suitability for particular employment.

- The physical capacities and standards of community and regional services and infrastructure, existing and planned.

- The structure of the community, including participation of various sectors in local government and community activities.

- The incidence and possible causes of various identifiable social problems.

These are questions of fact and judgement which can often be clarified by approaching, in each case, individuals who are known to have a responsibility or strong concern for that particular matter in their community. Usually, a series of personal interviews is the most satisfactory means of obtaining or requesting such information.

Perceptions, Attitudes and Values

Gathering useful material pertaining is values to more problematic. First, it is difficult to elicit unambiguous value statements because answers depend strongly on nuances in the questioning. Secondly, it may be hard to ascertain how stable or widespread a particular attitude is. Sample surveys can be employed which have the advantage of showing how widespread a particular attitude is. However, a survey is a one-shot testing of opinions and does not allow for the development of ideas with reflection and dialogue.

A more fruitful approach in open-ended situations is loosely structured face to face contact. This contact may take

many forms. Amongthe methods commonly used to elicit the views of the community are public meetings, round table discussions, open house forums and personal interviews. Each approach has its strengths and weaknesses in terms of the people who are likely to become involved and the kinds of information likely to emerge.

Public Meetings

Public meetings are useful for describing and publicizing a program, and for identifying the strongly held views of interest groups. They are not an appropriate means for detecting the range and revalence of community attitudes as the less strident views are often not voiced.

Round Table Discussions

Round table discussions with local community groups allow for airing of social concerns and show some measure of the concensus regarding particular attitudes. If repeated with a number of groups, each group selected on the basis of different membership criteria, very useful results are possible.

Open House

An open house is an opportunity for people to view material on the development and question the proponent and is mainly useful as a means for individuals in the community to pursue their particular concerns, seeking knowledge of the development and offering suggestions for modification. Values and attitudes may emerge as a by-product.

Personal Interviews

Personal interviews with a cross-section of the population can produce good information on perceptions and attitudes.

Compared to round table discussions, however, in the personal interviews the interviewer plays a greater role in influencing the results and it is more difficult to discover community as opposed to purely personal concerns.

The above discussion has implied that general information on values can be obtained from a community and then applied to evaluate development options. A more straightforward approach can sometimes be taken; that is, the options themselves can be discussed with the community, and the people can be asked to evaluate these directly in their own terms. If a good level of understanding can be established between the proponent and the community on the nature of the development, its effects on the community, and criteria that need to be considered in making the final selection, this is an excellent means of bringing local values to bear on the evaluation process. A process containing a good information program with public meetings, open houses and round table discussions, or some variation of these, would probably be needed to reach the required level of understanding. To ensure that all apsects of development were unpartially described the media and government, as well as the developer, should take an active role in the information and construction programs.

Public input to evaluation of alternatives can be taken a step further by incorporating citizen representation directly in the planning process. This has many implications beyond socio-economic impact assessment, and from the assessment viewpoint, the considerations discussed above would still apply.

Governmental requirements for impact assessments, both socio-economic and ecological, have been largely accepted by private firms and public works agencies and have been

applauded by certain segments of the academic community and the general public. There is, however, a growing body of criticism from various sources which calls into question how useful impact assessment has been.

There are those criticisms which relate to the adequacy of impact assessment in terms of its methodological and theoretical foundations and the data base on which it relies. This criticism looks for a more rigorous approach, and is most frequently advanced by academic and professional specialists who are conscious of the weak methodological grounds and flimsly data base of much that has been done to date.

An example of such criticism is provided by a recent editorial which appeared in The Ecologist concerning impact statements. Although this was addressed specifically to the ecological aspect of impact assessment, it could be argued that it applies equally to the socio-economic component. The author's view of those who conduct impact assessments is that they "conduct the studies regardless of how quickly results are demanded, write large, diffuse reports containing reams of uninterpreted and incomplete descriptive data, and in some cases, construct "predictive" models irrespective of the quality of the data base".

