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EXXON MINERALS COMPANY

CRANDON PROJECT

SOCIOECONOMIC STUDY

prepared by RPC, Inc.

SOCIOCULTURAL ANALYSIS METHODOLOGY

SOCIOECONOMIC ASSESSMENT

EXXON CRANDON PROJECT

prepared for
Exxon Minerals Company

by
RPC, Inc.
Austin, Texas
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FOREWORD

This report describes the techniques RPC, Inc. plans to use to estimate the sociocultural effects of Exxon's proposed mine/mill complex near Crandon, Wisconsin. In it, we describe our general approach to the analysis, the areas we will look at as indicators of sociocultural change, the information we will gather and how we will gather it, and how we will analyze the data to forecast possible sociocultural effects of the project.

The sociocultural analysis describes the local study area on the basis of sociocultural indicators, survey research, and direct observation. We describe related factors, such as public facilities and services, in other elements of the socioeconomic assessment. However, our assessment does not include archeological studies, as they are covered by a separate contract.

We will appreciate any comments you may have on the methods and techniques we describe in this paper. You may direct comments and suggestions to any of the following:

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SUMMARY

Exxon Minerals Company (Exxon) is considering the establishment of a mine/mill complex near Crandon, Wisconsin. This proposed complex would be based on a large ore body containing commercial quantities of zinc and copper. Engineering and economic feasibility studies are underway for the project, and environmental studies are in progress to satisfy local, state, and federal regulatory requirements. Exxon estimates that construction and operation phases of the project will each employ 800-900 people.

Exxon has retained RPC, Inc. to prepare a comprehensive assessment of potential socioeconomic effects of the Crandon Project. The overall assessment will forecast effects of the project on the local study area's demography, economy, housing and land use, public facilities and services, fiscal capabilities, sociocultural characteristics, and Native American communities. We will conduct statistical surveys in the local study area to supplement available information for these analyses. In addition, we are preparing two case studies on communities that share characteristics with the local study area and that have experienced industrial development of a type similar to that expected from the Crandon Project.

The sociocultural analysis will consist of a baseline description, estimates of future conditions without and with the proposed mine/mill complex, and a forecast of potential effects of the project. Each of these steps requires various assumptions, data, and methods of analysis. We discuss these in detail in this paper.

The baseline will be a description of historical trends and existing conditions in the local study area. We will use three types of information to develop this description:

1. Quantitative descriptions of sociocultural characteristics

2. Surveys conducted as a separate element of the socioeconomic assessment

3. Direct observation of people and events in the local study area

We will estimate future conditions without the proposed Crandon Project and under several alternatives of project development. Our estimates of future conditions will emphasize quantitative forecasting to the greatest extent possible. However, many sociocultural characteristics do not lend themselves to quantitative description, much less to quantitative forecasting. Our major forecasting techniques will be:

1. Estimating on the basis of past trends

2. Identifying patterns

3. Describing possible futures for different approaches to project development

Many sociocultural conditions result from a variety of economic, demographic, and physical factors. Thus, this analysis will draw on other elements of the socioeconomic assessment. Those elements include the economic, demographic, housing and land use, public facilities and services, and fiscal analyses.

For this analysis, we make assumptions about sociocultural interactions in a way that isolates sociocultural characteristics most likely to be affected by the project and related activities. Thus, this study will focus on four major sociocultural activities: reproduction, sustenance, order and safety, and socialization. We further refine these activities into specific characteristics. These characteristics are familiar sociocultural items such as marriage, divorce, employment, housing, crime, and schooling.

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1. INTRODUCTION

This paper describes the assumptions, models, and specific methods for our study of potential sociocultural effects of Exxon's proposed Crandon Project. This introduction sets the context for the more detailed discussions that follow. The remaining chapters provide specific information about our use of sociocultural indicators, survey data and direct observation, and forecasting techniques.

PURPOSES OF THE ANALYSIS

We have five purposes in performing the sociocultural analysis:

1. Provide information necessary for the required environmental impact report
2. Document existing sociocultural characteristics in the local study area
3. Identify and describe possible sociocultural changes resulting from the proposed Crandon Project
4. Provide officials and residents of the local study area with information to help them plan for the future
5. Provide Exxon Minerals Company with information necessary for project planning

The Wisconsin Environmental Policy Act (1972) requires that social and economic effects of major projects be assessed and analyzed as part of the permitting process. The Wisconsin Department of Natural

Resources (DNR) has administrative responsibility to consider socioeconomic effects of proposed projects before they issue permits. Thus, in compliance with state statute, Exxon Minerals has commissioned a major socioeconomic assessment of its proposed Crandon Project. This sociocultural analysis is one element of that larger work. The socioeconomic assessment is being closely coordinated with the DNR and other relevant agencies, and its progress is being monitored by the DNR.

Documentation of existing sociocultural characteristics in the local study area is an essential part of a sociocultural effects analysis for the following three reasons:

1. It is necessary to have a good description of existing conditions and historical trends in order to estimate future conditions.

2. Documentation of conditions before project development begins is necessary to identify changes that take place after development begins.

3. A detailed description of existing local conditions will provide data that will be useful to state and local officials and to local residents for planning, management, and funding.

We will estimate future conditions in the local study area both without and with development of the mine/mill complex. We will use these estimates of future conditions to identify and describe the effects that might result from the proposed Crandon Project.

The sociocultural analysis will be useful to officials and residents of the local study area for planning and management because it will provide data and analysis normally beyond the financial and technical resources of most local governments. Thus, the work we describe in this paper is intended to satisfy regulatory requirements, to

provide information for company planning, and to be useful to public and private planners.

ASSUMPTIONS

Sociocultural assessment requires a definition of society. The following definition allows society to be discussed and analyzed in terms of a few major functions or activities:

> A society is a politically organized, relatively self-sufficient population of human beings which maintains a culture and which is capable of existing longer than the life span of any individual member, the population being recruited at least in part by the sexual reproduction of its members. (Land, 1975, adapted from Parsons, 1966, and Aberle et al., 1950)

This definition of society implies that society encompasses four classes of activities: (1) reproduction, (2) sustenance, (3) maintenance of order and safety, and (4) socialization and sociocultural organization.

The definition quoted above makes no reference to territory or space. We will use the local study area for the proposed Crandon Project, described in Definition of the Local Study Area, as the geographic territory for our sociocultural analysis.

2. SOCIOCULTURAL INDICATORS

Sociocultural indicators provide a quantitative description of existing sociocultural conditions and historical trends. An indicator can most simply be defined as a "data element which reflects social change" (Community Indicators Policy Research Project, 1974). A more complete definition is that a sociocultural indicator is a "direct and valid statistical measure which monitors levels and changes over time in a fundamental social concern" (Organization for Economic Cooperation and Development, 1976). For purposes of this analysis, we will use the latter definition.

Although indicators have been used and discussed in the literature at least since the 19th century, their current use is an outgrowth of the revival of concern over sociocultural trends in the late 1950's and early 1960's (DeNeufville, 1975). In particular, Social Indicators (Bauer, 1966) was published as a response to a National Aeronautics and Space Administration study of the effects of the space program on society. This publication led to an increased interest in the development of indicators that would provide data on areas of sociocultural concern and contribute to our understanding of current sociocultural problems. However, a review of the literature indicates disagreement among advocates as to the limitations in the use of sociocultural indicators (DeNeufville, 1975).

There are two basic limitations in the use of indicators that apply to this analysis: (1) conceptual problems and (2) practical problems of data validity. Mukherjee (1976) wrote that "the basic condition to evolve any indicator is that it must depict variable properties beyond its own." The importance of establishing this relationship is cited throughout the literature (Biderman, 1966; Community Indicators Policy Research Project, 1974; Sheldon and Land, 1972).