The editorial goes on to charge that too often impact assessments have become a specialized stock-in-trade of some academics and to many consultants, who produce immense, non-critical reports, voluminous in terms of non-integrated facts but bare of significant and testable conclusions. The editorial notes that such a misuse of intellectual capital levels a client against the continuing advance of scientific methodology, partly because those who carry out impact assessments do not utilize the more recently evolved, sophisticated tools of analysis and probably because those scholars

who do contribute to the evolution of scientific advance cannot accept the working constraints normally imposed on teams of specialists preparing impact assessments.

While acknowledging that impact assessment may be lacking in rigor, much of the refinement of methodology and technique that goes on in academia is excessively elaborate and could not be incorporated into an operable impact assessment. An impact statement is a 'time sensitive' document that is required for planning and decision-making and therefore must often be hurriedly prepared. Thus, it may not be able to both meet the expectations of academics in terms of quality and still meet the deadlines set by the decision makers.

Another criticism is that impact assessment has been deflected from the goal of providing an objective appraisal of the effects of a project on the socio-economic environment and has become instead a tool to advance certain self-serving interests, including those of the proponent. The argument suggests that although an impact study is prepared under the auspices of a governmental body, which is presumed to safeguard the 'public interest', the proponent remains responsible for its preparation and thus may slant the appraisal in favour of the project being proposed. It is also feared that a public information or consultation program, often conducted as part of an impact assessment exercise, may serve to anticipate and diffuse any opposition by convincing the affected population that all legitimate concerns will be considered and by emphasizing the economic benefits that will accrue to the area. In this way, a base of support for the project can be built in the communities that will be affected. The documentation submitted to government may also be prepared in such a way as to emphasize the project's benefits, and to play down the significance of unwanted side effects. However, an adequate

provision for the public airing of an impact statement leaves little reason to suppose than an obviously biased impact assessment would serve the interests of the proponent, although the disparate access to information must be kept in mind when evaluating a public protest against a private action.

A related and perhaps more serious criticism is that the impact assessment process provides a point of entry for the private sector to exert an inordinate degree of influence in areas of social policy and planning that properly belong in the public domain. Many of the concerns that the proponent is requested to address and to suggest prescriptions for, in an impact assessment, are questions of social policy. On the other hand, the impact assessment process provides a point of entry for the incorporation of values promoted through the social policies of government into planning by the private sector, leaving the question of which becomes the dominant and which the subordinate very much undecided.

Finally, there are criticisms that the assumptions and ideals of rational, comprehensive planning and 'scientific' management, implicit in impact assessment, are inappropriate. It is suggested by these critics that 'muddling through' is the norm when it comes to planning and decision-making and that it is more effective than the rational, comprehensive approach in terms of getting things done. These critics would thus regard impact assessment as a misconceived approach to planning and decision-making.

It is a moot point, however, as to whether impact assessment is accurately described by the caricature of over-planning and over-management that these critics paint. The uncertain consequences of undertaking a development project can be either ignored or anticipated. Impact assessment is based on the assumption that the latter course is more sensible

although the exercise will never be so elaborate and all encompassing as to eliminate all uncertainty. In simplistic terms, impact assessment can be viewed as 'muddling through' with some method and purpose.

Finally, private industry has criticized impact assessment on the grounds that it represents an unnecessary extension of governmental regulations which have to be accommodated in project planning, but serve little purpose. The expense and additions to lead time incurred through the preparation of an impact assessment are regarded as unwarranted.

It appears that this view of impact assessment may be changing. With the private sector's growing acceptance of certain responsibilities relating to social policy, for example, the hiring, training and adjustment of Native people, it is becoming evident that impact assessment provides a useful framework within which the planning of such programs can be undertaken. In addition, the impact assessment process can provide a basis for the more effective integration and coordination of public planning and programming activities at all levels.

There is also a growing realization by the private sector that social values have changed considerably in recent years. It is now widely expected that private firms demonstrate a high degree of social responsibility in undertaking investment projects and thus the burden of proof for establishing the desirability of a particular project is considered to lie with the proponent. This change in the operating environment is profound and can be dealt with more effectively through accommodation than through resistance.

FOOTNOTES

1 Good introductions to benefit-cost analysis can be found in E. J. Mishans Elements of Cost-Benefit Analysis, and the Canadian Treasury Board's benefit-cost analysis manual.