Another area of concern is that indicators may be used to interpret a particular sociocultural characteristic as desirable or undesirable. This is especially true when the "direction" of the indicator is interpreted (Biderman, 1966; Sheldon and Freeman, 1970). For example, public assistance could be interpreted as either good or bad, depending on an individual's political and sociocultural beliefs. Advocates of public assistance programs feel that they are necessary to maintain a minimum standard of living for some members of society. Opponents argue that such programs have a negative effect on the economy and on individual incentive.

Further problems occur when indicators are used too broadly (Sheldon and Freeman, 1970). A classic example of this is the use of crime statistics as an indicator of general criminal activity. Because a number of crimes go unreported, the statistics may reflect police activity rather than types or numbers of crimes actually committed. However, it is often necessary to recognize these data limitations and to use available statistics as indicators, with

emphasis on the fact that the indicator does not give a complete representation of sociocultural reality.

Sheldon and Freeman (1970) list three applications for sociocultural indicators:

1. Improve descriptive reporting
2. Analyze sociocultural change
3. Aid in estimating the future

They emphasize the interdependence of these applications and the need for realistic uses of indicators. Inherent in the use of indicators is the need "to reduce information overload through concentration on relevant indicators and supporting data" (Organization for Economic Cooperation and Development, 1976).

After careful review of potential models for the use of indicators, we adopted Kenneth Land's (1975) organization of indicators for this assessment. It provides a credible means of using quantitative data to describe current sociocultural conditions. However, this model does not impose values on those conditions that are open to conflicting interpretations.

DESCRIPTION OF SOCIOCULTURAL INDICATOR MODEL

The sociocultural indicator model we use for this study is directly related to the definition of society quoted earlier. Table 1 lists the four major sociocultural activities identified in the definition of society: reproduction, sustenance, order and safety,

Table 1

ORGANIZATION OF SOCIOCULTURAL INDICATOR CONTENT AREAS

Type of Activity	Institutional Organization	Distributive Consequences
Reproduction	Family Health care	Marriage Fertility Divorce Morbidity Mortality
Sustenance (production of goods and services)	Economy	Employment Consumption Leisure Housing Transportation
Order and safety	Government Religion	Crime Alcohol and drug abuse Political and religious participation
Socialization	Learning	Schooling

SOURCE:

Modified from K.C. Land, "Social Indicator Models: An Overview." In: K.C. Land and S. Spilerman (eds.), Social Indicator Models, Russell Sage Foundation, New York, 1975.

and socialization. It also lists the sociocultural institutions that are generally associated with each of the major activities. The distributive consequences of the activities and institutions are observable conditions that reflect the strength of the associated activities and institutions in the society. We will use distributive consequences as our sociocultural indicators.

Relationship of Indicators to Institutions and Activities

According to Mukherjee (1976), sociocultural indicators have both an intrinsic value and a representational value. That is, a sociocultural indicator is a statistic that describes some characteristic of society, such as number of high school graduates. However, because of the general nature of the characteristic, we can assume that it also tells us something about larger sociocultural factors such as learning and socialization.

This discussion describes our assumptions about the relationships between the indicators in Table 1 and the sociocultural institutions and activities they are assumed to represent. We discuss these relationships within the context of a generalized North American culture, dominated by a European background. We recognize that subcultures exist in the local study area. We will conduct a separate analysis of Native American communities in the local study area, but we are assuming that other distinct subcultures share a sufficient number of

sociocultural elements with the generalized North American culture that the indicators we describe are valid.

Table 1 divides the indicators into groups according to the most direct relationship of the indicator to the major sociocultural activities. However, we recognize that most of the indicators have functional ties to all of the major sociocultural activities. For example, employment is most directly related to economy, but it also has ties to family, government, and learning. To prevent undue complication of the model, we will not consider these cross-relationships in our analysis. We will discuss functional relationships between institutions and indicators in terms of the activity to which they are most directly related.

Reproduction

Reproduction involves courtship, mating, conception and delivery, and sustenance of the new person until he or she is a functional member of society. These actions take place within a setting of sociocultural roles, norms, and values. The most common expression of these roles, norms, and values is in the sociocultural institution known as the family. The model for the family in North American culture is the nuclear family composed of parents and dependent children. However, that form varies considerably, particularly regarding the number of parents. A single-parent family is now recognized as a legitimate family unit (Landis, 1969).

In spite of the expanded definition of the family unit, most reproduction, as defined above, involves marriage, even if the marriage ends in divorce. Thus, marriage rates are directly related to the reproductive capacity of a society (DeJong and Sell, 1977; Ewer and Crimmins-Gardner, 1977). Likewise, fertility, defined as the birth rate per 1,000, is directly related to the reproductive capacity of a society (Kiser, 1970). Divorce is a sociocultural event that is instrumental in changing the nature and definition of the family. Divorce removes individuals from the pool of eligible new parents, at least for a period of time, and it slightly diminishes the overall reproductive capacity of the society (Hooz, 1970).

Morbidity (sickness) is an indicator of a society's ability to prevent and control disease. High rates of disease reduce the overall reproductive capacity of a society. Poor health can impair the ability to conceive and deliver children and to provide the necessary sustenance for dependent children. We analyze other possible effects of morbidity, such as effects on the quality of medical services and facilities and number of physicians and other health care personnel required, in the public facilities and services analysis.

Mortality (death rate) indicates characteristics of the health care institutions of a society (Friedman, 1973). High rates of infant mortality and of mortality in those age groups most responsible for sustenance decrease a society's capacity for reproduction.

Sustenance

In our North American culture, sustenance is provided, for the most part, through economic institutions (Quinn, 1963). Employment is the preferred means of obtaining sustenance, although society provides for sustenance of the unemployed. A society's level of consumption also indicates its capacity for sustenance. One measure of consumption is household effective buying income, which reflects the relative condition of the society's economy. We also assume leisure to be directly related to sustenance, because a certain amount of leisure is essential to sustain one's capacity to work. Housing is directly related to the capacity of a society to provide sustenance, as it indicates the ability of the economic institutions to support housing (Quinn, 1963). Transportation is directly related to a society's capacity for sustenance, both as an indicator of the ability of the economic institutions to support transportation and as a means for people to travel to work.

Order and Safety

Some degree of order and safety is essential for people to be able to carry out their daily activities. Order is maintained both by formal and informal means, with formal control usually maintained through the legal system (Savona, 1971). Norms and taboos that have not been translated into law are enforced by informal means such as ridicule, reproof, or economic incentives. Values and norms enforced by such informal means include honor, responsibility, punctuality, and loyalty.

In the generalized North American culture, most behavior that is considered harmful to individuals or to the structure of the society is controlled by formal means. Thus, information such as the crime rate is often used to indicate the extent and type of violations of major sociocultural codes of conduct. An increase in crime rate suggests a decrease in order and safety in the society. However, because crime data usually do not accurately reflect the full extent of crime in a society, these data should be used only as indicators of direction of change in the level of order and safety.

Use of alcohol and drugs is also controlled by formal means; if they are used improperly they also affect the society's order and safety. Many automobile accidents result from the disorientation that often accompanies excessive consumption of alcohol or drugs. Excessive use of alcohol or drugs may also be responsible for some instances of violent behavior and crime.

It is difficult to describe informal sociocultural control quantitatively because there are no records of violations of informal sociocultural norms. The two primary indicators that have been used for describing informal sociocultural control are political and religious participation (Canter, 1977). Political and religious institutions are primary preservers of traditional values. Thus, the extent of participation in these institutions may indicate the society's continuation of traditional values.