2 See Monitoring Socio-Economic Change prepared by the Northern Programs Planning Division of Indian Affairs and Northern Development for the Environmental-Social Program, Northern Pipelines.

An example of an active socio-economic monitoring system is the one established by British Columbia Hydro & Power Authority in connection with its 'Seven Mile' hydro-electric project on the Columbia River. A second monitoring system was recently implemented by Hydro's 'Site One' project on the Peace River.

3 See, for example, Council on Environmental Quality, Guidelines for Preparation of Environmental Impact Statements (1975); British Columbia Environmental and Land Use Committee, Guidelines for Coal Development (1975); British Columbia Hydro & Power Authority, Evaluation of Energy Generation Projects. Guidelines for Environmental Impact Assessment of Power Projects (1975); Department of the Army, Corps of Engineers, Water and Related Land Resources: Feasibility Studies, Federal Register, Vol. 40, No. 217, Part 294 (1975).

4 This section draws on Chapter 4 of Environmental Impact Assessment: Principles and Procedures, by the International Council of Scientific Unions Scientific Committee on Problems of the Environment (1975). For more extensive discussion of these approaches, see Warner, M. L. and Preston, E. H., Review of Environment Impact Assessment Methodologies, Batelle Columbus Laboratories, Columbus, Ohio (Report to U. S. Environmental Protection, 1973); Lapping, M. B., Environmental Impact Assessment Methodologies: A Critique, Environmental Affairs, Vol. 4, No. 1 (1975); Whitlatch Jr., E. E., Systematic Approaches to Environmental Impact Assessment: An Evaluation, Water Resources Bulletin, 12, No. 1 (February 1976).

[5] A good example is J. C. Sorensen's A Framework for Identification and Control of Resource Degradation and Conflict in the Multiple Use of the Coastal Zone, Dept. of Landscape Architecture, University of California, Berkeley (1971).

[6] Leopold, C. B., A Procedure for Evaluating Environmental Impact, U. S. Geological Survey, Circular 645, Washington, D. C. (1971).

[7] See, for example, Hessel, D. C. et al, Impact Assessment for the Tioga River Watershed Acid Mine Feasibility Study in Tioga County, Penn. Batelle Columbus Labs., Columbus, Ohio (1972).

[8] See Whitman, I. L., Design of an Environmental Evaluation System, (Report to Bureau of Reclamation, Batelle Columbus Labs., Columbus, Ohio, 1971).

APPENDICES

A. GLOSSARY OF TERMS

Benefit-Cost Analysis: A tool of economic analysis, based on the principles of welfare economics, which provides a social as opposed to private accounting of the benefits and costs of an investment project.

Compensation: Payments made to individuals suffering a loss as a result of an impact which cannot be mitigated economically. For example, if the entry of fish into a water intake system could not be mitigated economically, then compensation might be paid to those incurring costs as a result of the destruction of fish.

Mitigation: Altering the technical design, location, scale or timing of a project in order to avoid or reduce an undesirable impact. For example, a fine screen might be placed on a water intake system to prevent fish from being drawn into the system.

Multiplier: A ratio that states the amount by which income increases when an additional dollar enters the economy of a region. The increase in income is more than the additional dollar since a fraction will be spent (part will be saved or taxed or spent outside the region in question), creating income for those who receive that fraction. They, in turn, will spend that income, and so on. If, for example, the multiplier has a value of 2, this means that one dollar entering the region's economy creates an additional dollar of income indirectly. Multipliers may be constructed for employment changes as well as for income changes.

Social Adjustment: A term referring to the ability of an individual or a community to accommodate social change. The inability to adjust is assumed to give rise to a variety of social ills, such as alcoholism, mental health problems, family breakdowns, etc.

Socio-Economic Effect: A social or economic process that is stimulated by a development.

Socio-Economic Impact: The net change in social well-being resulting from a socio-economic effect.

Socio-Economic Impact Assessment: A procedure for systematically identifying, predicting and evaluating socio-economic effects which forms part of a comprehensive planning process.

Welfare Economics: A branch of economic theory dealing with the effects of economic changes on the well-being of society as a whole rather than on its individual members.

B. SUGGESTIONS FOR FURTHER READING

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