Relatively high rates of political and religious participation do not necessarily indicate a high level of order and safety within

the society. In fact, many societies display the opposite relationship. However, it is through political and religious activities that a society can clarify and express its values and norms (Community Indicators Policy Research Project, 1974). While high rates of participation in political and religious activities do not indicate a high degree of order and safety in the society, very low participation rates in these activities may indicate that the society does not use two major avenues for clarification of issues and informal enforcement of values and norms.

Socialization

Socialization is the process of learning to adopt what is valued by one's society and to discard what is not valued. It includes learning to speak the language, wear the clothes, perform the work, and otherwise represent the values and attitudes of the society. Most socialization is informal, conducted within family and friendship groups. However, North American society relies heavily on formal mechanisms of socialization, primarily schooling (Quinn, 1963). An individual with no formal education has difficulty being fully functional, because most social activities require specific knowledge, such as reading. Thus, we can use schooling as an indicator of the most important form of socialization in this society.

MEASUREMENT OF SOCIOCULTURAL INDICATORS

The sociocultural indicators we use in this analysis are the factors listed as "distributive consequences" in Table 1. These include marriage, fertility, divorce, morbidity, mortality, employment, consumption, leisure, housing, transportation, crime, political and religious participation, and schooling. These indicators provide information about the sociocultural institutions and activities listed in Table 1.

We will measure the indicators listed above using data from state, regional, and local sources. Table 2 lists data points and sources for each of the indicators. Our selection of data needs and sources of information was partially influenced by Socioeconomic Impact Analysis (Fisher, 1979).

INTERPRETATION OF SOCIOCULTURAL INDICATORS

We will collect data for sociocultural indicators in historical time series (going back several years). We will compare the data describing the local study area with averages for the state of Wisconsin. We will use these data to document recent historical trends and characteristics of each of the sociocultural indicators listed in Table 2. We will use these quantitative indicators in conjunction with survey data and observed behavior to describe existing sociocultural conditions in the local study area.

Table 2

DATA POINTS AND SOURCES FOR SOCIOCULTURAL INDICATORS

Indicator	Data Points	Data Sources
Marriage	Marriage rate per 1,000 population; percentage of the population unmarried	U.S. Bureau of the Census; Wisconsin Department of Administration
Fertility	Birth rate per 1,000 population	Wisconsin Department of Administration
Divorce	Divorce rate per 1,000 population; ratio of marriages to divorces	Wisconsin Department of Administration
Morbidity	Cases of and deaths from reported diseases	Wisconsin Department of Health and Social Services
Mortality	Death rate per 1,000 population	Wisconsin Department of Administration
Employment	Employment and unemployment rates	Crandon Project socioeconomic assessment economic analysis
Consumption	Household effective buying income	Crandon Project socioeconomic assessment economic analysis
Leisure	Number of acres per 1,000 population for recreational use	Crandon Project socioeconomic assessment economic analysis
Housing	Percent substandard housing	Crandon Project socioeconomic assessment housing and land use analysis
Transportation	Number of registered vehicles; number of scheduled airline flights per day; number of scheduled buses per day	Wisconsin Department of Transportation; Republic Airlines; local bus companies
Crime	Overall crime index; property crime index; violent crime index	Wisconsin Department of Administration
Alcohol and drug abuse	Number of arrests for alcohol and drug abuse; demand for counseling services	Wisconsin Council on Criminal Justice, Department of Health and Social Services
Political and religious participation	Number and percent of registered voters; membership in religious institutions	Wisconsin State Elections Board; Glenmary Research Center (Washington, D.C.) data on religious institutions
Schooling	Student/staff ratios; dropout rates; years of school completed by persons 25 years and older	Wisconsin Department of Public Instruction; U.S. Bureau of the Census

3. SURVEY AND OBSERVATIONAL RESEARCH

In addition to analyzing the sociocultural indicators, we will document attitudinal factors. Our analysis will incorporate data from surveys and direct observation in the local study area.

SURVEY DATA

Statistical surveys, which we conduct as a separate element of the socioeconomic assessment, obtain information from permanent residents of the local study area, seasonal residents, and tourists. These surveys focus on specific demographic and employment characteristics, as well as attitudes and perceptions of life in the local study area. The Survey Research Methodology describes the questionnaires and sampling techniques for these surveys.

We will use the results of the surveys to update and supplement the sociocultural indicator data. In the case of attitudinal and perceptional data, survey results will constitute a unique description of certain sociocultural characteristics.

OBSERVATION

Both the sociocultural indicators and the survey research will produce quantitative data describing baseline conditions in the local study area. However, since both of these techniques have certain limitations, they may not reveal subtle, but important, sociocultural characteristics. We will directly observe communities in the local study area to supplement the indicators and survey data. Observational research is not usually quantified, and it cannot be easily replicated. However, as Selltiz et al. (1959) describe the value of observation:

> . . . its purpose may be to gather supplementary data that may qualify or help to interpret findings obtained by other techniques.

The major problem associated with observational research is the bias introduced by the observer, and the possibility that the observer may introduce his or her interpretations as part of the observed behavior. There are two primary means to minimize this problem. The first is to use more than one observer, and the second is to specify the items that are to be observed and how they are to be reported. We will use two observers, one male and one female. In addition, we have specified the following items to be observed and reported:

1. Number, age, sex, dress, and behavior of people observed
2. Activities observed
3. Type, age, condition, and spacing of buildings

4. Presence/absence of abandoned autos, dilapidated buildings, and trash

5. Indicators of levels of material consumption (age of automobiles, presence of recreational equipment and vehicles)

6. Patterns of sociocultural interaction (fences, use of streets)

We will make these observations for each community in the local study area. Where appropriate, we will tape-record notes as the observation is made, along with specific information about place, date, time of day, and weather conditions. When it is inappropriate to make recorded notes at the time of observation, we will record notes as quickly after the observation as is practical. In addition, we will take photographs where it is possible to do so without drawing undue attention or disrupting observed behavior. Observers will make every effort to minimize the effect of their presence on observed behavior, and they will report and describe instances where there is reason to believe that their presence was a factor in the observed behavior.

4. ESTIMATES OF FUTURE CONDITIONS

A sociocultural assessment must estimate future conditions without and with the proposed project. Duncan (1969) observed that:

> A "state of the art" report on social forecasting should, in all honesty, be quite brief. Such an area, in the sense of a coherent body of precepts and practices, has not yet been developed.

However, during the years since Duncan's statement, it has been necessary to make the most reasonable estimates of conditions possible. Miller (1977) describes four types of estimates of future conditions: prediction, projection, conjecture, and forecast. Miller's description of methods for estimating sociocultural futures is based on work he and others performed for the U.S. Corps of Engineers Institute for Water Resources through the Stanford Research Institute Center for the Study of Social Policy. Miller describes the four types of estimates as follows:

> 1. Prediction: As used here, the prediction is the simplest but least useful kind of futures estimate. A prediction is a blithe assertion that "X" will exist or occur hereafter. It does not specify the causality modes invoked; probabilities of occurrence or nonoccurrence are estimates; and often no date is cited by which the prediction is to be realized.
>
> 2. Projection: A projection (or extrapolation) is a more or less straightforward extension of past and present trends into the future on the basis of

some stated assumption, most often the assumption that the future will resemble the present. In and of itself, the projection makes no claims to foresee what will happen, contenting itself with merely indicating what would happen if its stated assumptions should happen to be realized. Projections as such also ignore cause-effect explanations, treating their subject as a black box which is behaving in a certain way, for whatever reasons. Population projections are a familiar example.

3. Conjecture: A conjecture is an "if...then" proposition in which the if is stated at the outset while the then is inferred and examined on the basis of implications inherent in the if. This is, of course, the approach taken in making a projection, but other forms of conjecture go on to identify and analyze the important causality modes involved. On the other hand, the conjecture may pay no attention to timing and scheduling of potential future situations and events. Under the term "contingency analysis," a conjecture may examine sequential cause-effect relationships without ever setting these in a particular time frame. Generally speaking also, the conjecture does (or is amenable to) examine a more numerous and varied range of possibilities than the typical projection. A conjecture may (but need not) appraise the probabilities of the actual occurrence of potential future situations and events.

4. Forecast: As prediction is the simplest, but least useful form of futures estimate, so the forecast is the most difficult and most useful form. The forecast delimits its topic with the greatest possible precision, explores a range of potential futures outcomes in the least ambiguous terms possible, specifies and analyzes the salient cause-effect relationships in the greatest feasible detail, fixes potential scheduling of future situations and events as closely as possible and details the estimated probabilities of every potential future with the greatest attainable precision. Judged by these stern criteria many futures estimates submitted as forecasts are in fact something less - predictions, projections, or conjectures.

Within the context of these four types of estimates of socio-cultural futures, Miller lists three types of techniques for

sociocultural forecasting: time series/projections, models and simulations, and qualitative techniques. We intend to forecast sociocultural conditions using time series/projections and qualitative techniques. Though the use of models and simulations is attractive in concept, such models are not yet reliable enough to use in a practical assessment. We are still in the situation that prompted Land's (1975) observation that current theory does not provide the basis for comprehensive models that would be useful and acceptable for an effects assessment.

Our approaches have limitations, as do all approaches. In combination, the advantages of the two approaches will offset their disadvantages. Specifically, the major problem with trend analysis is that it assumes past trends will continue into the future. By using qualitative approaches, such as scenarios (supposing different sociocultural conditions under different courses of project development), we have a reasoned basis for modifying the results of our quantitative analysis.

In spite of the concern that trend analysis does not account for current changes in causal factors, this technique is considered valid because "past events limit future choices" (Shannon and Weaver, 1949). Duncan (1969) quoted William F. Ogburn, who was one of the first observers and analysts of the effects of the technological change on society:

> ". . . social trends seldom change their direction quickly and sharply." Therefore, "The projection of a trend line

> into the future has some trustworthiness and tells us with some degree of probability what the future will be."

Our second approach to estimating future conditions falls into Miller's (1977) third category, that of qualitative techniques. We will produce scenarios of probable future sociocultural conditions without and with the project. Vlachos (1977) defines a scenario as:

> A synoptic view of developments that appear relevant to a particular situation or setting; it is an imaginative narrative of possible alternative futures based upon assumptions and analyses regarding trends and events.

The major limitation in using scenarios is that there is no limit to the imaginativeness of the narrative. However, as the scenarios offset the limitations of trend analysis, structuring the scenarios on our quantitative data will limit them to the realm of likely eventualities. As Vlachos (1977) indicates, writers of scenarios should distinguish between three distinct groups of variables in considering possible future conditions:

1. Those such as climate, topography, and language that are so relatively stable they can be considered almost constant
2. Variables that change linearally or exponentially, such as education or population
3. Those incalculable variables and complex conditions involving cause-and-effect mechanisms that are not currently understood

The last category of variables includes natural calamities, political upheavals, and technological breakthroughs.

Clearly, the writer of scenarios must focus attention on the second category of variables. Such variables also constitute the

content of sociocultural indicators and characteristics that we will describe in the baseline portion of our research.

Zentner (1975) specifies three characteristics scenarios must have if they are to be useful. Those characteristics are credibility, utility, and intelligibility. One of the major tasks in scenario writing is the identification of relevant variables. As in the use of sociocultural indicators, we will use Land's (1975) definition of society that identifies four major sociocultural functions of reproduction, sustenance, order and safety, and socialization. These factors delineate the variables we will consider in our scenarios.

The procedure we will use to produce scenarios of alternate futures includes trend analysis of quantitative sociocultural indicators and review of all existing plans and forecasts for the local study area. This approach closely ties the quantitative portions of our work to the qualitative portions, with the intent that each will supplement the other.

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